Chess-Based Cognitive Remediation Therapy (CB-CRT) for addictive disorders

Manual for group interventions

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Introduction to the manual

Chess-based cognitive remediation therapy – a manual for group interventions with the example of addictive disorders

The neurocognitive training described in this manual, which is based on the board game chess, was developed in Spain by psychologist Juan Antonio Montero as a psychotherapeutic group intervention for the adjunctive treatment of addictive disorders and other mental disorders ("Entrenamiento cognitivo a través del ajedrez", ECAM®, https://ajedrezmagic.es/el-entrenamiento-cognitivo-a-traves-del-ajedrez) and has been used successfully there since 2016. It can be used in open and closed groups. Using the example of its application for addictive disorders, this manual contains guidelines for twelve training sessions spread over six weeks. In 90-minute sessions twice a week, participants are presented with chess exercises that address various cognitive functions. The aim is to address the lack of control over motivational processes that is present in addictive disorders, which manifests itself as an imbalance between reflective processes ("cortical control") and dominant impulsive actions ("reward system"). In addition to strengthening cognitive processes, the program includes metacognitive and psychoeducational elements that promote the learning and application of coping strategies and may help improve social functioning. The program can also be used against other disorders such as attention deficit hyperactivity disorder, schizophrenia, or dementia. This manual focuses on addictive disorders but can also be applied to the aforementioned disorders after modifying the psychoeducational section.

The following section presents the fundamentals and areas of application of cognitive remediation therapy (CRT, also known as cognitive enhancement therapy or cognitive rehabilitation), on which the chess-based cognitive remediation therapy (CB-CRT) described in this manual is based, and places it in the context of scientific findings, particularly in the field of addiction. Furthermore, a literature review on the suitability of the presented program as CRT is provided.

CRT aims to improve cognitive impairments and can be used as an adjunct to psychotherapeutic interventions (Cella et al., 2016). Functional areas such as attention, perception, and executive functions (such as inhibition, decision-making, cognitive flexibility, and working memory) are often trained. These cognitive functions play a decisive role in addictive disorders, among other things. Addictions often begin with maladaptive patterns of consumption, have a chronic course, are often characterized by relapses, and lead to compulsive consumption via neural and cognitive changes (Koob, 1996). Models such as dual-process theories assume that addictive disorders are caused by an imbalance between two distinct but interacting neural systems that are essential for decision-making and thus behavior (Bechara, 2005): The system underlying impulsive behavior, which is responsible for signaling immediate reward, is associated with brain regions such as the amygdala and the striatum (consisting of the putamen and nucleus caudatus). The reflective system signals the longer-term consequences of actions and has its neural basis in the ventromedial prefrontal cortex (VMPC), the dorsolateral prefrontal cortex (DLPFC), the anterior cingulate, the insula, and the hippocampus. If the impulsive system is dominant, the reflective system cannot exert the necessary cognitive control over consumer behavior. The long-term harmful consequences are ignored in favor of immediate rewards. The imbalance between the two systems can also manifest itself in impaired inhibitory control, which leads to risk-taking behavior, among other things (Bechara, 2005). In addition to these impairments, substance dependence also causes dysfunctions in other executive functions such as problem solving, mental flexibility, judgment, and working memory (Yucel et al., 2007).

Over the last decade, CRT has also found its way into the treatment of addictive disorders. In particular, improvements have been seen in the functional areas of divided attention, working memory, and episodic memory. Positive effects of CRT have also been found in non-cognitive areas such as self-esteem and well-being, as well as in the reduction of substance cravings (Bernardin et al., 2014). In particular, improvements in working memory performance and inhibitory abilities could have a positive effect on consumption behavior through implicit processes associated with addictive behavior.

This manual describes the CB-CRT approach in a group setting. Numerous studies have shown that a variety of cognitive processes are involved in

playing chess. (Hanggi et al., 2014). This activates neural networks and functional areas that overlap with those affected by addictive disorders, such as attention, perception, memory functions, problem solving, and other executive functions. When playing chess, brain regions that are primarily relevant for executive functions are consistently activated. Functional magnetic resonance imaging (fMRI) has shown, for example, that while searching for the best next move, the dorsolateral prefrontal cortex (DLPFC), premotor brain areas, and parietal and occipital regions (e.g., occipito-parietal junction) are activated (Atherton et al., 2003). When solving complex chess problems, involvement of the DLPFC and the middle temporal lobe was also observed (Onofrj et al., 1995). When comparing chess positions (Campitelli et al., 2007) the DLPFC and also the parietal and temporal cortex were activated. In a positron emission tomography (PET) scan, the occipito-parietal junction and the prefrontal cortex were active during a simple chess exercise (Nichelli et al., 1994). The studies therefore suggest that it is primarily the reflective system that is activated when playing chess. Studies on cognition in chess players show better performance in problem solving compared to non-chess players (Unterrainer et al., 2006). Children who play chess also demonstrated better cognitive abilities, particularly in planning and problem solving, are less susceptible to distractions and show better attention, and chess had a positive effect on children's socio-personal development (Aciego et al., 2012).

There is currently only one study on the effectiveness of classical chess training on cognition and therapeutic success in addictive disorders, involving cocaine addicts (Goncalves et al., 2014). As an additional intervention, “motivational chess” was used, a combination of “motivational interviewing” (Stein et al., 2009) and chess training. There was an improvement in various areas of attention and executive functions. Chess improved working memory in particular, even compared to the control group, which received occupational therapy.

In summary, there is a large overlap between cognitive domains that are impaired in addictive disorders and the positive effects of chess on functional areas. Cognitive control and inhibitory control can be improved through chess (Demily et al., 2009). Chess can train decision-making and judgment skills, as players must continuously consider the possible

consequences of each move during the game (Nichelli et al., 1994). In addictive disorders, altered functions in the areas of problem solving, cognitive flexibility, and working memory can be trained through chess (Hanggi et al., 2014), because chess requires players to repeatedly solve problems, react to changing circumstances or unexpected moves by their opponent, and plan several moves in advance.

There are already promising findings showing that traditional chess training can be effective as an add-on therapy for attention deficit hyperactivity disorder (ADHD). Chess had a positive effect on ADHD by reducing the severity of the disorder (Blasco-Fontecilla et al., 2016). Another study on ADHD showed improved concentration abilities (Nour ElDaou, 2015). Through chess training, voluntary processing, inhibitory capacity, and planning abilities were improved in schizophrenic patients (Demily et al., 2009).

In our own studies, which are currently being published, we found initial evidence of a strengthening of the prefrontal cortex and an improvement in sustained attention (Seeger et al., 2025) in abstinent alcohol-dependent individuals, improved neural efficiency in smokers willing to quit, and improvements in cognitive performance (especially in the areas of attention and cognitive flexibility), increased life satisfaction, and positive effects on abstinence and cravings in both patient groups. The intervention was also very well received and rated by abstinent alcohol-dependent individuals (Seeger et al., 2025).

Chess or CB-CRT can therefore be a promising tool for additional intervention in addictive disorders, especially for strengthening the reflective system. It is easy to implement in clinical practice and can also be played by patients at home after discharge. Furthermore, it offers a meaningful leisure activity and thus has a social integration function that should not be underestimated, in addition to its therapeutic benefits.

This manual was developed to enable therapists, psychologists, occupational therapists, and other professionals to use chess as a standardized form of cognitive remediation training. The practical guide can be used in therapeutic contexts with closed or open groups.

The 6-week program described here can be used in this form wherever CRT is typically applied, particularly for conditions such as ADHD, schizophrenia, depression, or autism. It is also suitable for working with people with cognitive impairments or migrants, as it does not require advanced language skills and requires little prior knowledge. As already mentioned, the psychoeducational elements used as examples at the beginning of each lesson in this manual are derived from work with people with addictive disorders. They can be adapted to the respective participant groups, whereby parts of the psychoeducational elements can be adopted across participant groups.

We would like to thank psychologists Carmen Gaitán Coronado, Alfred Wieland, Damian Karl, and Gereon Lex for their collaboration on our studies and the development of the first standardized exercises.

General organizational information

Group size
A group size of 6 to 16 participants is recommended. To ensure the most efficacious cognitive training possible, the group size should not be too small or too large.
This is because each participant should be given appropriate consideration. This means that the individual questions or requests should be distributed as evenly as possible among the participants so that no one feels favored or disadvantaged.

Materials:
Demonstration board, computer/screen, worksheets, stopwatch

- Most of the exercises are carried out using a demonstration board (or demo board for short) and the corresponding pieces. Some can also be supported by a computer or screen. You will find information on this in the description of the relevant exercise blocks.
- A few exercise blocks consist of worksheets, which are also described in the corresponding section blocks.

- The use of a stopwatch is recommended for exercises with longer time limits (e.g., 30 seconds to view a position on the demo board).

Before the first training session

- Check the room: Where should the training take place?
- Lighting: Is the room sufficiently lit?
- Where in the room should the demo board be placed and how? A demo board can easily be placed on a flip-chart.
- Are there enough seats for all participants? Check the seating arrangement: Does every participant have a clear view of the demonstration board and the instructor?
- Prepare materials:
    - Demonstration board and demonstration pieces (applies to all training sessions)
    - Technical test: Are the flip-chart chart, computer, and screen working properly? (applies to all training sessions)
    - Handout: “Information for participants“

Before each training session

- Prepare materials:
    - Demo board and demo pieces
    - Feedback forms and pens for all participants
    - Technical test: Are the flip chart, computer, and screen all working properly?
    - Worksheets and pens for all participants, if relevant exercises are included in the training session.

During the first training session

- Distribute participant information that participants can read at the beginning of the introduction while they wait for other participants.
- Welcome all participants; no introductions are necessary.
  Briefly explain the program to the participants. In particular, emphasize the importance of support for addiction. Suggested wording for this introduction:

  "Dear participant,
  we are delighted that you are taking part in our chess-based training. The chess-based training is designed to help you make decisions in difficult situations that will lead you out of your addictive behavior rather than reinforcing it. The aim is not to teach you how to play chess, but rather to use key components of thinking and decision-making that are also required in chess to improve your resilience in critical situations related to addiction. The problem with addiction is that over time, you become increasingly impulsive, acting without thinking things through, and then make poor decisions. The so-called reflective system, which makes you pause and think about the long-term consequences of your actions, becomes progressively less effective over time. This is an automatic process that alters the relevant regions of the brain and promotes relapse. The aim of the training is therefore to reverse these negative and debilitating changes through systematic training. Embedding the training within a chess-based context can be fun and boost motivation. Skills such as improved perception and attention, the ability to inhibit inappropriate behavior, better memory, improved problem-solving, and, in general, the ability to make wise decisions are learned. This involves exercises designed to last 90 minutes, spread across twelve sessions. You do not need any special skills or knowledge of chess, just a willingness to engage with the exercises. Chess rules are only explained in the section blocks where they are necessary for understanding. It has been shown that such training actually improves these cognitive skills and also reduces substance cravings and leads to greater well-being and self-esteem.

We wish you all the best and every success! Do you have any questions?“

- Clarify with participants whether a 5-minute break should be taken halfway through a training session. If necessary, this question can be clarified in the second training session once the participants have had a chance to get a sense of the effort involved.
- Ask participants to turn off or silence smartphones, smartwatches, and other electronic devices that could be distracting, so that they can focus without interruption and enjoy an effective training atmosphere.
- Clarify whether there are any questions and answer them if necessary.

Methodological and technical notes

Time frame and time specifications
The proposed time frame for the individual exercises serves as an important guideline for the course instructor. The time specifications for attention spans and how long the chessboard is visible should be adhered to as closely as possible. The rule of thumb is: the shorter the specified time, the less one should deviate from it. For example, the time specification “3 to 5 seconds” for short-term memory should not be deviated from.

Spoken text *(italics)*
The manual contains specific instructions for the course instructor. These are written *in italics* and serve as examples of how to phrase the exercises.

Psychoeducational aspect:
At the beginning of each training session, the course instructor explains why the task can be helpful for abstinence (“psychoeducation”). For each exercise, the participants are told which elements are to be trained, for example, planning skills or visual-spatial functions. It is pointed out that the parts of the exercise can make a relevant contribution to changing consumption behavior with the aim of achieving abstinence.

Description of exercises and adaptation to participants´needs

- The exercises are described on the demonstration board or using a worksheet. The exercises are designed so that the course instructor can adjust the difficulty to match the participants´ cognitive level.
- Avoid overwhelming weaker participants! To ensure that everyone has a sense of achievement, assign easier tasks to weaker participants and more difficult tasks to stronger ones.
- For participants with minimal or no cognitive impairments, the course instructor may skip certain tasks in order to reach more advanced levels of difficulty more quickly.
- Participants can be called on at any time, even if they do not explicitly raise their hands. This means that they are constantly required to concentrate and participate.
- After the instructor removes the pieces from the demonstration board in reconstruction exercises, they must be able to verify the participants´ answers. Solutions for all exercises can be found in the manual.
- The applause of the whole group after an exercise has been solved correctly serves as positive social reinforcement. However, applause should not be given after every small step of the exercise (e.g., a piece has been placed) so that the flow of the exercise is not interrupted.

Procedure for new participants in open groups:

- New participants receive the participant information in the appendix and will be informed how the exercises are conducted. If necessary, questions can be answered in a one-on-one meeting with the course instructor before the first session.

Changing the level of difficulty:

- Each participants´ level becomes apparent during the first few sessions. The level of difficulty should be adjusted based on the individual performance of the participants.
- Each exercise is numbered according to the following pattern: Session.Exercise block.Exercise.Difficulty level, for example S2.1.4.L3 for session 2, exercise block 1, exercise 4, difficulty level 3.
- The course instructor ensures a careful balance between the level of difficulty and the participants´ demonstrated abilities. Ideally, the

exercises should be neither too easy nor impossible for a participant to solve. Therefore participants do not all need to start at the same level of difficulty.

Duration of sessions and scope of the exercises

- Training sessions are scheduled to last 90 minutes. A 5-minute break is planned either halfway through or at the end of each section block. In consultation with the participants, the break can be omitted.
- There are usually two blocks in each training session, and in some cases, three. There are usually more exercises available than necessary. Therefore, not every exercise of one exercise block needs to be completed. It is more important that an exercise block does not last longer than specified in the description.

Procedure for incorrect answers

As a general rule, incorrect or inaccurate answers should be handled in three steps as follows:

1. Ask the participant to reflect again. If this does not help:
2. Ask the participant to take a step back, preferably to their original seat and view the board again from a distance.
3. If this does not help to solve the exercise, involve the group and ask a participant who indicates that they know the solution.

Notation of chess pieces and squares

- The notation is that specified by the World Chess Federation (FIDE: Fédération Internationale des Echecs).
- Lowercase letters denote files (verticals) and colors (usually before a capital letter).
- Capital letters denote pieces, sometimes omitted for pawns.
- Numbers denote ranks (horizontals).

Abbreviations → Meaning	**Examples**
w → white	e1 = e-file, 1st rank
b → black	B6 = b-file, 6th rank
K → King	wK = white king
Q → Queen	bN =black knight
R → Rook	bNg4 = black knight on g4
B → Bishop	bPe7 = black pawn on e7
N → Knight	g4w = white pawn on g4
P → Pawn	

Training session procedure

(1) Welcome
(2) Description of the content of the training session in question
(3) How many exercise blocks exist? – Most training sessions have two, some have three: see the numbering in the manual, for example:
Session 1 has two exercise blocks, exercises 1.1 and exercises 1.2 (2 blocks)
Session 4 has three exercise blocks, exercises 4.1 to 4.3 (3 blocks).
(4) Which cognitive functions are being trained today (Psychoeducation)?
(5) Description of the first exercise block
(6) Check whether the participants have understood the exercises; answer any questions if necessary.
(7) Start with the first exercise block.
(8) Farewell

Repeat steps 5 to 7 for other exercise blocks of the training session.

Structure of each exercise block (2 or 3 exercise blocks per training session)

Each exercise block is described in the manual according to the following structure:

I. Materials: required course materials
II. Implementation:
III. Description of the exercises and their implementation with the participants
IV. Time frame: Suggested time frame; check with a stopwatch if necessary
V. Psychoeducational introduction
VI. Instructions: spoken language, *written in italics*
VII. Level of difficulty:
    L1: very easy
    L2: easy
    L3: medium
    L4: difficult
    L5: very difficult

    The exercises are sorted by level of difficulty and should generally be performed in ascending order of difficulty from L1 to L5.
VIII. Procedure for incorrect answers

SESSION 1.

First welcome:

Welcome to group training! I hope you found your way here easily. This type of training has been implemented in various institutions for many years. First, I would like to explain a few things about the procedure.

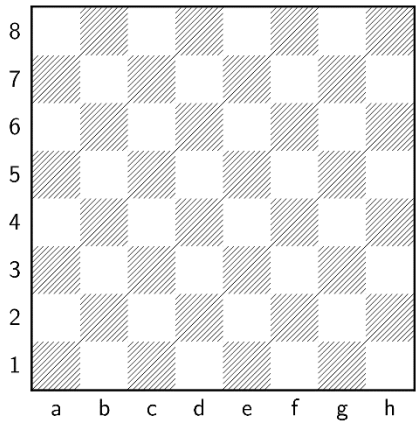
The training will always take place in a group. You will not actively play chess here. We work almost exclusively with the demonstration board.
→ point to the board.

The aim is not to be better than others or to compete with each other, but to specifically train various cognitive skills.
During the training sessions, I will ask you various questions and select you at random to answer, even if you have not volunteered. Therefore, please try to concentrate on each question.
If you don't know the right answer, try to work it out using different strategies. If a task is solved correctly, you will receive applause from the whole group.
A five-minute break is scheduled halfway through the 90-minute session. If you prefer, we can skip this break. So I'll ask you right away: Would you prefer to have a break or not?
Before we begin, we have one request: if you have your smartphone with you, please put it on silent mode.
Do you have any questions?

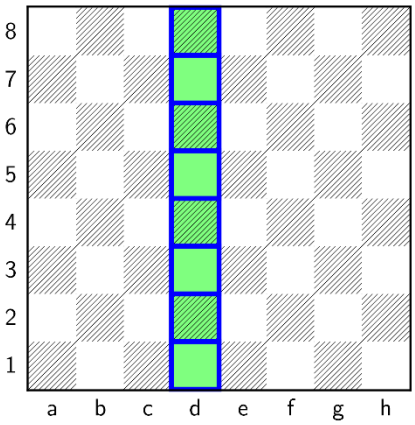
Explanation of the chessboard and the pieces

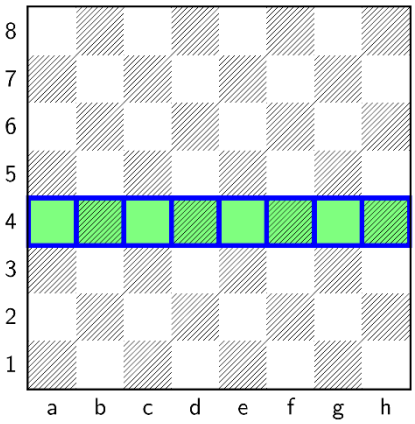
We will mostly be working with the demonstration chessboard (short: demo board). It looks like this:
Support and carry out all explanations with gestures.

The chessboard[1]

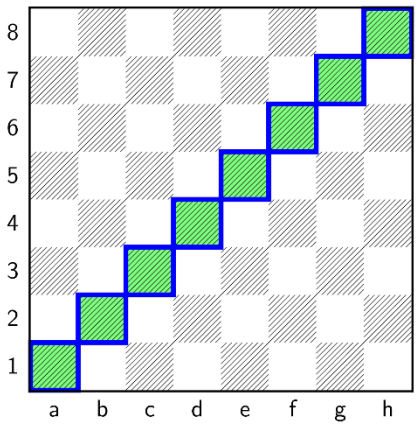


It is divided into 8 files (a-h) and 8 ranks (1-8).

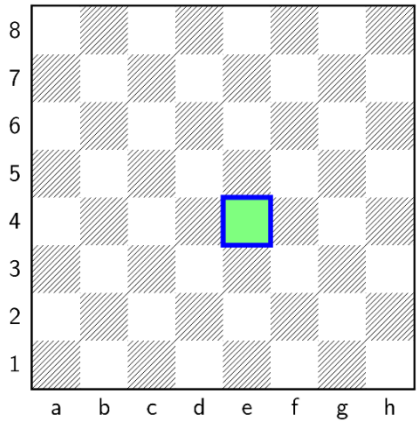




There are also diagonals.
When a piece moves along a diagonal, it never leaves its own color square.



[1] The chess diagrams in this manual were created using LaTeX and the chessboard package Fischer, U. (2023). *chessboard (Version 5.12) [LaTeX-Paket]*. https://ctan.org/pkg/chessboard.



We name a square by first announcing its file and then its rank. In the example, the square is e4.

In training, the 1st and 2nd ranks are always at the bottom, the 7th and 8th ranks are always at the top; the a-file is always on the left and the h-file is always on the right. The square at the bottom right is always white.

Practice naming a square with each participant.
"Which square is this?"
Briefly point to a square.

Select participants at random. **Clap when the answer is correct.**

In chess there are 6 different white and black pieces[2]. Even though we have different colors on the board and for the pieces, we still speak of white and black squares and pieces.

Show the pieces one by one and ask the participants if they can guess which piece it is. Clap if the answer is correct.



Pawn



Knight



Bishop



Rook



Queen



King

[2] The demo board pieces in this manual are reproduced with the kind permission of Texma, https://texma.pl

Exercise 1.1: PERCEPTION. VISUOSPATIAL FUNCTIONS. Visual tracking.

Materials:
- Demo board

Implementation:
- Pieces are placed on the demonstration board. Participants are asked to identify the rank, file, and square (in that order) in which the pieces are located. Participants can see the pieces on the board.
- One participant is asked per position.
- It is important to give the participants time to recognize everything. If necessary, correct them in a friendly and supportive manner.
- It is important to implement the clapping.

Time frame:
- 30 to 90 seconds per diagram (depending on complexity), 30 minutes in total.

Psychoeducational introduction:
The following exercise is about perception. There is evidence that substances such as nicotine and alcohol can negatively affect perception. That is why we are training perception and related processes today. Perception is generally important for a variety of cognitive functions. Over the course of the next few sessions, you will learn why this is also important for your abstinence. In general, it can be said that the exercises strengthen the so-called reflective system, which protects against rash actions and is important for controlling substance use.

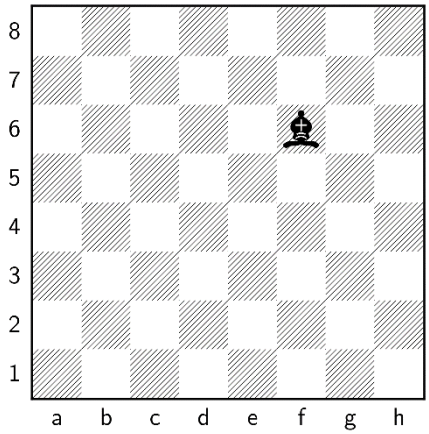
Instructions:
- *"Do you have any questions about the explanations? Okay. Now let´s start with the first exercise. In our first exercise, the focus is on perception. I will ask you which rank, which file, and which square the piece is located."*
- *"After a correct answer, we will all clap."*

Level of difficulty:
1: one piece
2: two or three pieces
3: four or five pieces
4: six or seven pieces
5: eight pieces

Procedure for incorrect answers:

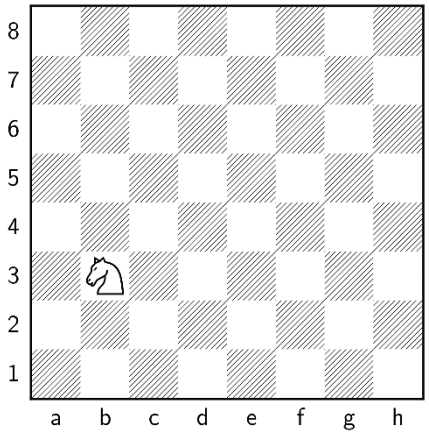
- Reasons for incorrect answers may include not understanding the instructions.
- Another possible reason is that the participant names the rank or the square instead of the file.
- Give the participant 5 seconds to think.
- Then ask again about the rank and the file, using gestures if necessary.
- If needed, ask the participant to focus only on the specific question (rank, file, square) and not to mention unrelated information. If participants immediately give the coordinate of a square instead, ask them to first name rank and then the file.
- Repeat the instructions, if necessary.

S1.1.1.L1



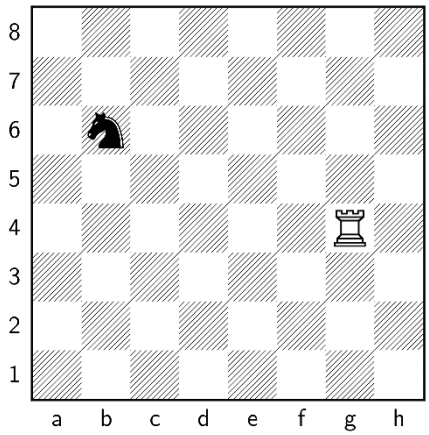
6th rank, f-file, square f6

S1.1.2.L1



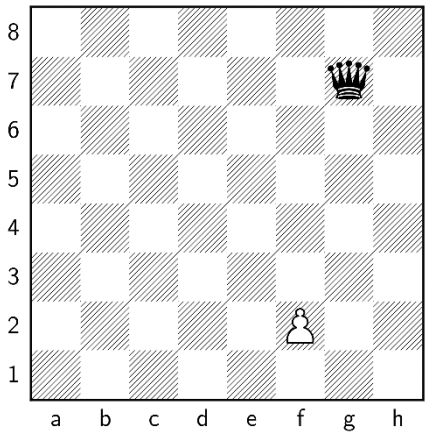
3rd rank, b-file, square b3

S1.1.3.L2



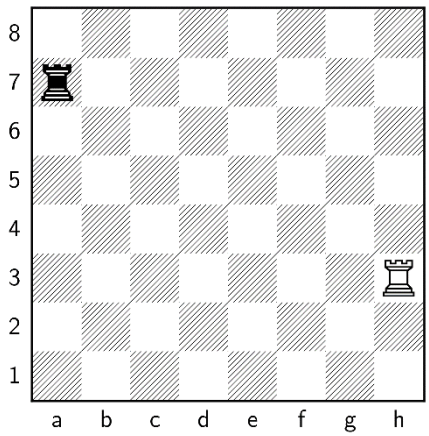
5th, 6th rank, b+g-file,
squares b6, g4

S1.1.4.L2



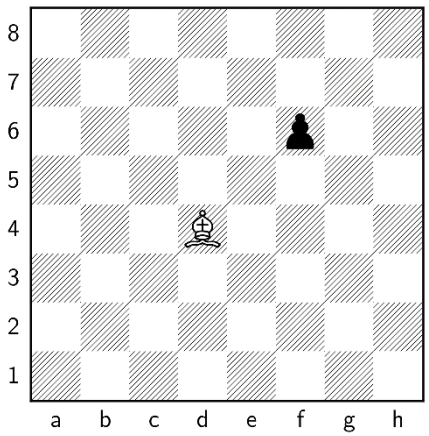
2nd, 7th rank, f+g-file,
squares f2, g7

S1.1.5.L2



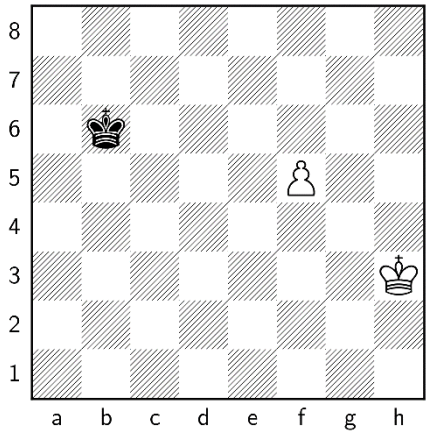
3rd, 7th rank, a+h-file,
squares a7, h3

S1.1.6.L2



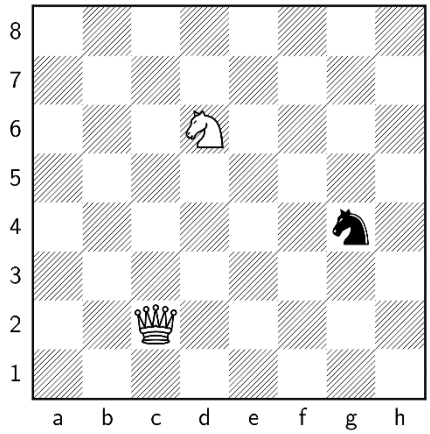
4th, 6th rank, d+f-file,
squares d4, f6

S1.1.7.L2



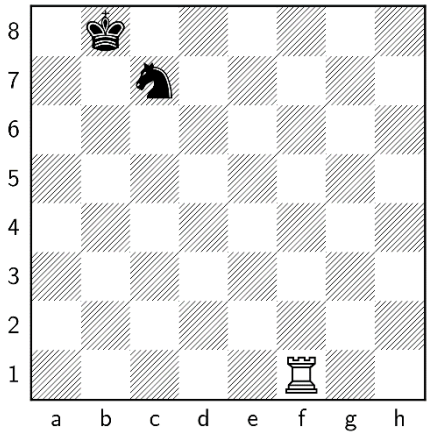
bKb6
wPf5
wKh3

S1.1.8.L2



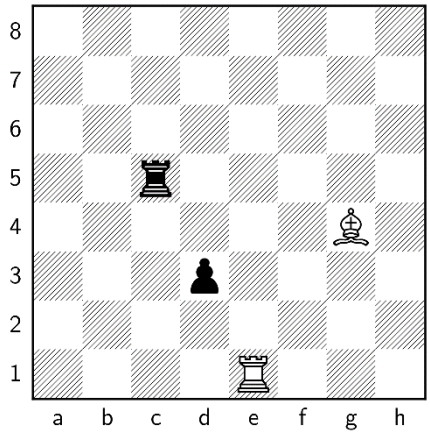
wQc2
wNd6
bNSg4

S1.1.9.L2



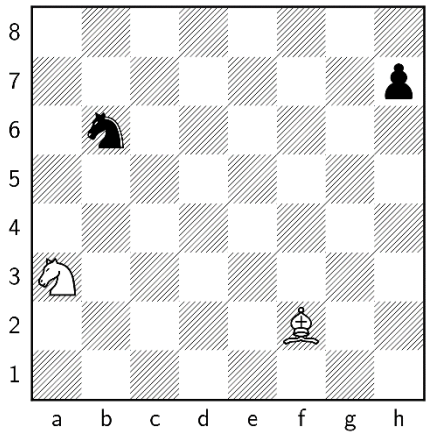
bKg8, bNc7, wRf1

S1.1.10.L3



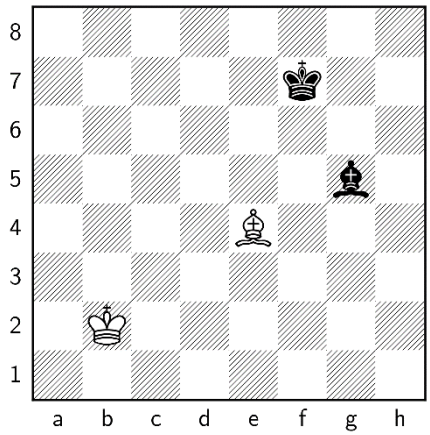
bRc5, bPd3, wRe1, wBg4

S1.1.11.L3



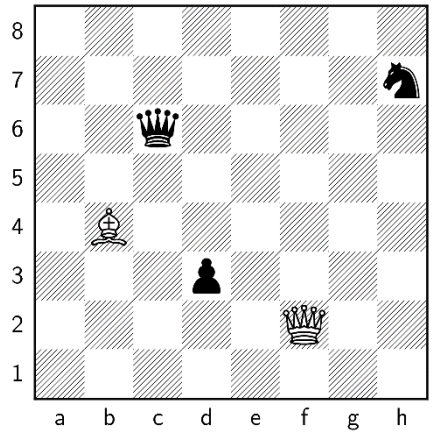
wNa3, bNb6, wBf2, bPh7

S1.1.12.L3



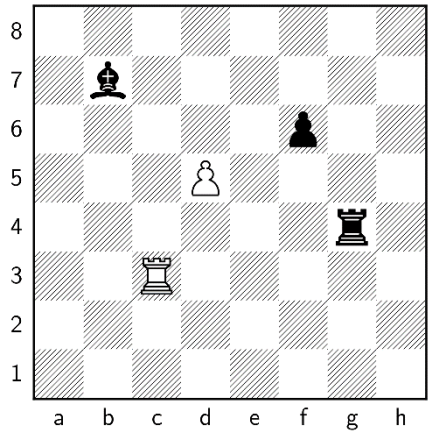
wKb2, wBe4, bKf7, bBg5

S1.1.13.L3



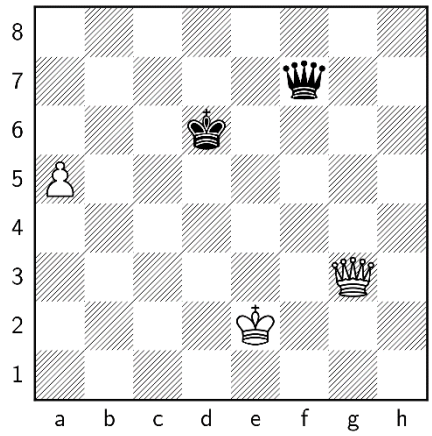
wBb4, bQc6, bPd3, wQf2, bNh7

S1.1.14.L3



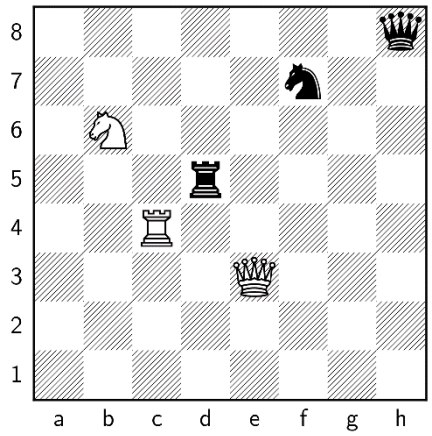
bBb7, wRc3, bRg4, wPd5, bPf6

S1.1.15.L3



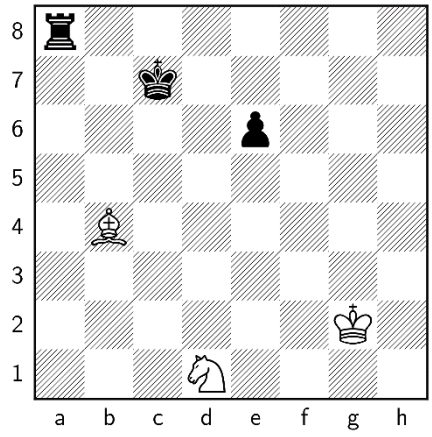
wPa5, bKd6, wKe2, bQf7, wQg3

S1.1.16.L4



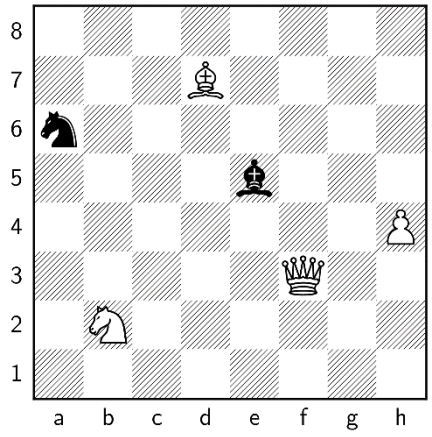
wNb6, bNf7, wQe3,
bQh8, wRc4, bRd5

S1.1.17.L4



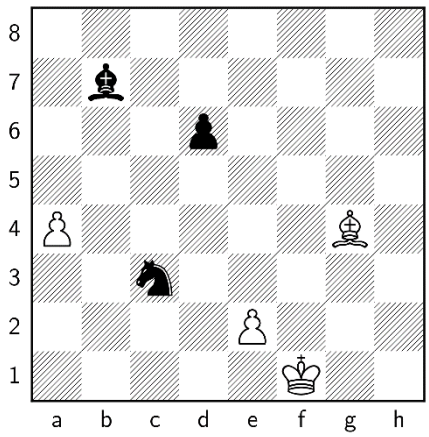
wNd1, wBb4, wKg2,
bKc7, bRa8, bPe6

S1.1.18.L4



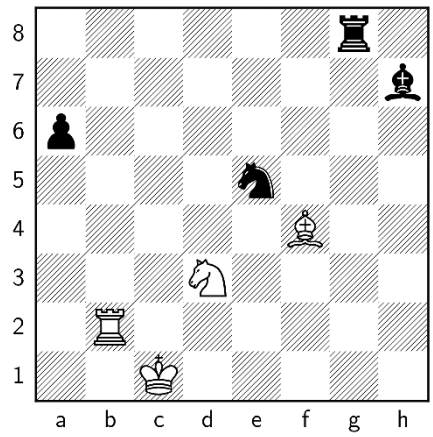
wQf3, wNb2, wBd7,
wPh4, bNa6, bBe5

S1.1.19.L4



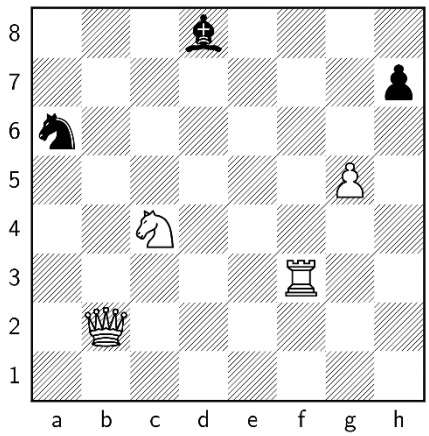
wKf1, wBg4, wPa4, wPe2,
bBb7, bNc3, bPd6

S1.1.20.L5



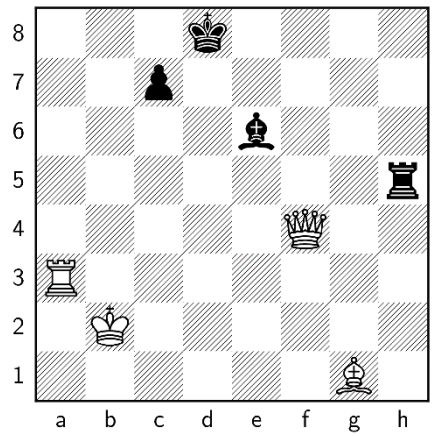
wKc1, wRb2, wNd3, wBf4,
bRg8, bNe5, bBh7, bPa6

S1.1.21.L4



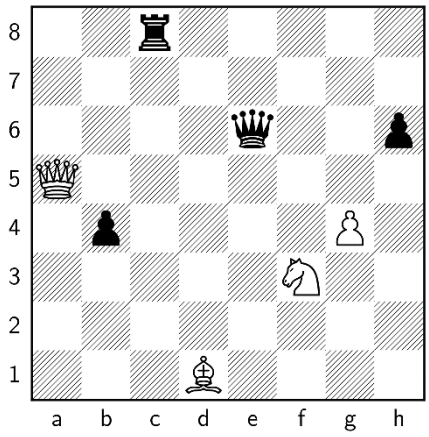
wQb2, wRf3, wNc4, wPg5,
bBd8, bNa6, bPh7

S1.1.22.L5



wKb2, wQf4, wRa3, wBg1,
bKd8, bRh5, bBe6, bPc7

S1.1.23.L5



wQa5, wBd1, wNf3, wPg4,
bQe6, bRc8, bPb4, bPh6

Exercise 1.2: IMMEDIATE MEMORY. Visuospatial memory. Retrieval of spatial localization.

Materials: Demo board
Implementation:

- The course instructor allows the participants to observe the chessboard for 3 seconds. Then he or she removes the pieces from the board and asks a participant where the pieces were located (top right, top left, bottom left, bottom right). The participant must respond as quickly as possible and name the piece and color. The instructor always phrases the question in the same way.
- The course instructor can change the order of the questions and does not have to start at the bottom left. Depending on the level of the participants, simpler questions can be asked, or the course instructor can point to the position being asked with a finger.

Time frame:

- 30 to 90 seconds per diagram.
- Total: 20 minutes

Psychoeducational introduction:
In the following exercise, we will train our short-term memory. This is important for internalizing and implementing therapy content. Training short-term memory is also useful because in many cases of addictive disorders, short-term memory can be impaired by substances. Addictive substances are often used specifically to increase cognitive performance. Therefore, improving short-term memory performance as well as other cognitive functions can be helpful for abstinence, as no addictive substances are needed to increase cognitive performance.
Since memory processes generally play a very important role in the development and maintenance of substance dependencies, similar exercises will also be included in other training sessions.

Instructions:

- *"I am now going to show you a position for a short while. Afterwards, I will remove the pieces and ask one of you to answer some questions about it."*
- *"Which piece was in the bottom left corner? Which piece was in the top right corner?"* Etc.

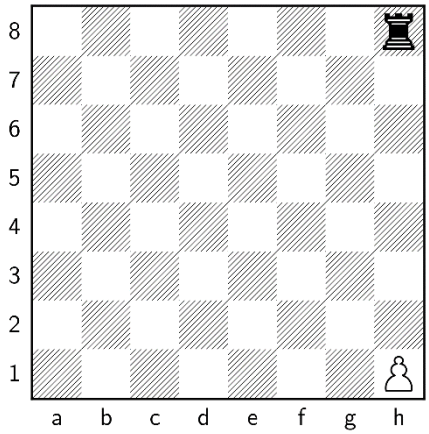
Level of difficulty:

1: one piece (not applicable)
2: two pieces
3: three pieces
4: four pieces
5: not applicable

Procedure for incorrect answers:

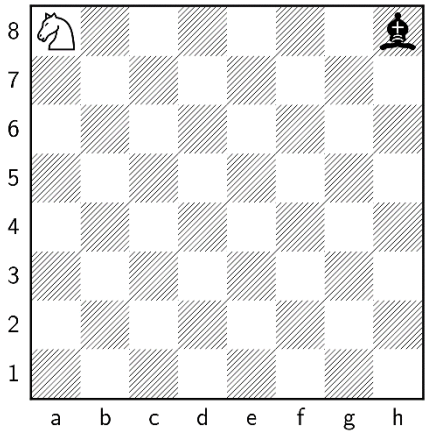
- The reason may be that the participant is not concentrating.
- Ask whether the participant was not concentrating.
- Ask the participant to try to concentrate better.
- Assign the solution to another participant.

S1.2.1.L2



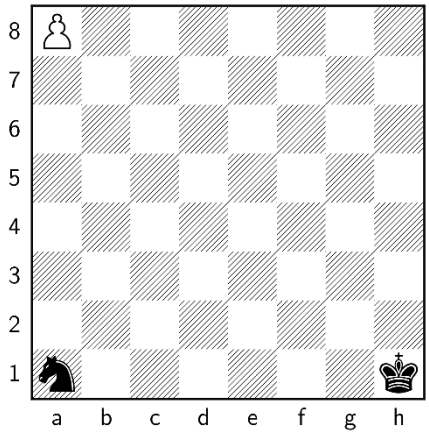
bRh8, wPh1

S1.2.2.L2



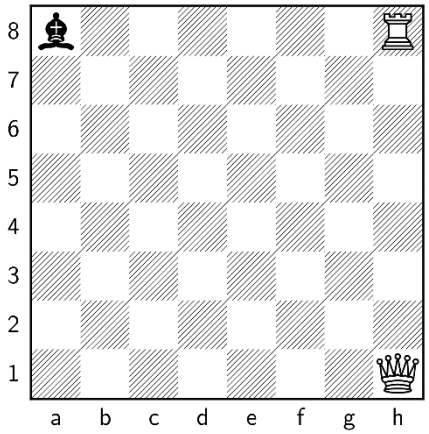
wNa8, bBh8

S1.2.3.L3



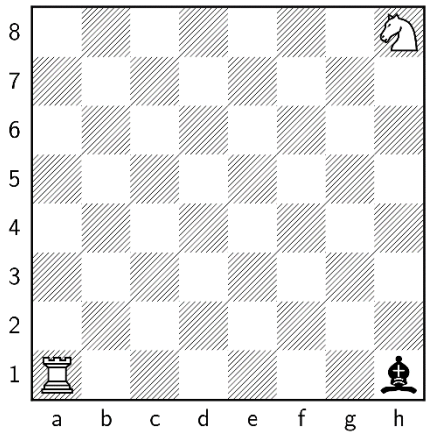
wPa8, bKh1, bNa1

S1.2.4.L3



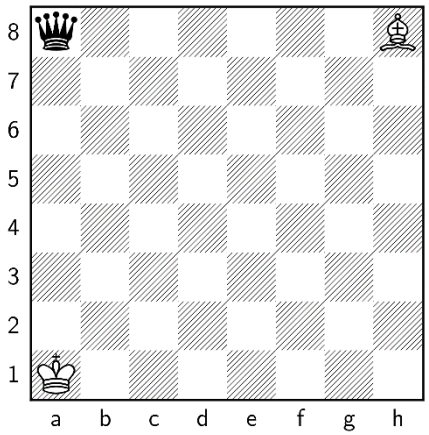
bBa8, wRh8, wQh1

S1.2.5.L3



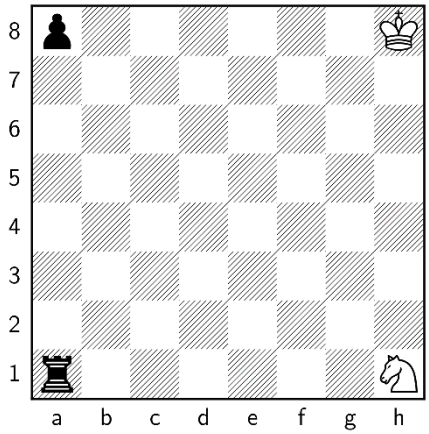
wNh8, bBh1, wRa1

S1.2.6.L3



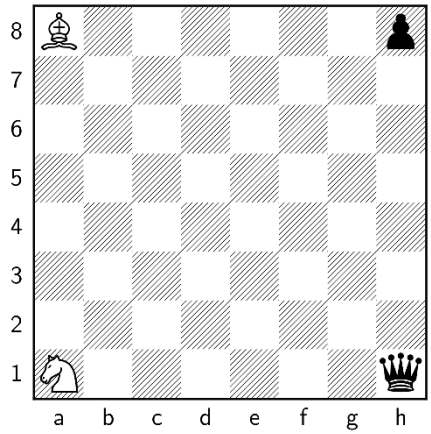
bQa8, wBh8, wKa1

S1.2.7.L4



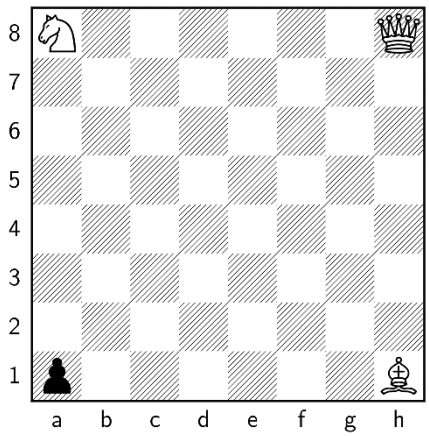
bRa1, bPa8, wNh1, wKh8

S1.2.8.L4



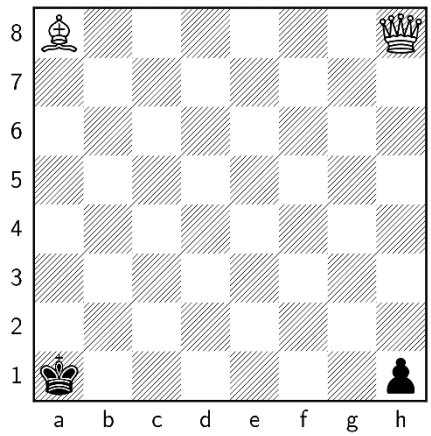
wNa1, wBa8, bQh1, bPh8

S1.2.9.L4



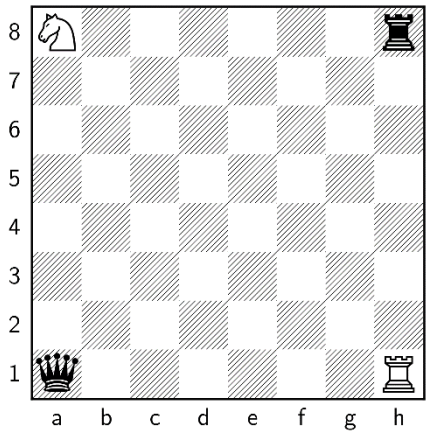
bPa1, wNa8, wBh1, wQh8

S1.2.10.L4



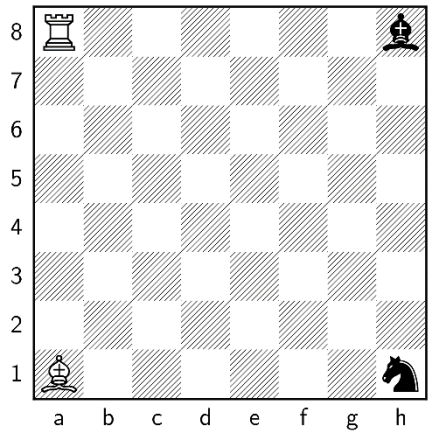
bKa1, wBa8, bPh1, wQh8

S1.2.11.L4



bQa1, wNa8, wRh1, bRh8

S1.2.12.L4



wBa1, wRa8, bNh1, bBh8

SESSION 2.

Exercise 2.1: ATTENTION STRATEGIES. Visual tracking.

Materials: Demo board, computer

Implementation:

- Introduce the pieces on the computer because their appearance differs from the demo board (first use of the computer at this point).
- Brief recap: What are squares, files, ranks, coordinates, what pieces are there, how are the squares, pieces, and colors labeled?
- In this exercise, participants must focus exclusively on the pieces mentioned by the instructor. The instructor names pieces that the participants must pay constant attention to.
  Methodological note: It is helpful to make it clear that participants should concentrate exclusively on their attention, as there is naturally a strong tendency to find meaningful connections within the positions.

Time frame:

- Repetition of coordinates, square, file, rank, pieces: approximately 5 minutes.
- Total: approximately 25 to 50 minutes.

Psychoeducational introduction:

Today we will focus on training to maintain attention. In addictive disorders, it is important to redirect attention away from substance-related stimuli and situations. For example, confrontation with the substance, such as seeing a cigarette packet, can trigger a desire to consume it. Therefore, it makes sense to train oneself to be able to divert attention to other objects that have nothing to do with the substance.

Instructions:

- *“First, let's repeat the names of the coordinates. What is the name of this square? What is the name of this piece? Very good, now that we've got that right, let's move on to today's exercise.“*
- *“The aim is to control our attention. Please try to focus your attention solely on the pieces or areas of the chessboard mentioned. If your thoughts wander, this is normal and not a big deal. In this case, try to bring your attention back to the board.“*

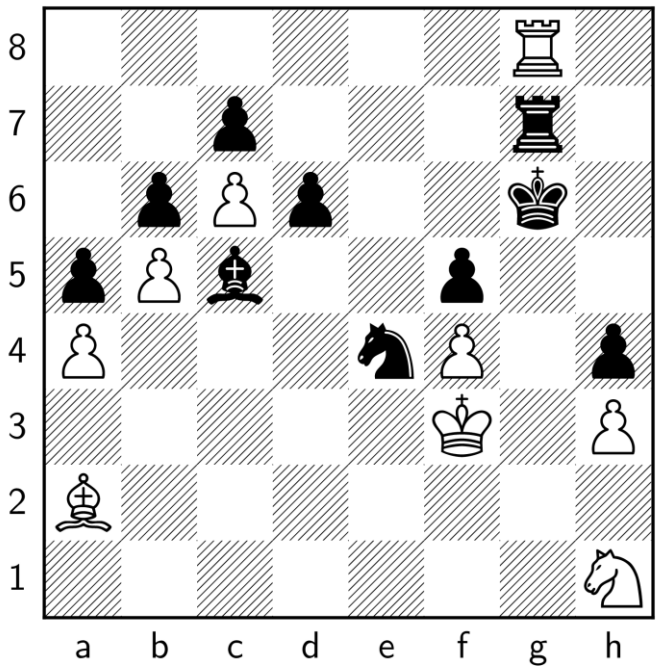
Level of difficulty:
In chess, arrangements of pieces are often perceived as bundled units, known as chunks. The pieces and squares that require attention may be spread across several chunks, meaning that attention is not focused locally but requires shifting.

- 1: 10 seconds, one chunk (i.e. only local attention)
- 2: 10 seconds, several chunks
- 3: 15 seconds, several chunks
- 4: 15 seconds, many chunks
- 5: 20 seconds, many chunks (i.e. distributing attention across the entire chessboard)

Procedure for incorrect answers:

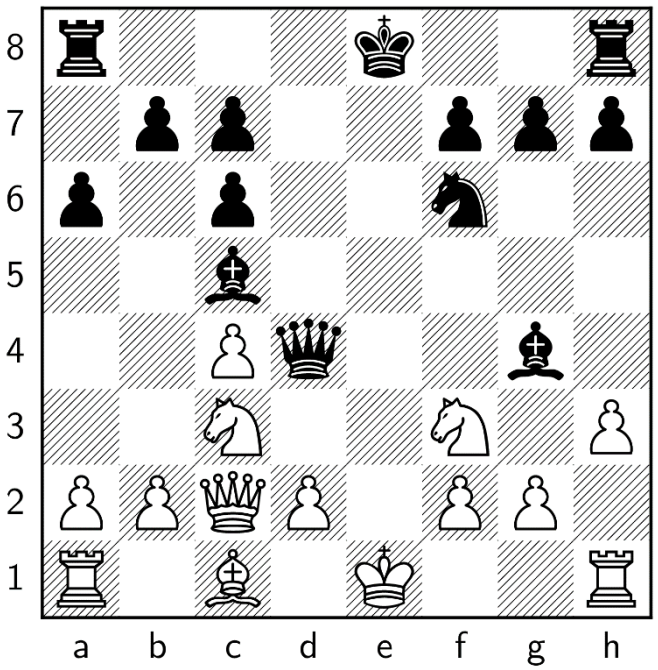
- There are no incorrect answers in this exercise.
- Always remind participants that the exercise is about observing and directing their attention.

S2.1.1



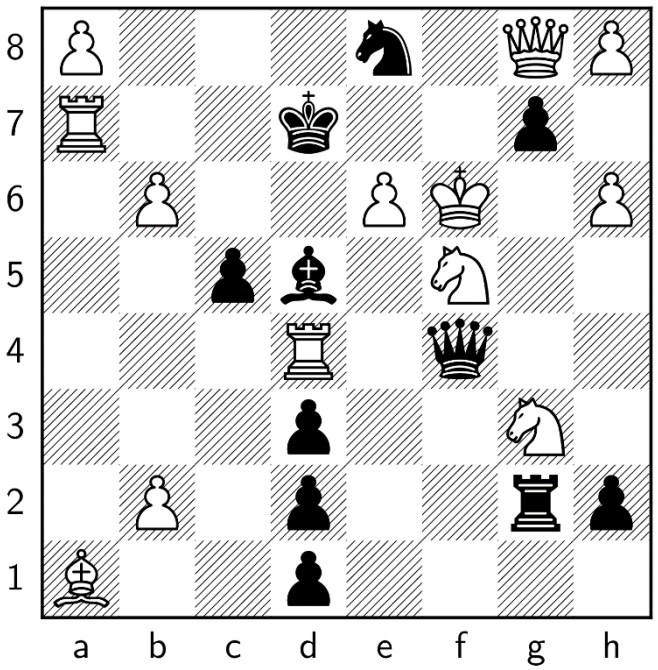
1.	Pay attention to the rooks. (10 seconds)	L1
2.	Pay attention to the 2nd rank. (10 seconds)	L1
3.	Pay attention to the d-file. (10 seconds)	L1
4.	Pay attention to the 8th rank. (10 seconds)	L1
5.	Pay attention to the b-file. (10 seconds)	L1
6.	Pay attention to the kings. (10 seconds)	L2
7.	Pay attention to the knights. (15 seconds)	L3
8.	Pay attention to the 5th rank. (15 seconds)	L4
9.	Pay attention to the pawns. (20 seconds)	L5

S2.1.2



1.	Pay attention to the b-file. (10 seconds)	L1
2.	Pay attention to the queens. (10 seconds)	L2
3.	Pay attention to the g-file. (10 seconds).	L3
4.	Pay attention to the white rooks. (15 seconds)	L3
5.	Pay attention to the kings. (15 seconds)	L3
6.	Pay attention to the knights. (15 seconds)	L3
7.	Pay attention to the 2nd rank. (15 seconds)	L4
8.	Pay attention to the c-file. (15 seconds)	L4
9.	Pay attention to the black pieces only. (20 seconds)	L5
10.	Pay attention to the black pawns. (20 seconds)	L5
11.	Pay attention to all pawns. (20 seconds)	L5

S2.1.3



1. Pay attention to the black pawns on white squares. (10 seconds) L2

2. Pay attention to the kings. (10 seconds) L2

3. Pay attention to the 6th rank. (10 seconds) L2

4. Pay attention to the black pieces on the 2nd rank. (10 seconds) L2

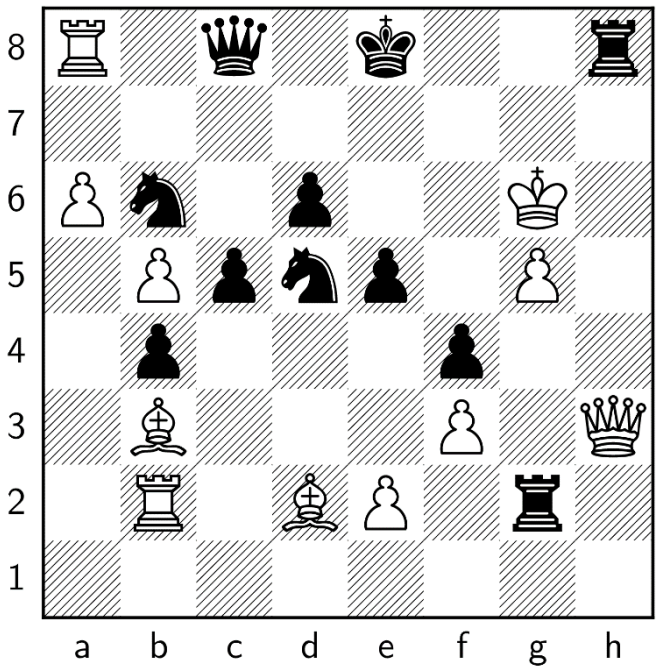
5. Pay attention to the queens. (15 seconds) L3

6. Pay attention to the white rooks. (15 seconds) L3

7. Pay attention to the black knights and the black bishops. (15 seconds) L3

8. Pay attention only to the black pieces on the black squares. (20 seconds) L5

S2.1.4



1. Pay attention to the bishops. (10 seconds) L1

2. Pay attention to the knights. (10 seconds) L1

3. Pay attention to the 5th rank. (10 seconds) L2

4. Pay attention to the 3rd and 8th rank. (15 seconds) L3

5. Pay attention to the b- and h-file. (15 seconds). L3

6. Pay attention to the pawns. (15 seconds) L3

7. Pay attention only to the white pieces. (20 seconds) L5

8. Pay attention only to the black pieces on black squares. (15 seconds) L4

9. Pay attention to the d-file and the 3rd rank. (15 seconds) L4

10. Pay attention to the 2nd, 4th and 7th rank. (15 seconds) L4

11. Pay attention to the white pieces on white squares. (15 seconds) L4

12. Pay attention to all black pieces on white squares.
(20 seconds) L5

13. Pay attention to all pieces on black squares.
(20 seconds) L5

Exercise 2.2: SHORT-TERM MEMORY.

Materials: Demo board

Implementation:

- The instructor places one or more figures on the demonstration board, leaves them there for one minute (the time can be changed as desired, depending on the level of the participants), and then removes them. Immediately afterwards, he asks the participant where the pieces were located. Ideally, the participant will name the square. Alternatively, he or she will rebuild the pieces on the demo board.

Time frame:

- Per diagram: approximately 1 to 3 minutes
- Total: approximately 45 minutes

Psychoeducational introduction:

In the following exercises, we will once again train our short-term memory. As mentioned previously, this is important for therapy in order to internalize and implement therapeutic content. It also supports abstinence, as there is no need to resort to addictive substances to improve cognition in the short term. Working memory is impaired in many addictive disorders.

Instruction:

- *„I will now position one or more pieces on the board. You have some time to memorize this position. I will then remove the pieces from the board. Afterward, I will ask you where the pieces were located. If you have difficulty answering, please reposition the pieces.“*

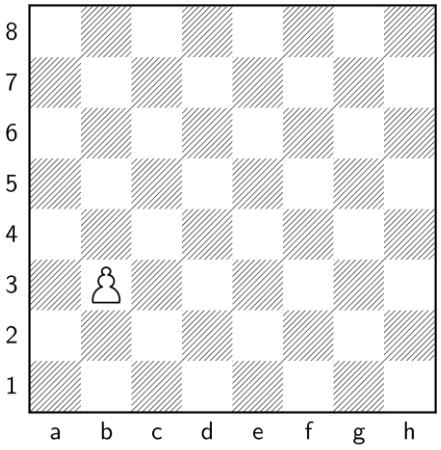
Level of difficulty:

1: one piece, single color
2: two pieces, one or two colors
3: three pieces, one or two colors
4: four pieces, one or two colors
5: more than four pieces, one or two colors

Procedure for incorrect answers:

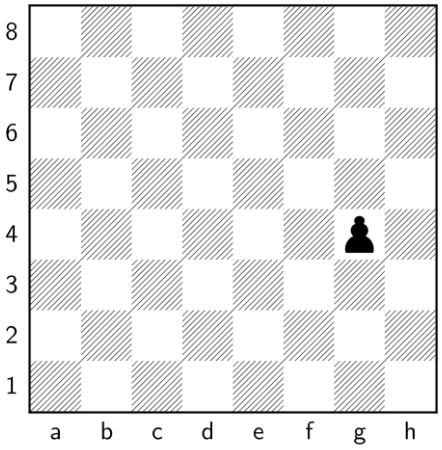
- If participants place the piece near the correct square:
- *“Are you sure?*
- *Take a step back and consider whether the image looks correct.*
- *Can the others confirm the answer, or do they have an alternative suggestion?“*
-
- If participants cannot remember at all:
  “Can you roughly name a corner of the board where the piece was standing? Maybe it will work better next time. Try to concentrate.“

S2.2.1.L1



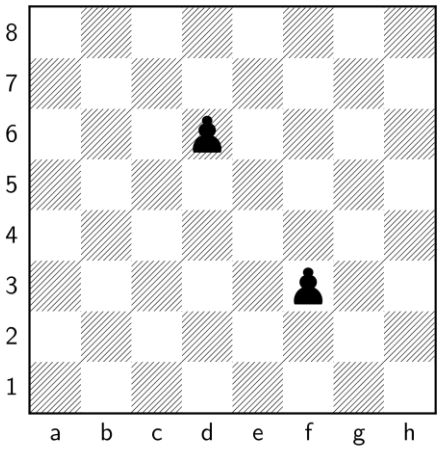
b3

S2.2.2.L1



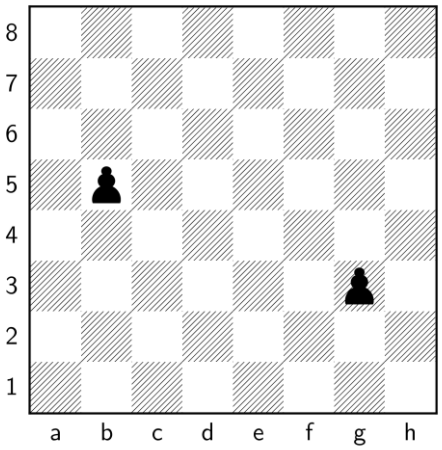
g4

S2.2.3.L2



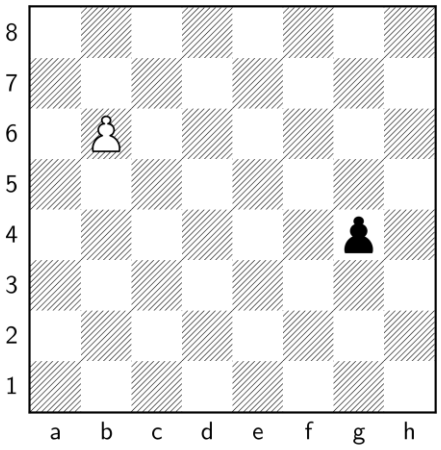
d6 and f3

S2.2.4.L2



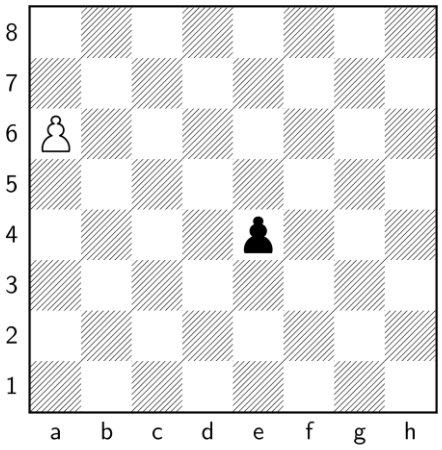
b5 and g3

S2.2.5.L2



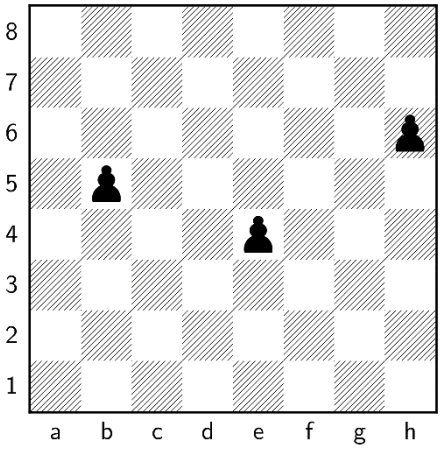
b6 and g4

S2.2.6.L2



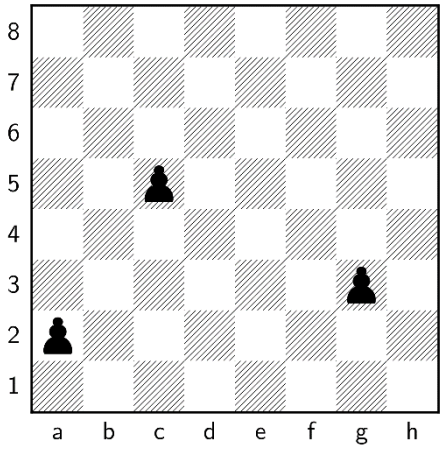
a6 and e4

S2.2.7.L3



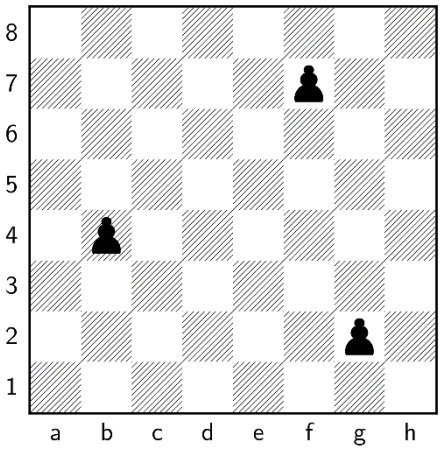
b5, e4, h6

S2.2.8.L3



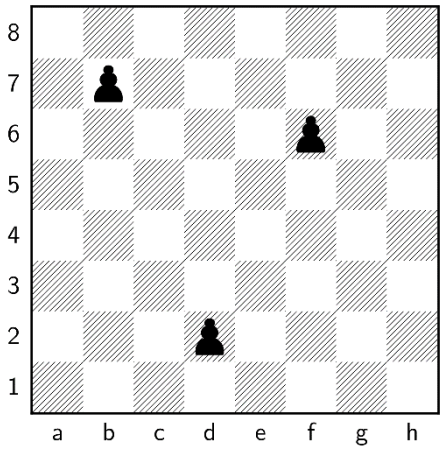
a2, c5, g3

S2.2.9.L3



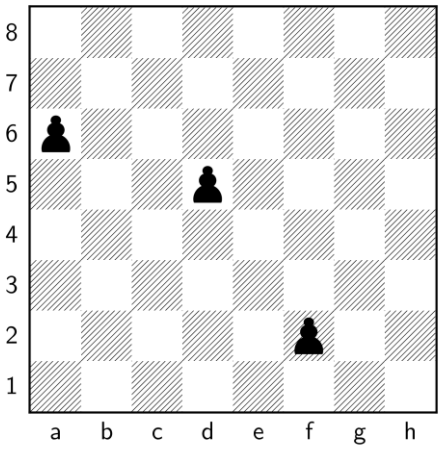
b4, f7, g2

S2.2.10.L3



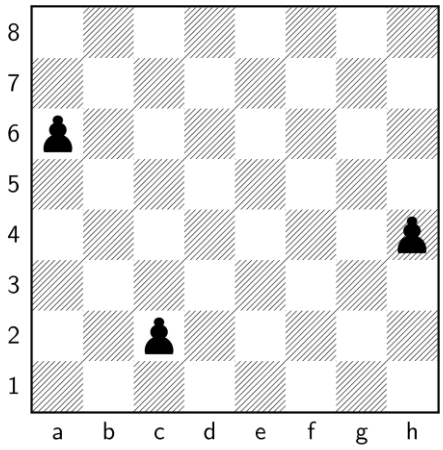
b7, d2, f6

S2.2.11.L3



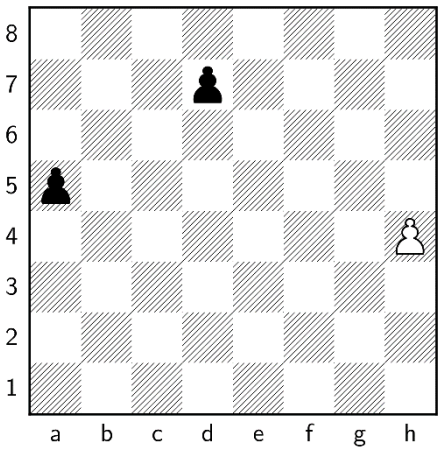
a6, d5, f2

S2.2.12.L3



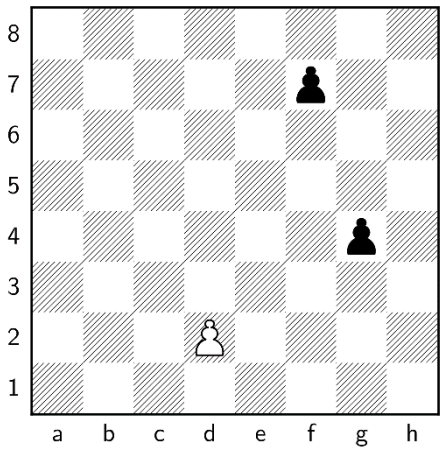
a6, c2, h4

S2.2.13.L3



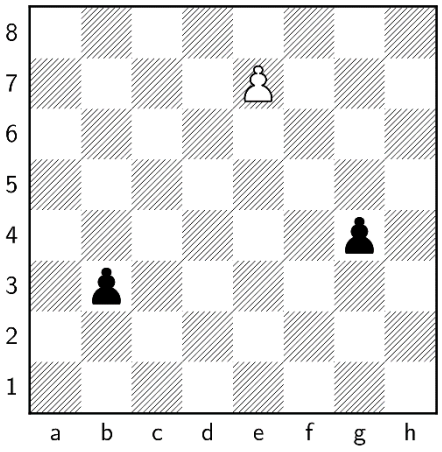
a5, d7, h4w

S2.2.14.L3



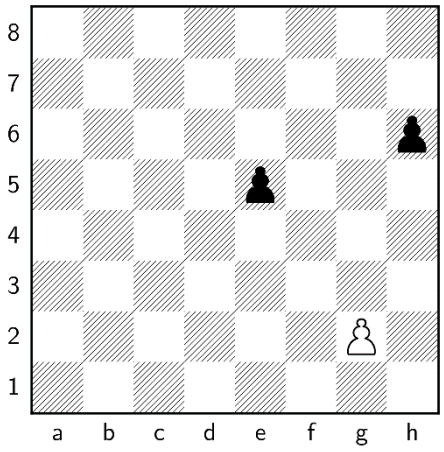
d2w, f7, g4

S2.2.15.L3



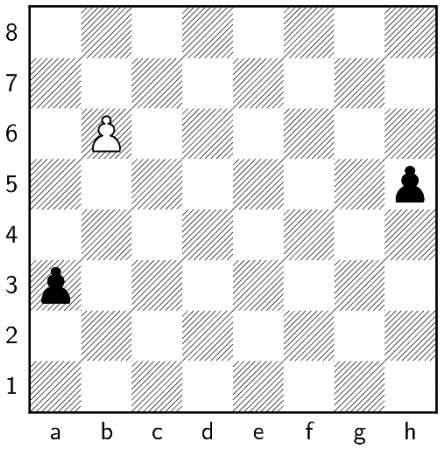
b3, e7w, g4

S2.2.16.L3



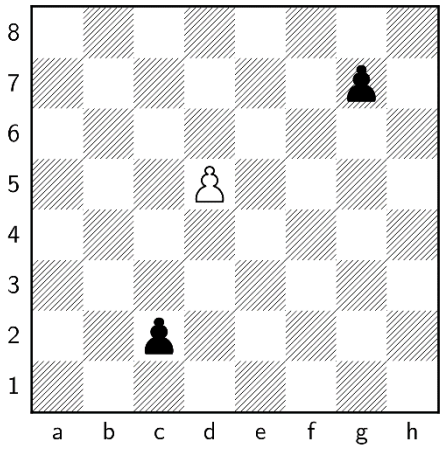
e5, g2w, h6

S2.2.17.L3



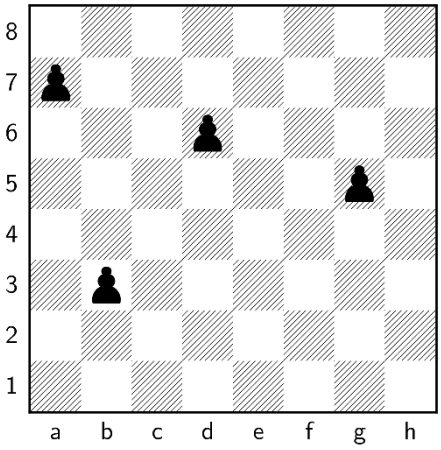
a3, b6w, h5

S2.2.18.L3



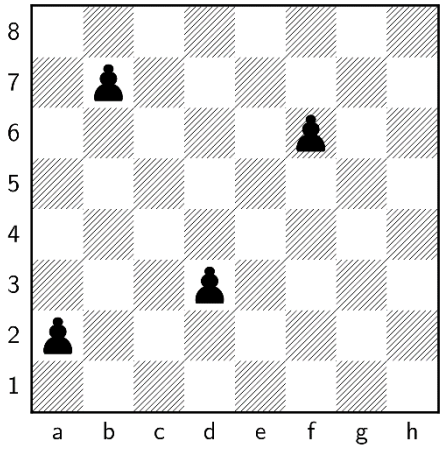
c2, d5w, g7

S2.2.19.L4



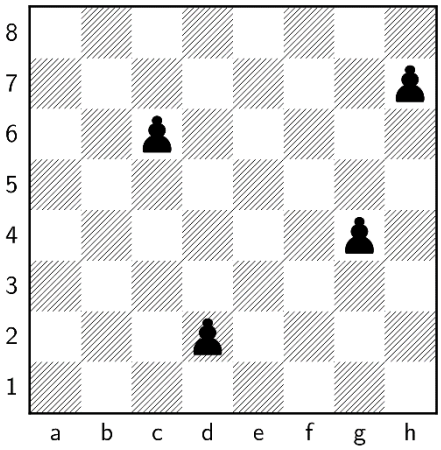
a7, b3, d6, g5

S2.2.20.L4



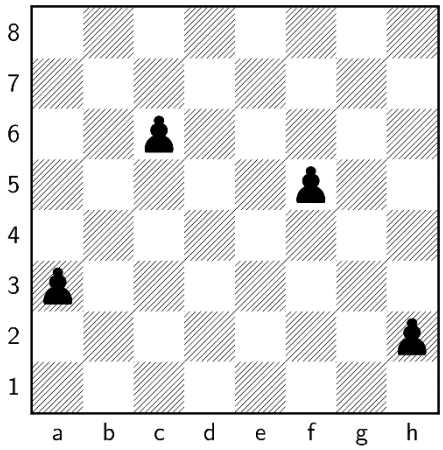
a2, b7, d3, f6

S2.2.21.L4



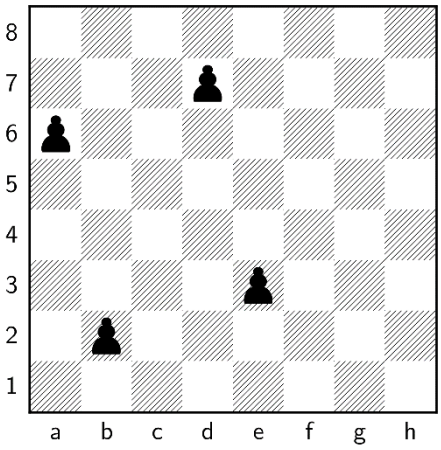
c6, d2, g4, h7

S2.2.22.L4



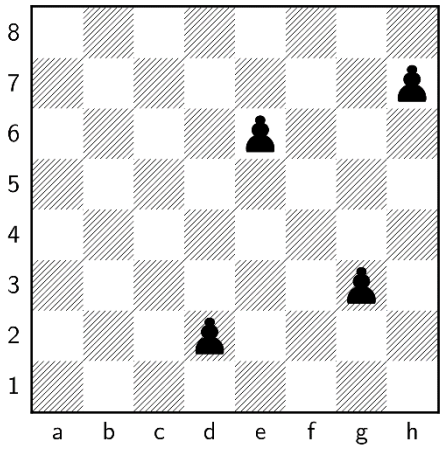
a3, c6, f5, h2

S2.2.23.L4



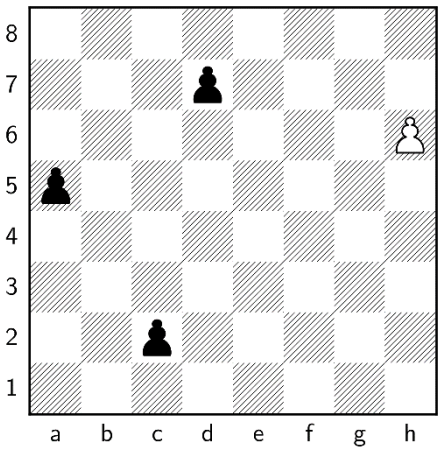
a6, b2, d7, e3

S2.2.24.L4



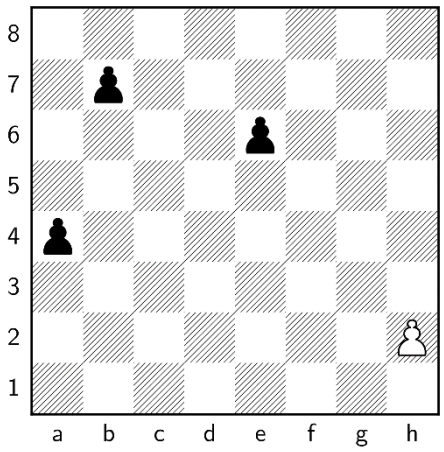
d2, e6, g3, h7

S2.2.25.L4



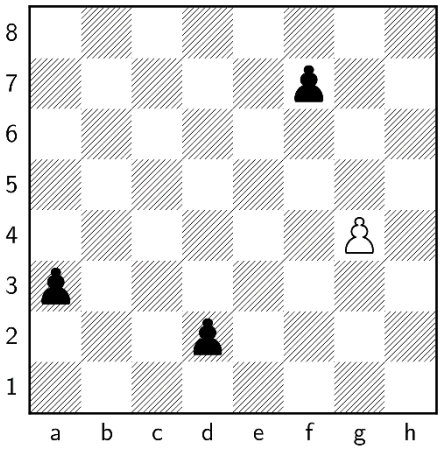
a5, c2, d7, h6w

S2.2.26.L4



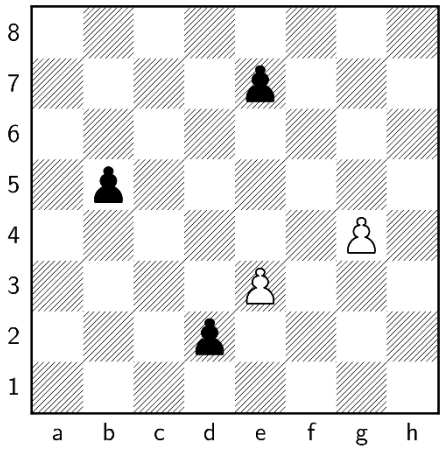
a4, b7, e6, h2w

S2.2.27.L4



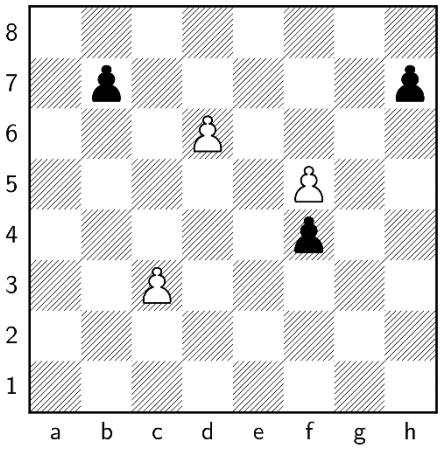
a3, d2, f7, g4w

S2.2.28.L5



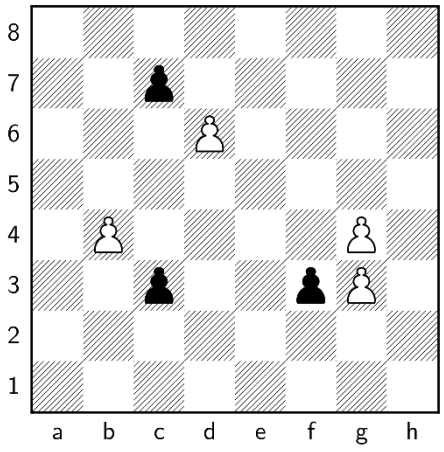
b5, d2, e3w, e7, g4w

S2.2.29.L5



b7, c3w, d6w, f4, f5w, h7

S2.2.30.L5



b4w, c3, c7, d6w, f3, g3w, g4w

SESSION 3.

Explanation of the movement of the pieces

Materials: Demo board, marker chips

Implementation:

- For the explanation, it is important to repeat the coordinates in order to make it easier to understand how the pieces move.
- Briefly ask: What are files, ranks, squares; what pieces are there, and what are they called?
- The instructor explains how all the chess pieces move. He imitates the possible moves with gestures on the demonstration board, using marker chips as an aid if necessary.
- Explain in detail how the pieces move, in the following order:
  Rook
  Bishop
  Queen
  King
  Knight
  Pawn
- See below for further instructions

Time frame:

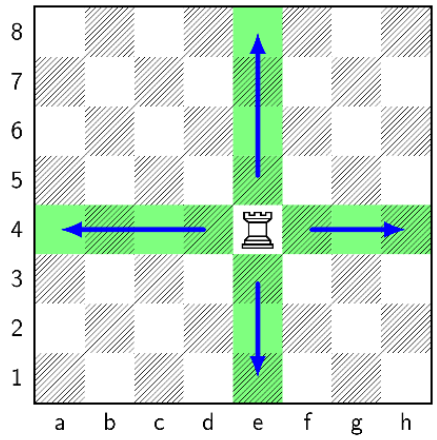
- Explanations: 15 to 20 minutes

Instructions:

The instructor places the corresponding piece on one of the four central squares of the board, gestures to indicate the possible moves, and describes them (text in italics, see below).

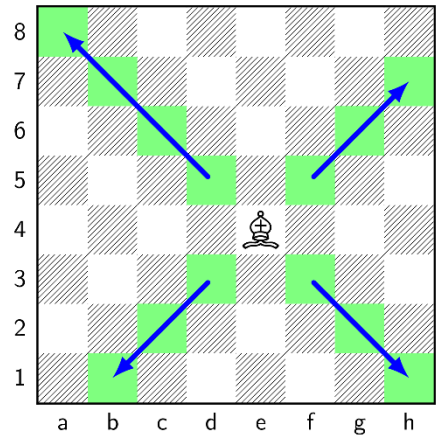
Support this with gestures and movements using the pieces.
Then place the pieces randomly on the board and ask a participant to show the possible moves.

Rook



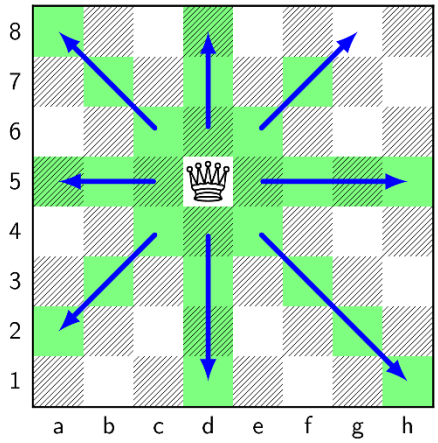
This is the rook. It moves horizontally and vertically as far as it wants, or until it is stopped by one of its own pieces. It can capture an opponent's piece (except the king).

Bishop



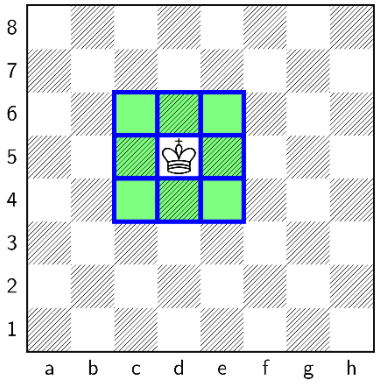
This is the bishop. It can only move diagonally. It moves as far as it wants until it is stopped by one of its own pieces or an opponent's piece. It can capture an opponent's piece (except the king). A bishop “sticks” to its color square and cannot change it. Each player has a “black-squared” and a “white-squared” bishop..

Queen



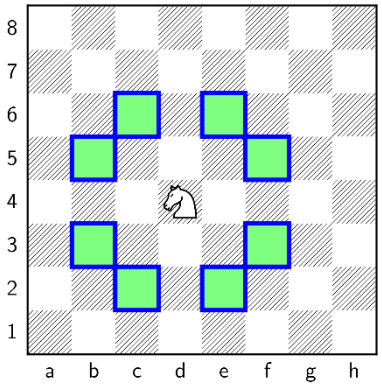
This is the queen. She can move in any direction: horizontally, vertically, and diagonally in all directions. This makes her the most powerful piece. She can move as far as she wants until she is stopped by one of her own pieces or an opponent's piece. She can capture an opponent's piece (except the king).

King



This is the king. It can only move one square in any direction. It can capture any other piece (except the king). It is the most important piece in the game and must never be captured. An attack by an opponent's piece on the king is called check (check). If it can no longer be protected from attack or cannot escape, it is checkmated.

Knight

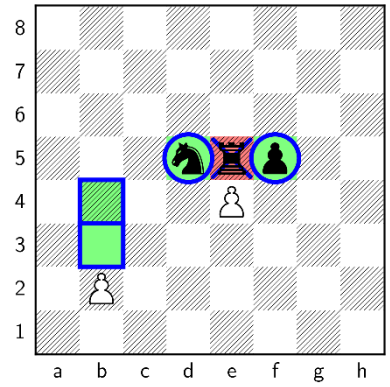


This is the knight. It moves two squares forward and one square to the side. So it moves like an "L." It also changes the color of the square with each move.
The knight is the only piece that can jump over other pieces.

Show all possible moves individually and mark them with marker chips.

The possible moves are also referred to as a "knight's move."

Pawn



This is the pawn. It can only move forward. On its first move, it can move two squares forward if it wants to. Otherwise, it can only move one square forward at a time. Although the pawn moves forward, it captures an opponent's piece diagonally. This means that pawns can be blocked by placing another piece in front of them.

Exercise 3.1: PERCEPTION. Visuospatial functions. Visual tracking.

Materials: Demo board, marker chips

Implementation:
The course instructor imitates a move (i.e., a possible move) of a piece using gestures or, alternatively, marker chips on the board. The participants name the piece or pieces that are allowed to make the move shown.

Time frame:
Total: approximately 10 to 15 minutes

Psychoeducational introduction:
The following exercise focuses on visual tracking and spatial awareness. This exercise trains the part of the brain that is important for action planning and strategic thinking, known as the reflective system. In addictive disorders, this is important to include the long-term consequences of substance use in decisions and actions. Through greater control by this reflective system, the effects of the impulsive system can be weakened. This can help make it easier to resist the quick reward provided by the addictive substance.

Instruction:
"I will show you moves on the board and would like you to tell me which piece or pieces could have made this move."

Level of difficulty:
This depends on the possible pieces that can move on the chessboard as shown by the course instructor.

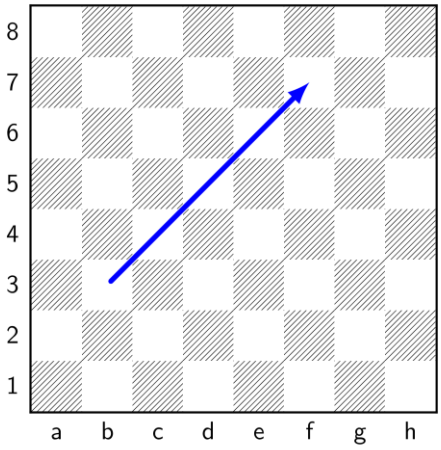
Methodological note:
Unlike the other exercises, this one deviates from the usual procedure and is not arranged in order of increasing difficulty. The reason for this is that it would not be appropriate to begin with the knight´s movements (lowest difficulty), and then proceed to the increasingly complex movements of the other pieces. Under such conditions, the pieces to be identified would become too predictable, which would not meet the cognitive purpose.

1: Knight
2: Rook or queen, or bishop or queen
3: Pawn or rook, or queen or king
4: Capturing pawn or bishop, or queen or king
5: Rook or queen, or king (two movements)

Procedure for incorrect answers:

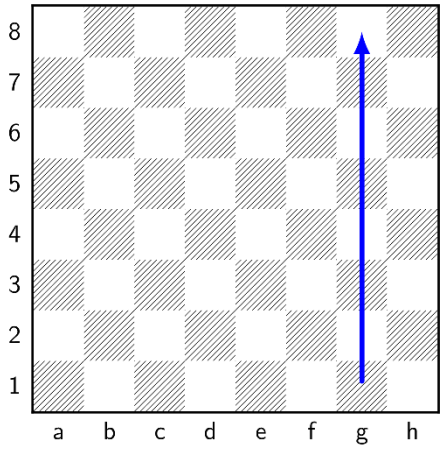
- If necessary, repeat the pieces´movements and make sure that all participants understand them. If they name the wrong pieces: *“Are you sure? How would you describe the piece´s movement?“*

S3.1.1.L2



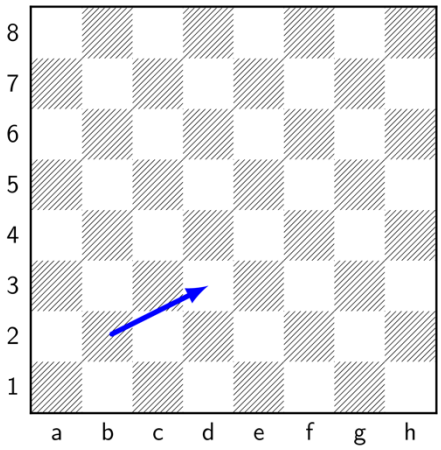
bishop or queen

S3.1.2.L2



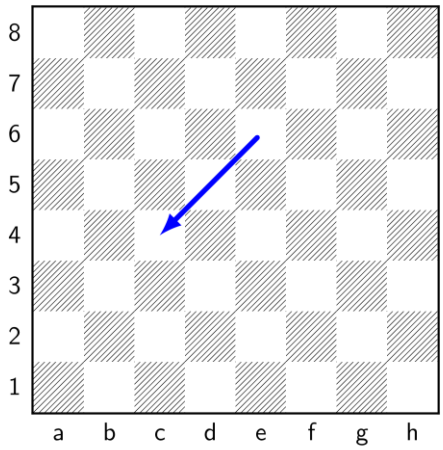
rook or queen

S3.1.3.L2



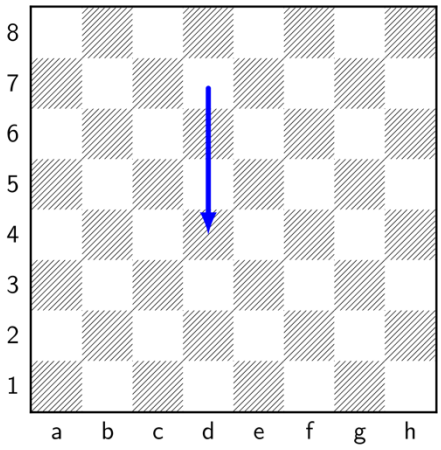
knight

S3.1.4.L2



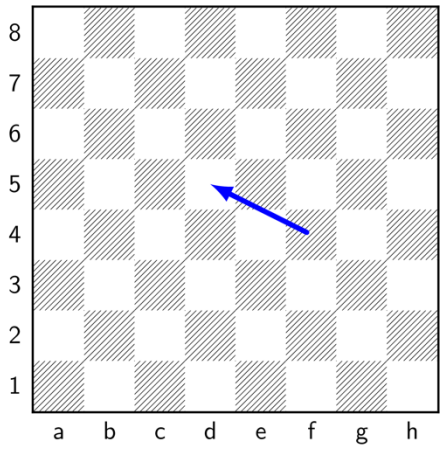
bishop or queen

S3.1.5.L1



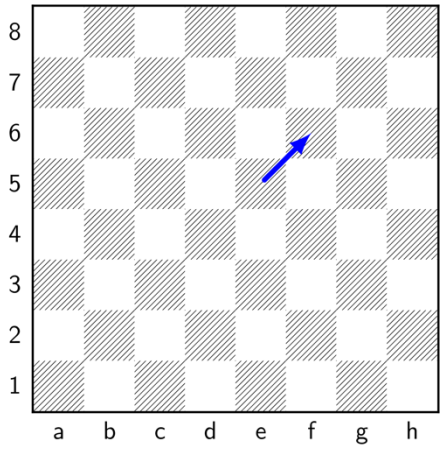
rook or queen

S3.1.6.L1



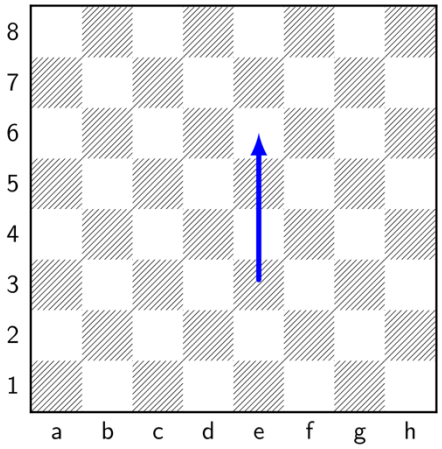
knight

S3.1.7.L4



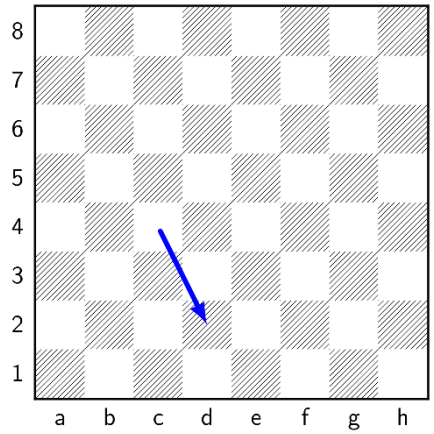
king, queen, bishop
or capturing white pawn

S3.1.8.L2



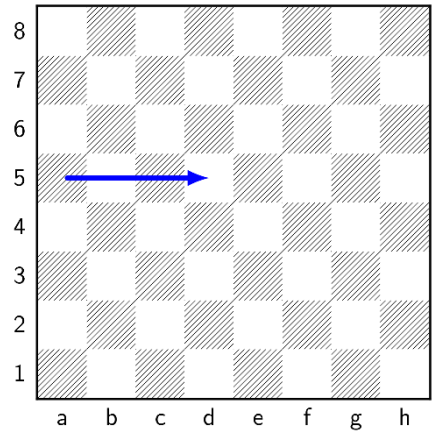
rook or queen

S3.1.9.L1



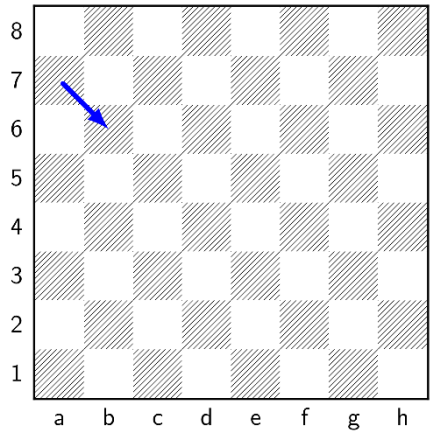
knight

S3.1.10.L2



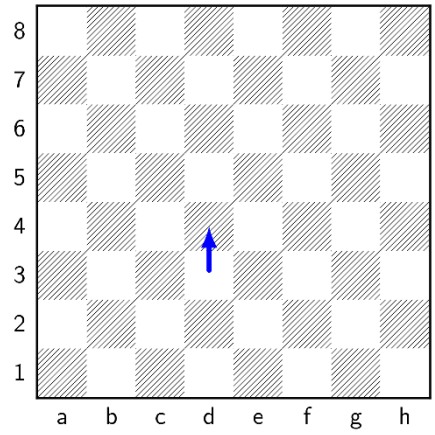
rook or queen

S3.1.11.L4



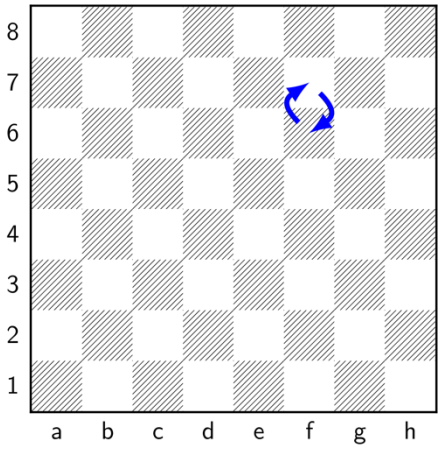
bishop, king, queen or capturing
black pawn

S3.1.12.L3



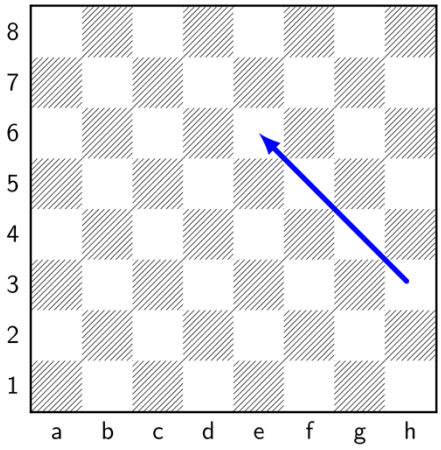
white pawn, rook,
queen or king

S3.1.13.L5



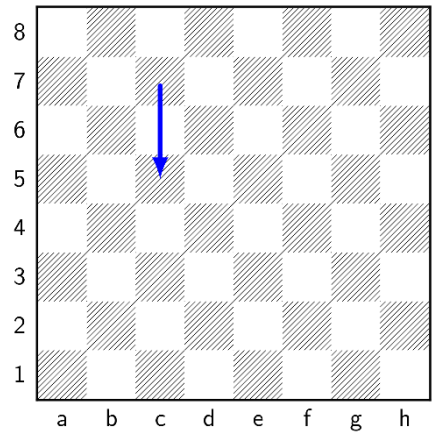
rook, queen, king
(two moves: f6-f7-f6)

S3.1.14.L1



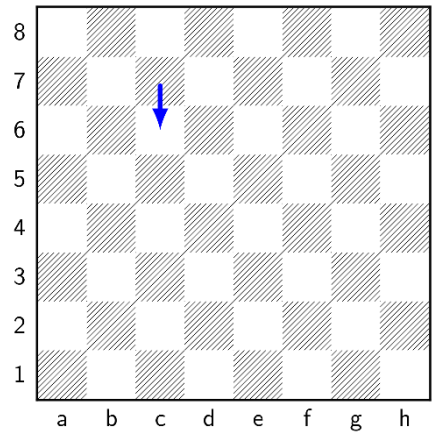
bishop or queen

S3.1.15.L2



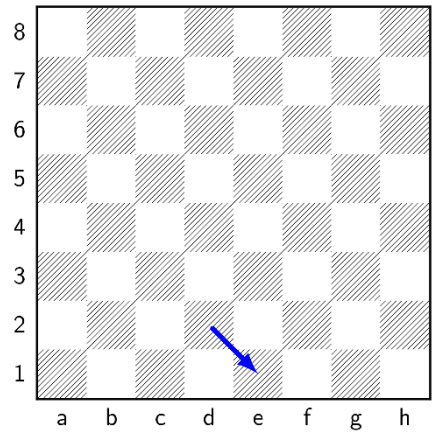
rook, queen or
black pawn

S3.1.16.L3



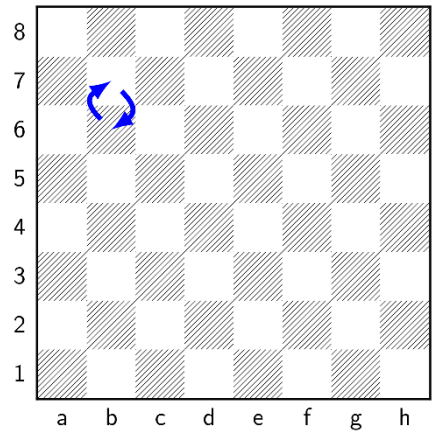
rook, queen, king or
black pawn

S3.1.17.L4



bishop, queen, king or
capturing black pawn

S3.1.18.L5



rook, queen,
king (two moves: b6-b7-b6)

Exercise 3.2: PERCEPTION. Visuospatial functions. Visual tracking. Decision-making

Materials: Demo board, marker chips

Implementation:

- Participants should plan a route with a piece. A destination is specified (green marker chip). Obstacles are also included (red marker chips). Participants should find the shortest route (number of moves). The piece must not land on any of the obstacles.
- First, the instructor asks the participant for the number of moves in his or her solution. Then the participant demonstrates the moves on the demo board.
- Set up the diagram: Mark red (dark) and green (lighter) squares with marker chips.
- Recommended thinking time for participants:
  30 seconds at the beginning (for groups with no cognitive impairments); later increase to approx. 60 seconds for difficulty level 4.
- For people with cognitive impairments: time to view the board approx. 60 seconds; one route found is sufficient.

Time frame:

- Total: 24 diagrams, approximately 50 to 60 minutes

Psychoeducational introduction:
In this exercise, we train planning thinking and, once again, visual-spatial functions. Planning thinking is important in addiction treatment in order to make long-term decisions. Consider the long-term damage to the body caused by continued consumption. This ability is also important for choosing alternative behaviors, such as resisting the urge to reach for a cigarette. It can also help you develop and apply conflict management strategies. Like other exercises you have already learned, visual-spatial functions help strengthen the part of the brain that is important for controlling substance use.

Instructions:

- *“The aim is to reach the green square with the bishop or knight in as few moves as possible, without stepping on a red square. So plan the shortest route to the goal.*
- *Once you have found your solution, you will first be asked for the number of moves in your route.*
- *Then I will ask you to come to the front and show your route (moves) on the demo board.“*

Level of difficulty:

Basically, the bishop is easier than the knight.

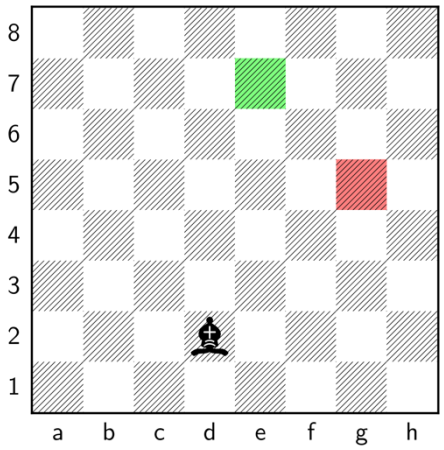
- Bishop:
  - 1: 2 moves, 1 – 4 obstacle squares, one route
  - 2: 3 moves, 2 – 4 obstacle squares, one route
  - 3: 3 moves, 2 – 4 obstacle squares, one route
  - 4: 4 – 5 moves, 4 obstacle squares, 2 routes
  - 5: not applicable
- Knight:
  - 1: 2 moves, one obstacle square, one route
  - 2: 3 moves, 2 – 4 obstacle squares, one route
  - 3: 3 moves, 2 – 4 obstacle squares, 2 – 3 routes
  - 4: 3 moves, 3 – 4 obstacle squares, 3 – 4 routes
  - 5: >= 3 moves, >= 4 obstacle squares, >= 4 routes

Procedure for incorrect answers:

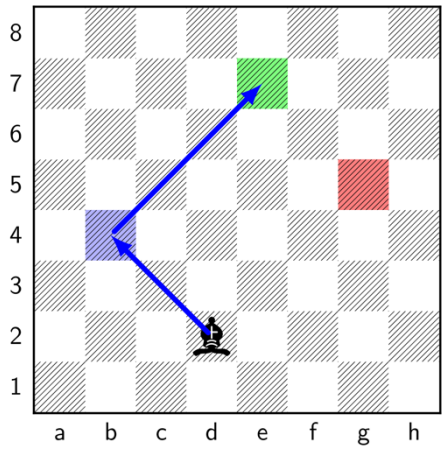
- Sometimes participants do not recognize the prohibited and target squares. In this case, ask whether the diagram is visually understandable.
- Sometimes participants have problems understanding the movement paths of the pieces. In this case, use differently colored (e.g., blue) marker chips to mark possible movement paths.
- Sometimes it is easier for participants to solve the diagram backwards, starting from the target square.

“In the next exercise, I would like you to try to reach the green square with the bishop in as few moves as possible. The red square must not be entered.“

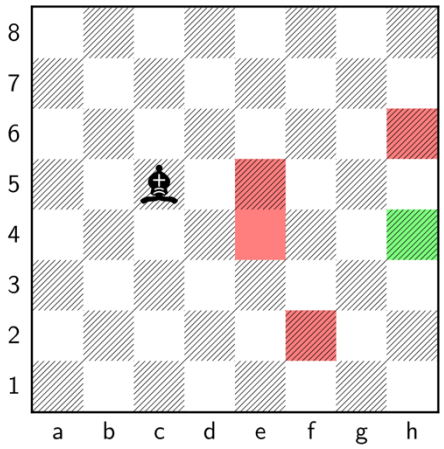
S3.2.1.L1



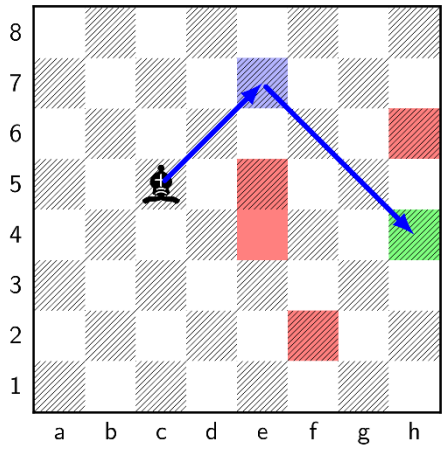
2 moves



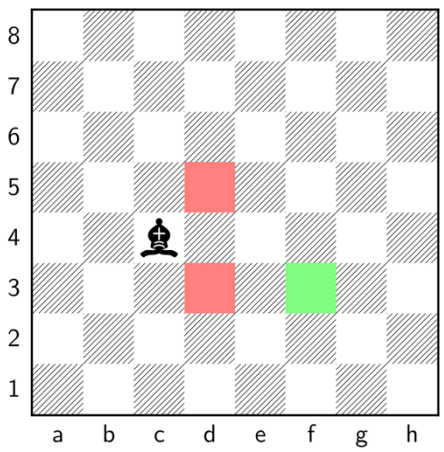
S3.2.2.L1



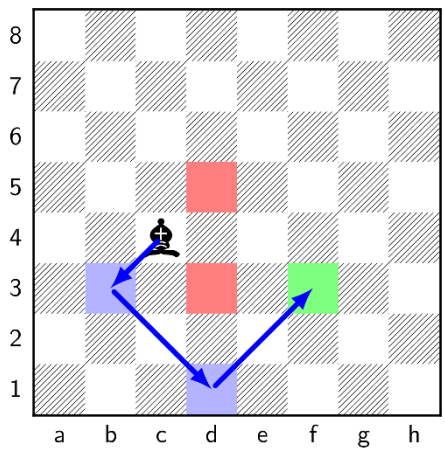
2 moves



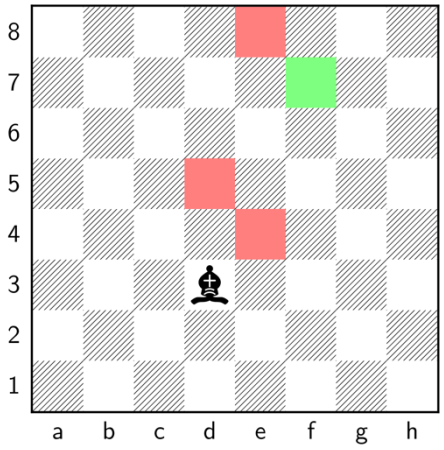
S3.2.3.L2



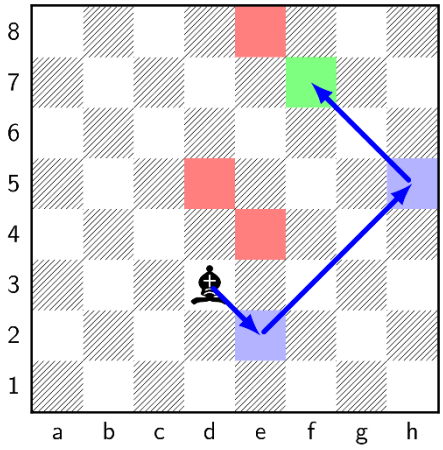
3 moves



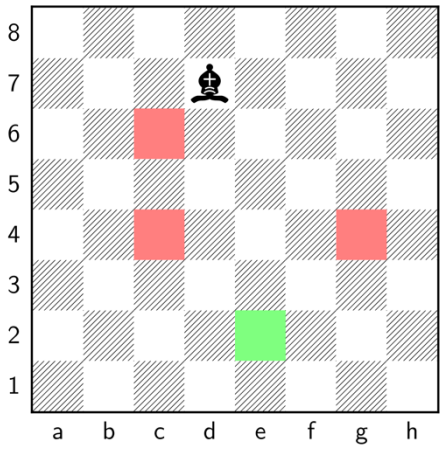
S3.2.4.L2



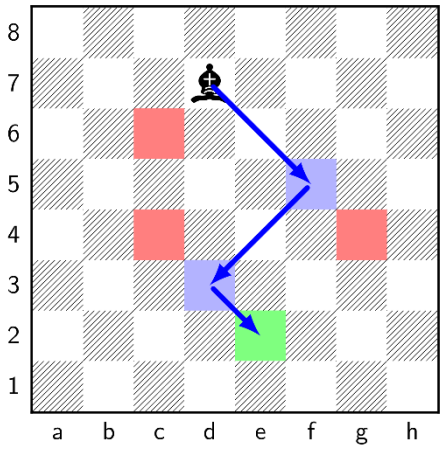
3 moves



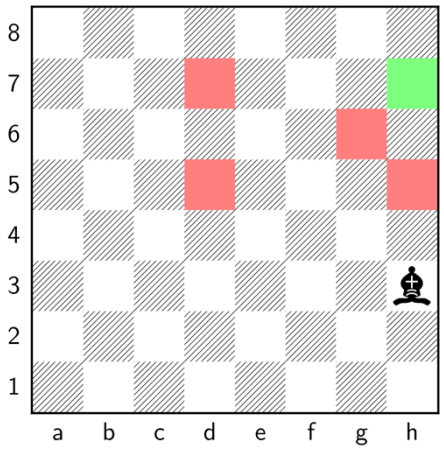
S3.2.5.L3



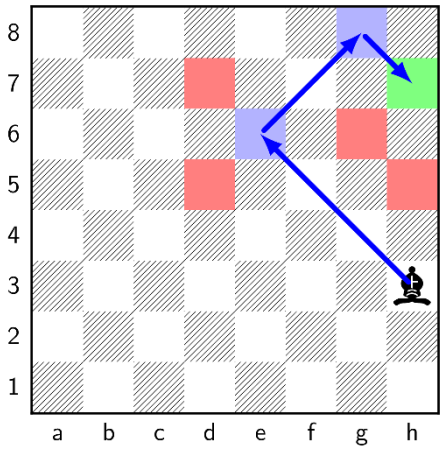
3 moves



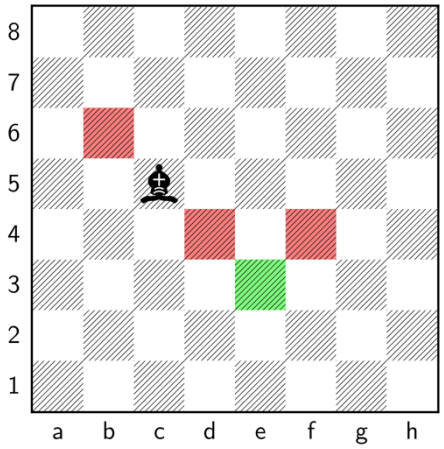
S3.2.6.L3



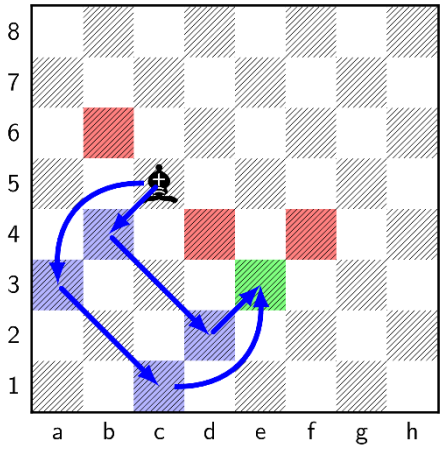
3 moves



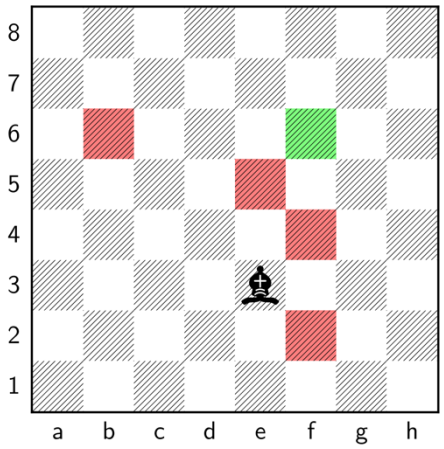
S3.2.7.L3



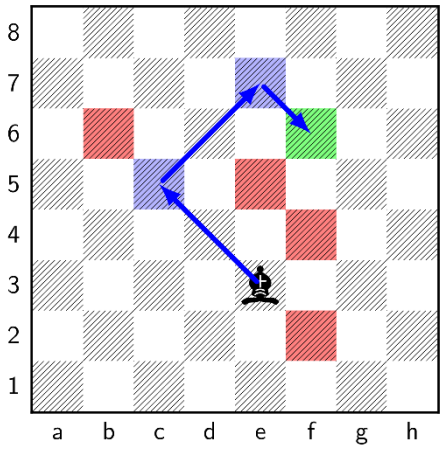
3 moves / 2 routes



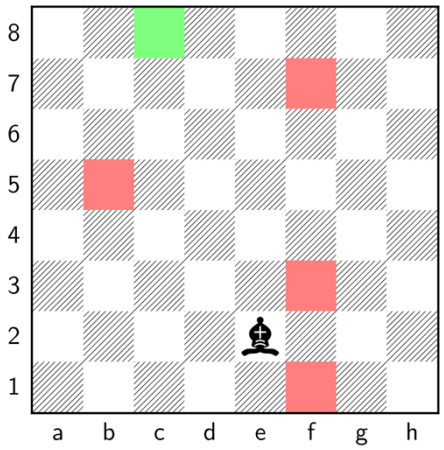
S3.2.8.L3



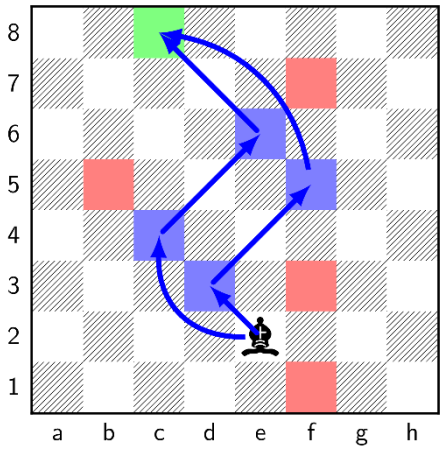
3 moves



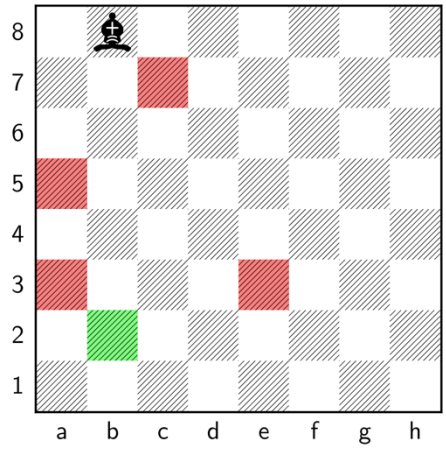
S3.2.9.L3



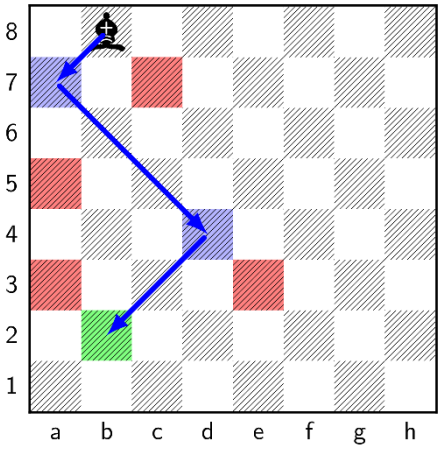
3 moves / 2 routes



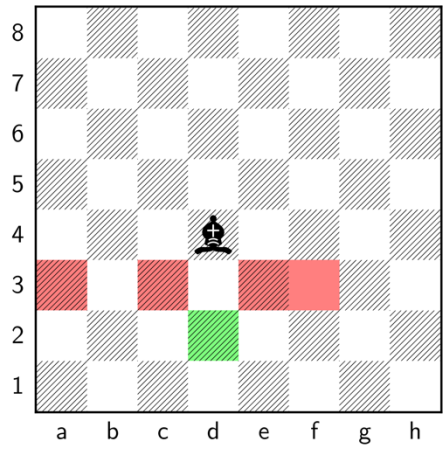
S3.2.10.L3



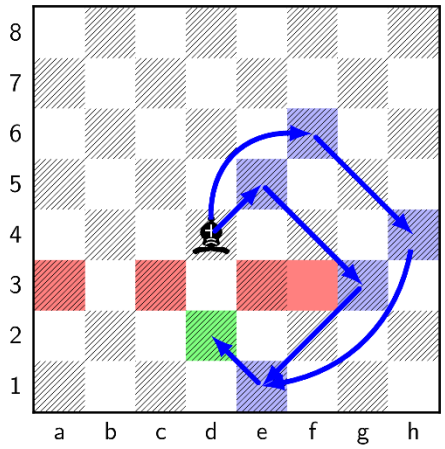
3 moves



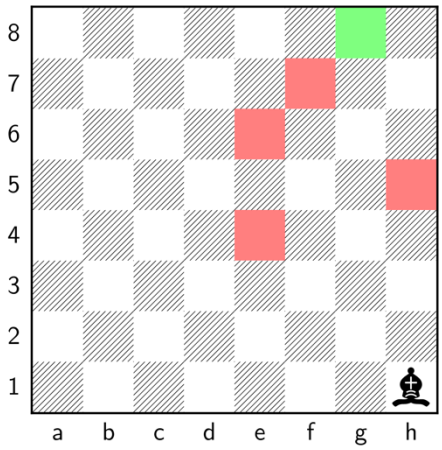
S3.2.11.L4



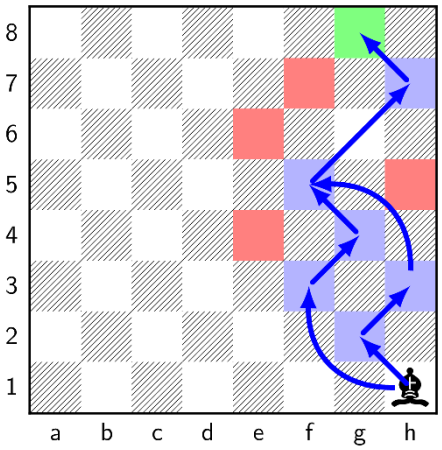
4 moves / 2 routes



S3.2.12.L4

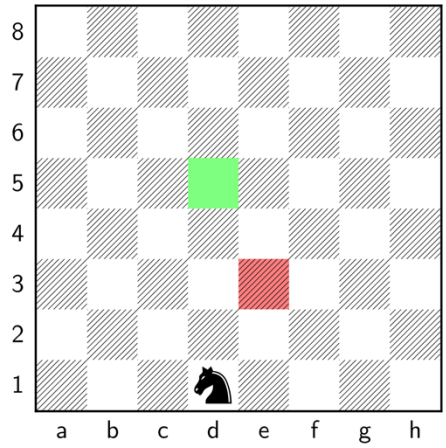


5 moves / 2 routes

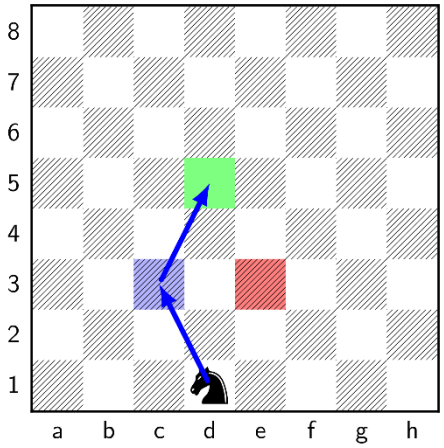


“In the next exercise, I ask you to try to reach the green square with the knight in as few moves as possible. The red square must not be entered.“

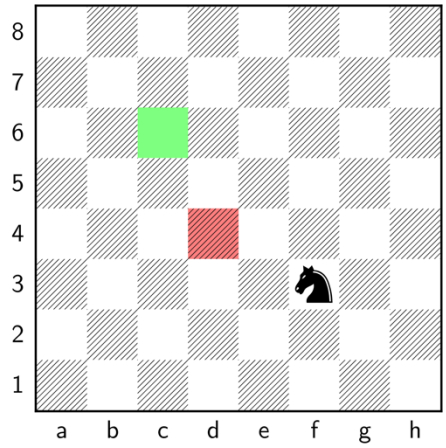
S3.2.13.L1



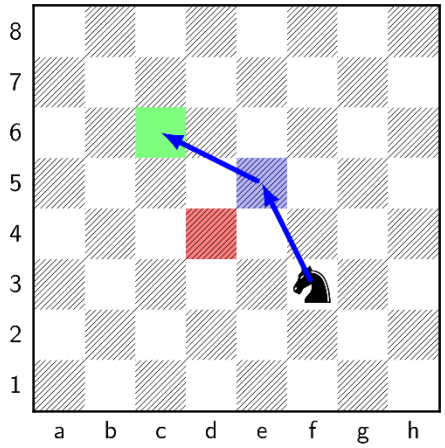
2 moves



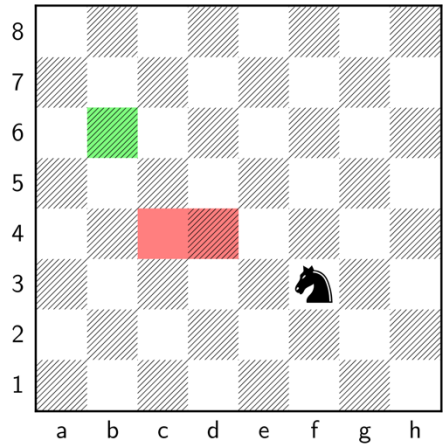
S3.2.14.L1



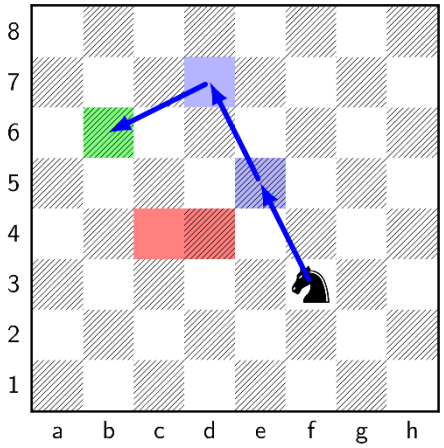
2 moves



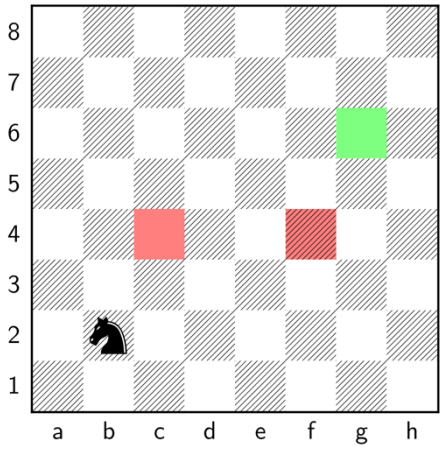
S3.2.15.L2



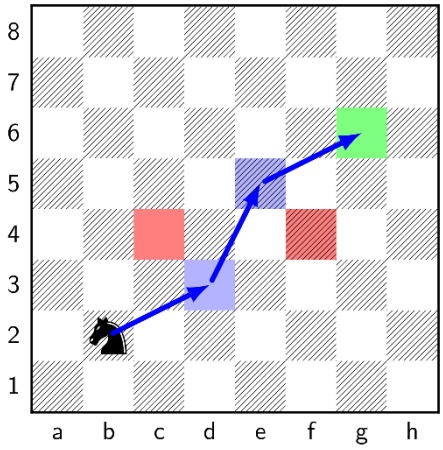
3 moves



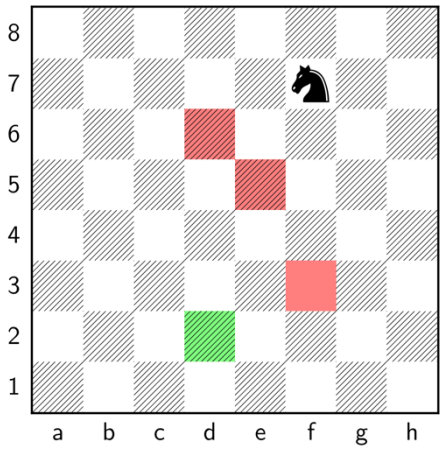
S3.2.16.L2



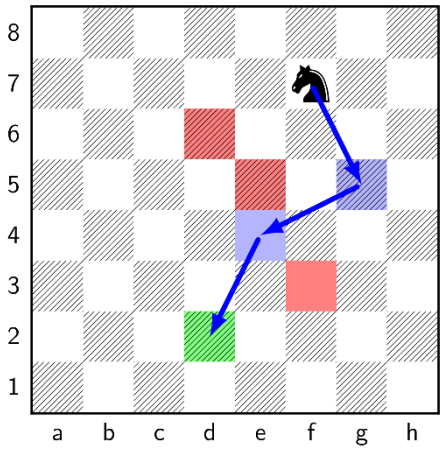
3 moves



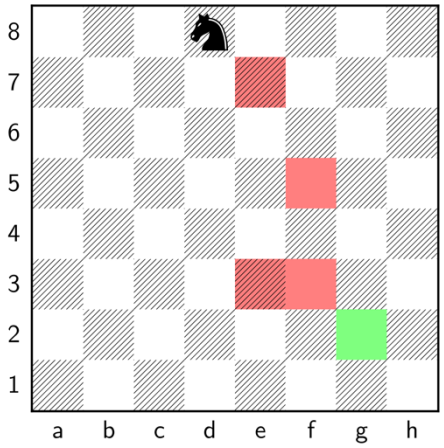
S3.2.17.L2



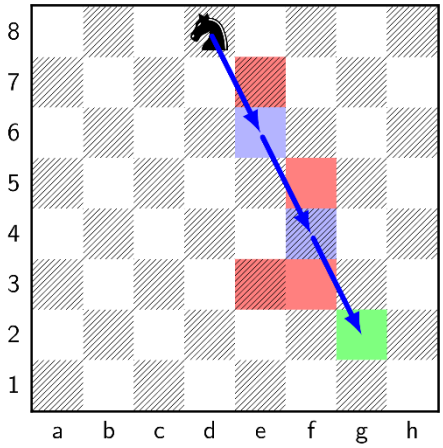
3 moves



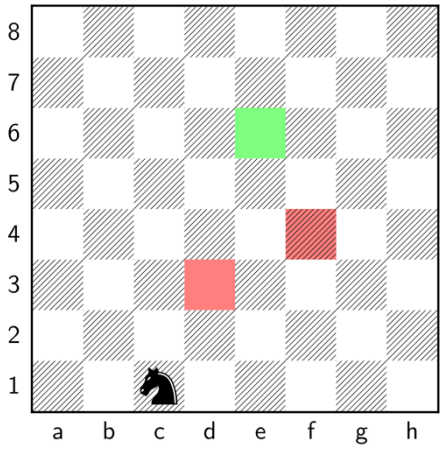
S3.2.18.L2



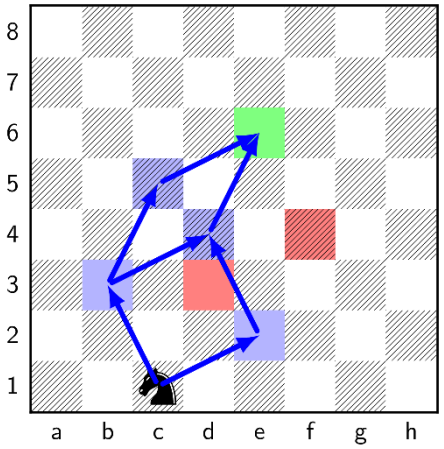
3 moves



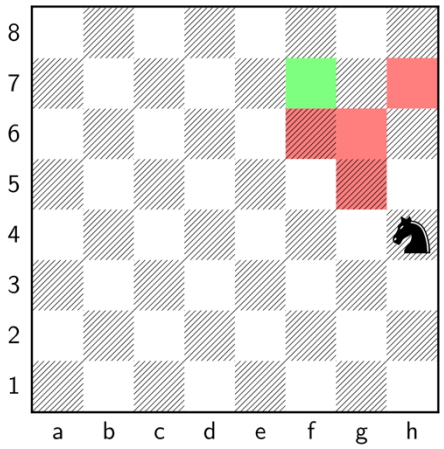
S3.2.19.L3



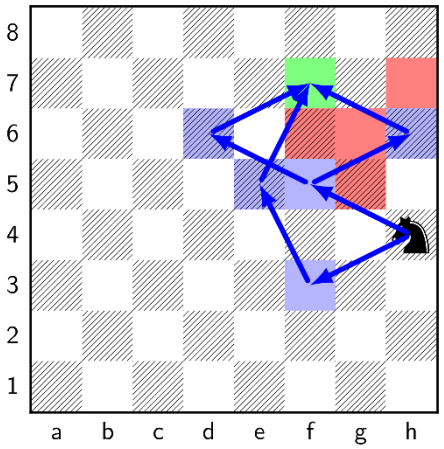
3 moves / 3 routes



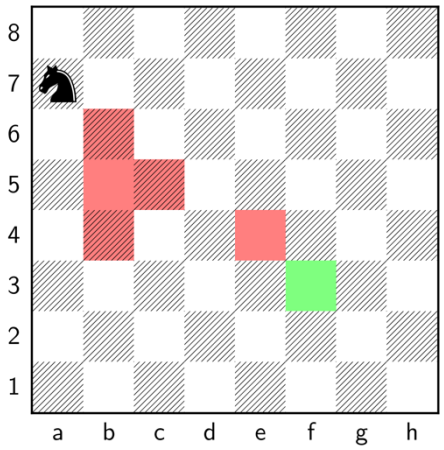
S3.2.20.L3



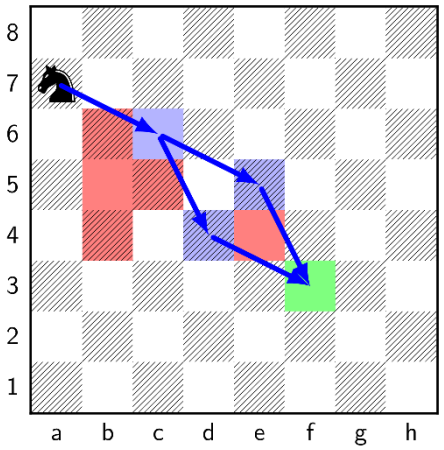
3 moves / 3 routes



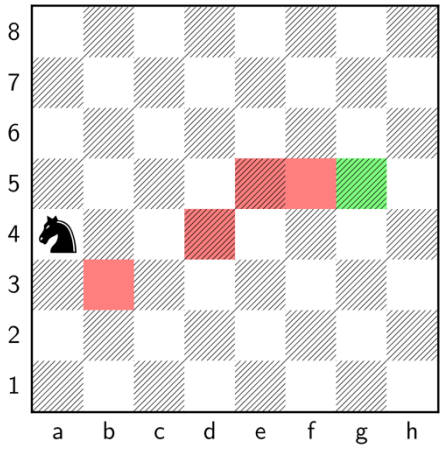
S3.2.21.L3



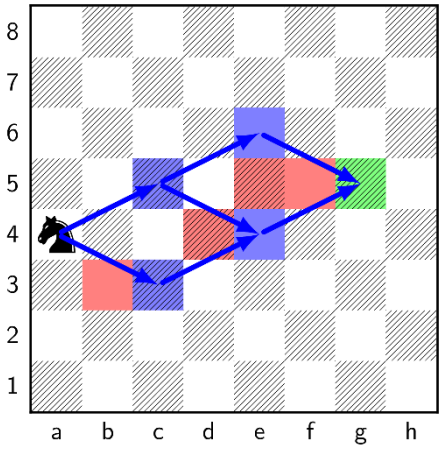
3 moves / 2 routes



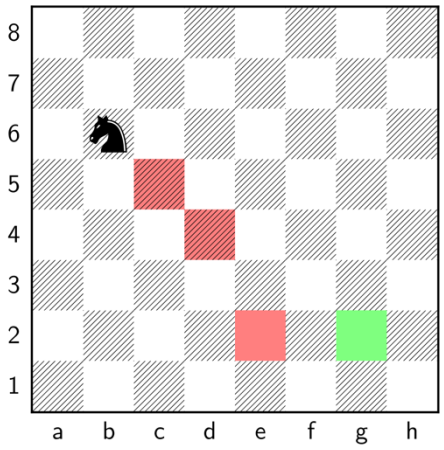
S3.2.22.L4



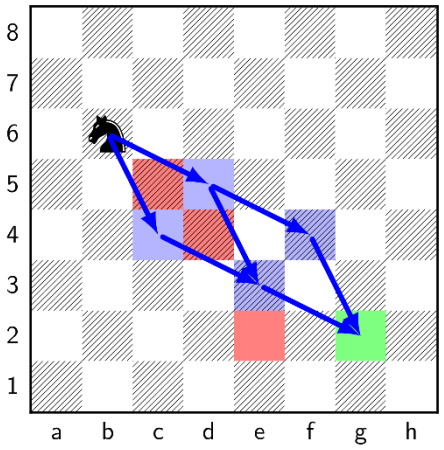
3 moves / 3 routes



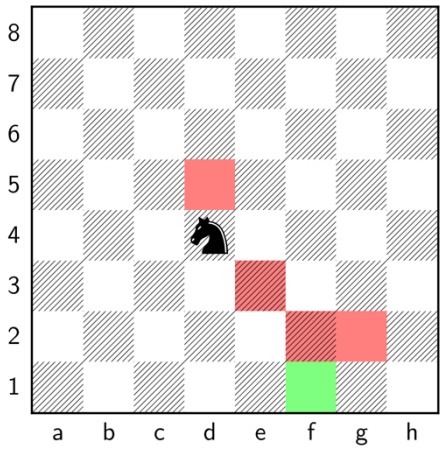
S3.2.23.L4



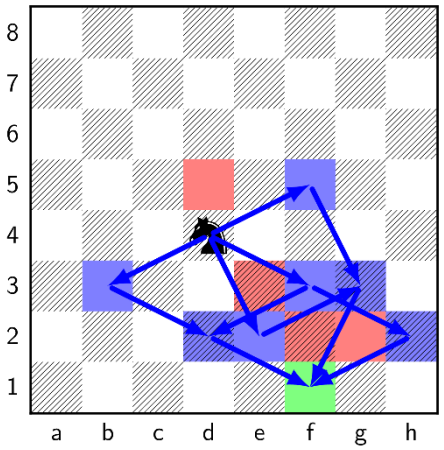
3 moves / 3 routes



S3.2.24.L5



3 moves / 5 routes



SESSION 4.

Exercise 4.1: SUSTAINED ATTENTION. Quantification

Materials: Computer/screen, stopwatch
Implementation:

- Participants answer questions while viewing the board.
- Read out instructions, call on participants, ask questions.

Time frame:

- Recommended time for reflection:
  approx. 30 seconds
- Approx. 5 – 7 minutes per position
- Total for 4 positions: approx. 25 to 35 minutes

Psychoeducational introduction:

The first part of today´s training is again about attention. However, the exercise is different from last week.
As you have already heard, in addictive disorders it is important to divert attention away from substance-related stimuli and situations. For example, confrontation with the substance, such as seeing a cigarette pack, can trigger cravings for consumption. Therefore, it is useful to train oneself to be able to direct attention to other objects that have nothing to do with the substance.
This exercise also trains visual-spatial functions. You already learned about this exercise last week. As mentioned, the aim is to strengthen the part of the brain that is important for controlling substance use.

Instructions:

- Explain the exercise
  “Today's exercise is initially about challenging your attention a little. I will show you a position. You will then be asked questions about it.“

Level of difficulty:

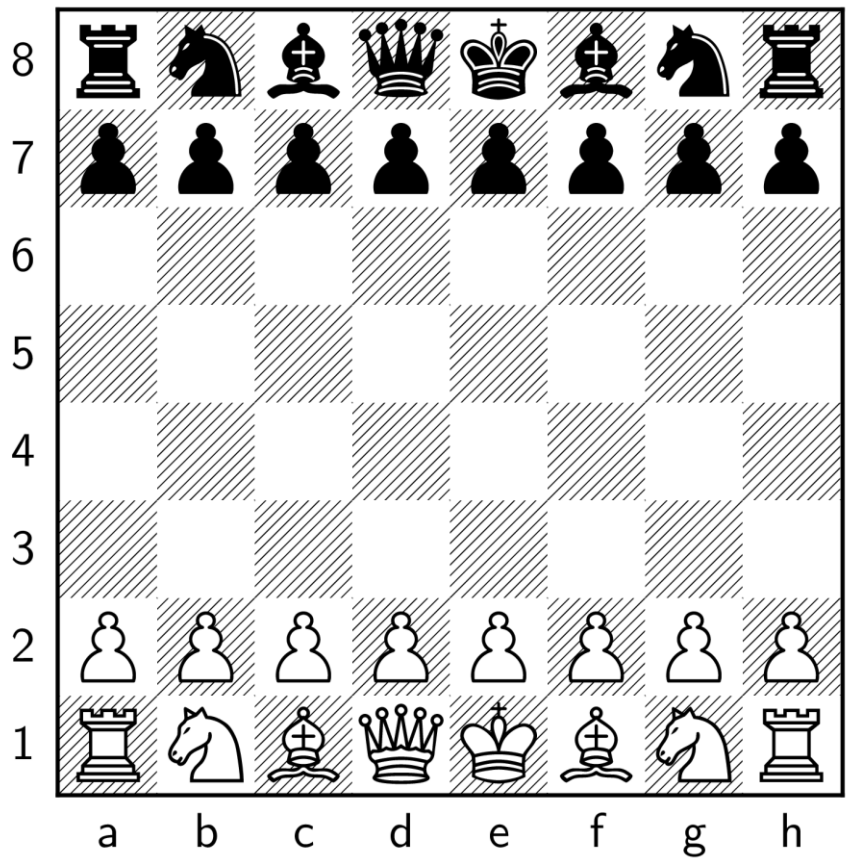
- The diagrams (positions) are sorted in ascending order according to their level of difficulty.
- Basic and more detailed characteristics were used as parameters:
  Basic characteristics:
  Number of pieces
  Color: Number of white and black pieces
  Type of piece

  Detailed characteristics:
  Files
  Ranks
  Squares
  Square color (color of a square on which a piece is standing)

L1: Pos. 1 (6 basic + 11 detailed characteristics= 17)
L2: Pos. 2 (11 basic + 9 detailed characteristics = 20)
L3: Pos. 3 (12 basic + 20 detailed characteristics = 32)
L4: Pos. 4 (11 basic + 24 detailed characteristics = 35)
L5: not applicable

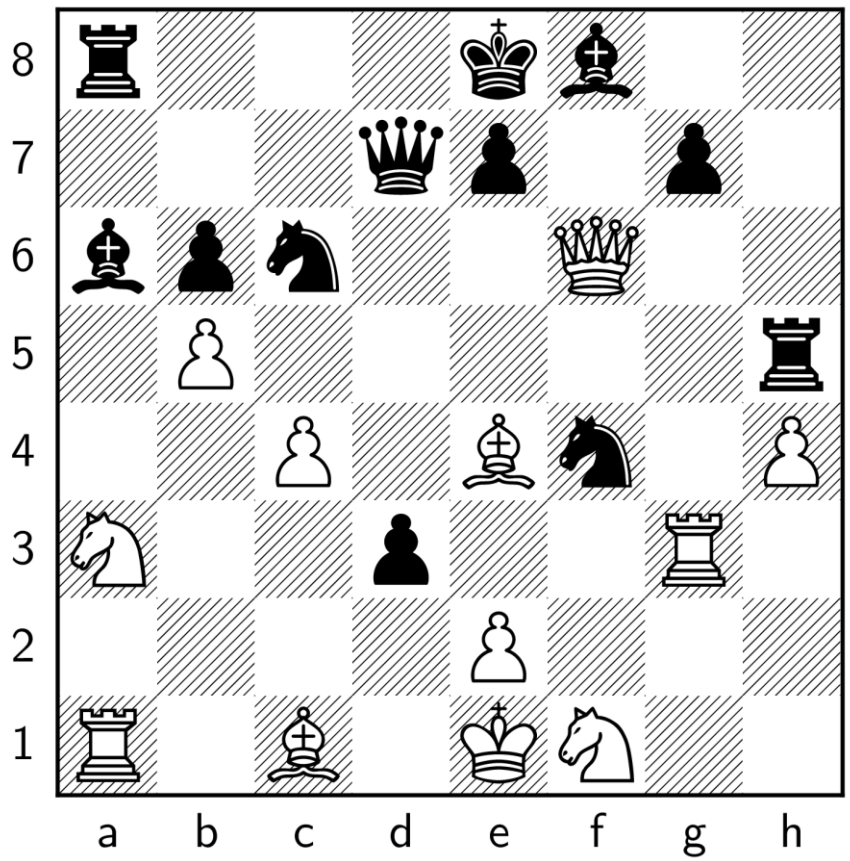
Procedure for incorrect answers:

- Participants may not understand the question. In this case, ask them to pay closer attention and repeat the question.
- If participants have miscounted, ask them if they are sure or if they would like to count again. If they insist on their answer, kindly ask them to count aloud to get them to work. If the answer is still incorrect, ask another participant to solve the problem.



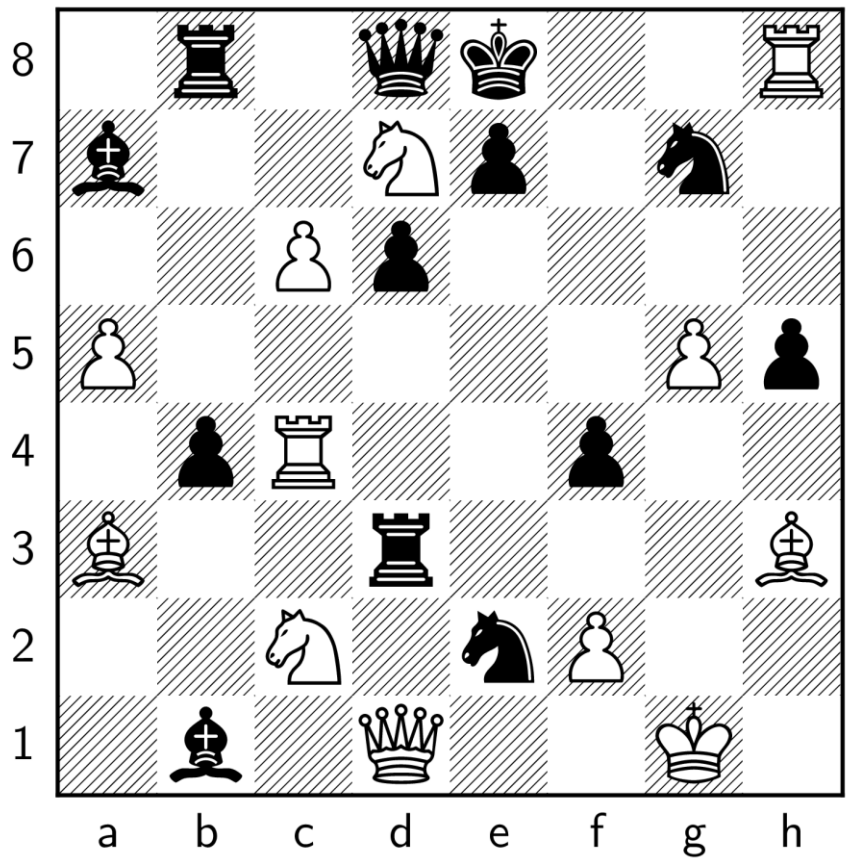
1. How many pieces are on the board? **32**
2. How many pawns are on the board? **16**
3. Which squares are the rooks placed on? **wRa1, wRh1, bRa8, bRh8**
4. Which squares are the knights and the bishops placed on?
   wNb1, wNg1, bNb8, bNg8, wBc1, wBf1, bBc8, bBf8
5. On which squares are the kings and the queens placed?
   wKe1, wQd1, bKe8, bQd8
6. How many black pieces on black squares are there on the 7th rank?
   4
7. How many pieces are there in total on the diagonal h1-a8 and on the a-file? **7**
8. How many pieces are there in total on the 2nd rank and the g-file?
   11
9. How many pieces are there in total on the a1-h8 diagonal and the h-file? **7**

S4.1.2.L2



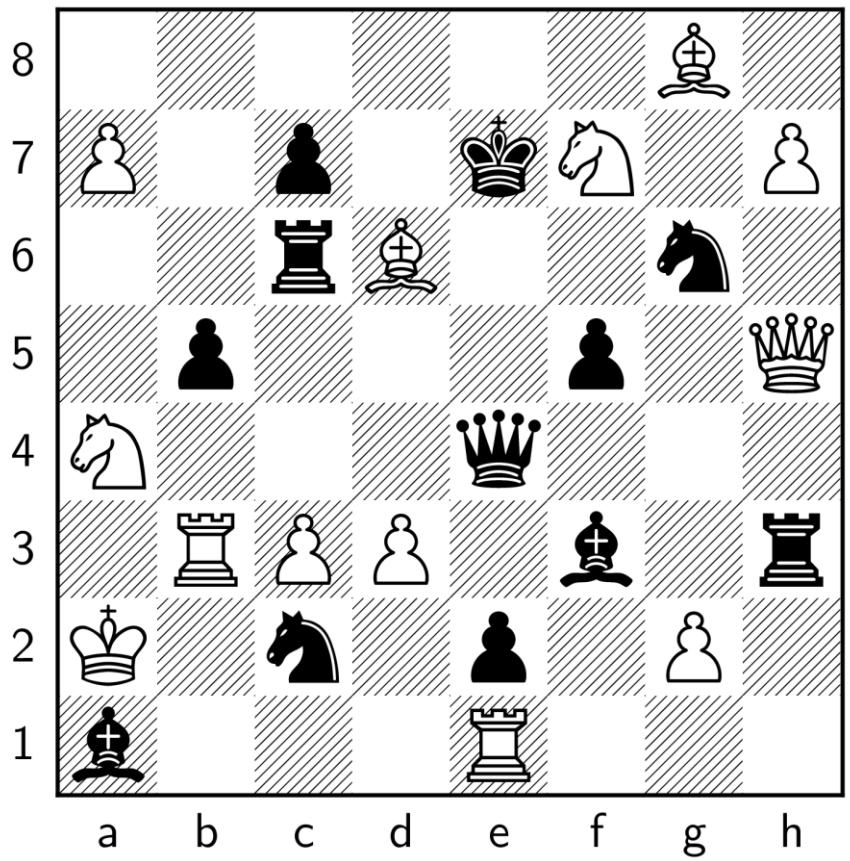
1. How many white pawns are on the board? **4**
2. How many pieces are on the board? **24**
3. How many pawns are on the board? **8**
4. How many bishops and knights are on the board? **8**
5. How many pieces are there in total on the a- and the h-files? **6**
6. How many black pieces on white squares are there on the board? **7**
7. How many black pawns on black squares are there on the board? **3**
8. How many black pawns on white squares are there on the board? **1**
9. How many white pieces are there in total on the 1st and the 3rd ranks? **6**
10. How many black pieces are there in total on the 6th and the 8th ranks? **6**

S4.1.3.L3



1. How many knights are on the board? **4**
2. How many black pieces are there on the board? **13**
3. How many pawns and bishops are there on the board? **13**
4. How many pieces are there in total on the 2nd and the 7th ranks? **7**
5. How many black pieces are there in total on ranks 2, 4, 7, and 8? **9**
6. How many white pieces on white squares are there in total on ranks 1, 2, and 3? **3**
7. How many pieces are there in total on the d- and the f-files? **7**
8. How many white pieces on black squares are there in total on files a, g and h? **5**
9. How many pieces are there in total on the b-file and the 1st rank? **5**
10. How many queens and rooks are there in total on the 8th rank and the d-file? **5 (2 queens + 3 rooks)**

S4.1.4.L4



1. How many pieces are there on the board? **25**
2. How many black pieces are there on white squares? **9**
3. How many bishops and knights are there on the board? **8 (4 each)**
4. How many white pawns on white squares are there on ranks 2, 3, and 7? **3**
5. How many black pawns on white squares are there in total on files b, c, and f? **2**
6. How many pieces on white squares are there in total on files b, c, and f? **7**
7. How many pieces are there in total on files a, e, and f, as well as on the 2nd and the 6th ranks? **16**
8. How many black pieces are there in total on the 1st and the 7th ranks, as well as on files c, d, and e? **7**
9. How many pawns are allowed to move diagonally? **4**
10. How many pawns are not allowed to move / are blocked? **1**

Exercise 4.2: SUSTAINED ATTENTION. Position and quantification

Materials: Paper and pens, stopwatch

Implementation:

- Here, the participants mark white knights on white squares on two worksheets. They are then asked how many they found and how they went about marking them (e.g., by files, ranks, squares, square color, etc.).
- Print out worksheets (in the appendix) according to the number of participants.
- Explain the exercise
- Hand out worksheets
- Discussing solutions is recommended: ask questions about the approach, participants report individually

Time frame:

- 3 minutes per worksheet
- Debriefing per worksheet approx. 3 minutes
- Recommended total time: maximum approx. 15 minutes for both worksheets

Psychoeducational introduction:

The first part of today´s training is again about attention. However, the exercise is different again from last week.
As you have already heard, in addictive disorders it is important to divert attention away from substance-related stimuli and situations. For example, confrontation with the substance, such as seeing a cigarette pack, can trigger cravings for consumption. Therefore, it is useful to train oneself to be able to direct attention to other objects that have nothing to do with the substance.
This exercise also trains visual-spatial functions. You already learned about this exercise last week. As mentioned, the aim is to strengthen the part of the brain that is important for controlling substance use.

Instructions:

- *“Let's continue with another attention exercise. I will hand out a sheet of paper for this. In this exercise, you must mark the white knights on white squares. You have 3 minutes per sheet to complete this exercise.”*
- *“How many knights did you find? How did the others do?“*
- *“How did you go about marking them?“*

Level of difficulty:

- The more pieces on the board, the more difficult it is.
- The full boards on the second worksheet are more noticeable than the "gap boards" on the first sheet. When counting a full board (no empty squares), it is therefore easier to make mistakes than when counting a board that contains several empty squares.

L1: S4.2.1, 6 boards with empty squares
and a maximum 14 white knights on white squares per board

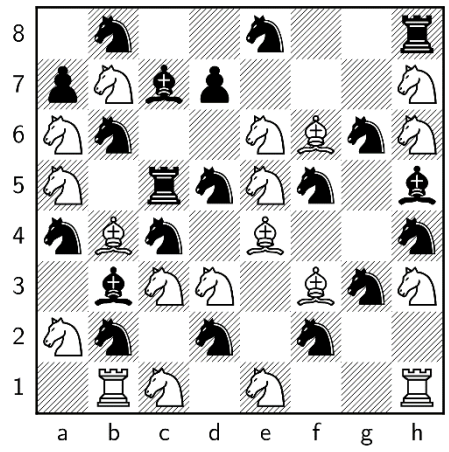
L2: S4.2.2, 6 full boards
with a maximum 9 white knights on white squares per board

Procedure for incorrect answers:

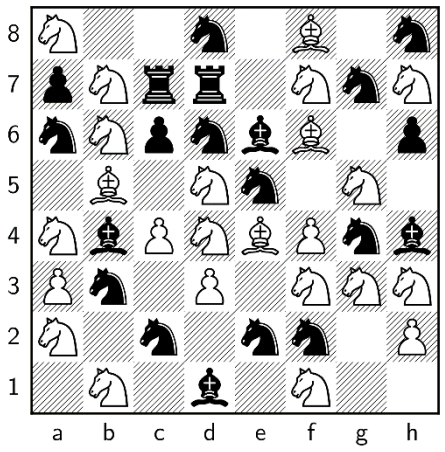
- If participants give an incorrect number, ask them to count again. The same applies if participants did not have enough time to find an answer.
- If a participant makes several mistakes, give them hints (e.g., cross out the knights found with a pen) to help them solve the exercise.

S4.2.1.L1

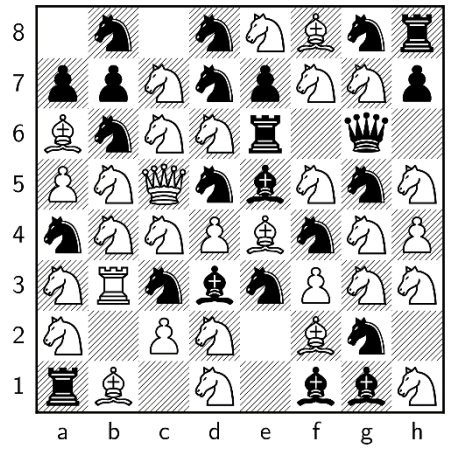
In this exercise, you must mark the white knight on white squares. You have 3 minutes to complete this exercise.



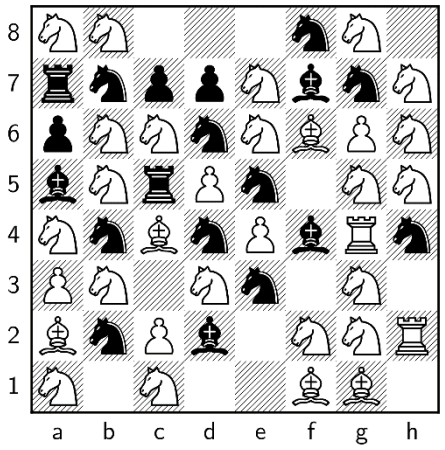
A



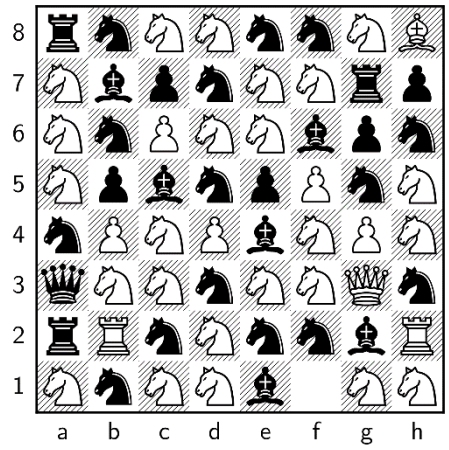
B



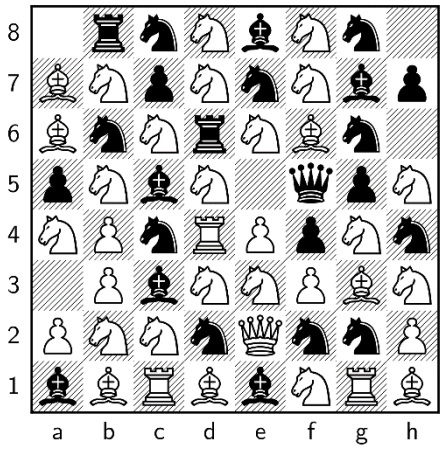
C



D

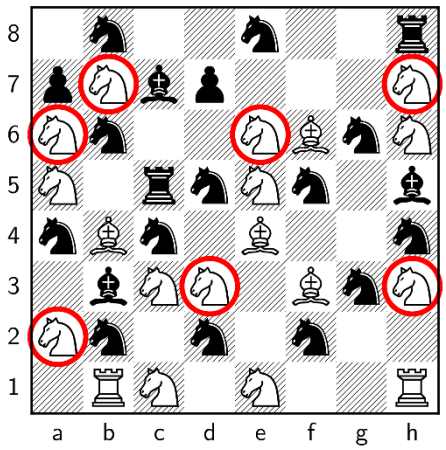


E

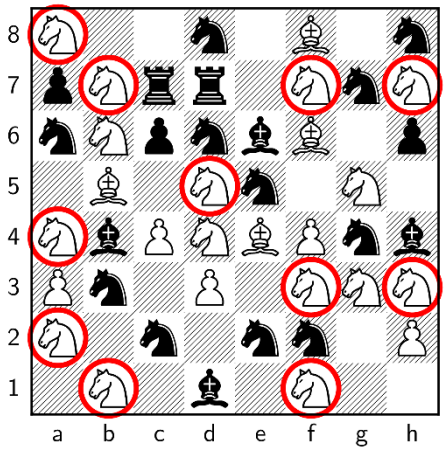


F

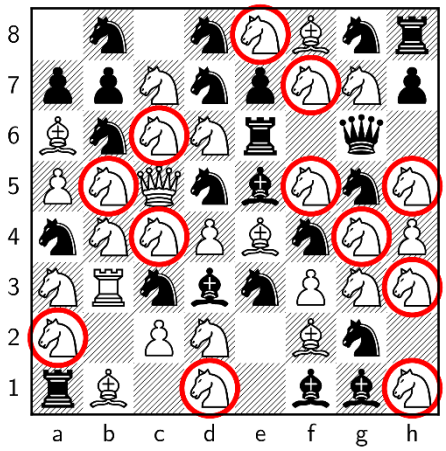
Solutions S4.2.1.L1:



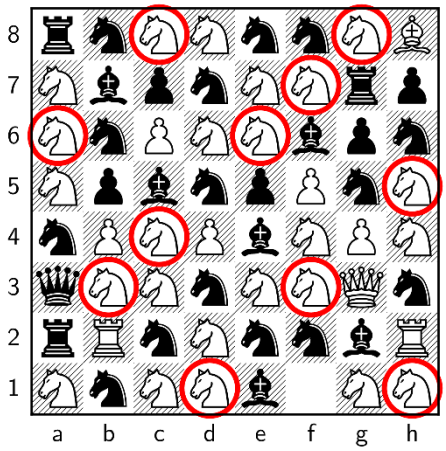
A (7)



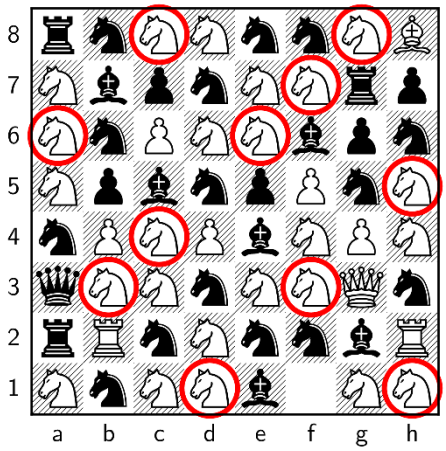
B (11)



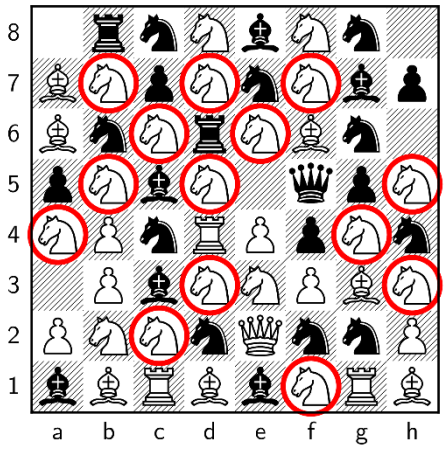
C (12)



D (11)



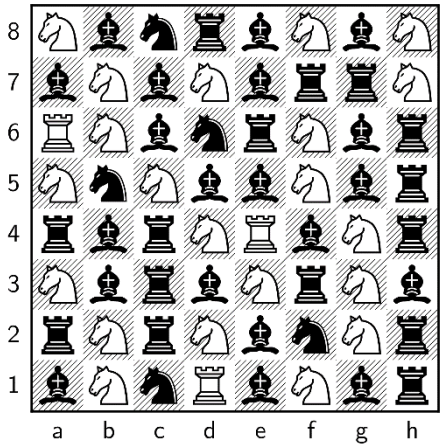
E (11)



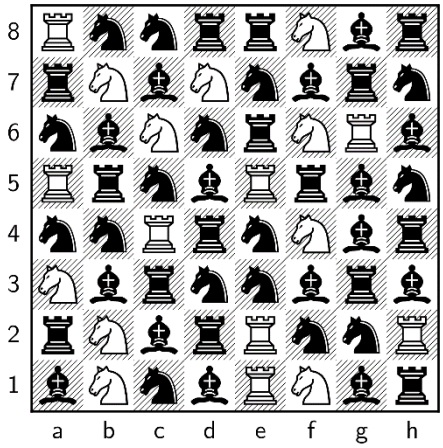
F (14)

S4.2.2.L2

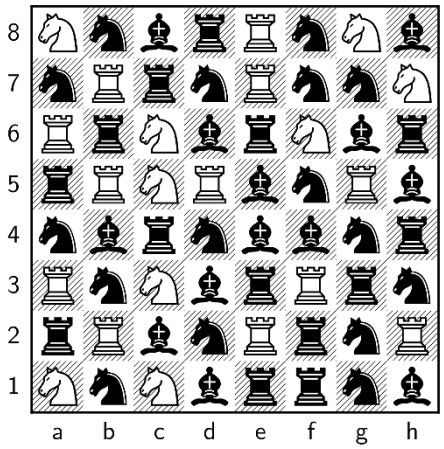
In this exercise, you must mark the white knight on white squares. You have 3 minutes to complete this exercise.



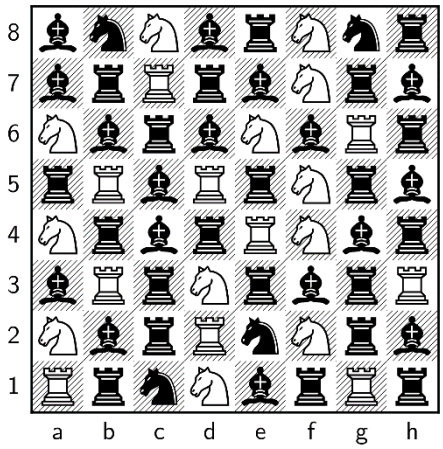
A



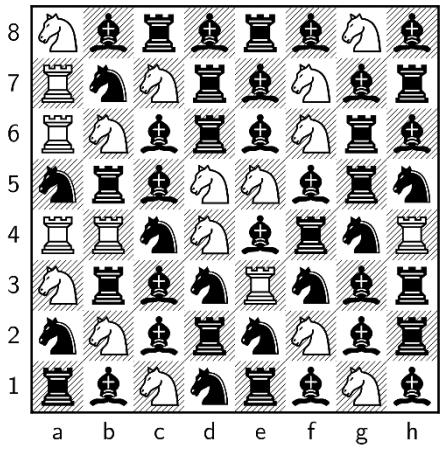
B



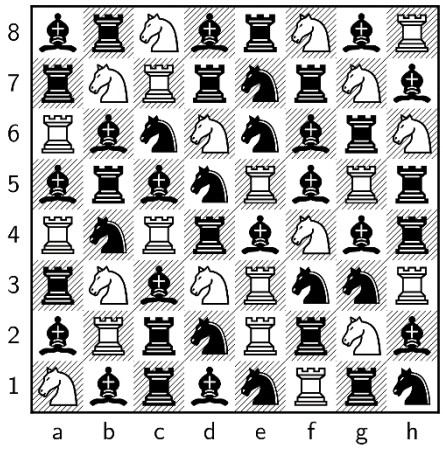
C



D

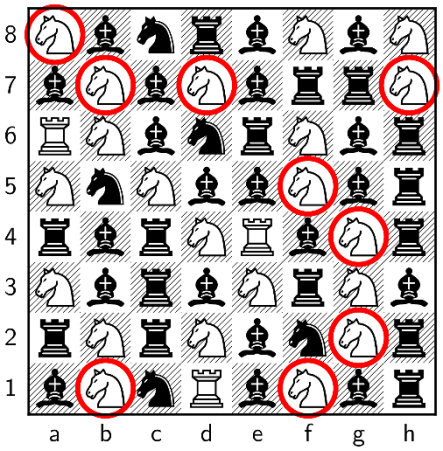


E

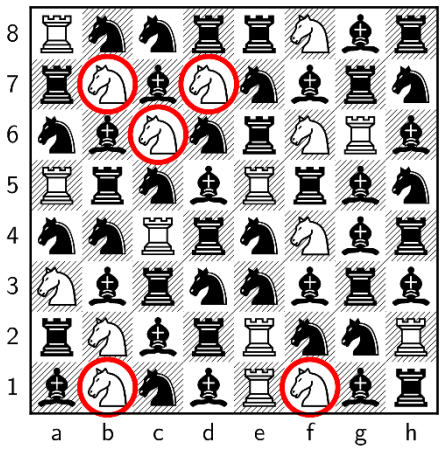


F

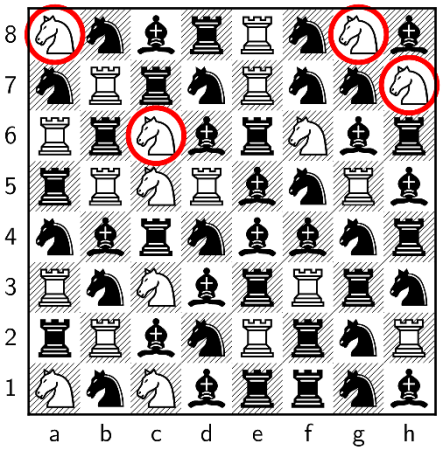
Solutions S4.2.2.L2:



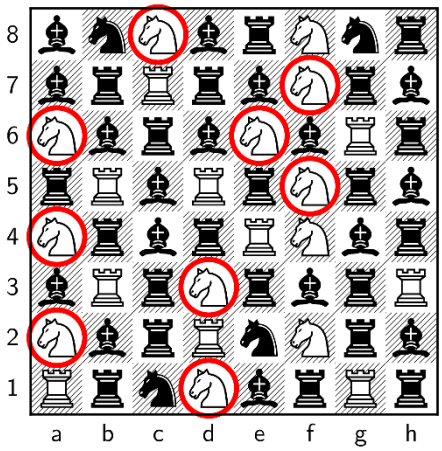
A (9)



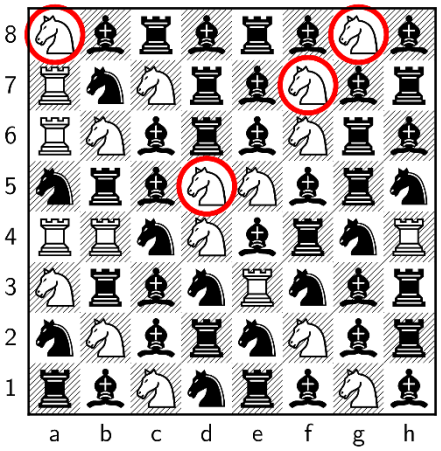
B (5)



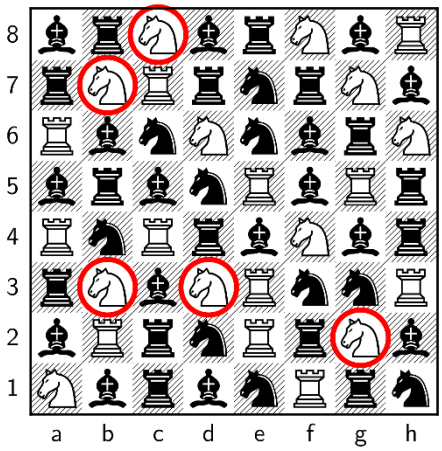
C (4)



D (9)



E (4)



F (5)

Exercise 4.3: SHORT-TERM MEMORY. Delayed memory exercise.

Materials: Demo board, stopwatch

Implementation:

- Show the position for 3-5 seconds; for participants with cognitive impairments, a maximum of 10 seconds.
- Participants are asked questions that have nothing to do with chess.
- After answering, the participant reconstructs the position on the board.
- There should not be too long a pause between removing the pieces and setting up the position (maximum 45 seconds), otherwise there is a risk of losing the position from short-term memory.

Time frame:

- Per diagram approx. one minute
- In total approx. 30–40 minutes

Psychoeducational introduction:

> Now we are going to train your short-term memory again, but with a different exercise. Today, there is an added difficulty in that you will be distracted while working on the task.
> As you have already heard, working memory is important for internalizing and implementing therapy content. It also supports abstinence, for example, as it reduces the need to improve cognition in the short term by taking addictive substances.
> As mentioned, you will be deliberately distracted during this exercise. People suffering from addiction can be severely distracted by addictive substances, e.g. when an alcoholic walks through the drinks aisle in a supermarket or a smoker stands at the checkout at a gas station and sees cigarettes. Therefore, we train you to be less distracted and to maintain your concentration even when you are distracted.

Instructions:

- *Let´s now train your short-term memory.*
- *I will now show you positions on the chessboard and ask you to memorize them. After I have removed the pieces from the board, I will ask you to reconstruct the positions, but before you rebuild the pieces, you must answer a question aloud.*

Level of difficulty:
The parameters used were patterns (chains of pieces consisting of at least two pawns), the number of knowledge units queried (e.g., “Name four cities” or “Name seven countries”) and the number of pieces. These were added up to level points. However, the levels of difficulty were set differently for four diagrams because the parameters were weighted differently or not at all.

Exercise package 1 (No. 1 to 12):
L1: Level points 7 to 8
L2: Level points 9
L3: Level points 10
L4: Level points 11
L5: Level points 12

Exercise package 2 (No. 13 to 24):
L1: Level points 7 to 8
L2: Level points 9
L3: Level points 10
L4: Level points 11
L5: not applicable

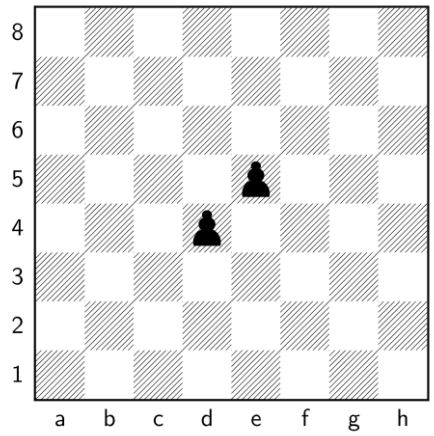
Procedure for incorrect answers:

- Participants may find it difficult to answer the distraction questions. In this case, spontaneously reduce the number of characteristics requested or ask a question from another area, e.g.:
    - Instead of *„Please name seven countries in America!“,* change to *“Please name **three** countries in America!“*
    - Instead of *„Please name four actors!“,* change to *“Please name four **fairy tales**!“*

Further examples of alternative questions, where x is a number that should not be greater than seven:

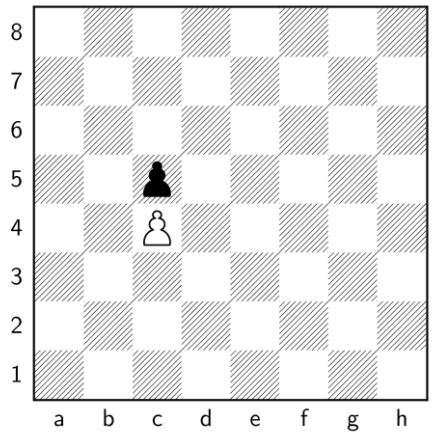
- *“Please name x flowers or plants!“*
- *“Please name x famous fairy tales!“*
- *“Please name x planets in our solar system!“*
- *“Please name x animals that live in the wild!“*
- *“Please name x famous scientists!“*
- *“Please name x famous castles or palaces!“*
- *“Please name x famous inventions!“*
- *“Please name x holidays!“*
- *“Please name x different types of buildings!“*

S4.3.1.L1



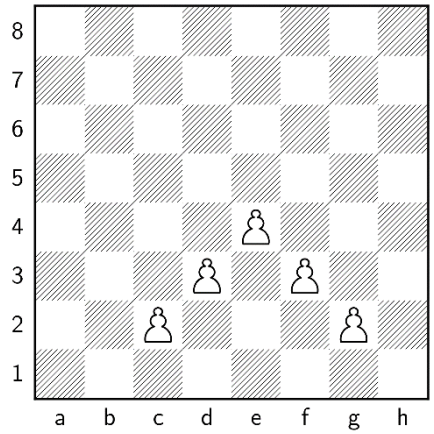
Please name five attractions in your home town!

S4.3.2.L1



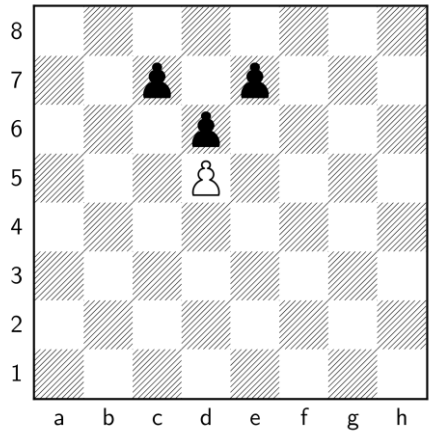
Please name five cities in France!

S4.3.3.L1



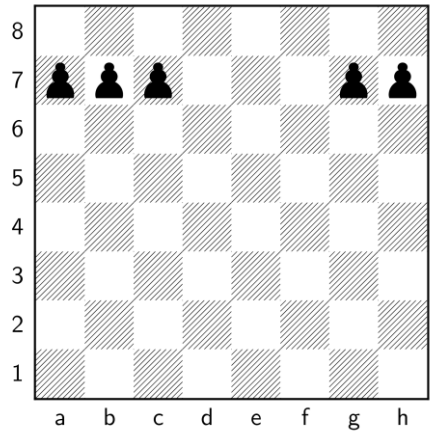
Please count in increments of three from zero to thirty (0-3-6, etc.)!

S4.3.4.L1



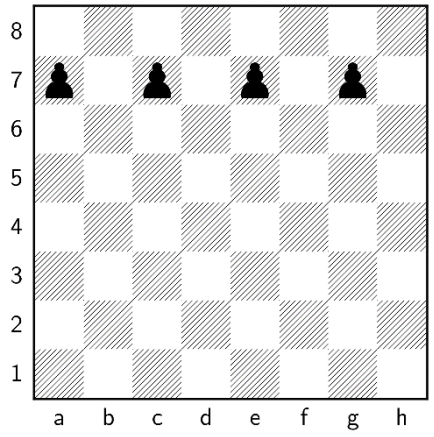
Please count down from thirty to zero in increments of three (30-27-24, etc.)!

S4.3.5.L2



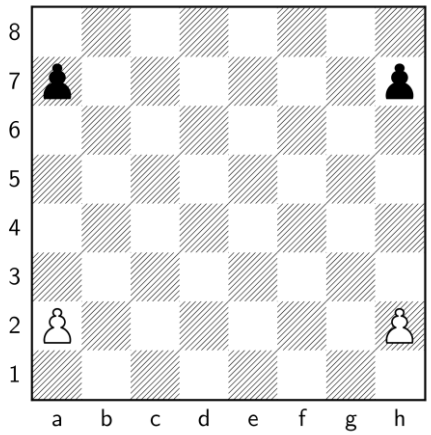
Please name six pets!

S4.3.6.L2



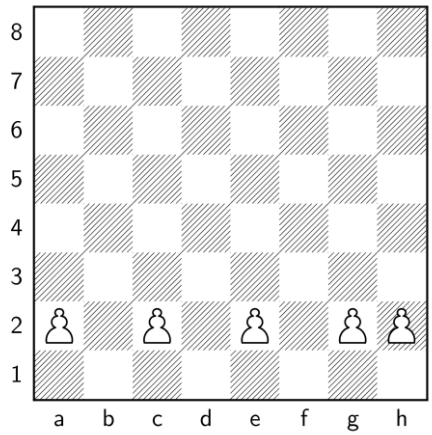
Please name seven female first names!

S4.3.7.L2



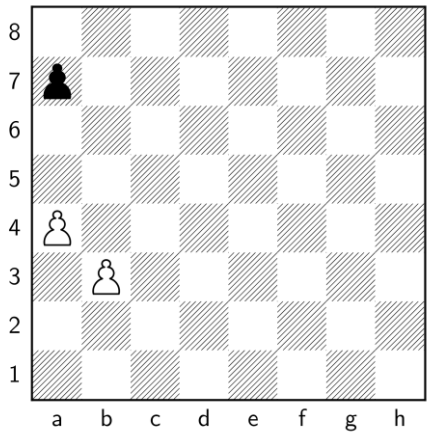
Please name seven male first names!

S4.3.8.L2



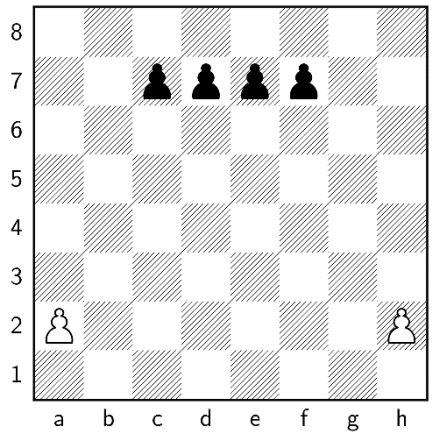
Please name seven species of birds!

S4.3.9.L2



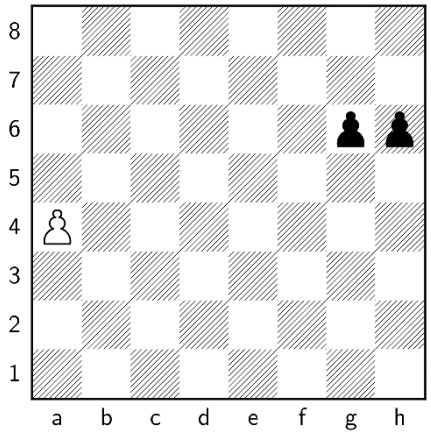
Please name seven countries in America!

S4.3.10.L3



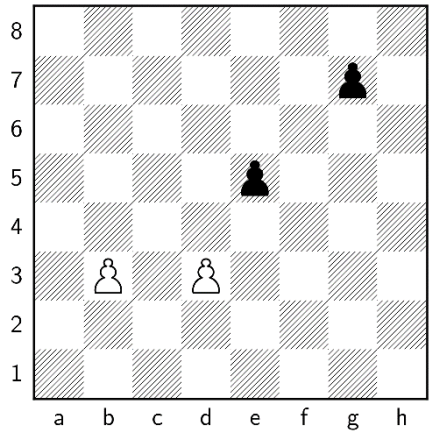
Please name six African countries!

S4.3.11.L3



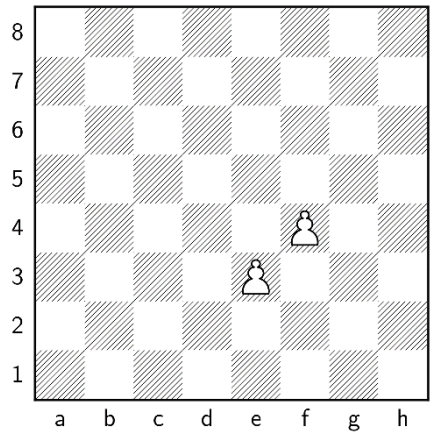
Please name eight fish species!

S4.3.12.L4



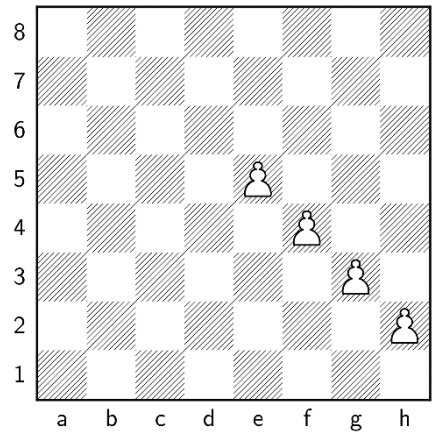
How many days are there in April, September, and November?

S4.3.13.L1



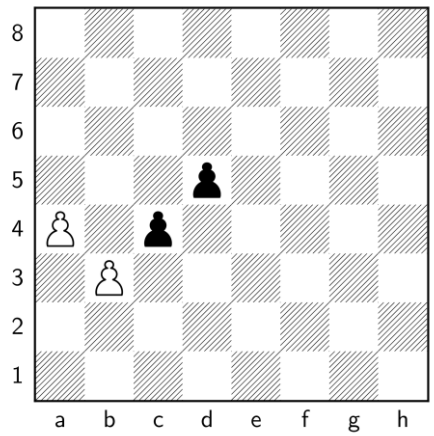
Please name four colors!

S4.3.14.L1



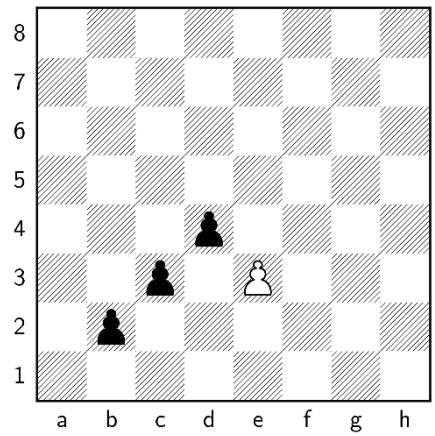
Please name four pieces of furniture!

S4.3.15.L1



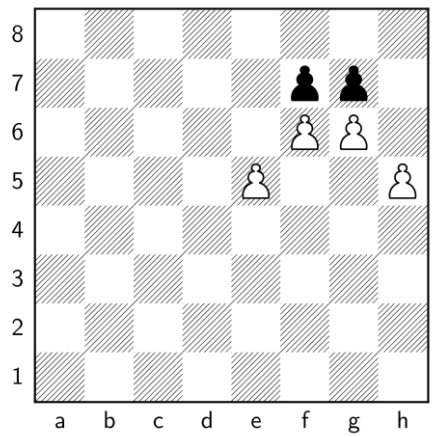
Please name four items of clothing!

S4.3.16.L1



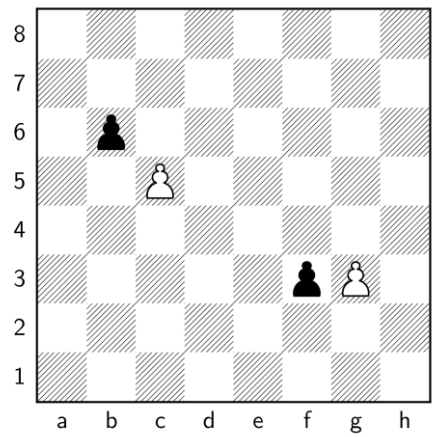
Please name four actors / actresses!

S4.3.17.L1



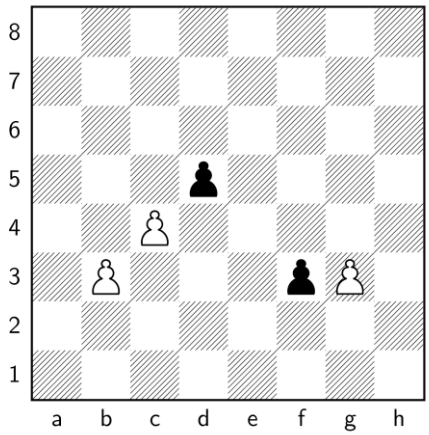
Please name four famous movies!

S4.3.18.L2



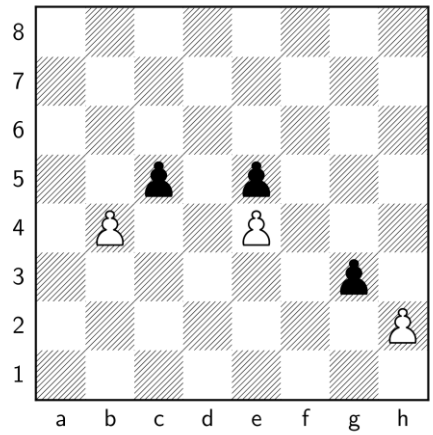
Please name five car brands!

S4.3.19.L2



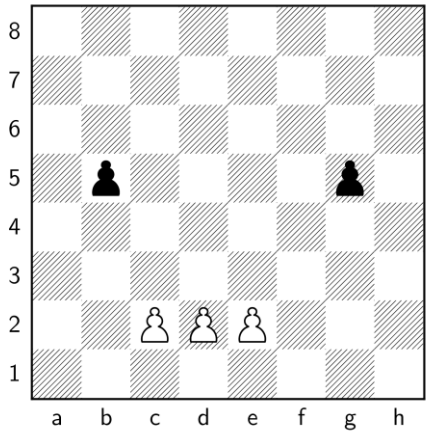
Please name five sports!

S4.3.20.L2



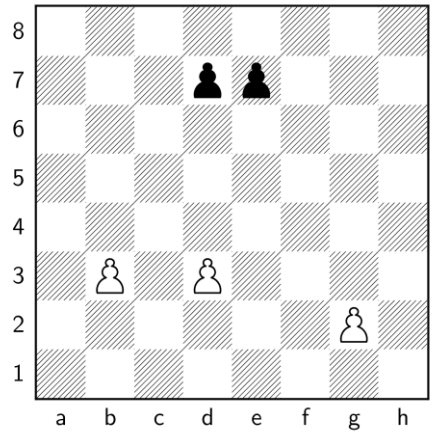
Please name five states!

S4.3.21.L3



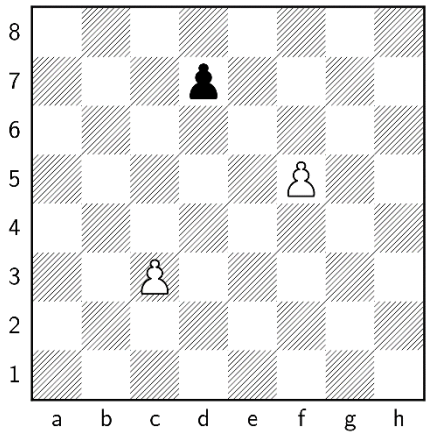
Please name six languages!

S4.3.22.L3



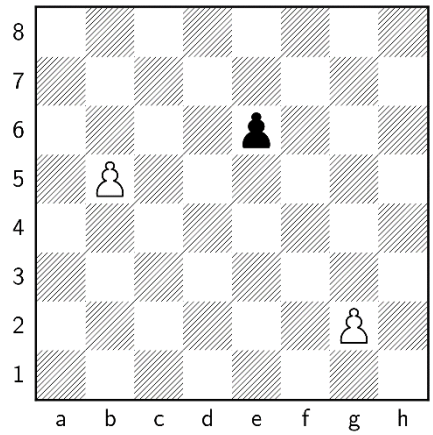
Please name six musical instruments!

S4.3.23.L4



Please name seven pop music artists!

S4.3.24.L4



Please name seven board games!

SESSION 5.

Exercise 5.1: MEMORY STRATEGIES. Mnemonics.

Materials: Demo board

Implementation:
The course instructor shows the first position (S5.1.1.L.1) for 60 seconds. This is the starting position (basic structure: four black pawns on c4, d5, c6, and c7) from which the entire exercise begins. Then they dismantle it. Afterwards, a participant is called upon to set up the position. If the position has been reconstructed correctly, there is applause.
In the next step, the instructor maintains this basic position and adds a pawn. After one minute, however, only the addition is dismantled, and a participant rebuilds it.
So the original, very first position (basic position) is always maintained and only one pawn is added, piece by piece. Only the growing addition (first one pawn, then two, etc.) is repeatedly removed before being reconstructed by a participant. With each new board position, the basic position (the basic structure) is maintained, supplemented by an increasing number of pawns. From S5.1.12.L3 onwards, other types of pieces are added in addition to pawns.

Time frame:
Two exercise packages (specified below) are usually sufficient for the exercise, which takes about 60 to 65 minutes.

Approximately 30 minutes can be estimated for the completion of a third exercise package (and thus all diagrams), which would correspond to the total length of a complete session without addressing the second exercise block (executive functions, transferring values, and calculating). This is therefore not recommended.

Psychoeducational introduction:
You already know that memory functions play a major role in the development and maintenance of addictive disorders. Today, we will not only train your working memory, but you will also learn techniques for better coping with such exercises. The diagrams build on each other and become increasingly difficult over time.

Instructions:

- *“I will now show you a chessboard for one minute. Then I will remove the pieces and ask you to rebuild it.”*

Level of difficulty:

- The following parameters are used:
- Number of pieces
- Number of types of pieces
- Number of colors

There are several exercise packages. A package is a series of diagrams that build on each other and belong together in terms of additions. There is a basic framework of several pieces to which additions are made.

Levels of difficulty for diagrams with one type of piece (pawns):
Exercise package 1, diagrams 1 to 11 (S5.1.1 to S5.1.11)

1: 4–5 pieces, one color
2: 6–7 pieces, two colors
3: 8–9 pieces, two colors
4: 10–11 pieces, two colors
5: > 11 pieces, two colors

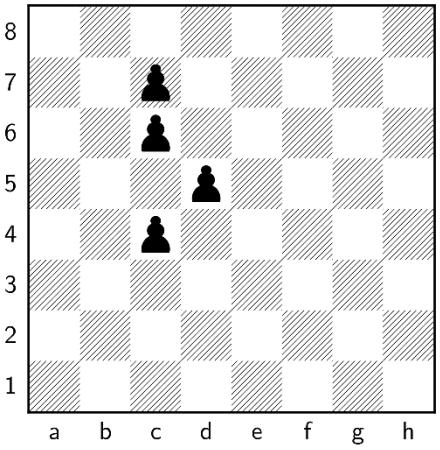
Levels of difficulty for diagrams with multiple types of pieces:
Exercise package 2, diagrams 12 to 23 (S5.1.12 to S5.1.23),
Exercise package 3, diagrams 24 to 35 (S5.1.24 to S5.1.35),

3: 4–5 pieces, 3 types of pieces, 1–2 colors
4: 6–9 pieces, 3–4 types of pieces, 2 colors
5: 10–15 pieces, 5–6 types of pieces, 2 colors

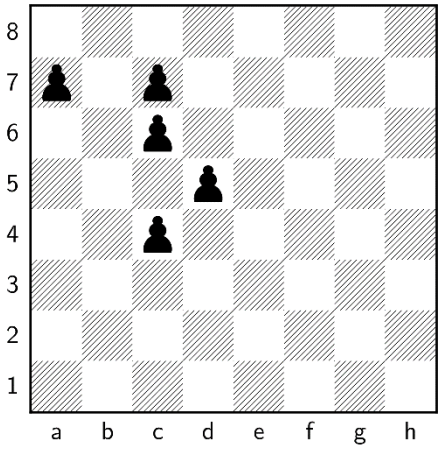
Procedure for incorrect answers:

- It often happens that participants only remember part of the diagram. In this case, praise them and encourage them to trust their intuition. If the participants still cannot come up with the correct solution, ask someone else in the group for help.

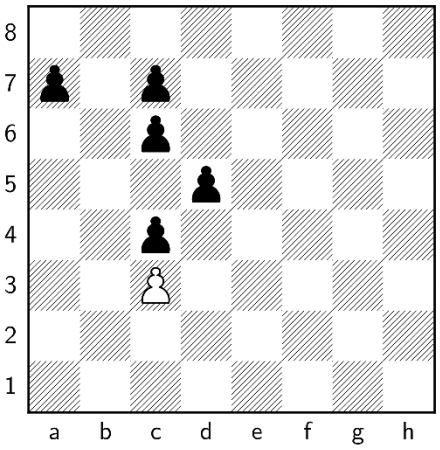
S5.1.1.L1 (base)



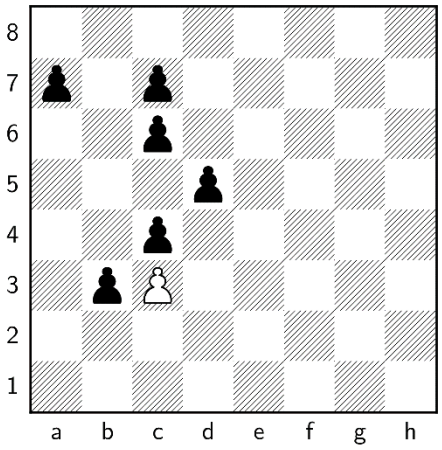
S5.1.2.L1



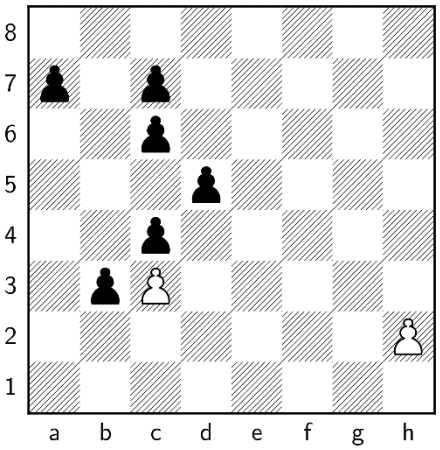
S5.1.3.L2



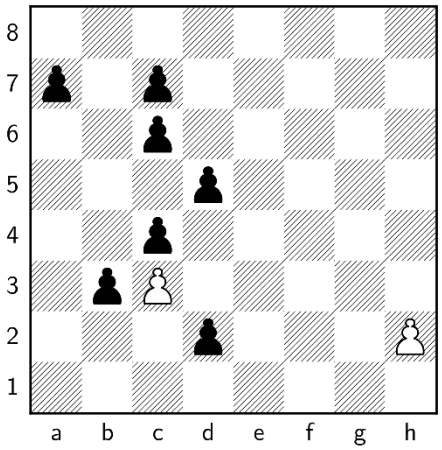
S5.1.4.L2



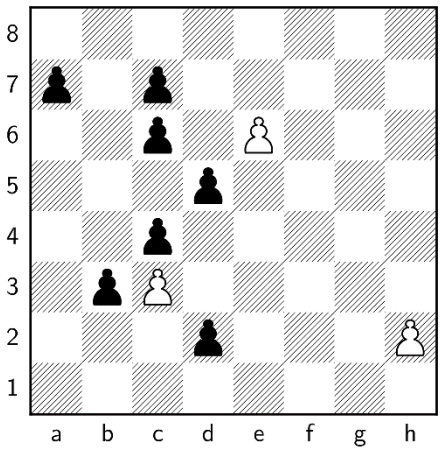
S5.1.5.L3



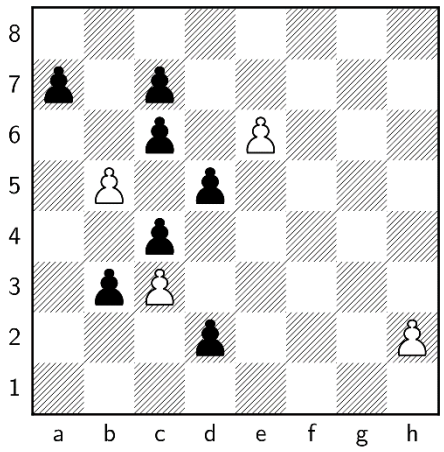
S5.1.6.L3



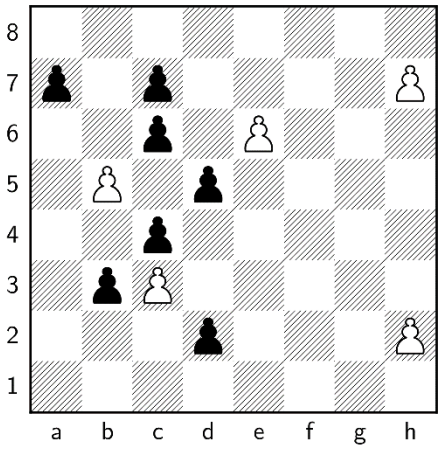
S5.1.7.L4



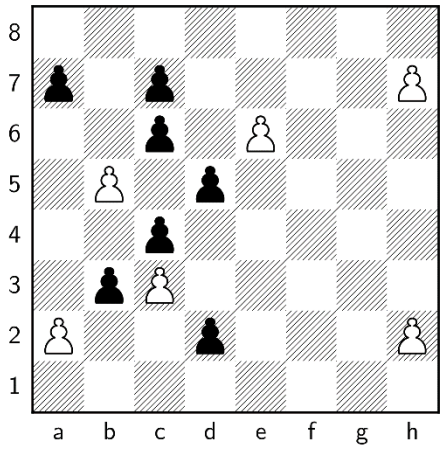
S5.1.8.L4



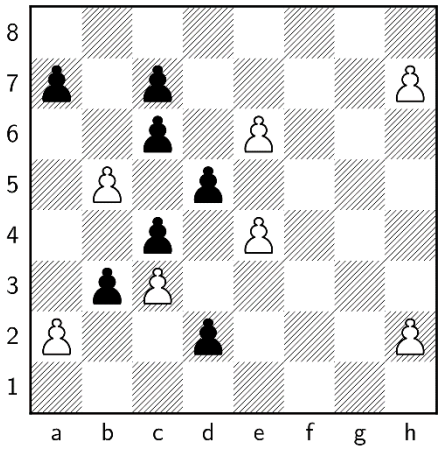
S5.1.9.L5



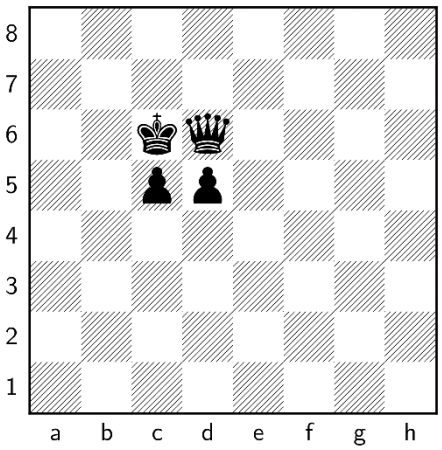
S5.1.10.L5



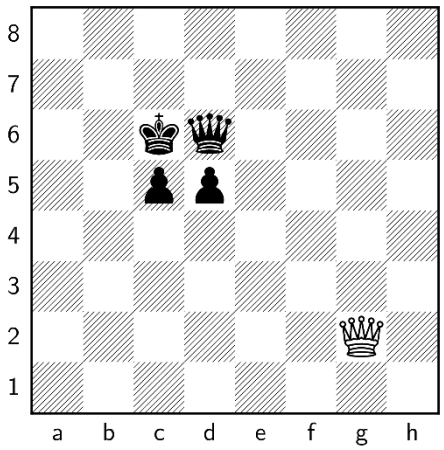
S5.1.11.L5



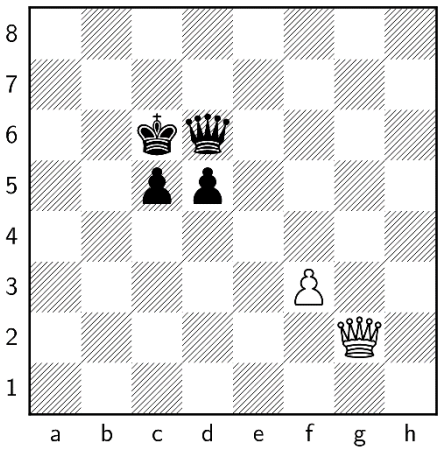
S5.1.12.L3 (base)



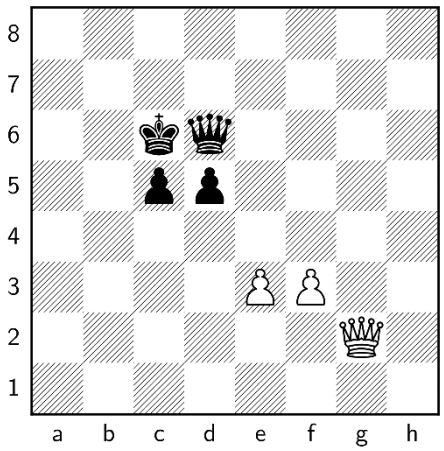
S5.1.13.L3



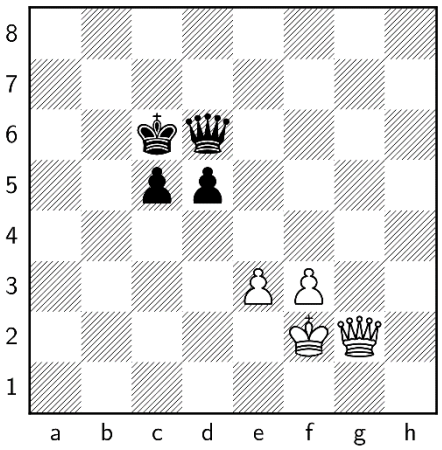
S5.1.14.L4



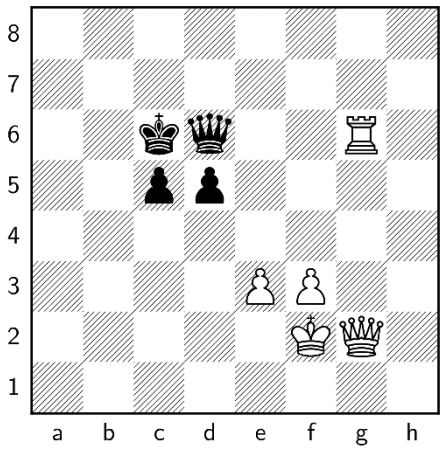
S5.1.15.L4



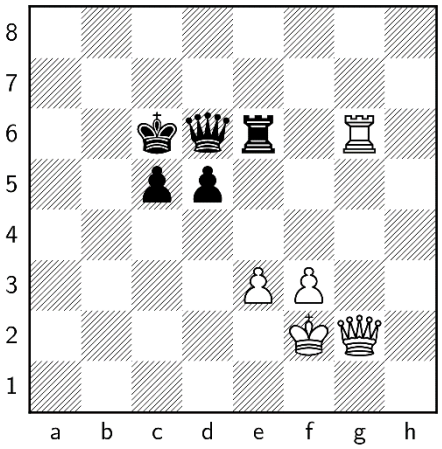
S5.1.16.L4



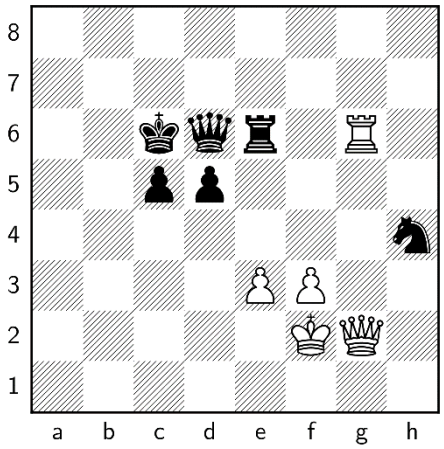
S5.1.17.L4



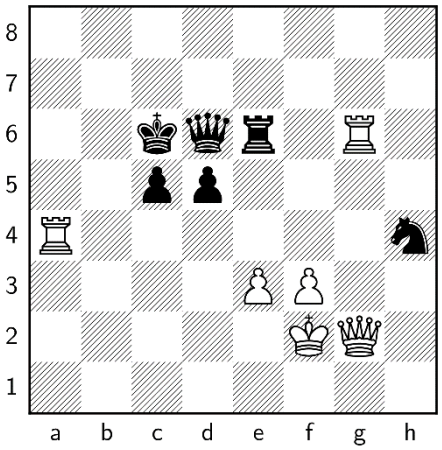
S5.1.18.L5



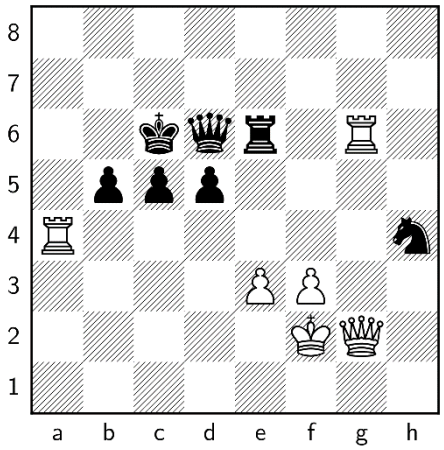
S5.1.19.L5



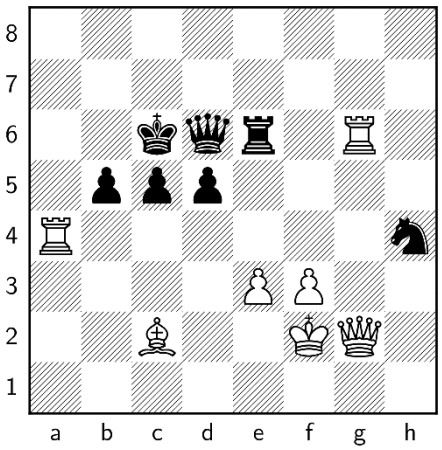
S5.1.20.L5



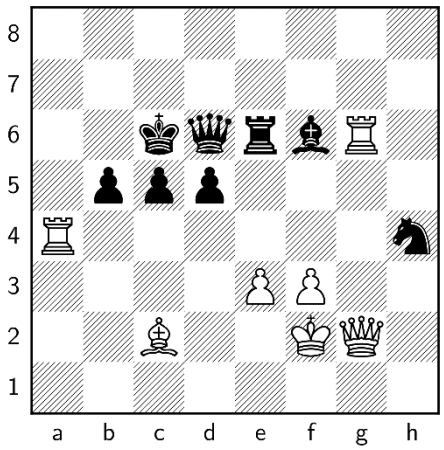
S5.1.21.L5



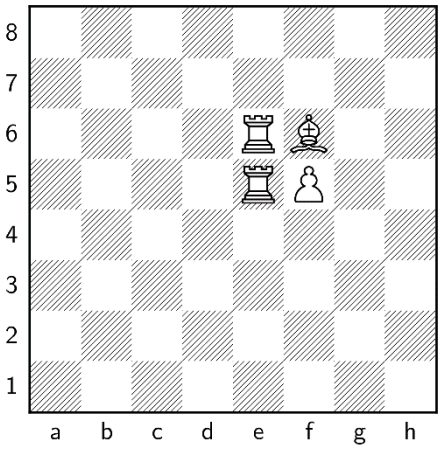
S5.1.22.L5



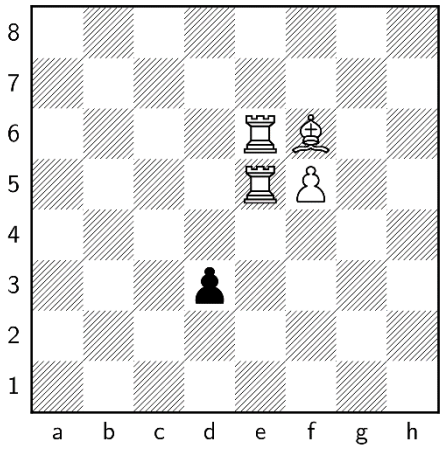
S5.1.23.L5



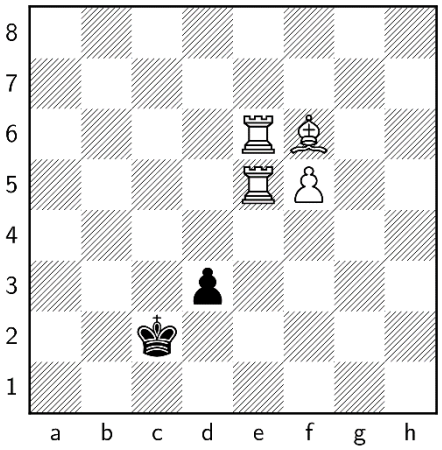
S5.1.24.L3 (base)



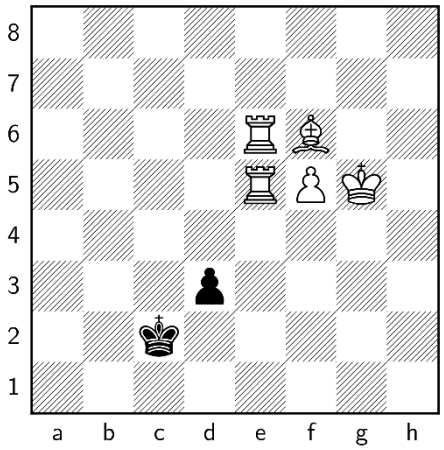
S5.1.25.L3



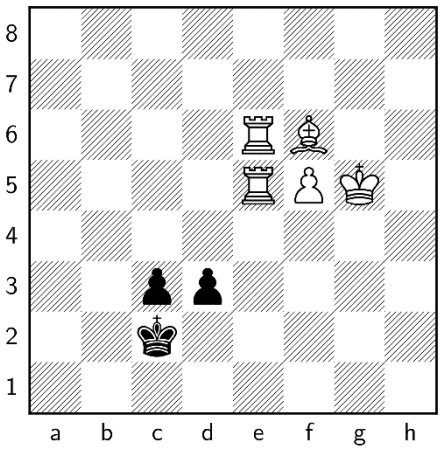
S5.1.26.L4



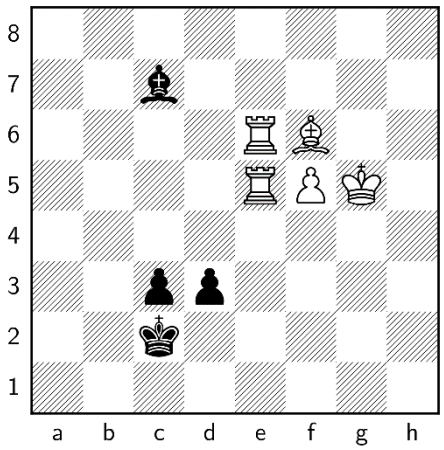
S5.1.27.L4



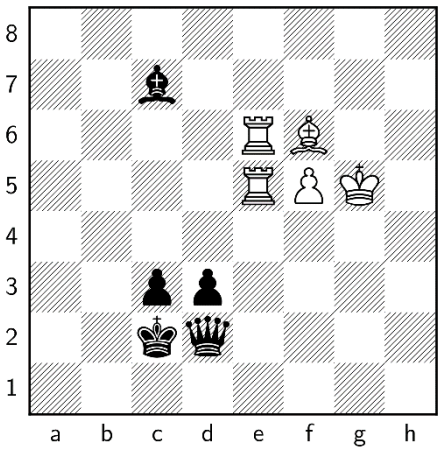
S5.1.28.L4



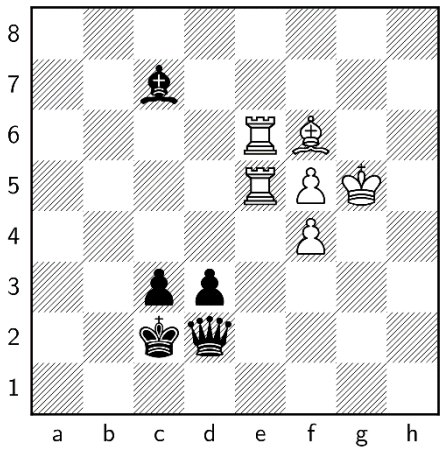
S5.1.29.L4



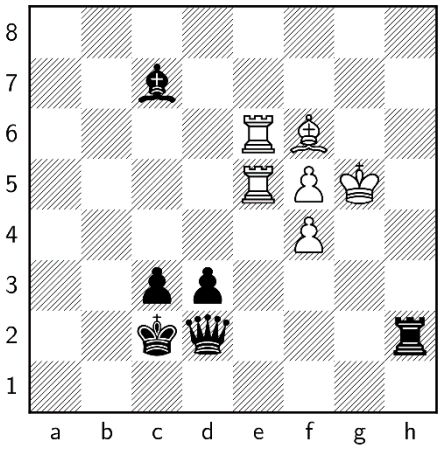
S5.1.30.L5



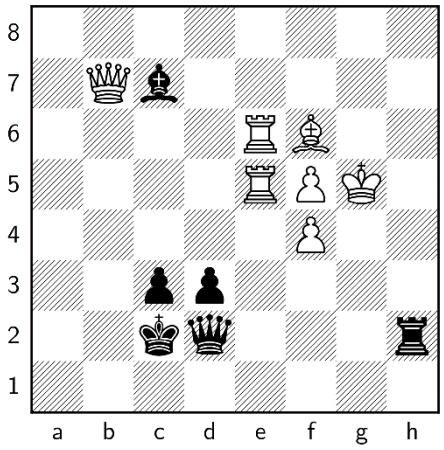
S5.1.31.L5



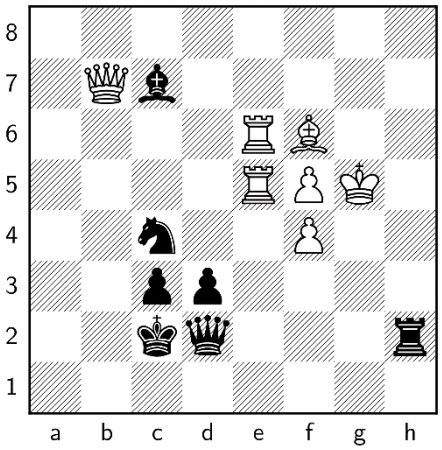
S5.1.32.L5



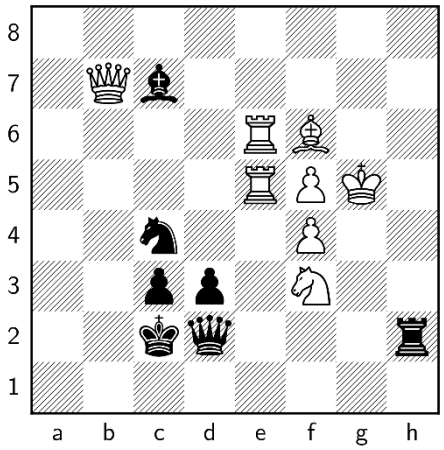
S5.1.33.L5



S5.1.34.L5



S5.1.35.L5



Exercise 5.2: EXECUTIVE FUNCTIONS. Transferring and calculating values.

Materials: Demo board, marker chips, verbal communication

Implementation:

- Start by explaining the value of the pieces on the demo board. For a cognitively impaired group, the assignment of values to pieces can be visually presented using marker chips.
- The assignment of values to the pieces described above should not be repeated (unless specifically requested by participants during the explanation). Participants should memorize the values of the pieces and then calculate the exercises.
- Read the pieces aloud one after the other, then call on participants.

Time frame:

- Approx. 20-30 seconds per exercise;
  approx. 10-15 minutes in total.

Psychoeducational introduction:
In this exercise, we train what are called the executive functions. These help us to control our behavior, achieve goals, and adapt to new situations. This can be trained with arithmetic problems, for example. Here, you will calculate with pieces instead of numbers, which makes the exercise more difficult.
The exercises for executive functions are designed to help you make more considered long-term decisions and counteract impulsive behavior.
Here, we can again mention the example of long-term damage to the body caused by prolonged consumption.

Instructions:

- *“First I would like to show you the value of pieces:*
  The pawn is worth one point.
  The bishop is worth three points.
  The knight is worth three points.
  The rook is worth five points.
  The queen is worth nine points.
  The value of the king cannot be clearly quantified. For this reason, it is not assigned a value in the world of chess.
  Today we will try to test our executive functions. To do this, we will calculate with the pieces: I will name the pieces, and you will tell me the sum of their values.“

Level of difficulty:

- The more pieces and types of pieces, the more difficult.
- The exercises are sorted accordingly.

  1: 1–2 pieces; 1 type of piece
  2: 2 pieces; 2 types of pieces
  3: 3–4 pieces; 2–3 types of pieces
  4: 4–5 pieces; 3–4 types of pieces
  5: 5 pieces; 4–5 types of pieces

Procedure for incorrect answers:

- Participants may make calculation errors. In this case, ask the participant to repeat the calculation.
- If participants are unsure about the value of a piece, it should be repeated.

S5.2.1.L1	pawn + pawn	2
S5.2.2.L1	rook + rook	10
S5.2.3.L2	queen + pawn	10
S5.2.4.L2	pawn + rook	6
S5.2.5.L2	knight + bishop	6
S5.2.6.L2	bishop + rook	8
S5.2.7.L2	rook + queen	14
S5.2.8.L3	rook + bishop + pawn	9
S5.2.9.L3	bishop + pawn + rook	9
S5.2.10.L3	bishop + pawn + pawn	5
S5.2.11.L3	knight + pawn + knight	7
S5.2.12.L3	pawn + pawn + queen	11
S5.2.13.L3	pawn + rook + pawn	7
S5.2.14.L3	knight + queen + pawn	13
S5.2.15.L3	pawn + bishop + queen	13
S5.2.16.L3	pawn + queen + pawn + pawn	12
S5.2.17.L3	bishop + knight + bishop + rook	14
S5.2.18.L3	rook + queen + pawn	15
S5.2.19.L3	bishop + pawn + rook	9
S5.2.20.L3	queen + bishop + knight	15
S5.2.21.L3	queen + pawn + bishop	13
S5.2.22.L3	pawn + queen + pawn	11
S5.2.23.L3	pawn + knight +bishop	7
S5.2.24.L3	knight + knight + queen	15
S5.2.25.L4	pawn + rook + knight + pawn	10
S5.2.26.L4	knight + rook + pawn + pawn	10
S5.2.27.L4	rook + bishop + queen + pawn	18
S5.2.28.L4	pawn + bishop + queen + rook	18
S5.2.29.L4	rook + bishop + pawn + knight	12
S5.2.30.L4	pawn + knight + queen + rook	18
S5.2.31.L4	knight + bishop + queen + pawn	16
S5.2.32.L5	queen + rook + bishop + pawn + queen	27
S5.2.33.L5	rook + queen + pawn + knight + rook	23

SESSION 6.

Exercise 6.1: ATTENTION TO DETAILS. Describing.

Materials: Demo board or computer / screen, stopwatch
Implementation:

- The participants first look at a position for about 30 seconds. Then the instructor asks the participants to describe the position both from a visual-spatial perspective (e.g., in which area of the board are there many or few pieces; are there symmetries or asymmetries) and from a chess-specific perspective (e.g., can one piece capture one or more others). If necessary, the instructor can provide hints about characteristics.
- The instructor then asks questions about the position.

Mode:
After three or four questions, the instructor hides the board from the participants and asks further questions.
It is recommended that this variation only be used with groups that are not cognitively impaired.

Time frame:

- S6.1.1.L1 to S6.1.4.L4: approx. 15 minutes each
- Total: approx. 60 minutes (when using a demo board)

Psychoeducational introduction:
Today we are again focusing on attention and concentration. You already know that in addiction it is important to divert attention away from substance-related stimuli and situations. Today we will specifically practice focusing attention on certain details and recognizing characteristics.

Instructions

- *"In this exercise, I would like you to look at the board. After half a minute, you should describe what you see as accurately as possible. This should be done from both a spatial and a chess-specific perspective. I will then ask you a few specific questions about the position."*

Level of difficulty:

- The positions are sorted in ascending order according to their level of difficulty.
- Basic and detailed characteristics were used as parameters:
  Basic characteristics:
  Number of pieces
  Color: Number of white / black pieces
  Type of piece

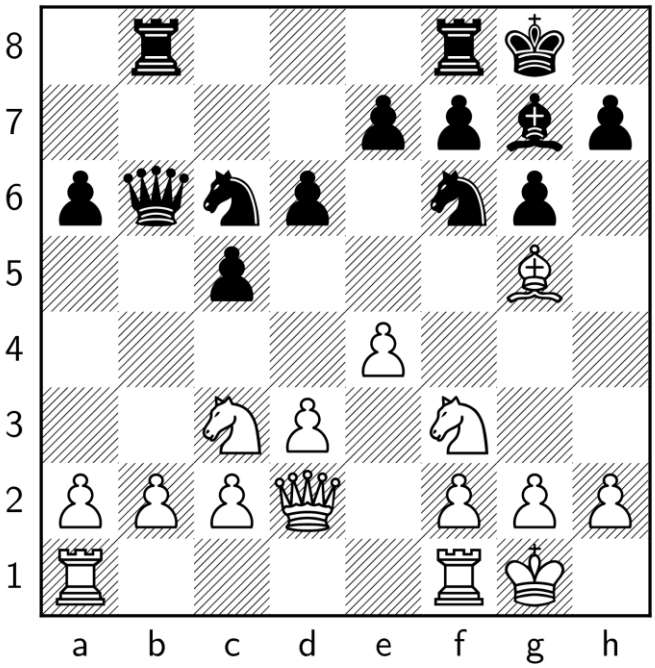
  Detailed characteristics:
  Files
  Ranks
  Squares
  Square color (color of a square on which a piece stands)
  Logical connection

  L1: 3 or 4 questions per position when viewing the board
  L2: Pos. 1 (9 basic + 7 detailed characteristics = 16)
  L3: Pos. 2 (10 basic + 9 detailed characteristics = 19)
  L4: Pos. 3 (12 basic + 8 detailed characteristics = 20)
  L5: Pos. 4 (13 basic + 11 detailed characteristics = 24)

  Procedure for incorrect answers:

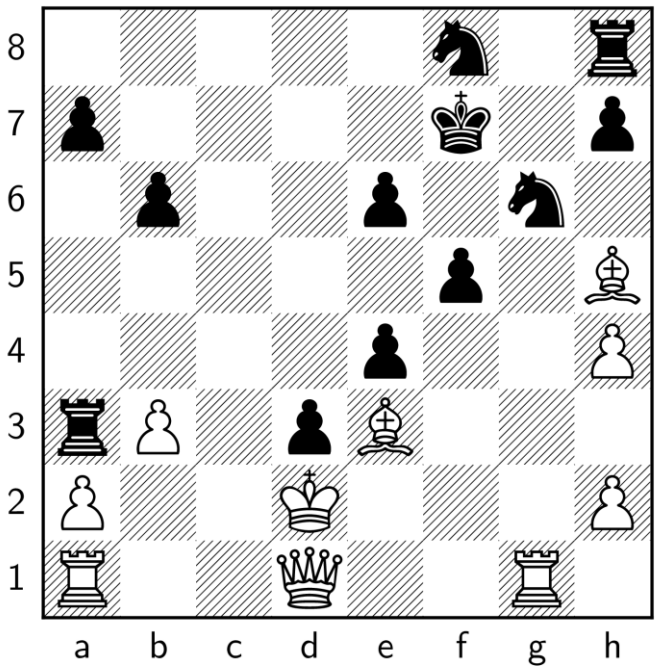
- If the answer is incorrect, participants have a second attempt.
- If this is also incorrect, help is requested from the group and, if necessary, the position is revealed

S6.1.1.L2

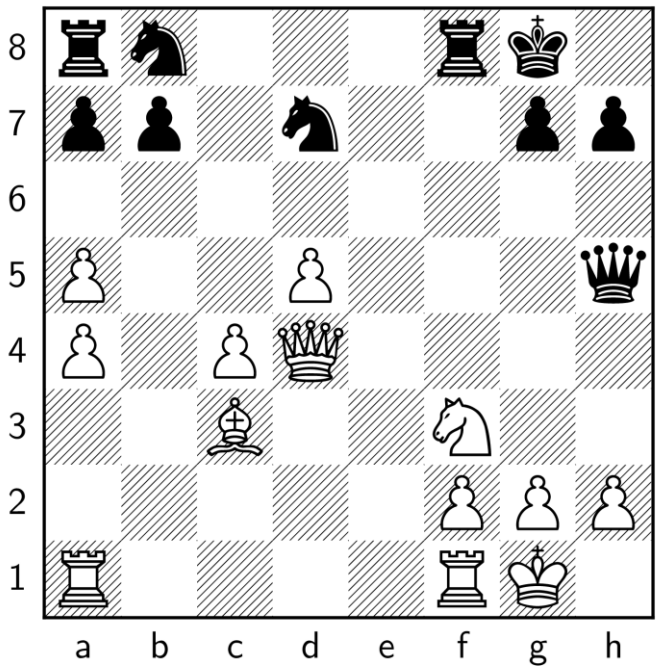


1.	Is there a rank on which there are no pieces?	**No**
2.	How many pawns does each side have?	**White 8, Black 7**
3.	How many rooks does each side have?	**2**
4.	What color is the pawn on the 5th rank?	**Black**
5.	Which black pieces are on the f-file?	**Rook, pawn, knight**
6.	Are the black queen and the white king on the same diagonal?	**Yes**
7.	Which white pieces are on the f-file?	**Rook, pawn, knight**
8.	Are there more, fewer, or the same number of pawns on the 6th rank as on the 7th rank?	**The same number**

S6.1.2.L3

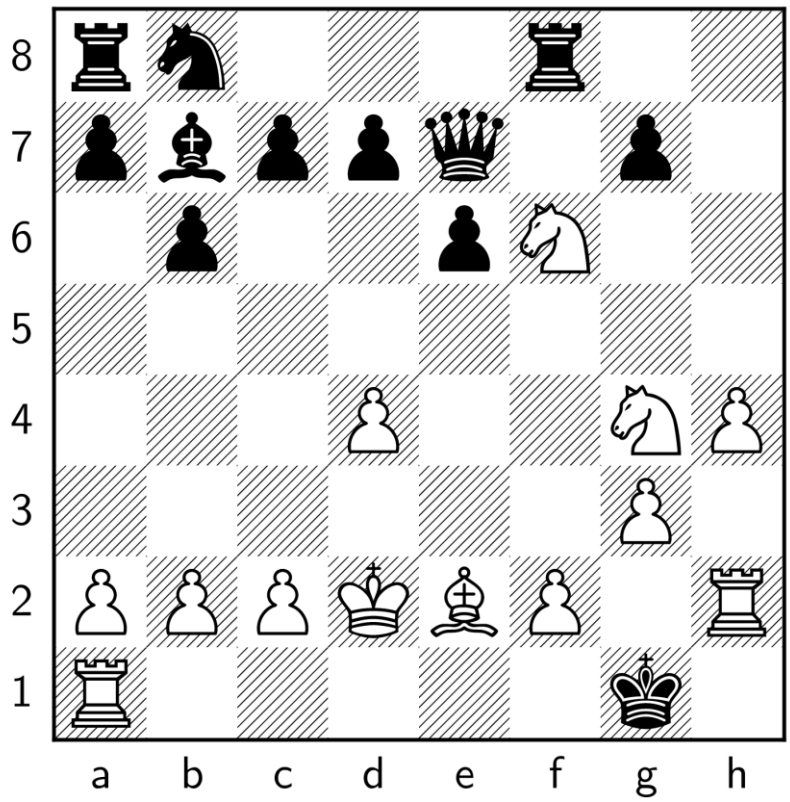


1.	Which side has more pawns?	**Black**
2.	How many black pawns are on the board?	**7**
3.	How many white pieces are on the 3rd rank?	**2**
4.	How many black pieces are on the e-file?	**2**
5.	Which file has no chess pieces?	**c-file**
6.	How many rooks are on the a-file?	**2**
7.	How many rooks are on the h-file?	**1**
8.	Are there more, fewer, or the same number of pawns on the a-file as on the h-file?	**Fewer**
9.	The white king is under attack – true or false?	**False**
10.	Black has 4 pieces under attack – true or false?	**False**



1.	Which side has more pawns?	**White**
2.	Does Black still have a bishop?	**No**
3.	How many bishops does White have?	**One**
4.	Are the kings on the same file?	**Yes**
5.	Is there a file without pieces?	**Yes (e-file)**
6.	On which ranks are the black pieces?	**5, 7 and 8**
7.	Which queen is more central?	**The white one**
8.	Are the queens on the same rank?	**No**
9.	Are the bishop and a black knight on the same file?	**No**
10.	Which side has more possible moves with its rooks?	**White**

S6.1.4.L5



1.	How many pieces are on the board?	**25**
2.	How many white pawns are on the board?	**7**
3.	How many rooks are on their starting square and what color are they?	**2, white and black**
4.	Is there an empty rank or file?	**Yes, the 5th rank**
5.	How many pieces are there in total on the second and the fifth ranks?	**7**
6.	How many pieces are there in total on the b-file and on the fifth rank?	**4**
7.	How many black pawns are on white squares?	**2**
8.	Can the bishop on b7 capture pieces?	**No**

9. Are the white knights on the same color squares and how many pieces are they attacking in total? **No, 1**

10. How many pieces are there in total on the diagonal a1-h8 and how many of them are not pawns? **5, two of which are not pawns**

Exercise 6.2: MEMORY STRATEGIES. Categorization. Working memory.

Materials: Demo board, stopwatch

Implementation:

- Explained in detail below.

Time frame:

- Definition of the quadrants: approx. 5 minutes
- S6.2.1.L1 to S6.2.4.L4: approx. 40 to 50 minutes

Psychoeducational introduction:
The following exercise again focuses on important memory functions. As in the last session, you will not only train your memory, but also learn strategies for memory-related tasks. In addition, you can apply your own strategies and will be asked about them. All of this can be helpful, including developing and applying strategies for your abstinence.

Instructions:

- Are explained below.

Level of difficulty:

- Various conceivable variables, such as quadrant reconstruction in reverse order or the classification of game-typical positions, are difficult or impossible to objectify, so that the number of pieces per diagram (board) is used as the best parameter here.

  1: 2 to 11 pieces (S6.2.1)
  2: 4 to 15 pieces (S6.2.2)
  3: 5 to 18 pieces (S6.2.3)
  4: 6 to 21 pieces (S6.2.4)
  5: not applicable

The chessboard is divided into four parts, as shown in the illustration (explain using gestures on the demo board):

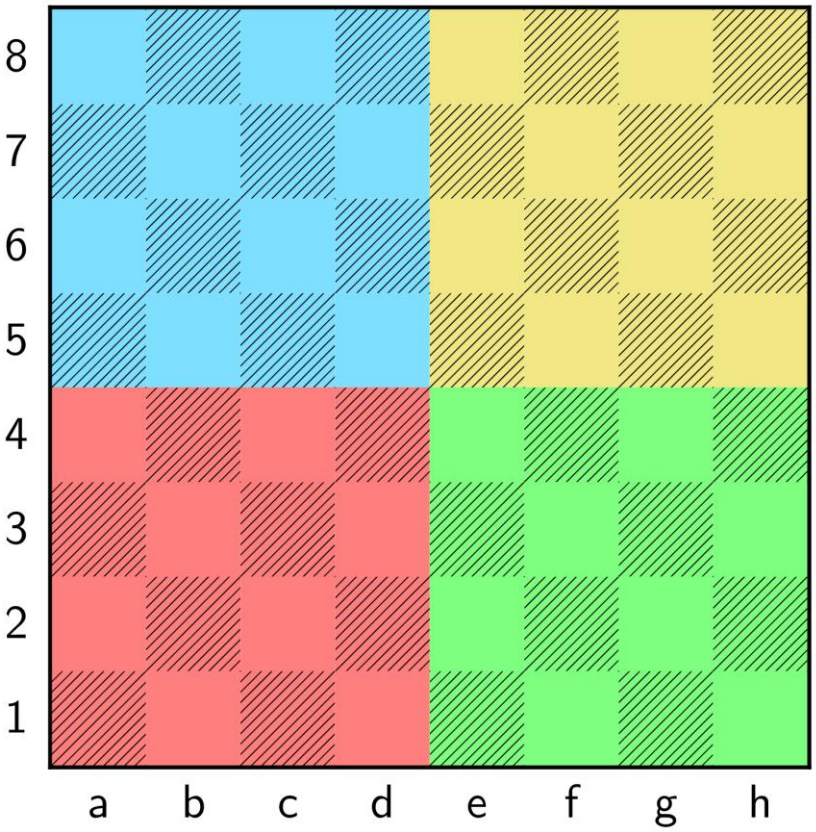
Quadrant definition

Blue: I

Yellow: II

Red: III

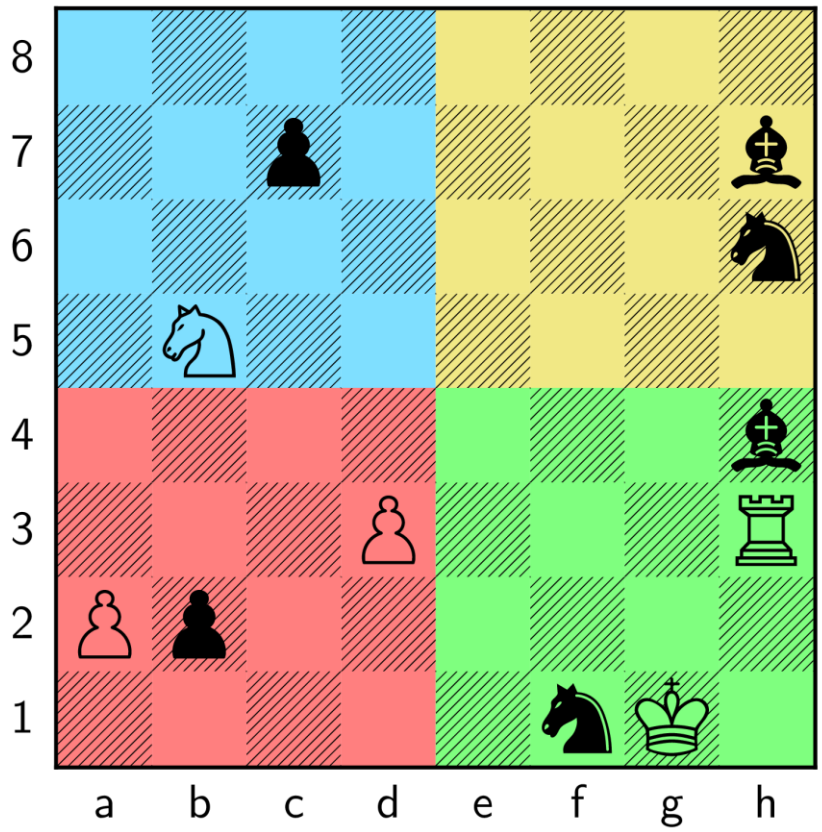
Green: IV



The colored quadrants are for clarity, but the color has no relevance for the participants. The course instructor ensures that the participants understand the spatial division of the board into four quadrants.
Now, pieces are placed in quadrant I, and the participants are asked to memorize the pieces.

S6.2.1.L1

Diagram 1 (11 pieces):



Instruction:

"For this exercise, it is helpful to memorize the position using strategies: The white knight captures the black pawn, and the black pawn is in its starting position."

Now the pieces are removed and one of the participants is asked to reconstruct the positions of the pieces on the demo board. Afterwards, the pieces are left in quadrant I and more are added to quadrant II (yellow, top right).

Instructions:

“In this case, we use visual-spatial memory by creating a spatial connection between the two pieces in one quadrant.“

The pieces from both quadrants (I+II) are removed.

Instructions:

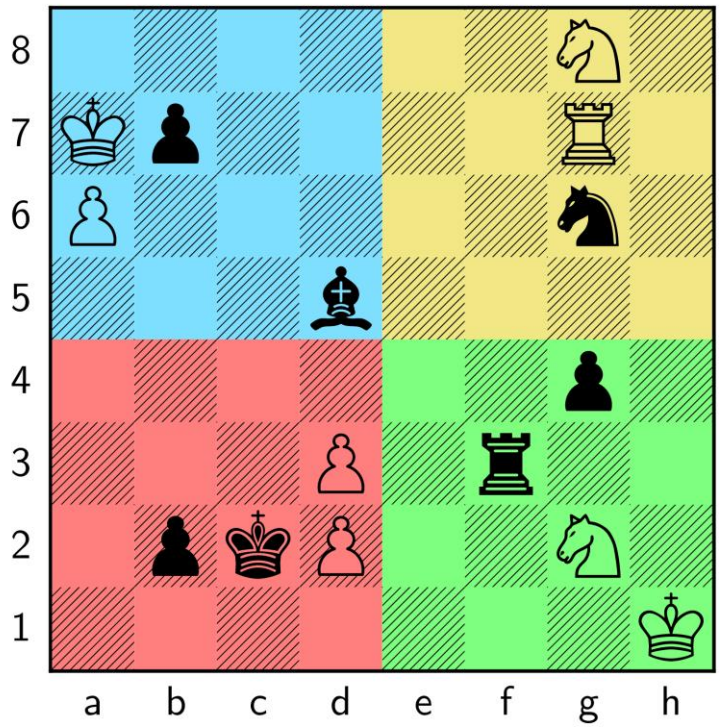
“I will now remove the pieces from the first two quadrants, and I would like one of you to reconstruct their positions, first those from the second quadrant, then those from the first. You should use different memorization strategies to solve the problem.“

Then, pieces are added to the third quadrant (red, bottom left) and participants are asked to use their preferred memory strategy. The pieces are removed from the three quadrants and one of the participants is asked to reconstruct the positions. This always begins with the quadrant last set up by the course instructor. After the third quadrant has been reconstructed, the course instructor asks the participants which strategy they used to work with metacognition. The next step is to position pieces in the fourth quadrant (green) and repeat the process.

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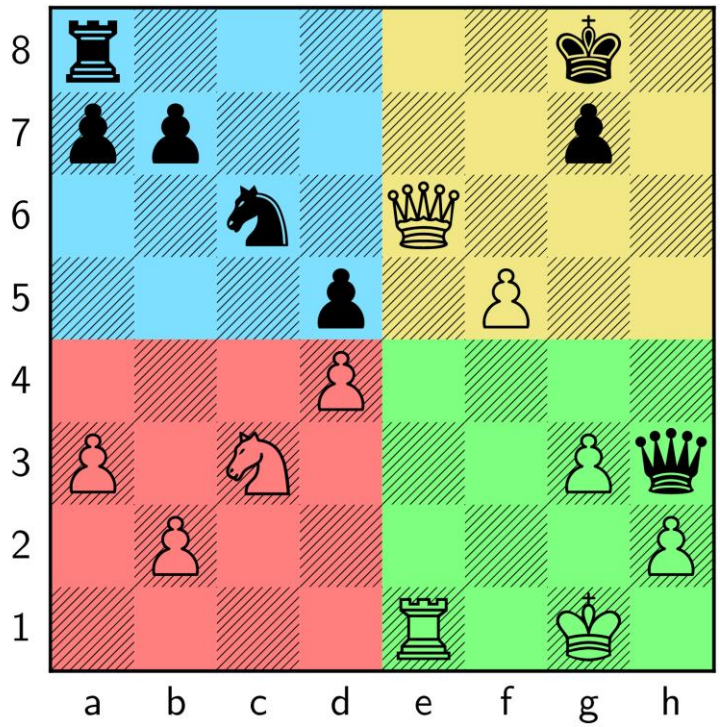
S6.2.2.L2

Diagram 2 (15 pieces):



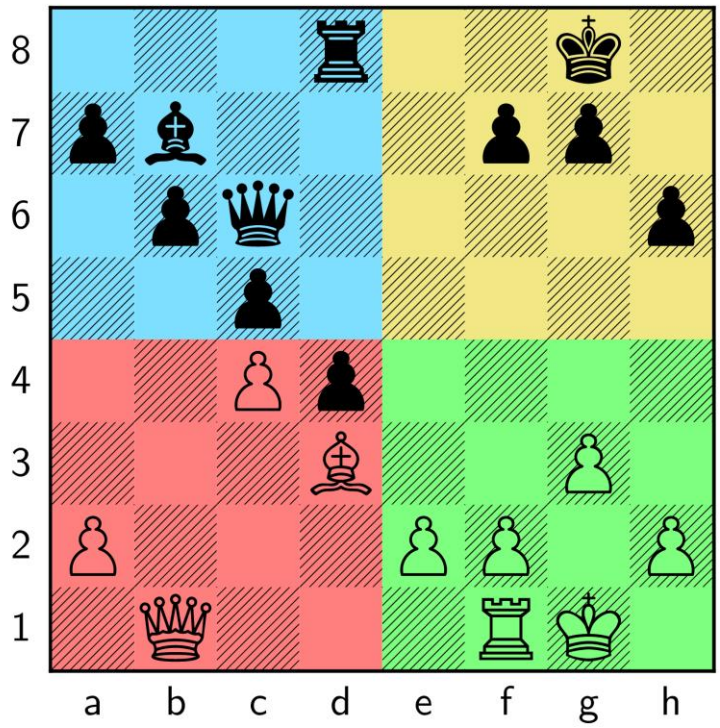
S6.2.3.L3

Diagram 3 (18 pieces):



S6.2.4.L4

Diagram 4 (21 pieces):



SESSION 7.

Exercise 7.1: ATTENTION. Attention span. Auditory messages.

Materials: Demo board, stopwatch

Implementation:

During this exercise, the instructor presents a position on the demonstration board for 5 seconds. This is then removed and the instructor immediately asks a few questions.

They should ensure that the participants do not think too much (e.g., about the exact position or where exactly a piece was standing). Conversely, the course instructor should ask their questions immediately after a correct answer, except at points where applause is expected (e.g., after two or three correct answers). The aim is for participants to maintain a certain question-and-answer-rhythm, which helps both them and the course instructor to carry out the exercise smoothly. On the other hand, there should be no sense of rushing through the diagrams.

Time frame: 9 diagrams, approx. 3 minutes per diagram;
approx. 27 minutes total time.

Psychoeducational introduction:

Today, we will again focus on attention in two exercise blocks. The blocks are again different from the previous ones in this area. As mentioned, attention training is important, for example, in order to be able to direct attention to objects that have nothing to do with the substance.

This exercise also requires short-term memory, the importance of which you already know from previous sessions.

Instruction:

“Today we are going to train our attention and memory. I will briefly show you a position. Then I will ask you some questions about it.“

Level of difficulty:

Two parameters used: number of pieces and basic characteristics. If the total was the same for each position, the number of pieces was weighted more heavily because it represents the basis for the questions.

1: Pos. 1 (10 basic characteristics + 3 pieces = 13)
Pos. 2 (10 basic characteristics + 3 pieces = 13)

2: Pos. 3 (9 basic characteristics + 4 pieces = 13)
Pos. 4 (9 basic characteristics + 4 pieces = 13)

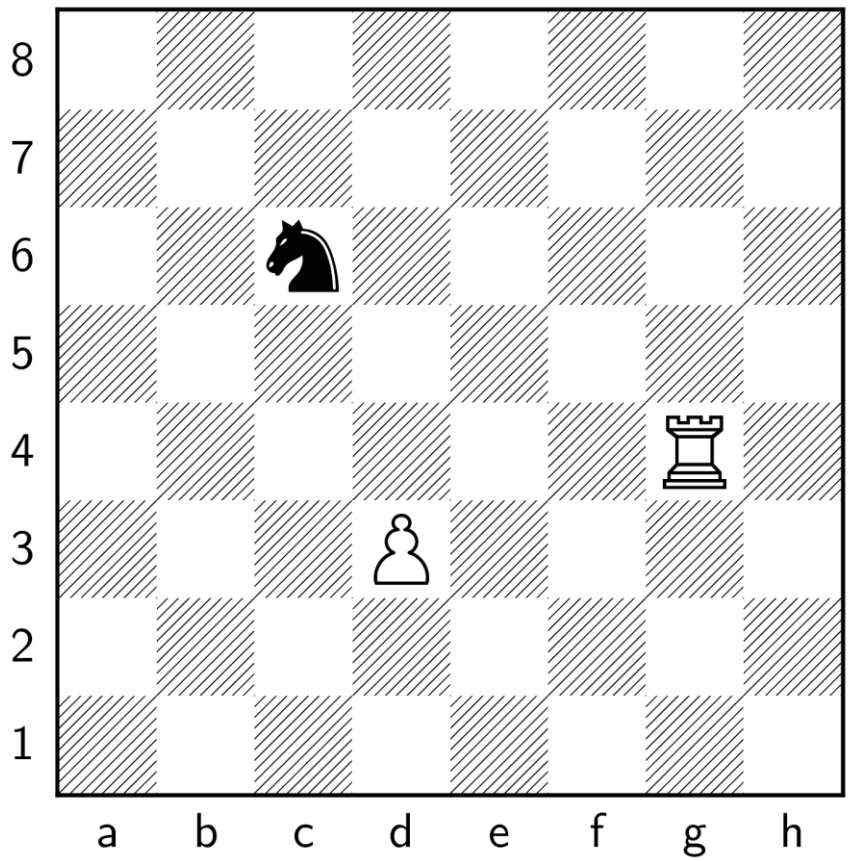
3: Pos. 5 (8 basic characteristics + 5 pieces = 13)

4: Pos. 6 (8 basic characteristics + 6 pieces = 14)
Pos. 7 (8 basic characteristics + 6 pieces = 14)

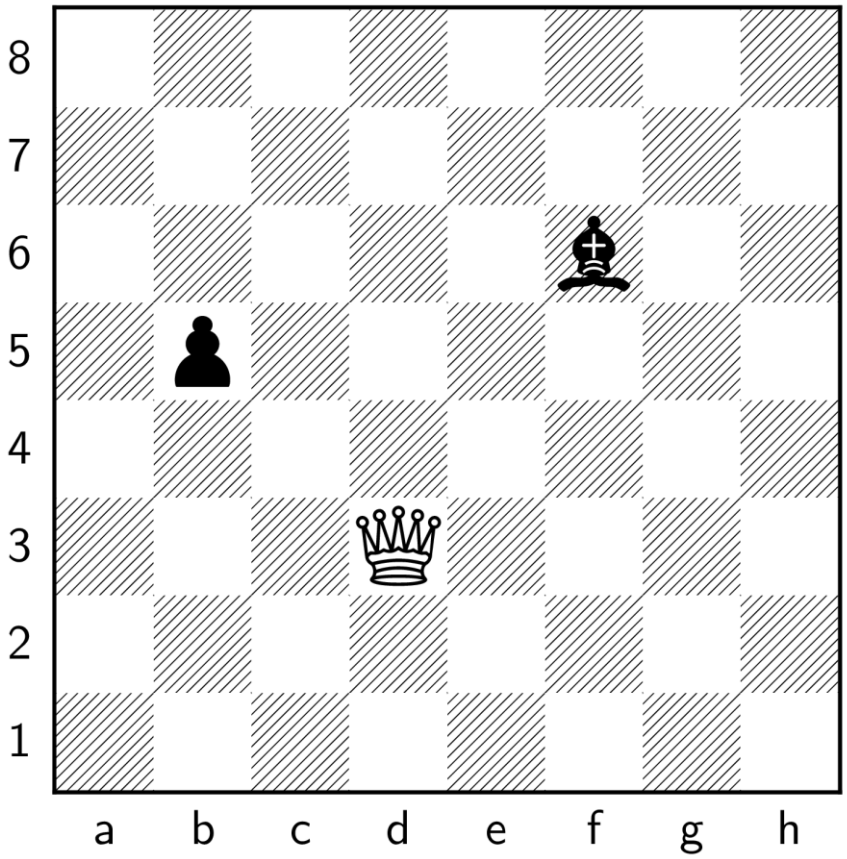
5: Pos. 8 (9 basic characteristics + 7 pieces = 16)
Pos. 9 (8 basic characteristics + 7 pieces = 15)

Procedure for incorrect answers:

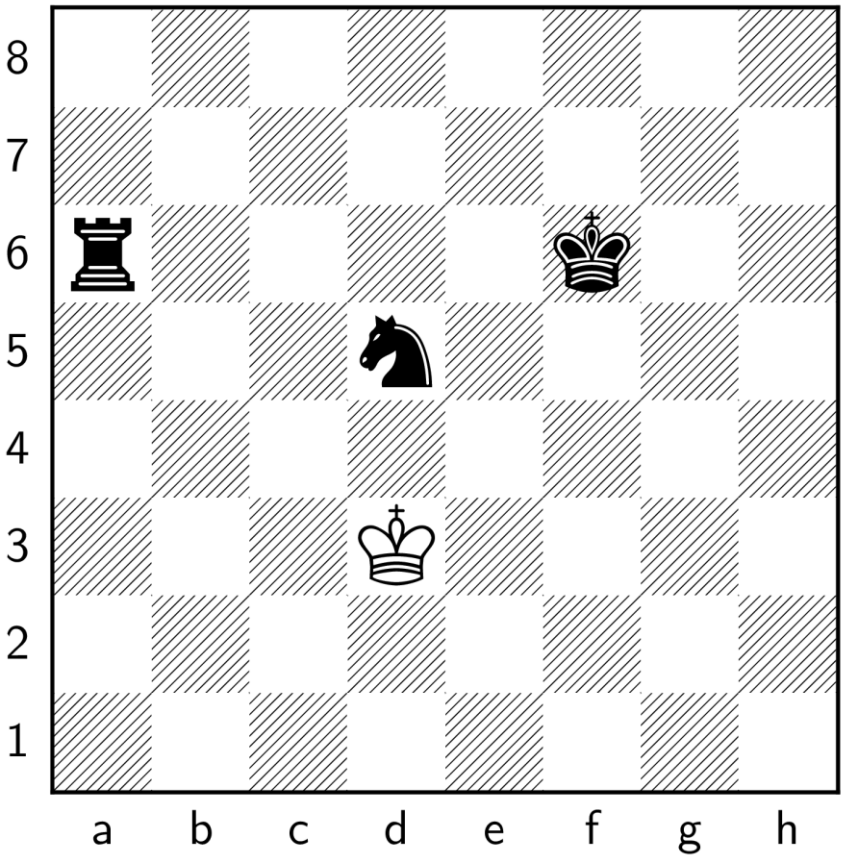
- If a participant has only partially (e.g., 1 piece) given the correct solution, the course instructor may confirm this. If the participant has ideas for a solution, they may express their guess.
- If the participant is otherwise stuck, another member of the group should help.



1.	How many pieces are on the board?	**Three**
2.	How many white pieces are on the board?	**Two**
3.	What color is the knight?	**Black**
4.	Is there a pawn on the board?	**Yes**
5.	Is there a king on the board?	**No**
6.	How many black pieces are on the board?	**One**
7.	Is there a bishop on the board?	**No**
8.	What color is the rook?	**White**

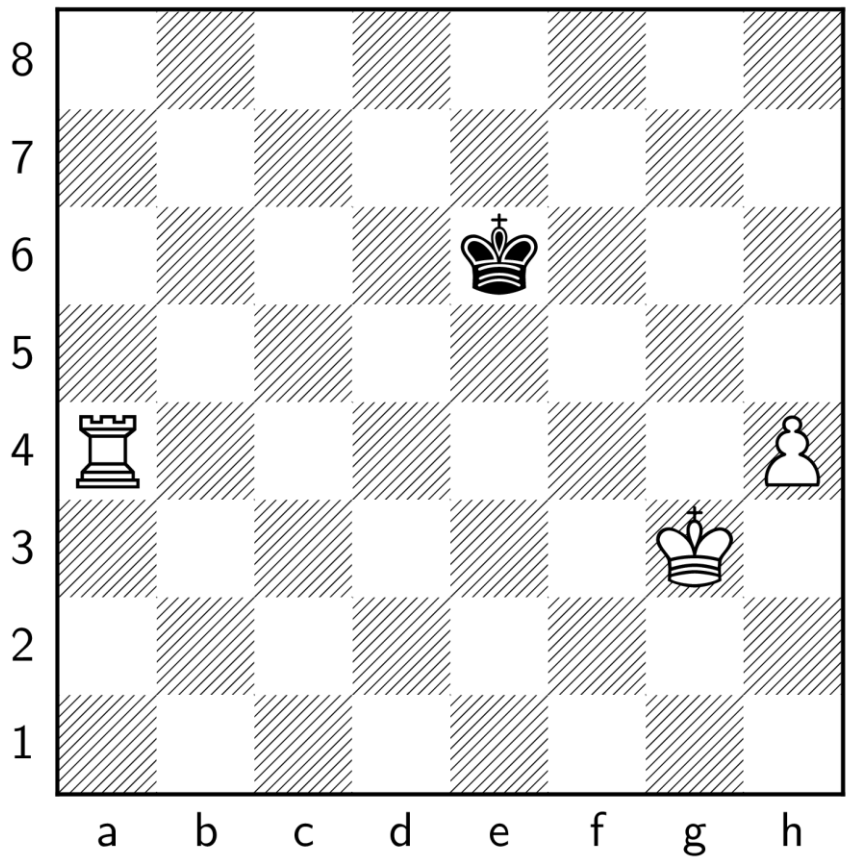


1.	How many pieces are on the board?	**Three**
2.	Is there a king on the board?	**No**
3.	How many black pieces are on the board?	**Two**
4.	What color is the pawn?	**Black**
5.	Is there a knight on the board?	**No**
6.	Is there a rook on the board?	**No**
7.	Is there a queen on the board?	**Yes**
8.	What color is the bishop?	**Black**



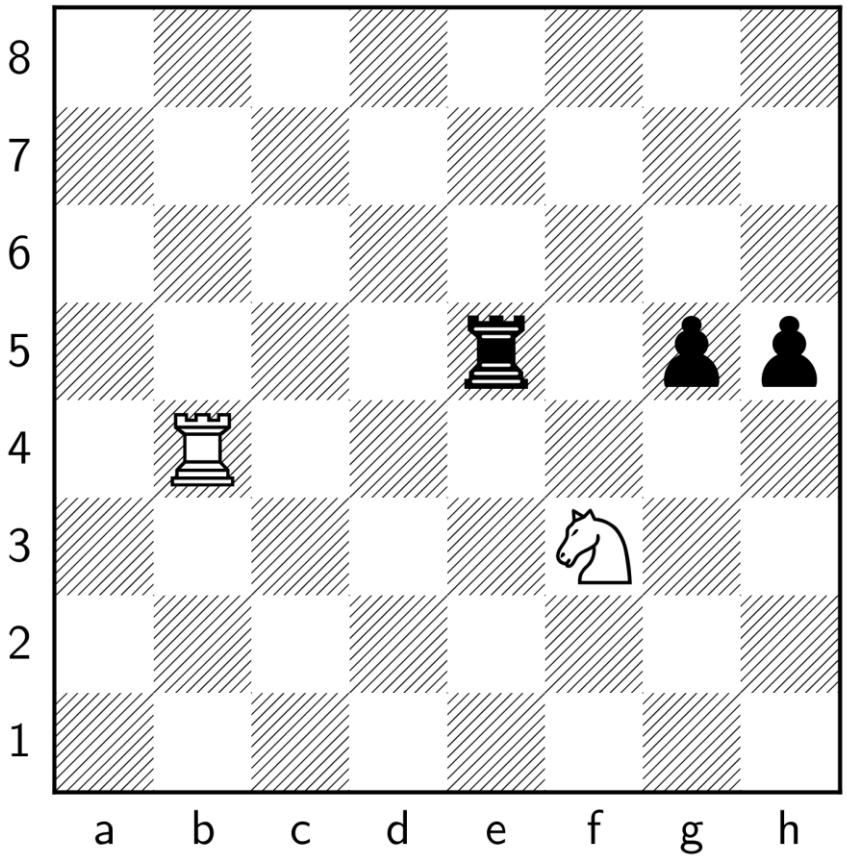
1.	What is the dominant color?	**Black**
2.	How many pieces are on the board?	**Four**
3.	Is there a queen on the board?	**No**
4.	Is there a pawn on the board?	**No**
5.	What color is the rook?	**Black**
6.	Which white piece is on the board?	**King**
7.	Is there a bishop on the board?	**No**
8.	What color is the knight?	**Black**

S7.1.4.L2

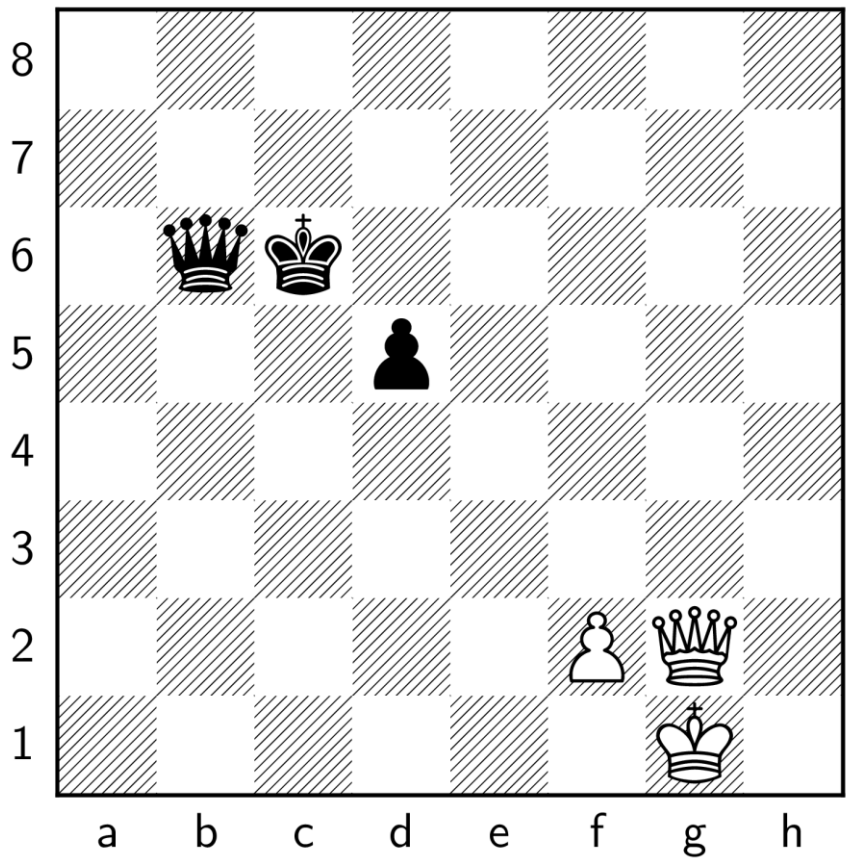


1. How many white pieces are on the board? **Three**
2. How many black pieces are on the board? **One**
3. Is there a pawn on the board? **Yes**
4. Is there a queen on the board? **No**
5. What color is the rook? **White**
6. Is there a bishop on the board? **No**
7. Is there at least one king on the board? **Yes (two)**
8. How many pieces are there on the board in total? **Four**

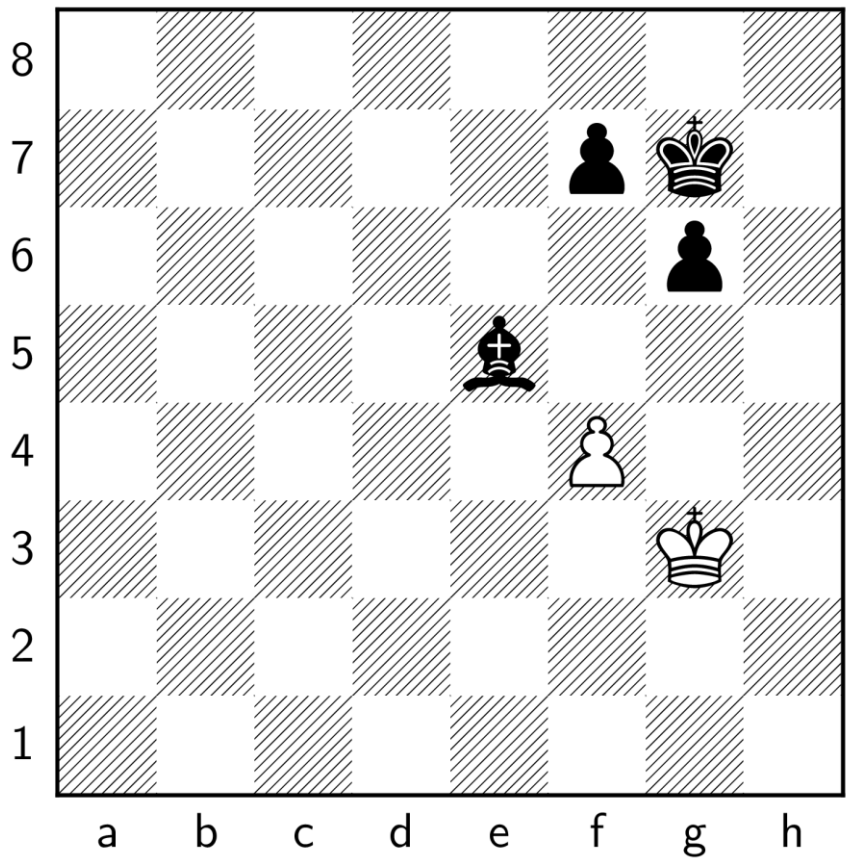
S7.1.5.L3



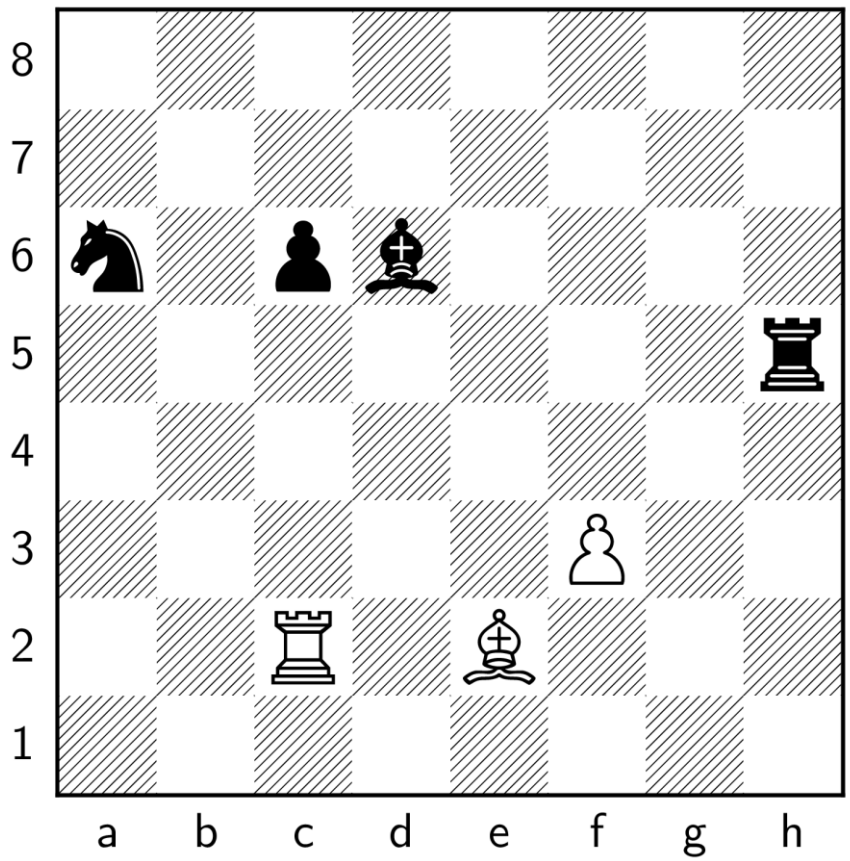
1.	How many pieces are on the board?	**Five**
2.	How many white pieces are on the board?	**Two**
3.	How many black pieces are on the board?	**Three**
4.	Is there at least one pawn on the board?	**Yes (two)**
5.	Is there a knight on the board?	**Yes**
6.	How many black pawns are on the board?	**Two**
7.	Is there at least one rook on the board?	**Yes (two)**



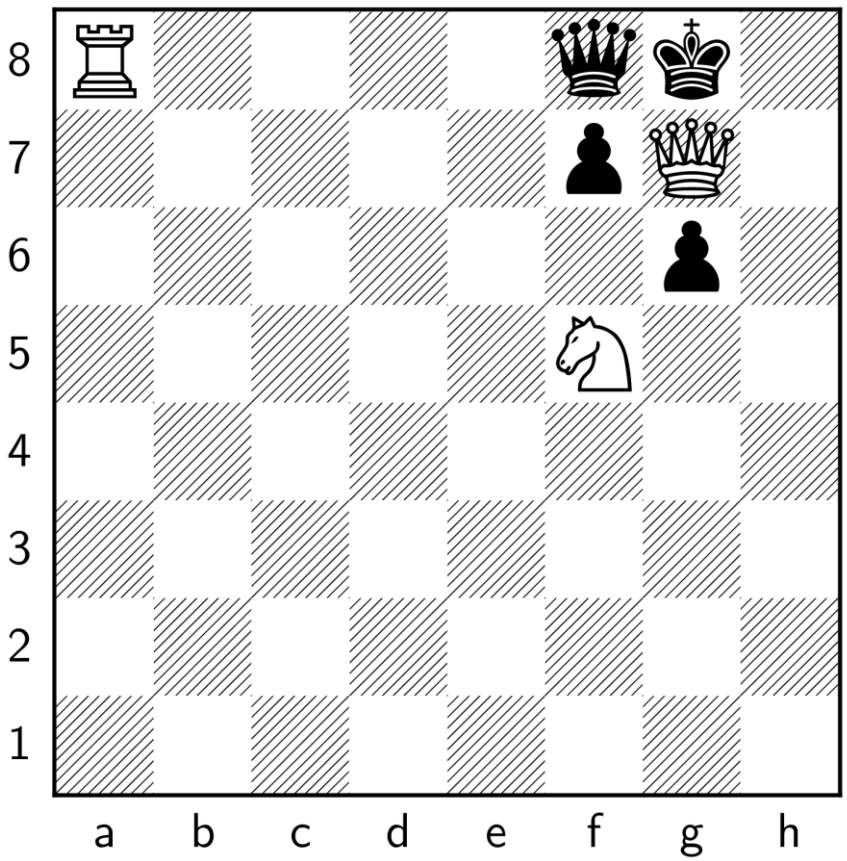
1. How many types of pieces are on the board? **Three**
2. How many pieces are on the board in total? **Six**
3. Is the number of black and white pieces equal? **Yes**
4. How many pawns are on the board? **Two**
5. Is there a black knight on the board? **No**
6. Is there a bishop on the board? **No**
7. How many white pieces are on the board? **Three**



1.	How many pawns are on the board?	**Three**
2.	How many white pieces are on the board?	**Two**
3.	Is the number of black and white pieces equal?	**No**
4.	How many black pieces are on the board?	**Four**
5.	Is there a queen on the board?	**No**
6.	Is there a bishop on the board?	**Yes**
7.	Is there a knight on the board?	**No**



1. How many white pieces are on the board? **Three**
2. How many pieces are there on the board in total? **Seven**
3. How many rooks are on the board? **Two**
4. How many knights are on the board? **One**
5. Is there a pawn on the board? **Yes (two)**
6. How many black bishops are on the board? **One**
7. Is there a white bishop on the board? **Yes**



1. How many queens are there on the board? **Two**
2. How many pieces are there on the board in total? **Seven**
3. How many white pieces are on the board? **Three**
4. Is there a knight on the board? **Yes**
5. What color is the knight? **White**
6. How many pawns are on the board? **Two**
7. What color is the rook? **White**

Exercise 7.2: ATTENTION. Attention span. Auditory messages.

Materials: Training manual

Implementation:

The sentences below are read aloud clearly. The participants should repeat them as accurately as possible.

Time frame:

- 10-15 minutes total.

Psychoeducational introduction:

In this block of attention exercises, you are asked not only to pay attention, but also to react and repeat. This trains your attention span.

Instructions:

"In this exercise, I will formulate a sentence and ask you to repeat it after I have called on you."

Level of difficulty:

The level of difficulty is mainly determined by the length and sentence structure.

1: Short sentences (maximum 10 words) with simple sentence structure: subject, predicate, object.
2: Short (maximum 10 words) main and subordinate clause constructions.
3: Longer (more than 10 words) main and subordinate clause constructions.
4: Particularly long (two lines) main and subordinate clauses.
5: not applicable

Procedure for incorrect answers:

- If participants cannot remember the sentence, encourage them to concentrate better and select another participant.
- If a participant repeats the sentence inaccurately, wait briefly (5 seconds) and they may correct themselves.
- Ask the participant to recall the sentence again. Otherwise, ask other participants to help.

S7.2.1 to S7.2.39

1. A white pawn will always be white. (L1)
2. I have only one king. (L1)
3. The squares are black and white. (L1)
4. I will place two pawns on the board. (L1)
5. I like the black pawns. (L1)
6. I still have a rook and a king. (L1)
7. I prefer the knight to the bishop. (L1)
8. Move the bishop of each color. (L1)
9. Move a black piece of your choice. (L1)
10. I will not move the queen to the king. (L1)
11. I have to be careful with the queen. (L1)
12. The knight´s moves sometimes look funny. (L1)
13. The instructor removes the pieces from the board. (L1)
14. My partner had to remember eight pawns. (L1)
15. You have captured my four knights on this board. (L1)
16. I will improve my memory with these exercises. (L1)
17. We will need to remember five or six pieces. (L1)
18. Sometimes there are many pieces on the board. (L1)
19. I prefer the attention exercises to the memory exercises. (L1)
20. The movement of the pieces is not that difficult. (L1)
21. I think I have a good memory. (L2)
22. Tell me how many white and black pawns are there. (L2)
23. To do this task correctly, we need to concentrate hard. (L2)
24. The brain is a muscle, and the chessboard is its gym. (L2)
25. Remembering the pieces is not as easy as I thought. (L3)
26. The instructor will now remove all chess pieces from the board. (L3)
27. I know we should train our memory because it helps with everything. (L3)
28. We know that sometimes we should focus more on the instructor. (L3)
29. Since we started doing chess exercises, I think we ´ve been thinking better. (L3)

Additional sentences:

30. The aim of the game of chess is to checkmate the king. (L2)

31. The chessboard has eight files, eight ranks, and 64 squares. (L2)

32. It is a great challenge to focus attention on one or more quadrants. (L3)
33. The king is the most important piece, but the queen is the most powerful. (L4)

34. With executive functions, we can organize and calculate, for example. (L4)

35. The chessboard can be divided into different areas, which we call quadrants. (L4)

36. The knight is worth just as much as the bishop, yet the two move very differently. (L4)

37. Checkmate means that the king is trapped – he can no longer get out of check. (L4)

38. Today, we are going to train sustained attention again and will soon be finished with this exercise. (L4)

39. Mathematicians have discovered that there are more possible moves in chess than there are atoms in the universe. (L4)

Exercise 7.3: EXECUTIVE FUNCTIONS. Organization. Working memory.

Materials: worksheets, stopwatch

Implementation:

The course instructor explains the exercise. The value of the pieces (introduced in SESSION 5) is repeated. Participants are given a worksheet showing six boards. For each diagram, the value of the white pieces must be determined and the boards must be sorted in descending order accordingly. Participants should not write any notes on the sheet or in the margins. Point this out separately before starting!

Participants have 6 minutes to complete the exercise (per worksheet). Afterwards, one participant is asked to share their results and briefly describe their approach. Call on two or three participants per worksheet, at most. The description of the procedure can be shorter for the second or third participant to avoid repetition.

Time frame:

Allow at least 6 minutes per worksheet;
30 minutes in total

Psychoeducational introduction:

The following exercise again focuses on training executive functions. It also provides additional training for the important short-term memory. These exercises are designed to help you make more considered long-term decisions and counteract impulsive behavior. Think again about the long-term damage to your body caused by continued consumption. The reflective system is therefore trained to counteract impulsive behavior such as short-term rewarding consumption.

Instructions:

“As we already know, the queen is worth 9 pawns, the rook 5, the knight 3, the bishop 3, and the pawn 1. The king has no quantifiable value and is therefore not counted. I will give you a worksheet with 6 chessboards, labeled A through F. Determine the value of the white pieces for each board. Please do not write the value of the pieces on the board or in the margin!
Then order the boards from highest value to lowest. You have six minutes to do this. Try to manage your time efficiently it.“

For the debriefing of the workingsheet:
“What order did you determine?“

- *“How did you determine the piece value for each diagram?“*

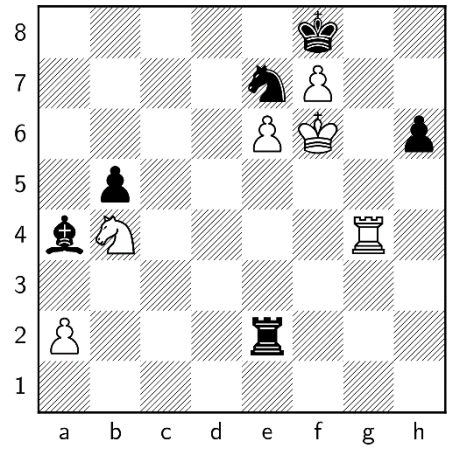
Level of difficulty:

There are three worksheets. These are of medium difficulty (levels 2 to 4). The level of difficulty is influenced by the number and type of pieces. The sum total then gives an average value per worksheet, which is used here as a parameter.
The diagrams are roughly sorted: large differences between the squares at the beginning, smaller differences at the end.

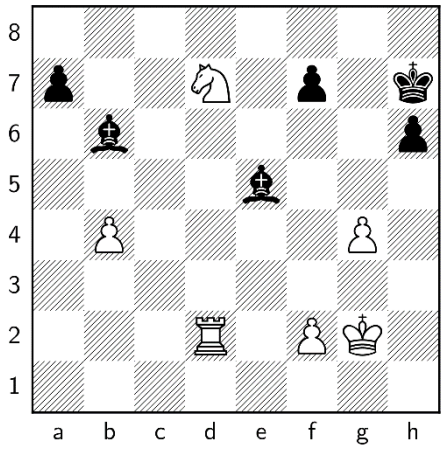
1: Average value below 17.5; few pieces, the diagram with the most points is visually recognizable at first glance (no worksheet)
2: Average value 17.5-22.5 (worksheet 1)
3: Average value 22.5-27.5 (worksheet 2)
4: Average value 27.5-32.5 (worksheet 3)
5: Average value above 32.5; many pieces on all boards, only slightly ahead of the other boards (no worksheet)

Procedure for incorrect answers:

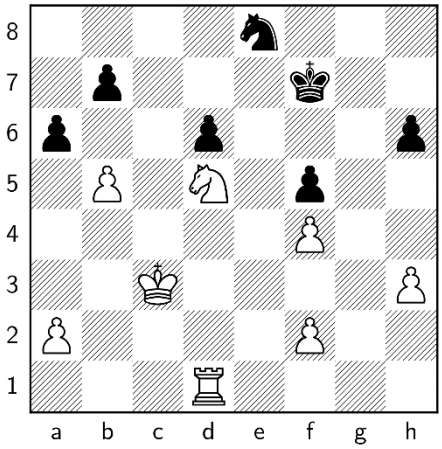
- Participants may make mistakes in their calculations. In this case, ask the participants to repeat the calculation.
- If participants are unsure about the value of a piece, repeat it.



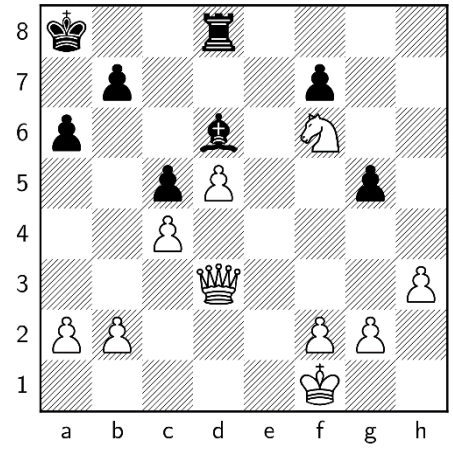
A



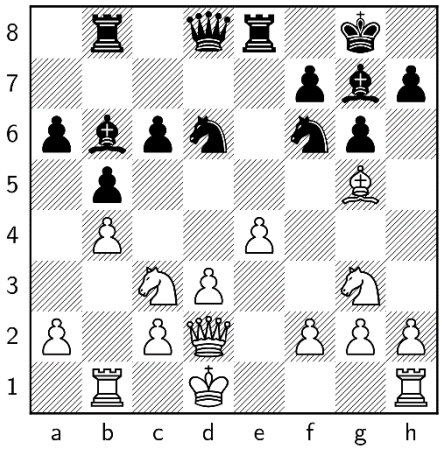
B



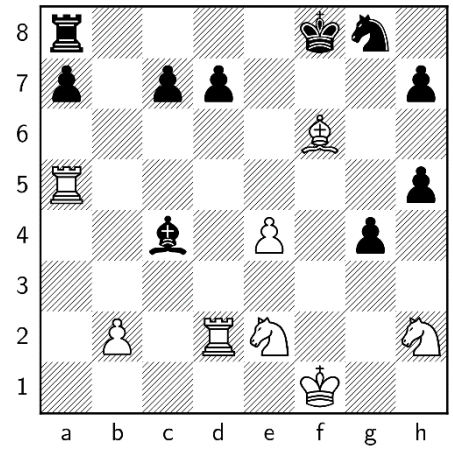
C



D

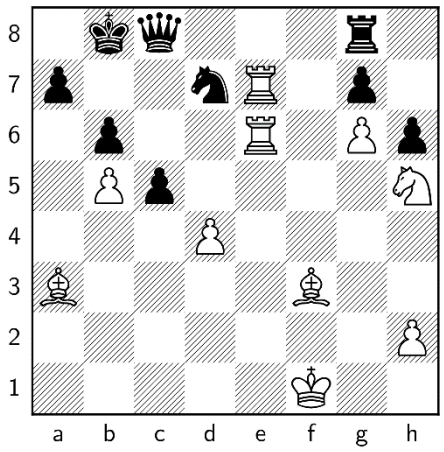


E

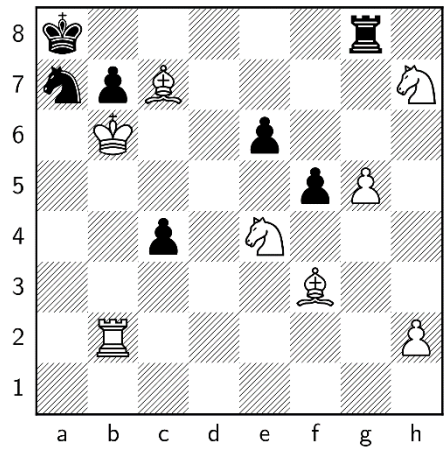


F

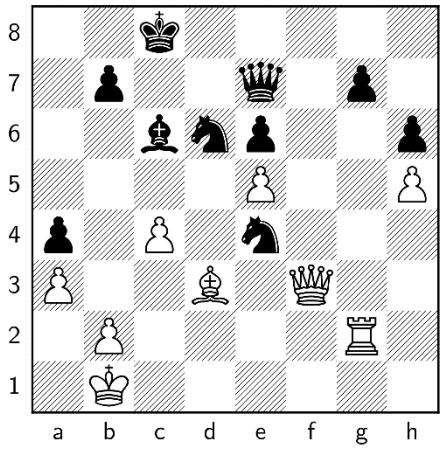
Order: _____



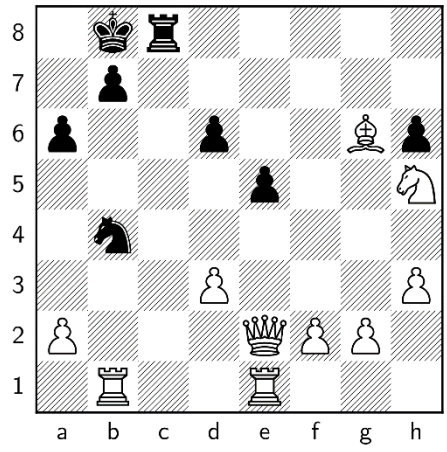
A



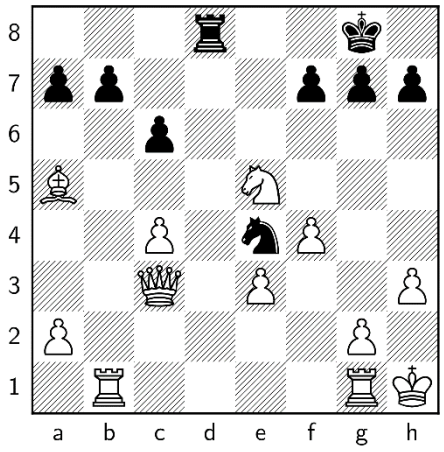
B



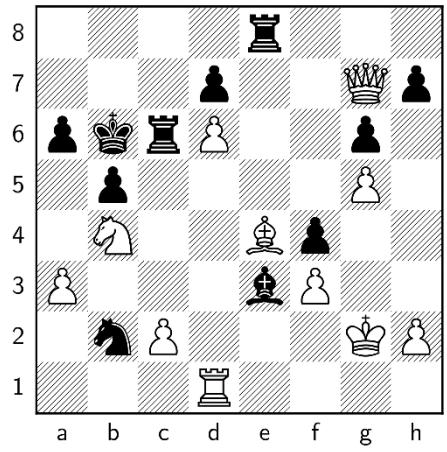
C



D

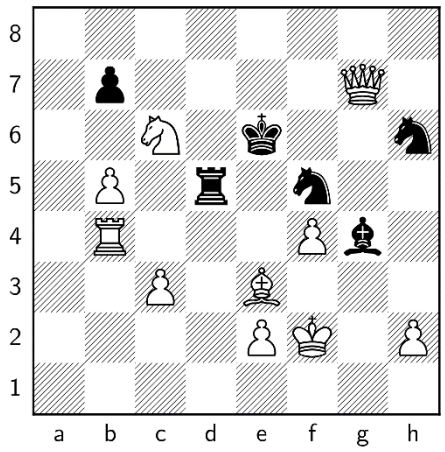


E

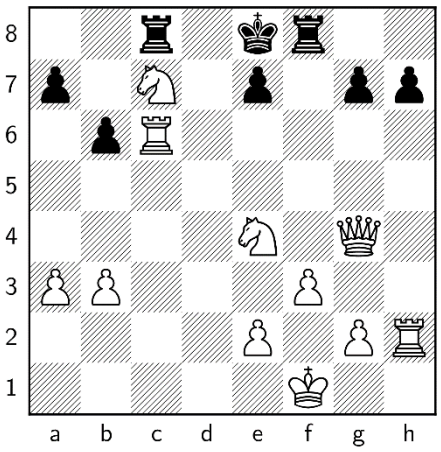


F

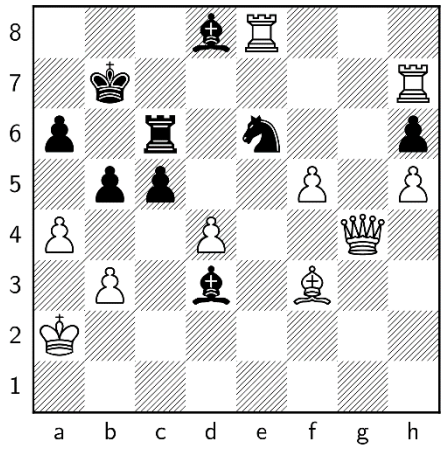
Order: _____



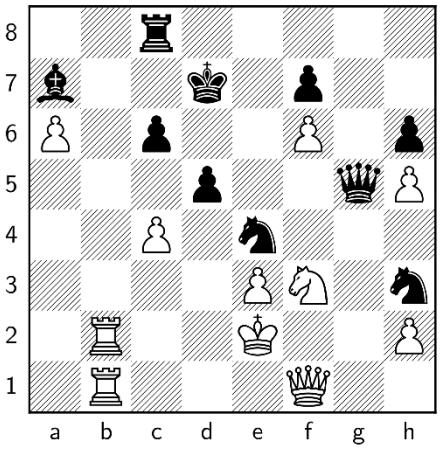
A



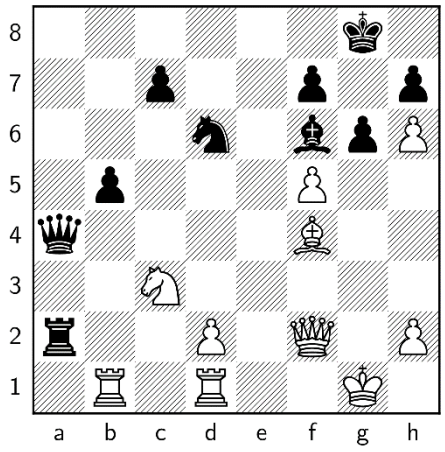
B



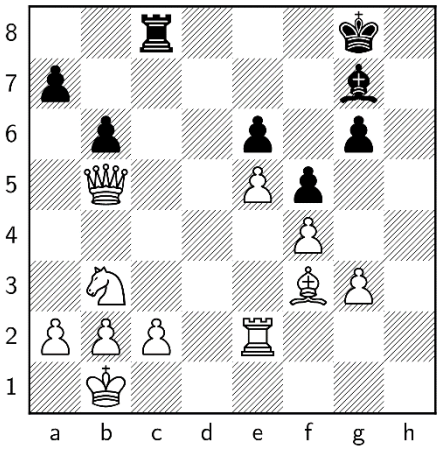
C



D



E



F

Order: _____

Solutions:
Value of the white pieces:

	Worksheet S7.3.1.L2
A	11
B	**11**
C	13
D	19
E	**36**
F	21
Average	18,5
Order	E, F, D, C, B, A

	Worksheet S7.3.2.L3
A	23
B	19
C	22
D	30
E	**31**
F	26
Average	25,16
Order	E, D, F, A, C, B

	Worksheet S7.3.3.L4
A	25
B	**30**
C	27
D	28
E	**29**
F	26
Average	27,5
Order	B, E, D, C, F, A

SESSION 8.

Exercise 8.1: EXECUTIVE FUNCTIONS. Planning skills. Mazes.

Materials: Demo board and marker chips, stopwatch

Implementation:

A board is set up with a white knight, two black rooks, and a black pawn. The participants must find a route for the knight to capture the pawn. The knight must reach its target (the black pawn) as quickly as possible, i.e., with the fewest number of moves possible. It may not enter any square controlled by a black rook.
Before the participants show the route they have found on the demo board, they state the number of knight moves required.

- Allow the position to be viewed for approximately 30 to 60 seconds (depending on difficulty) before calling on a participant.
- If necessary, repeat the movement of the knight and the rooks.
- If it becomes too complicated, proceed slowly and explain the solution in detail afterwards. Use marker chips if necessary.

For people with cognitive impairments: View the board for approx. 60 seconds; finding one route is sufficient.

Time frame:

Explanations: 5 minutes
18 diagrams, approx. 3 minutes each = approx. 54 minutes

Psychoeducational introduction:

In this exercise, we once again train the executive functions and thus the part of the brain that is important for controlling substance use. Specifically, it focuses on forward planning and, once again, visual-spatial functions. Planning skills are important in addictive disorders in order to make long-term decisions.

Instructions:

“We already know how the knight and the rooks move. How many moves does the knight need to capture the pawn? Choose the fastest route – as few moves as possible! The knight must not enter any square controlled by one or both black rooks, otherwise it could be captured.“

Level of difficulty:

The difficulty increases with the number of moves and the number of routes that can be found.

Parameters used: Number of moves, number of routes.

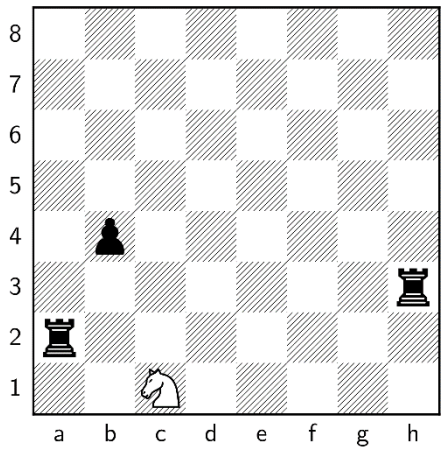
1: 2 moves, one route
2: 3 moves, 1 to 2 routes
3: 4 moves , 2 to 3 routes
4: 5 moves, 3 to 4 routes
5: 6 moves, 3 or more routes

Procedure for incorrect answers:

- Sometimes participants do not recognize the forbidden and the target squares. In this case, ask whether the task is visually understandable.
- Sometimes participants have trouble understanding how the pieces move. In this case, use differently colored (e.g., blue) marker chips to mark possible moves.
- Sometimes it is easier for participants to solve the puzzle backwards, starting from the target square.

Explanatory examples

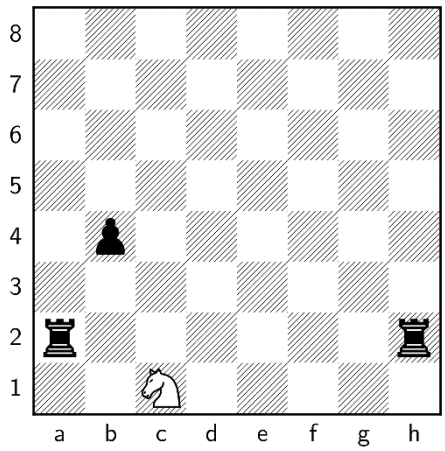
S8.1.E1



The knight may capture the rook on a2 because the square is not controlled by the other rook:

Nc1-a2-b4

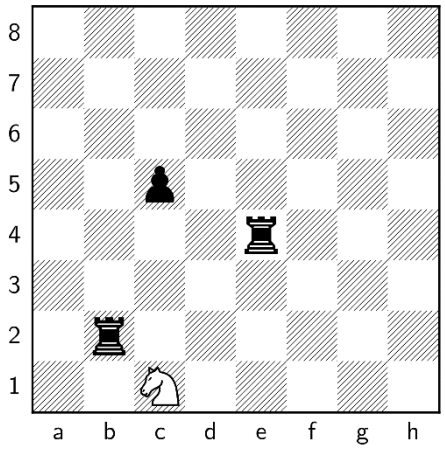
S8.1.E2



The knight cannot capture the rook on a2 because this square is controlled by the other rook.

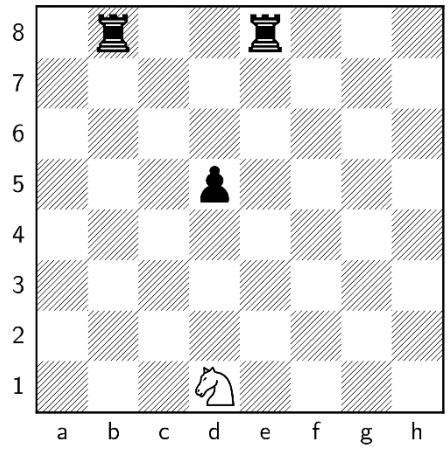
Therefore, only the route Nc1-d3-b4 is possible.

S8.1.1.L1 – 2 moves



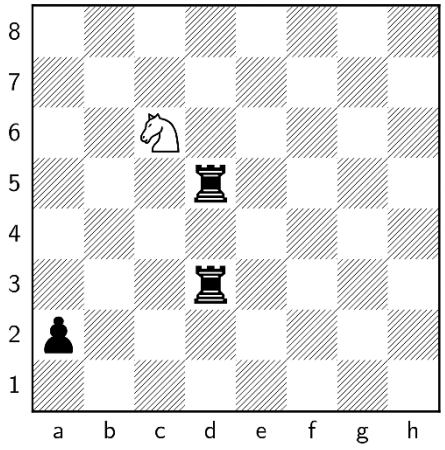
c1-d3-c5

S8.1.2.L1 – 2 moves



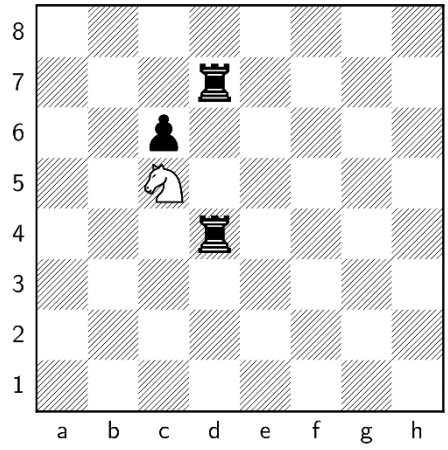
d1-c3-d5

S8.1.3.L1 – 2 moves



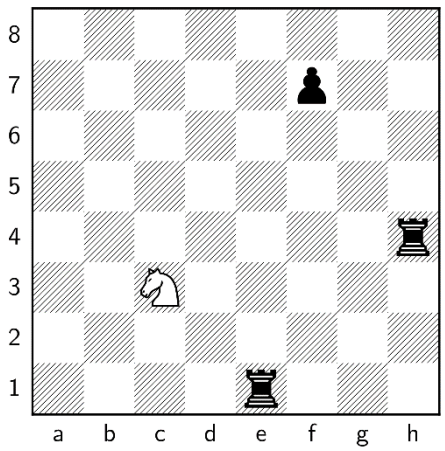
c6-b4-a2

S8.1.4.L2 – 3 moves



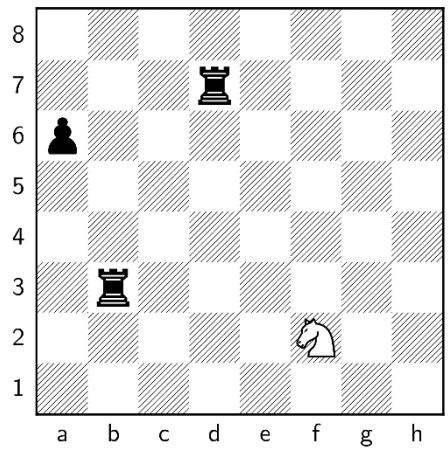
c5-b3-a5-c6 / c5-a6-b8-c6

S8.1.5.L2 – 3 moves



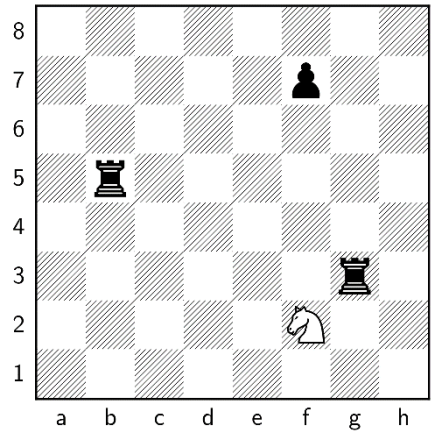
c3-b5-d6-f7

S8.1.6.L2 – 3 moves



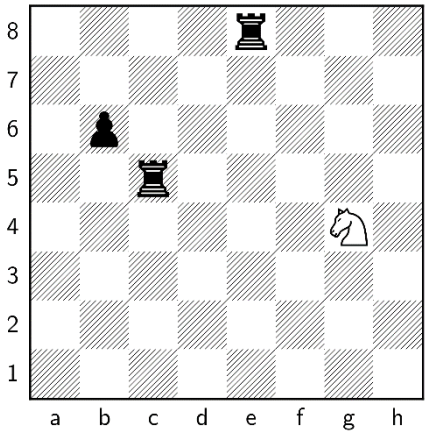
f7-e4-c5-a6

S8.1.7.L2 – 3 moves



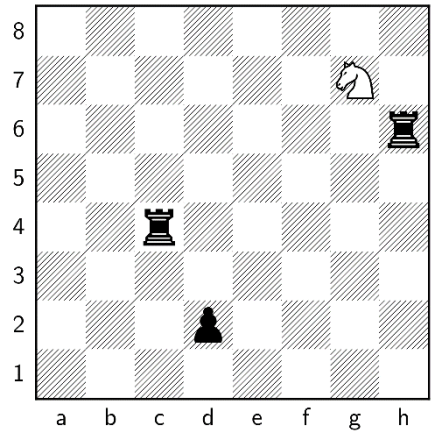
f2-e4-d6-f7

S8.1.8.L2- 3 moves



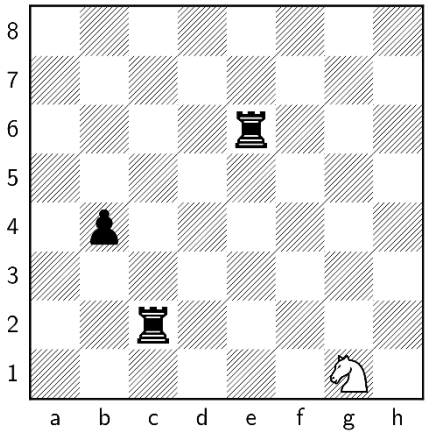
g4-f6-d7-b6

S8.1.9.L3 – 4 moves



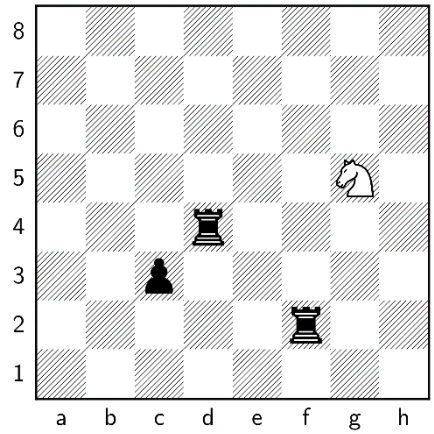
g7-f5-e3-f1-d2
g7-f5-g3-f1-d2
g7-f5-e3-c4-d2

S8.1.10.L3 – 4 moves



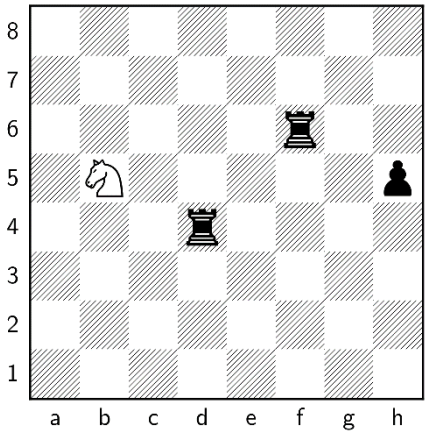
g1-h3-f4-d5-b4
g1-h3-f4-d3-b4
g1-f3-d4-c2-b4

S8.1.11.L3 – 4 moves



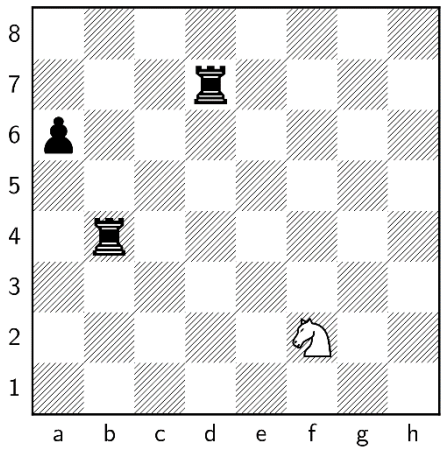
g5-e6-c7-b5-c3 / g5-e6-d4-b5-c3

S8.1.12.L4- 4 moves



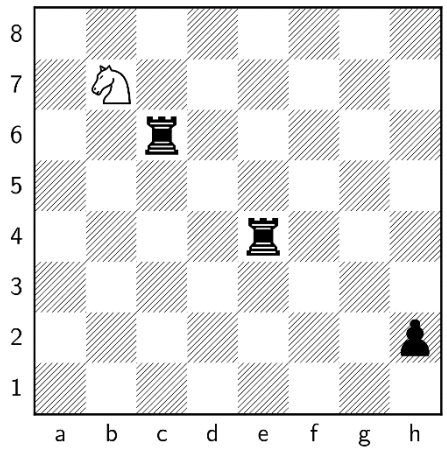
b5-d4-e2-g3-h5 / b5-c7-e8-f6-h5
b5-c7-e8-g7-h5 / b5-c3-e2-g3-h5

S8.1.13.L4 – 5 moves



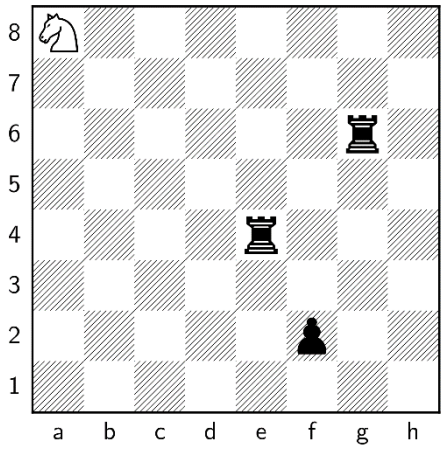
f2-h3-g5-e6-c5-a6

S8.1.14.L4 – 5 moves



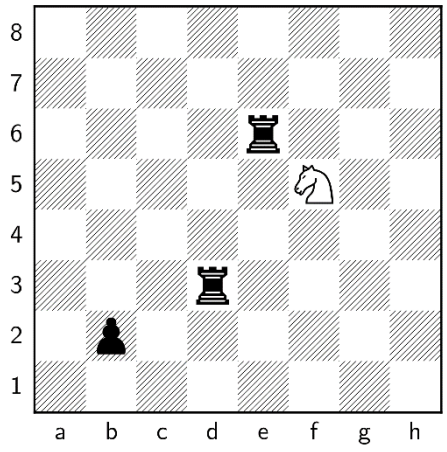
b7-d8-f7-g5-f3-h2
b7-a5-b3-d2-f3-h2
b7-a5-b3-d2-f1-h2

S8.1.15.L4 – 5 moves



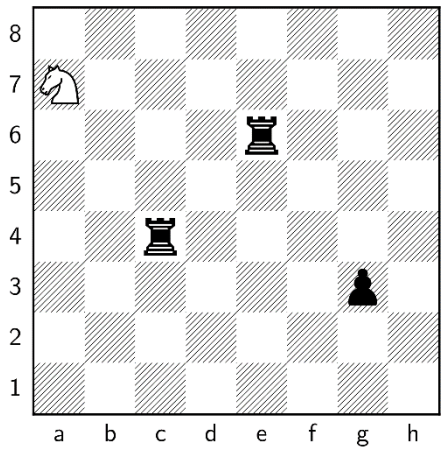
a8-c7-b5-c3-d1-f2
a8-c7-b5-c3-e4-f2
a8-c7-d5-c3-d1-f2
a8-c7-d5-c3-e4-f2

S8.1.16.L4 – 5 moves



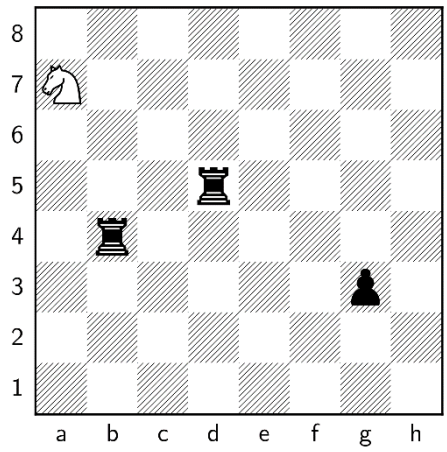
f5-h4-g2-f4-d3-b2
f5-g7-e6-c5-d3-b2
f5-g7-e6-c5-a4-b2
f5-g7-e6-f4-d3-b2

S8.1.17.L5 – 6 moves



a7-b5-a3-b1-d2-f1-g3
a7-b5-a3-c4-d2-f1-g3
a7-b5-a3-c4-d2-f1-g3

S8.1.18.L5 – 6 moves



a7-c6-b4-d5-e3-f1-g3
a7-c6-b4-d5-e3-f5-g3
a7-c6-b4-c2-e3-f1-g3
a7-c6-b4-d5-f6-h5-g3
a7-c6-b4-d5-f6-e4-g3
a7-c6-b4-d5-e7-f5-g3
a7-c6-e7-d5-f6-h5-g3
a7-c6-e7-d5-e3-f1-g3
a7-c6-e7-d5-e3-f5-g3
a7-c8-e7-d5-f6-h5-g3
a7-c8-e7-d5-e3-f1-g3
a7-c8-e7-d5-e3-f5-g3

Exercise 8.2: EXECUTIVE FUNCTIONS. Organization.

Materials: Demo board, stopwatch

Implementation:

First, ensure that the participants are familiar with the starting position. Repeat the initial position if necessary.
Explain the exercise:
The participants should move the white pieces to their starting squares with the fewest number of moves. To do this, the pawns can move backwards as an exception (but only one square at a time). Check moves do not matter, i.e. a king may move into check.
Mode a)
without capturing
Mode b) (not recommended for participants with cognitive impairments)
with capturing, exception: Black cannot capture a piece that has reached the starting position.

Time frame:

Explanation of the starting position and the exercise: approx. 5 minutes
Participants have one minute per diagram. The time can be adjusted depending on the difficulty.

Psychoeducational introduction:

Today´s second exercise block continues to focus on executive functions.
However, you will be given a completely different set of diagrams to train your planning skills.

Instructions:

„In this exercise, you are asked to show how many moves it takes to return the white pieces to their starting positions. Find the shortest route (the fewest number of moves). As an exception, the pawn can move backwards, but only one square at a time. Checks are irrelevant.“

Mode a)
“The black pieces cannot capture the white pieces, and vice versa.“
Mode b)
“Both colors can capture each other, with one exception: black pieces cannot capture white pieces that have reached their starting square.“

Level of difficulty:

In general, the diagrams in mode b) are more difficult because you have to pay attention to the squares occupied by black (obstacles) – the black pieces can capture white pieces there. Therefore, difficulty level 3 is assigned to them as the lowest level.

Mode a)

1: 3-5 pieces, 3-6 moves (diagrams 1 – 5)
2: 5-7 pieces, 7-10 moves (diagrams 6 – 10)
3: 5-7 pieces, 11-13 moves (diagrams 11 – 12)

Mode b)

3: 5-6 pieces, 5-6 moves (diagrams 13 – 15)
4: 6-8 pieces, 7-8 moves (diagrams 16 – 18)
5: >8 pieces, >8 moves (diagrams 19 – 20)

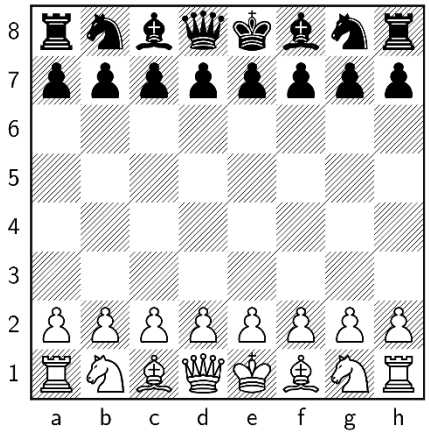
Procedure for incorrect answers:

- If the participants do not know how the pieces move, this should be explained to them.
- If participants make incorrect moves, they must be corrected.

Note on solution information:
There are numerous move orders for this exercise to achieve the goal. Therefore, only one move order is given as an example for each board in the solutions.

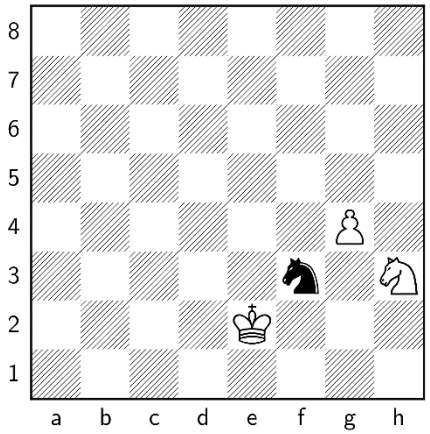
Explanatory examples

S8.2.E1



Explain and demonstrate the starting position as the goal for this exercise. It is important that all participants are familiar with the initial position.

S8.2.E2



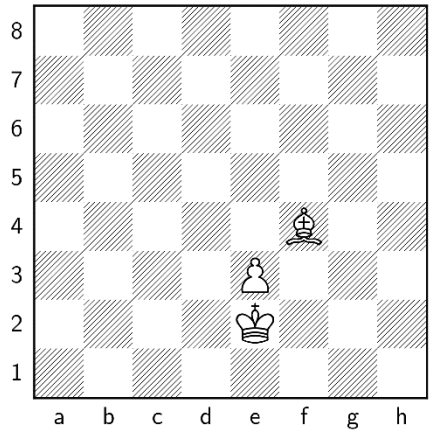
g3-g2: Pawns may only move back one square per move.

Ke1 is possible because checks do not apply.

Mode b):
g4xf3: Pawns may capture backwards.
Ng1 is possible since the white knight has returned to its starting square and therefore cannot be captured by Black.

Mode a) – boards 1 to 12

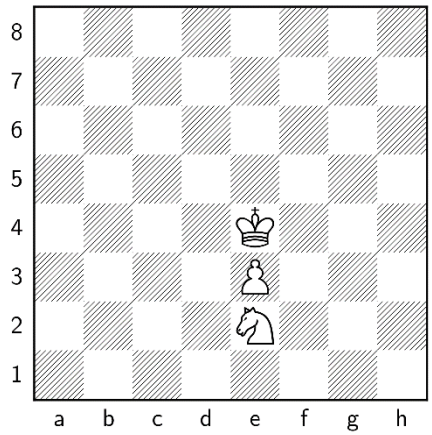
S8.2.1.L1



3 moves

1. Ke1
2. e2
3. Bc1

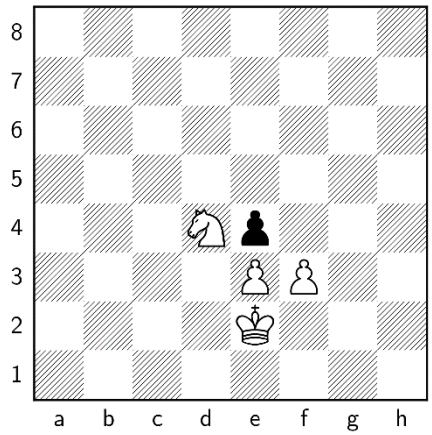
S8.2.2.L1



5 moves

1. Ng1
2. e2
3. Kd3
4. Kd2
5. Ke1

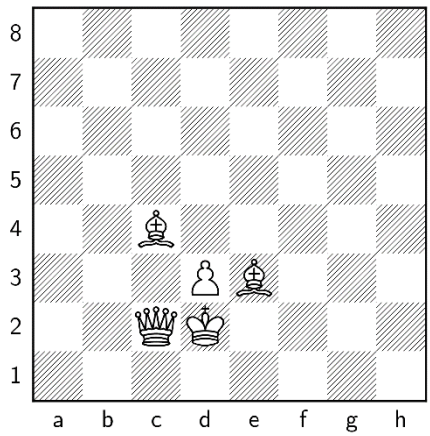
S8.2.3.L1



5 moves

1. Ke1
2. Ne2
3. Ng1
4. e2
5. f2

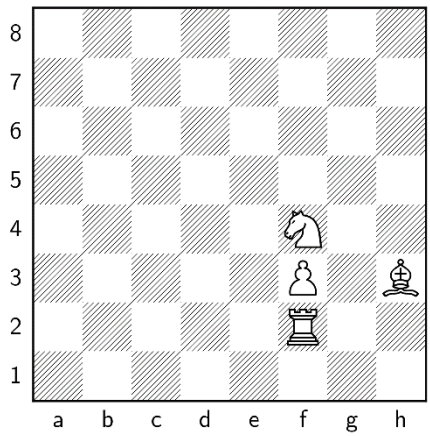
S8.2.4.L1



5 moves

1. Ke1
2. Qd1
3. Bc1
4. d2
5. Bf1

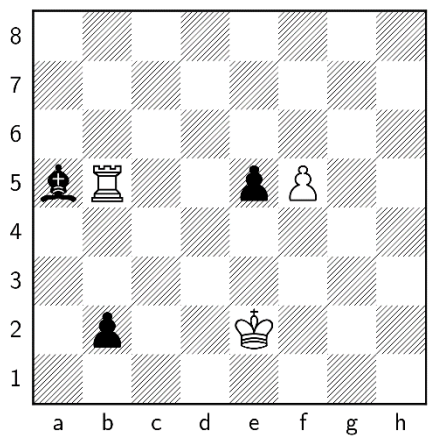
S8.2.5.L1



6 moves

1. Bf1
2. Ra2
3. Ra1
4. f2
5. Nh3
6. Ng1

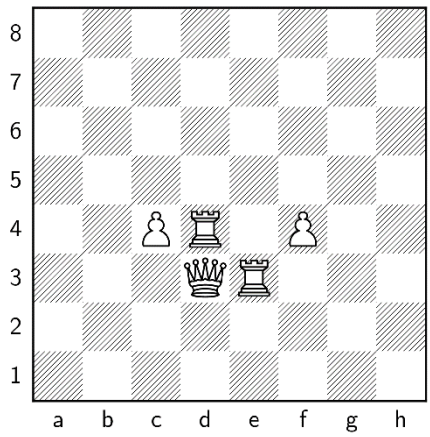
S8.2.6.L2



7 moves

1. Ke1
2. f4
3. f3
4. f2
5. Rb8
6. Rh8
7. Rh1

S8.2.7.L2

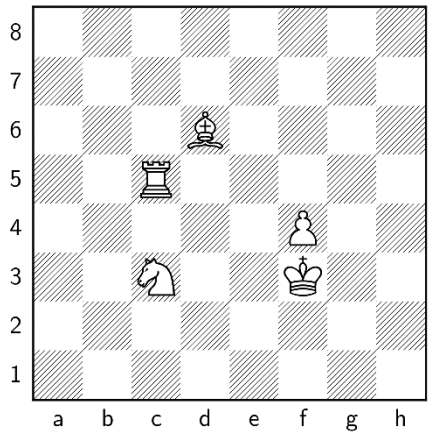


9 moves

1. Qd1
2. Rh3
3. Rh1
4. f3
5. f2
6. c3
7. c2
8. Ra4
9. Ra1

S8.2.8.L2

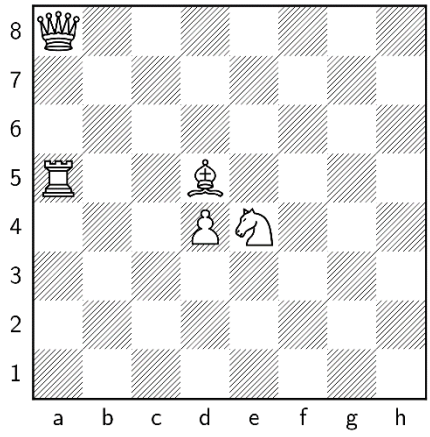
9 moves



1. Nb1
2. Kf2
3. Ke1
4. f3
5. f2
6. Rh5
7. Rh1
8. Bf4
9. Bc1

S8.2.9.L2

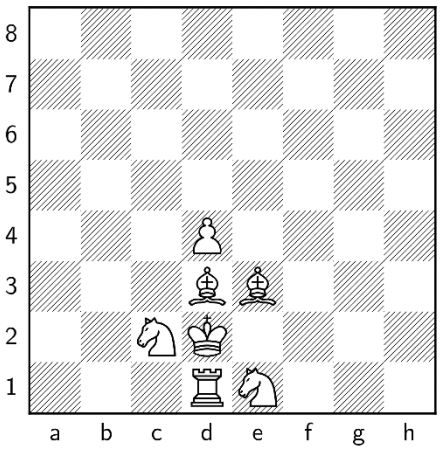
9 moves



1. Nc3
2. Nb1
3. Ra1
4. Bc4
5. Qh1
6. Qd1
7. Bf1
8. d3
9. d2

S8.2.10.L2

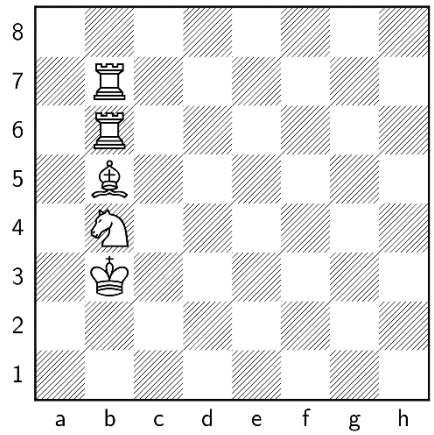
10 moves



1. Bf1
2. Ra1
3. Na3
4. Nb1
5. Nf3
6. Ng1
7. Ke1
8. Bc1
9. d3
10. d2

S8.2.11.L3

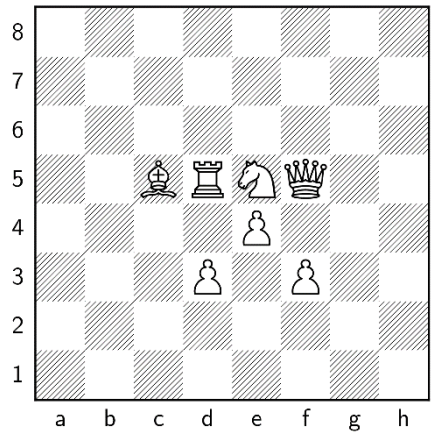
11 moves



1. Bf1
2. Kc2
3. Kd1
4. Ke1
5. Nc2
6. Na3
7. Nb1
8. Ra6
9. Ra1
10. Rh7
11. Rh1

S8.2.12.L3

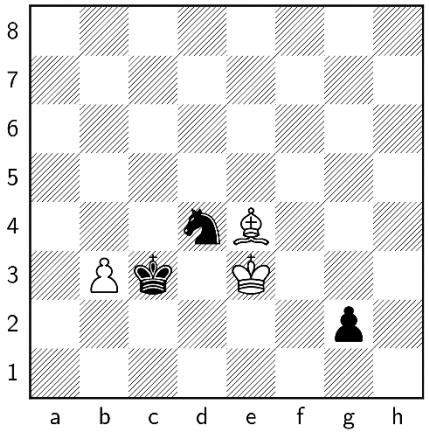
12 moves



1. Be3
2. Bc1
3. Ra5
4. Ra1
5. d2
6. e3
7. e2
8. f2
9. Qc2
10. Qd1
11. Nf3
12. Ng1

Mode b) – boards 13 to 20

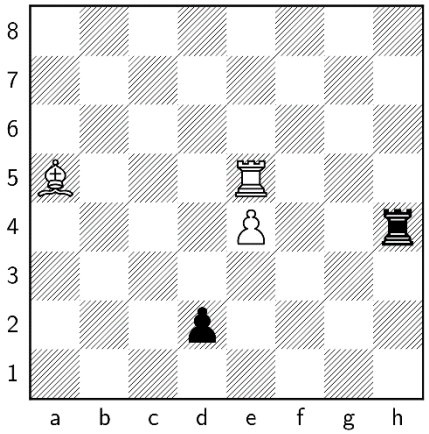
S8.2.13.L3



5 moves

1. Kf2
2. Ke1
3. Bxg2
4. Bf1
5. b2

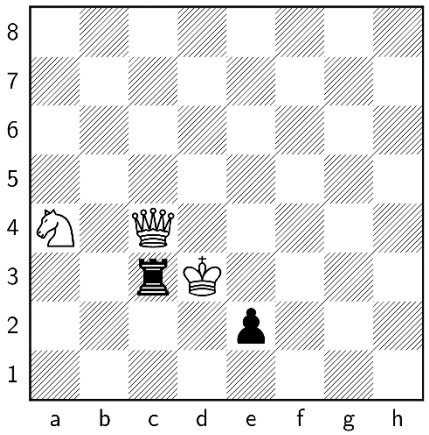
S8.2.14.L3



6 moves

1. Bxd2
2. Bc1
3. e3
4. e2
5. Ra5
6. Ra1

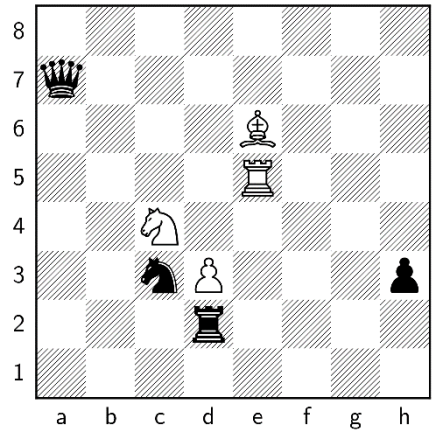
S8.2.15.L3



6 moves

1. Nxc3
2. Nb1
3. Kxe2
4. Ke1
5. Qc2
6. Qd1

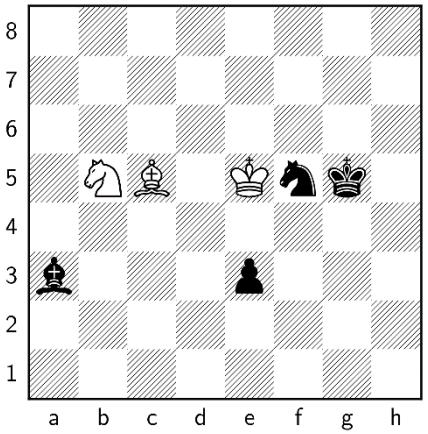
S8.2.16.L4



7 moves

1. Nxd2
2. Nb1
3. d2
4. Bxh3
5. Bf1
6. Rh5
7. Rh1

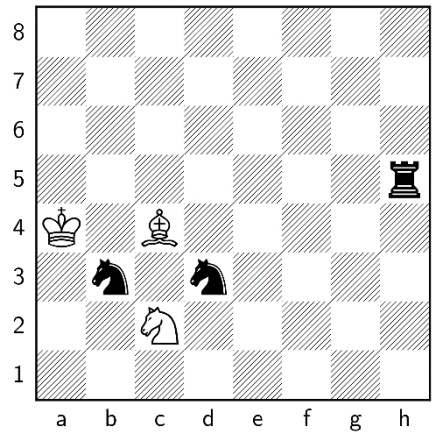
S8.2.17.L4



8 moves

1. Bxa3
2. Bc1
3. Nc3
4. Nb1
5. Ke4
6. Kd3
7. Ke2
8. Ke1

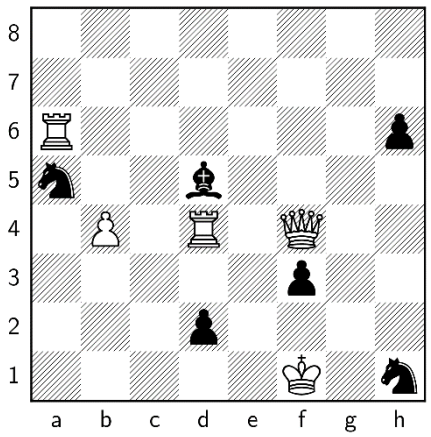
S8.2.18.L4



8 moves

1. Bxd3
2. Bf1
3. Na3
4. Nb1
5. Kxb3
6. Kc2
7. Kd1
8. Ke1

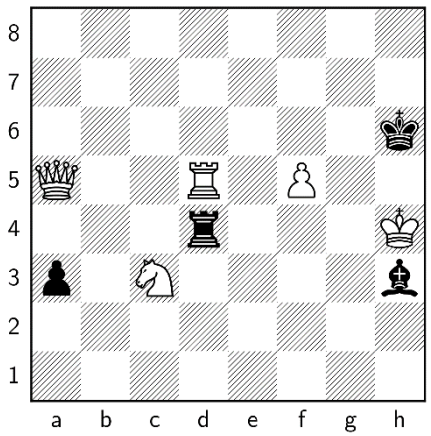
S8.2.19.L5



9 moves

1. Qxd2
2. Qd1
3. Rh4
4. Rxh1
5. Ke1
6. b3
7. b2
8. Rxa5
9. Ra1

S8.2.20.L5



12 moves

1. Rxd4
2. Rd1
3. Ra1
4. Nb1
5. Kg3
6. Kf2
7. Ke1
8. f4
9. f3
10. f2
11. Qd2
12. Qd1

SESSION 9.

Exercise 9.1: ATTENTION STRATEGIES. Visual tracking. Systematic exploration.

Materials: Demo board, worksheets (3 boards on one sheet)

Implementation:

- Participants are given a worksheet with three chessboards. Each board is divided into the quadrants introduced in session 6. The course instructor reads out questions about the quadrants.
  Before starting, ensure that all participants are familiar with the definition of the quadrants (and their numbering). If necessary, use the demo board and briefly repeat the quadrants.
- Participants should name the number of pieces asked for within seconds (time specified in brackets after the question, see below).
- Only the diagram currently being asked about by the course instructor (in order from top to bottom) is visible; the participants cover the other diagrams with another blank sheet of paper or fold them over.

Time frame:
Total time: approx. 30 to 40 minutes
Response time: indicated in brackets below

Psychoeducational introduction:
Today we will once again be focusing on training your ability to maintain attention. You will need to continue recognizing and processing details. This is meant to help you focus your attention on things that have nothing to do with the substance in your everyday life and to find your way through difficult situations.

Instructions:

- *"You will receive several boards with quadrants on paper. You will be asked questions about them, and you should answer as quickly as possible. Please do not make any notes in the margins."*

Level of difficulty:
The response time is adjusted to the number of pieces queried. The number is therefore used as a parameter.

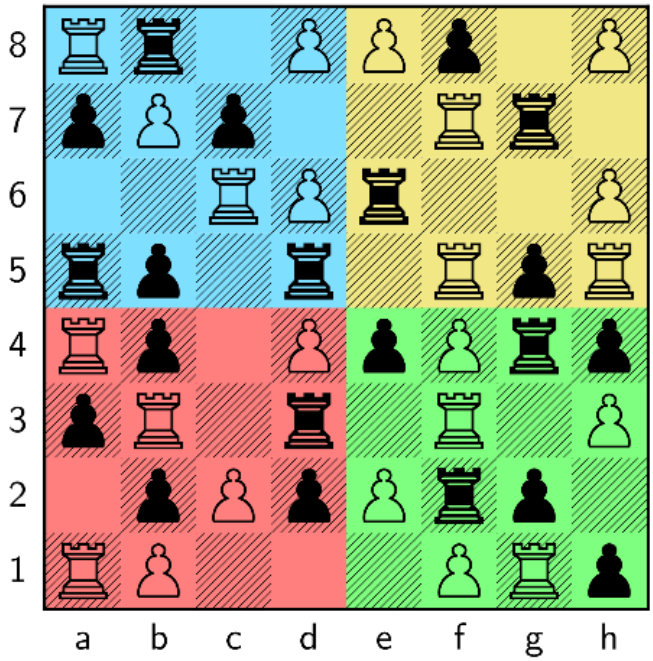
1: Number of pieces 1-10
2: Number of pieces 11-15
3: Number of pieces 16-20
4: Number of pieces: > 20
5: not applicable

Procedure for incorrect answers:

- The question may not have been understood acoustically; if necessary, ask it again.
- Ask whether the participant is sure; if necessary, have them count again.

If necessary: Pass the question on to another participant or the group

S9.1.1 – Board A



1. How many pawns are there in total in the fourth quadrant? **8** (10 seconds) (L1)

2. How many pawns are there in total in the second quadrant? **5** (10 seconds) (L1)

3. How many pawns are there in total in the third quadrant? **7** (10 seconds) (L1)

4. How many pawns are there in total in the first and fourth quadrants? **14** (10 seconds) (L2)

5. How many pawns are there in total in the second and third quadrants? **12** (10 seconds) (L2)

6. How many pawns are there in total in the first quadrant? **6** (10 seconds) (L1)

7. How many pawns are there in total in the second and fourth quadrants? **13** (10 seconds) (L2)

8. How many pawns are there in total in the third and fourth quadrants? **15** (10 seconds) (L2)

9. How many pawns are there in total in the first and third quadrants? **13** (10 seconds) (L2)

10. How many pawns are there in total in the first, third and fourth quadrants? **21** (15 seconds) (L4)

11. How many pawns are there in total in the first and second quadrants? **11** (10 seconds) (L2)

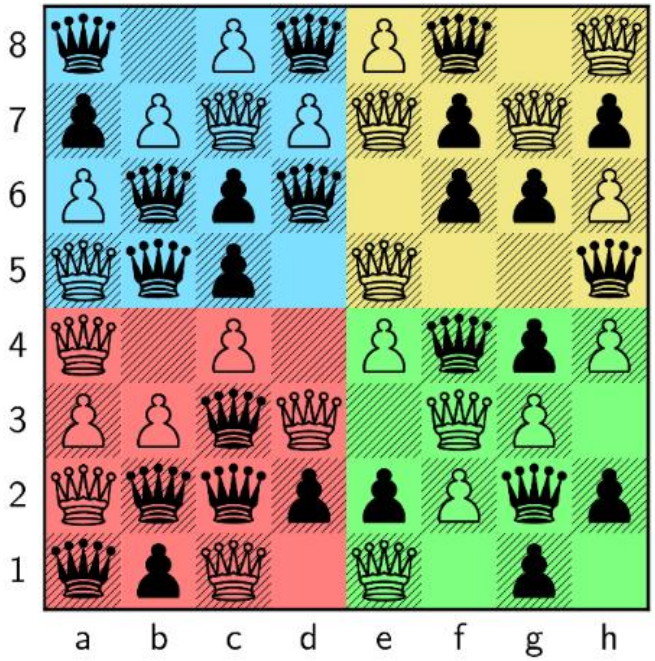
12. How many pawns are there in total in the third, second and fourth quadrants? **20** (15 seconds) (L3)

13. How many pawns are there in total in the fourth, second and first quadrants? **19** (15 seconds) (L3)

14. How many pawns are there in total in the third, second and first quadrants? **18** (15 seconds) (L3)

15. How many pawns are there in total in all quadrants? **26** (15 seconds) (L4)

S9.1.2 - Board B



1. How many queens are there in total in the fourth quadrant? **4** (10 seconds) (L1)

2. How many queens are there in total in the second quadrant? **6** (10 seconds) (L1)

3. How many queens are there in total in the third quadrant? **8** (10 seconds) (L1)

4. How many queens are there in total in the first and fourth quadrants? **11** (10 seconds) (L2)

5. How many queens are there in total in the second and third quadrants? **14** (10 seconds) (L2)

6. How many queens are there in total in the first quadrant? **7** (10 seconds) (L1)

7. How many queens are there in total in the second and fourth quadrants? **10** (10 seconds) (L1)

8. How many queens are there in total in the third and fourth quadrants? **12** (10 seconds) (L2)

9. How many queens are there in total in the first and third quadrants? **15** (10 seconds) (L2)

10. How many queens are there in total in the first, third and fourth quadrants? **19** (15 seconds) (L3)

11. How many queens are there in total in the first and second quadrants? **13** (10 seconds) (L2)

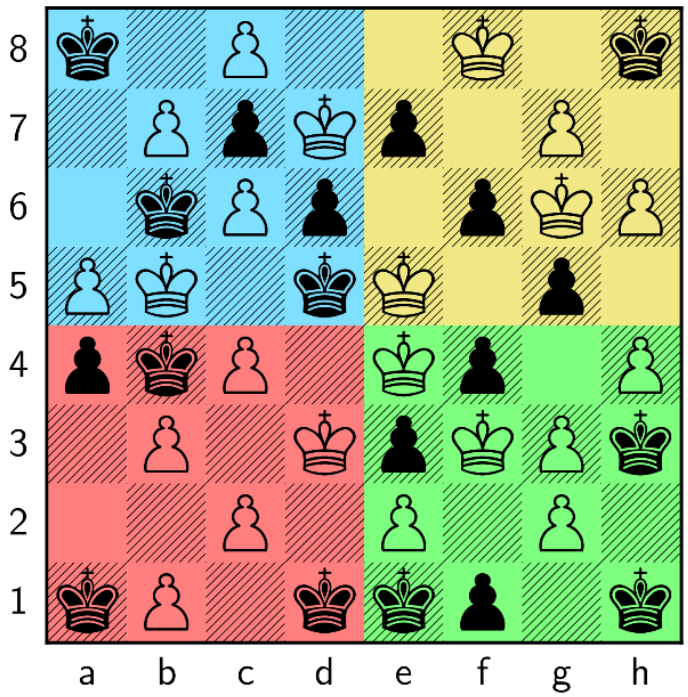
12. How many queens are there in total in the third, second and fourth quadrants? **18** (15 seconds) (L3)

13. How many queens are there in total in the fourth, second and first quadrants? **17** (15 seconds) (L3)

14. How many queens are there in total in the third, second and first quadrants? **21** (15 seconds) (L4)

15. How many queens are there in total in all quadrants? **25** (15 seconds) (L4)

S9.1.3 – Board C



1. How many kings are there in total in the fourth quadrant? **5** (10 seconds) (L1)

2. How many kings are there in total in the second quadrant? **4** (10 seconds) (L1)

3. How many kings are there in total in the third quadrant? **4** (10 seconds) (L1)

4. How many kings are there in total in the first and fourth quadrants? **10** (10 seconds) (L1)

5. How many kings are there in total in the second and third quadrants? **8** (10 seconds) (L1)

6. How many kings are there in total in the first quadrant? **5** (10 seconds) (L1)

7. How many kings are there in total in the second and fourth quadrants? **9** (10 seconds) (L1)

8. How many kings are there in total in the third and fourth quadrants? **9** (10 seconds) (L1)

9. How many kings are there in total in the first and third quadrants? **9** (10 seconds) (L1)

10. How many kings are there in total in the first, third and fourth quadrants? **14** (15 seconds) (L2)

11. How many kings are there in total in the first and second quadrants? **9** (10 seconds) (L1)

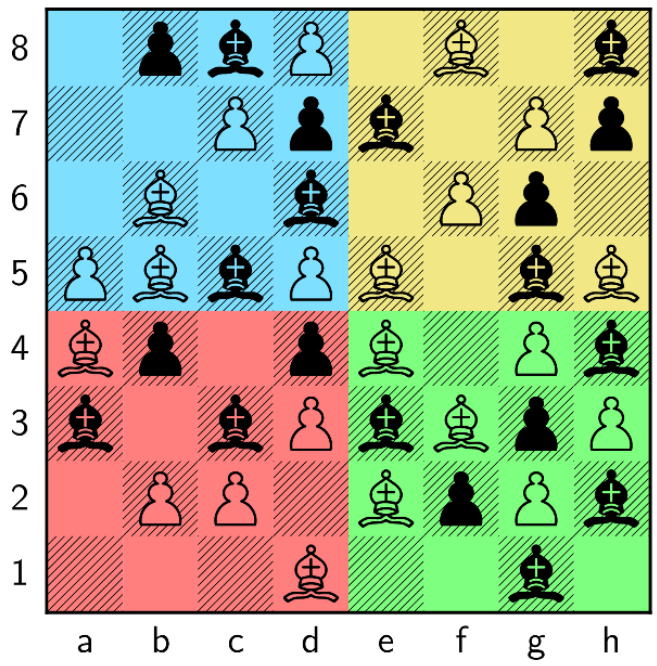
12. How many kings are there in total in the third, second and fourth quadrants? **13** (15 seconds) (L2)

13. How many kings are there in total in the fourth, second and first quadrants? **14** (15 seconds) (L2)

14. How many kings are there in total in the third, second and first quadrants? **13** (15 seconds) (L2)

15. How many kings are there in total in all quadrants? **18** (15 seconds) (L3)

S9.1.4 – Board D



1. How many bishops are there in total in the fourth quadrant? **7** (10 seconds) (L1)

2. How many bishops are there in total in the second quadrant? **6** (10 seconds) (L1)

3. How many bishops are there in total in the third quadrant? **4** (10 seconds) (L1)

4. How many pawns are there in total in the first and fourth quadrants? **11** (10 seconds) (L2)

5. How many pawns are there in total in the second and third quadrants? **9** (10 seconds) (L1)

6. How many bishops are there in total in the first quadrant? **5** (10 seconds) (L1)

7. How many pawns are there in total in the second and fourth quadrants? **9** (10 seconds) (L1)

8. How many bishops are there in total in the third and fourth quadrants? **11** (10 seconds) (L2)

9. How many bishops are there in total in the first and third quadrants? **9** (10 seconds) (L1)

10. How many bishops are there in total in the first, third and fourth quadrants? **16** (15 seconds) (L3)

11. How many pawns are there in total in the first and second quadrants? **10** (10 seconds) (L1)

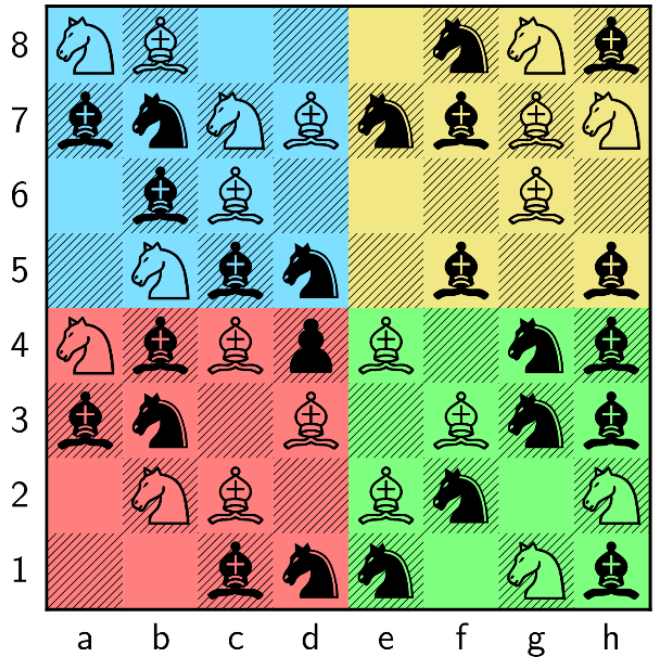
12. How many bishops are there in total in the third, second and fourth quadrants? **17** (15 seconds) (L3)

13. How many bishops are there in total in the fourth, second and first quadrants? **18** (15 seconds) (L3)

14. How many bishops are there in total in the third, second and first quadrants? **15** (15 seconds) (L3)

15. How many pawns are there in total in all quadrants? **20** (15 seconds) (L3)

S9.1.5 – Board E



1. How many knights are there in total in the fourth quadrant? **6** (10 seconds) (L1)

2. How many knights are there in total in the second quadrant? **4** (10 seconds) (L1)

3. How many knights are there in total in the third quadrant? **4** (10 seconds) (L1)

4. How many knights are there in total in the first and fourth quadrants? **11** (10 seconds) (L2)

5. How many knights are there in total in the second and third quadrants? **8** (10 seconds) (L1)

6. How many knights are there in total in the first quadrant? **5** (10 seconds) (L1)

7. How many knights are there in total in the second and fourth quadrants? **10** (10 seconds) (L1)

8. How many knights are there in total in the third and fourth quadrants? **10** (10 seconds) (L1)

9. How many knights are there in total in the first and third quadrants? **9** (10 seconds) (L1)

10. How many knights are there in total in the first, third and fourth quadrants? **15** (15 seconds) (L2)

11. How many knights are there in total in the first and second quadrants? **9** (10 seconds) (L1)

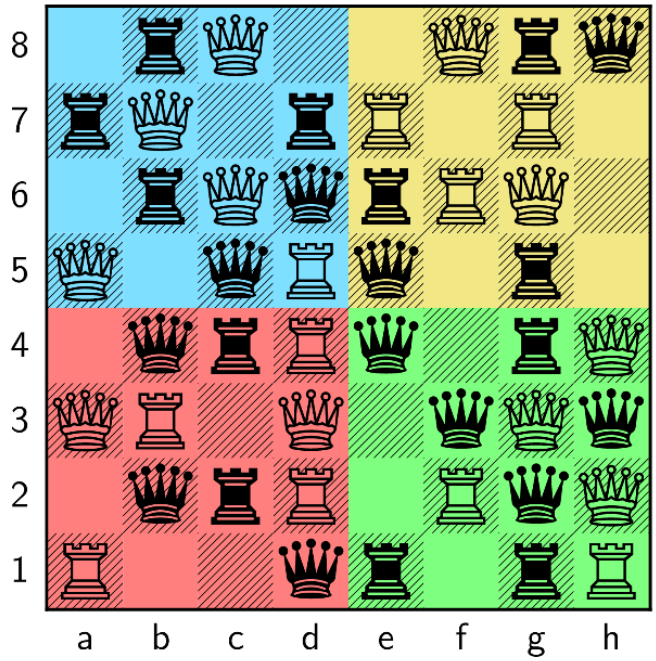
12. How many knights are there in total in the third, second and fourth quadrants? **14** (15 seconds) (L2)

13. How many knights are there in total in the fourth, second and first quadrants? **15** (15 seconds) (L2)

14. How many knights are there in total in the third, second and first quadrants? **13** (15 seconds) (L2)

15. How many knights are there in total in all quadrants? **19** (15 seconds) (L3)

S9.1.6 – Board F



1. How many rooks are there in total in the fourth quadrant? **5** (10 seconds) (L1)

2. How many rooks are there in total in the second quadrant? **6** (10 seconds) (L1)

3. How many rooks are there in total in the third quadrant? **6** (10 seconds) (L1)

4. How many rooks are there in total in the first and fourth quadrants? **10** (10 seconds) (L1)

5. How many rooks are there in total in the second and third quadrants? **12** (10 seconds) (L2)

6. How many rooks are there in total in the first quadrant? **5** (10 seconds) (L1)

7. How many rooks are there in total in the second and fourth quadrants? **11** (10 seconds) (L2)

8. How many rooks are there in total in the third and fourth quadrants? **11** (10 seconds) (L2)

9. How many rooks are there in total in the first and third quadrants? **11** (10 seconds) (L2)

10. How many rooks are there in total in the first, third and fourth quadrants? **16** (15 seconds) (L3)

11. How many rooks are there in total in the first and second quadrants? **11** (10 seconds) (L2)

12. How many rooks are there in total in the third, second and fourth quadrants? **17** (15 seconds) (L3)

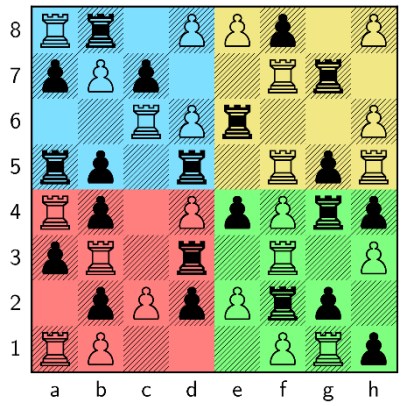
13. How many rooks are there in total in the fourth, second and first quadrants? **16** (15 seconds) (L3)

14. How many rooks are there in total in the third, second and first quadrants? **17** (15 seconds) (L3)

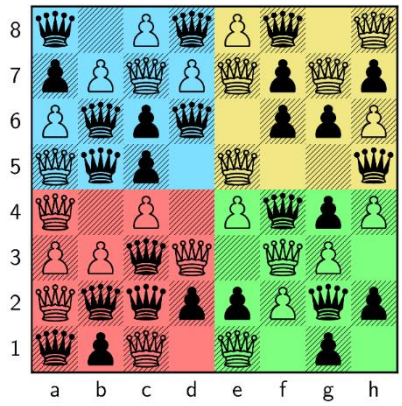
15. How many rooks are there in total in all quadrants? **22** (15 seconds) (L4)

Overview exercises 9.1 (worksheets below, sheet 1: A-C; sheet 2: D-F)

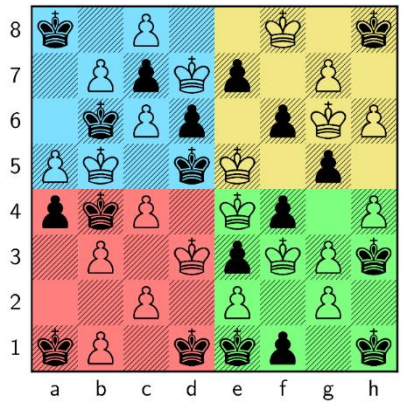
S9.1.1 Board A



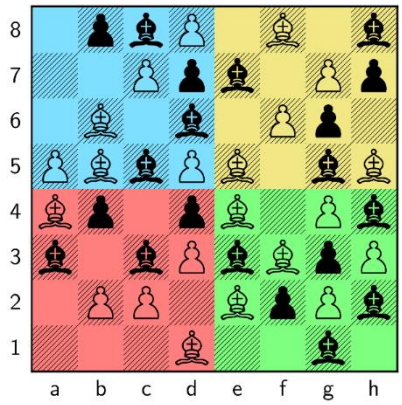
S9.1.2 Board B



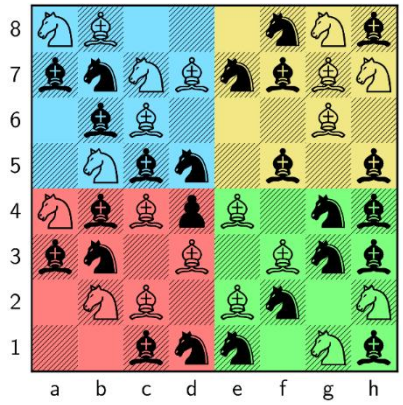
S9.1.3 Board C



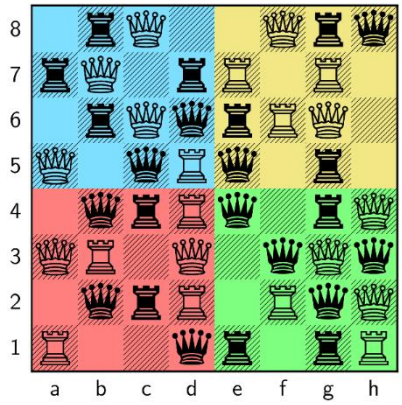
S9.1.4 Board D



S9.1.5 Board E



S9.1.6 Board F



Exercise 9.2: EXECUTIVE FUNCTIONS. Judgment.

Materials: Demo board
Implementation:
Participants should assess the legality of the moves.
To do this, the technical element of pinning is first explained (see explanatory example below).

For cognitively impaired groups:
The technical element of pinning can be omitted so as not to disrupt the dynamic cognitive process. In this case, omit the corresponding moves in the examples. Likewise, omit multi-move problems if necessary.

Show or announce the moves slowly and clearly. The exercise can also be carried out by simply naming the starting and target squares of the piece without making the move on the board. It is important that the participants are asked about the legality of the moves quickly.

Time frame:
30 seconds per move
10 to 15 minutes per diagram
Total time: 40 minutes

Psychoeducational introduction:
You know that executive functions are important for acting with foresight and controlling impulsive behavior. With another exercise, we will train the behavior that is important for controlling substance use and helps you make long-term decisions.

Instructions:
If the moves are shown on the demo board:

- *"I will move pieces from this position on the demo board. You are then asked to indicate whether each move is legal or illegal."*

If only the starting and target squares of the pieces are named:

- *"In this position, I will announce the move of a piece. You then tell me whether the move is legal or illegal."*
  Example: "Black bishop a4 to d1" etc.

Level of difficulty:

- 1: 10 pieces, no technical elements, no multi-moves
- 2: 17 pieces, one technical element, no multi-moves
- 3: 16 pieces, 2 to 4 technical elements, no multi-moves
- 4: 20 pieces, 5 technical elements, two multi-moves
- 5: 19 pieces, 8 technical elements, three multi-moves

Increasing the level of difficulty:

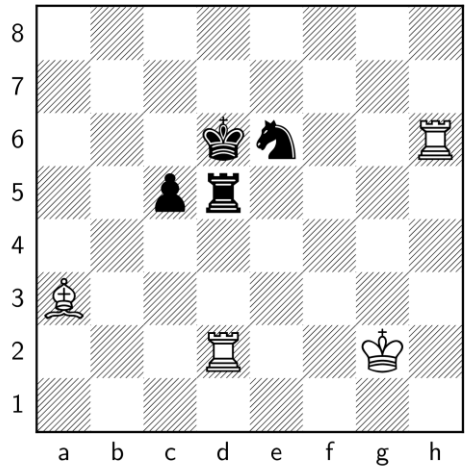
It is possible to ask whether a piece can reach its target square in a certain number of moves.

Procedure for incorrect answers:

- If participants repeatedly make mistakes, they may not be familiar with how the pieces move. Have participants explain their intermediate steps and thought processes and, if necessary, repeat the moves.

Explanatory example (only for groups without cognitive impairments):

S9.2.E1 – The pin



The pin

A piece is pinned if its move would expose its own king to check.
This means that a piece can only move if its own king remains protected. If this is not the case, the move may not be made (pinning).

1. Diagonal pin

The pawn on c5 cannot move because the black king would be in check by the white bishop.

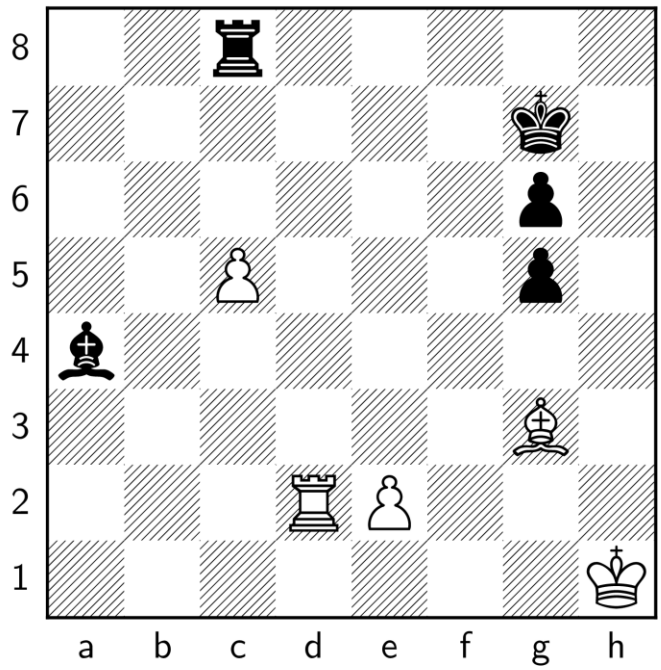
2. Horizontal pin

The black knight on e6 cannot move because the black king would be in check by the white rook on h6.

3. Vertical pin

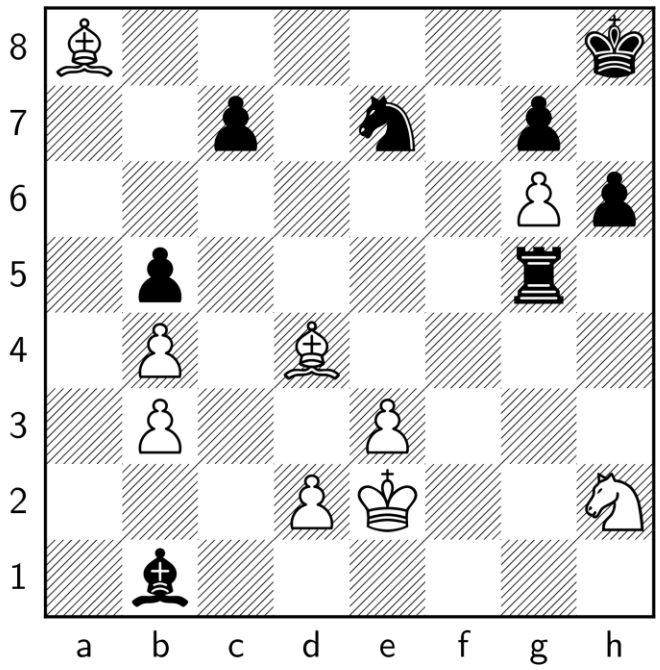
The black rook on d5 cannot leave the d-file (vertical) because the black king would be in check by the white rook on d2.

S9.2.1.L1



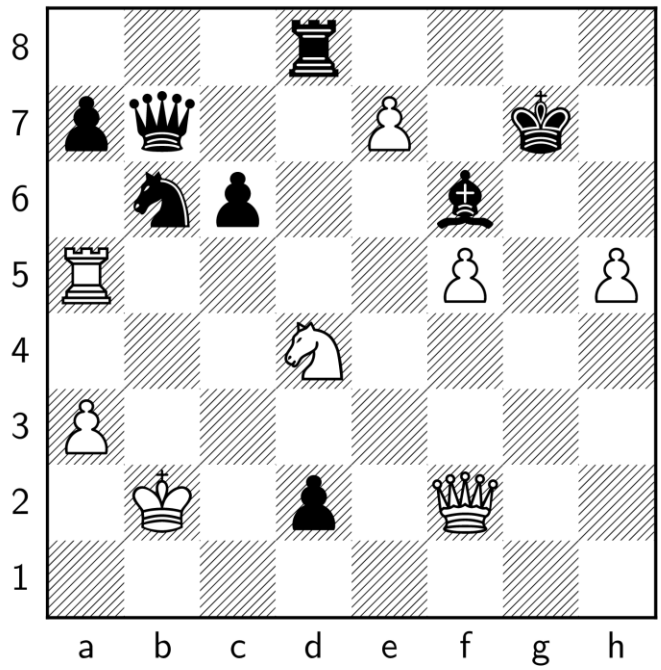
1.	Black bishop to d1.	Yes
2.	White rook to c3.	No
3.	White king to g4.	No
4.	Pawn from a2 to a4.	No
5.	Black rook to e6.	No
6.	Black king to h7.	Yes
7.	White bishop to d7.	No
8.	Pawn from c5 to c7.	No
9.	White rook to a2.	Yes
10.	White king to h3.	No
11.	White bishop to d6.	Yes
12.	Black rook to g8.	Yes
13.	Black pawn from g6 to g4.	No
14.	Black pawn from g5 to g4.	Yes
15.	Bishop from a4 to d7.	Yes
16.	White king to g7.	No
17.	White rook to a5.	No
18.	Pawn from e2 to e3.	Yes

S9.2.2.L1



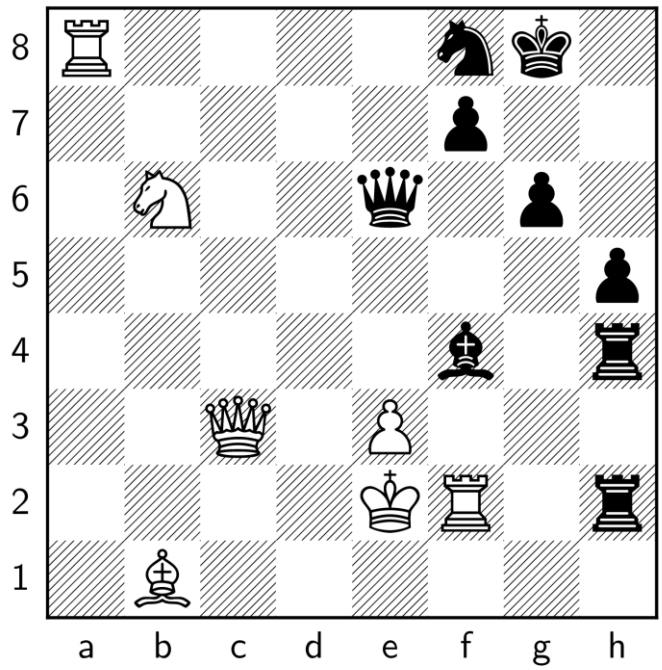
1.	White knight to g4.	Yes
2.	Black rook to g3.	Yes
3.	White king to e3.	No
4.	Pawn from c7 to b6.	No
5.	Black knight to d5.	Yes
6.	Black bishop to f8.	No
7.	Pawn from e3 to f3.	No
8.	Black rook to g2.	Yes
9.	White king to d3.	No
10.	Pawn from h6 to h5.	Yes
11.	Bishop from d4 to c3.	Yes
12.	Black knight to c6.	Yes
13.	Pawn from c7 to c6.	Yes
14.	White knight to f2.	No
15.	Black rook to a5.	No
16.	White king to e4.	No
17.	Pawn from b5 to a4.	No

S9.2.3.L2



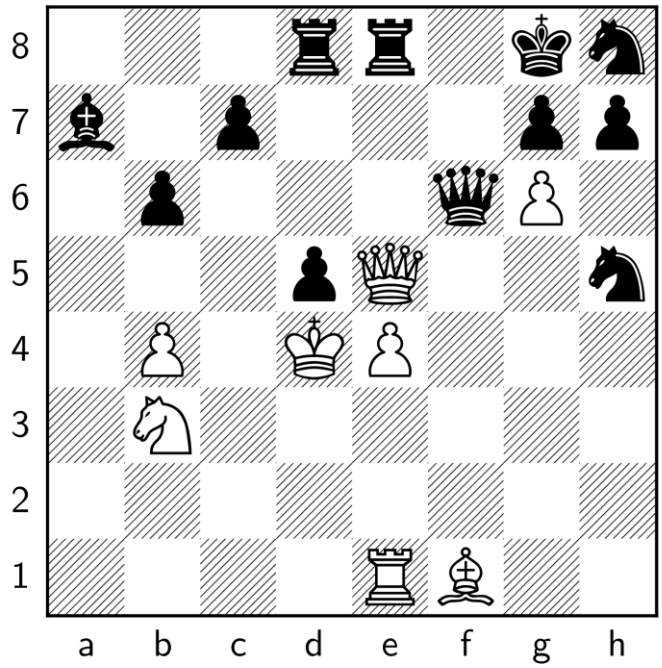
1.	Pawn e7 to e8.	Yes
2.	Knight d4 to e6.	No
3.	Knight b6 to a4.	Yes
4.	Queen f2 captures b6.	No
5.	King b2 captures d2.	No
6.	Pawn f5 to f6.	No
7.	Pawn e7 to f7.	No
8.	Bishop f6 to c6.	No
9.	Pawn a7 to a8.	No
10.	b6 to b5.	No
11.	c6 to c4.	No
12.	f6 to h4.	Yes

S9.2.4.L3



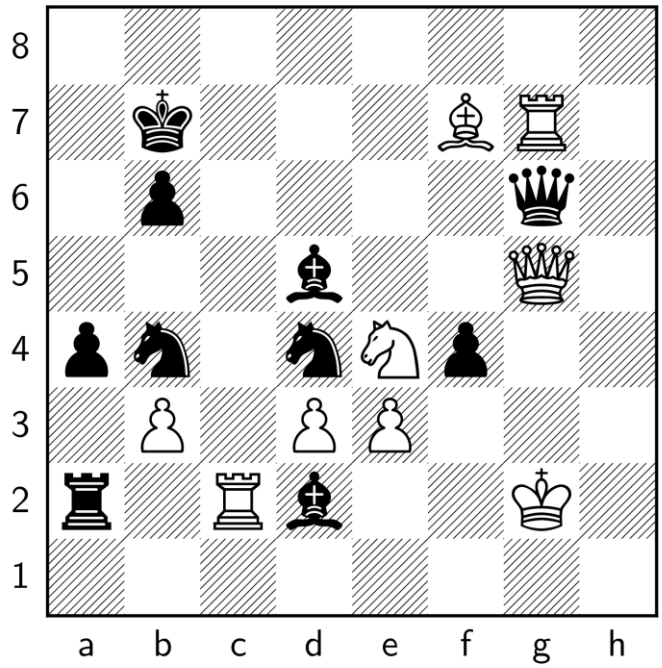
1.	Knight b6 to d7.	Yes
2.	Bishop b1 to g5.	No
3.	Rook f2 captures h2.	Yes
4.	King g9 to h8.	No
5.	Bishop f4 to e5. .	Yes
6.	Rook f2 captures f4.	No
7.	e3 captures f4.	No
8.	Rook a8 captures f8.	Yes
9.	e3 to e4.	Yes
10.	King e2 to f3.	Yes
11.	Bishop b1 captures f5.	No
12.	Queen c3 to h8.	Yes

S9.2.5.L4



1.	Knight b3 to d2.	Yes
2.	Bishop f1 to b5.	Yes
3.	Kd4 captures d5.	No
4.	Queen e5 captures c7.	No
5.	Bishop f1 captures b6.	No
6.	b6 to b5.	Yes
7.	Queen e5 captures e8.	No
8.	d5 captures e4.	Yes
9.	Knight b3 to e6 in two moves.	Yes (b3-c5-e6)
10.	Knight h8 captures e5 in two moves.	Yes (h8-g6-e5)

S9.2.6.L5



1.	Rook c2 to c7 check.	Yes
2.	Queen g6 to c6.	Yes
3.	Bishop f7 captures d5 check.	Yes
4.	Queen g5 to e7 check.	No
5.	Knight e4 to c5 check.	No
6.	Bishop f7 captures g6 check.	Yes
7.	Queen g5 captures d5 check.	No
8.	Queen g6 captures e4 check.	Yes
9.	Pawn f4 to e2 in two moves.	Yes (f4-e3-e2)
10.	Pawn b3 to a6 in two moves.	No
11.	Pawn a4 to c1 in three moves.	Yes (a4-b3-c2-c1)

SESSION 10.

Exercise 10.1: REASONING.
Recognizing unique characteristics.

Materials: Worksheets, stopwatch

Implementation:

Participants are asked to identify characteristics based on six different positions and find the board that differs from all the others. In this process, it is important to first identify the common characteristics of the positions in order to then identify the board that does not share these common characteristics (i.e., the exception).

Methodological note**:** The course instructor should explain the example sheet and answer questions from participants. Ensure that the exercise has been understood, but do not let participants search for solutions themselves at this point (the exercise comes later).

Then hand out the first worksheet. Give participants 3 to 5 minutes to complete the worksheet.

Time frame:

- Explain example sheet: approx. 10 minutes
- Approx. 11 minutes per sheet, including debriefing;
- Total time for all sheets (including example sheet): 58 minutes.

Psychoeducational introduction:

Today we will be looking at logical reasoning, which is also one of the executive functions. We will be training a skill that is important for planning actions and strategic thinking, known as the reflective system, which is primarily linked to the frontal regions of the brain.

Instructions:

"I will now give you a sheet with 6 different positions. Please look at it carefully and identify common characteristics. In a second step, look for a board that does not have these characteristics (an exception board). The common characteristics must be present on 5 boards and absent on one. Try to find this exception. You are welcome to write notes in the margin."

Level of difficulty:

1: not applicable
2: A
3: B
4: C
5: D + E

Solutions:

Example sheet (model answers)

No.	Common characteristic on all boards, exception→	Exception on board no.
1	There is at least one black rook	1
2	There are more than two pieces in the second quadrant	1
3	There are pieces on the f- and h-files	1
4	Check against the white king	2
5	There are pieces on the d-file	3
6	There is at least one white rook	3
7	There is more than one piece in the third quadrant	4
8	There is a white knight	6
9	Both sides have pieces in the opponent´s half of the board	6

Board A

No.	Common characteristic on all boards, exception→	Exception on board no.
1	There are rooks	1
2	There is at least one white bishop	2
3	There are queens	2
4	There are pieces on the c-file	2
5	Black king on g8	2
6	There is at least one black bishop	3
7	There are pieces on the d-file	3
8	There are 4 black and 4 white pawns	4
9	There is a white king on the first rank	5
10	There is more than one piece in the fourth quadrant	6
11	There are pieces on the diagonal g1-a7	6
12	There are pieces on the diagonal f1-h3	6

Board B

No.	Common characteristic on all boards, exception→	Exception on board no.
1	White and Black have an unequal number of pieces	1
2	Checkmate available	2
3	The a1-h8 diagonal is occupied by at least one piece	2
4	More than one piece in the second quadrant	2
5	Bishops on opposite-colored squares	3
6	There are pieces on the h-file	3
7	The c1-h6 diagonal is occupied by at least one piece	3
8	At least one rook on the board	4
9	At least one black knight on the board	4
10	More than one piece in the first quadrant	4
11	There are pieces on the d- and g-file	6

Board C

No.	Common characteristic on all boards, exception→	Exception on board no.
1	More than two pieces in the fourth quadrant	2
2	No complete set of pieces on the board	3
3	Pieces on the c-file	4
4	At least one queen on the board	4
5	There is a pair of knights of each side	6
6	There are pieces on the seventh rank	6

Board D

No.	Common characteristic on all boards, exception→	Exception on board no.
1	Full set of pawns for both colors	2
2	There are pieces on the e-file	2
3	There are pieces on the 7th and 8th ranks	2
4	For White, a rook, a knight, a bishop, and the queen are on the same squares (starting positions)	3
5	Legal positions	6 (three black knights)

Board E

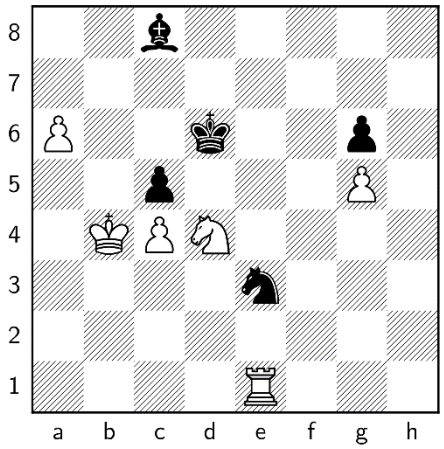
No.	Common characteristic on all boards, exception→	Exception on board no.
1	No complete set of pieces on the board	1
2	There are pieces on the diagonal b1-h7	2
3	There is a pawn chain c5-d4	3
4	The c1-h6 diagonal is occupied by at least one piece	4
5	There is at least one piece in the second quadrant	6

Example sheet S10.1.Ex

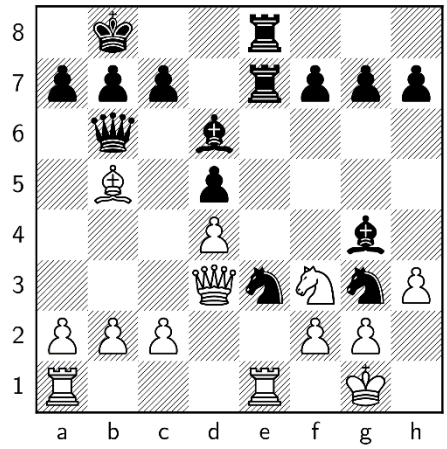
Look closely at the six boards below. Which one does not share any characteristics with the others?

You have 5 minutes.

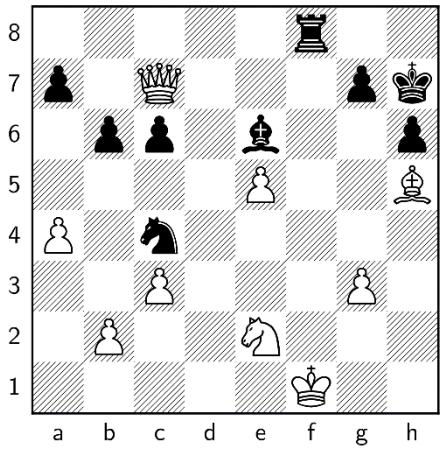
S10.1.Ex1



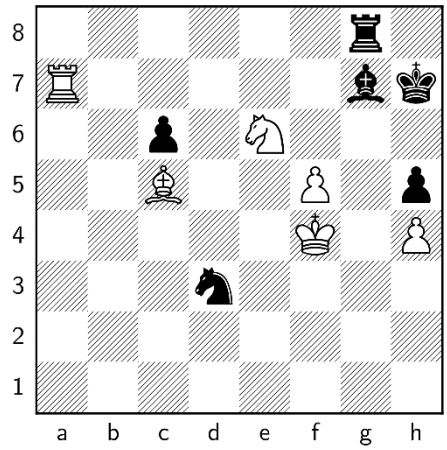
S10.1.Ex2



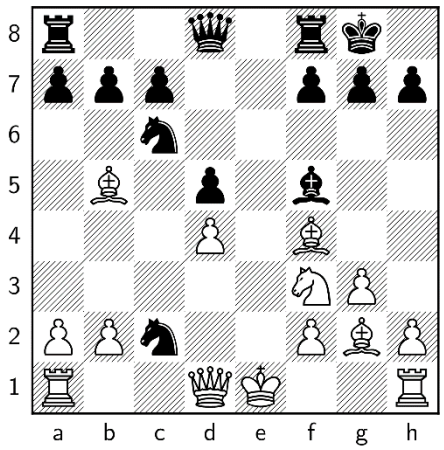
S10.1.Ex3



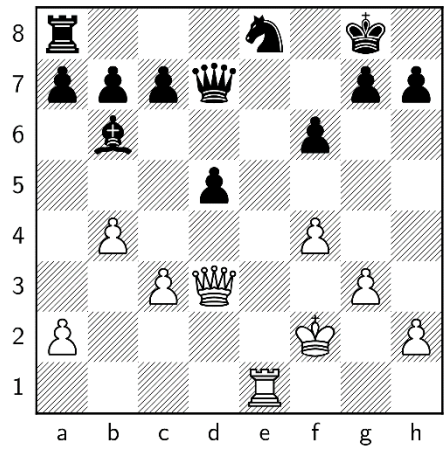
S10.1.Ex4



S10.1.Ex5



S10.1.Ex6

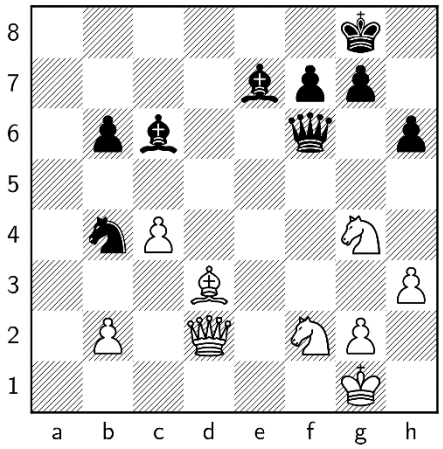


A S10.1.A.L2

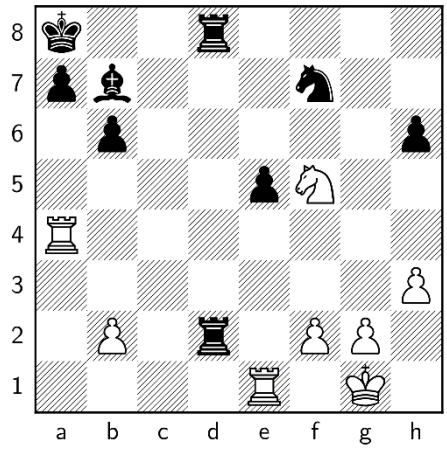
Look closely at the six boards below. Which one does not share any characteristics with the others?

You have 5 minutes.

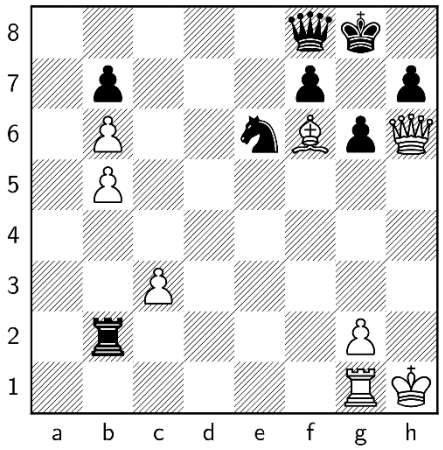
S10.1.A1



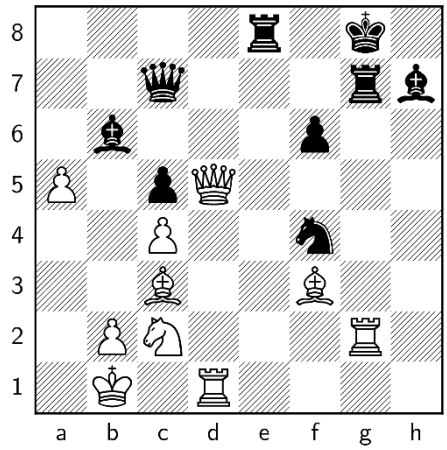
S10.1.A2



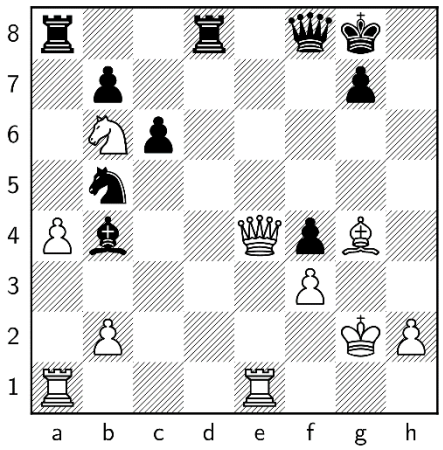
S10.1.A3



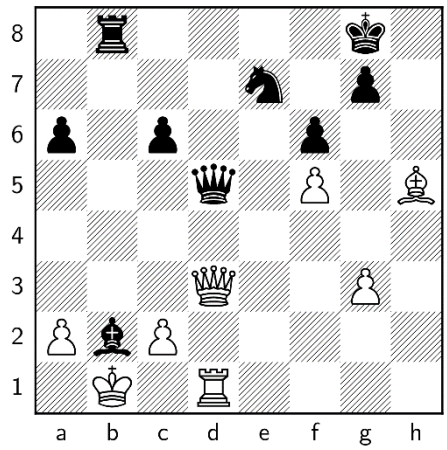
S10.1.A4



S10.1.A5



S10.1.A6

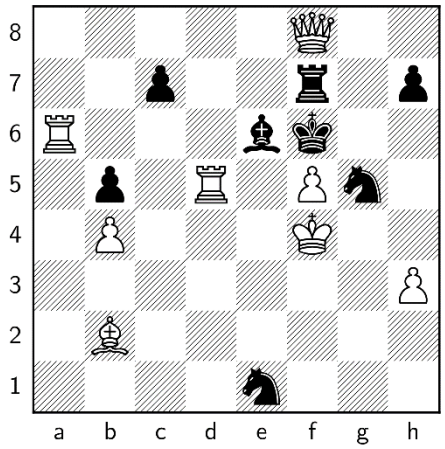


B S10.1.B.L3

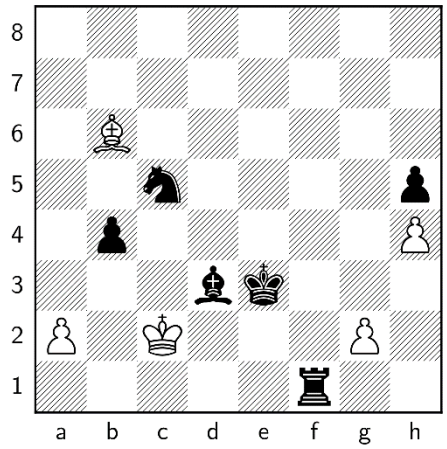
Look closely at the six boards below. Which one does not share any characteristics with the others?

You have 5 minutes.

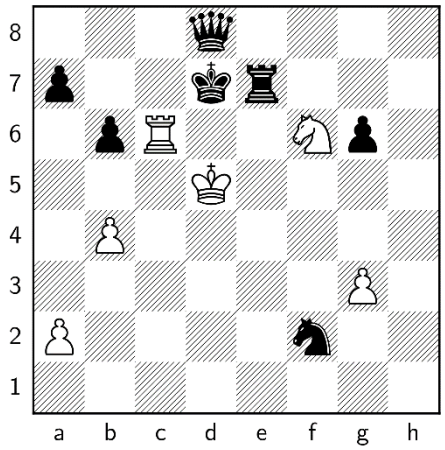
S10.1.B1



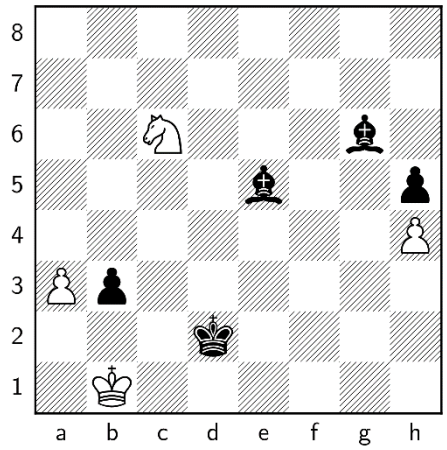
S10.1.B2



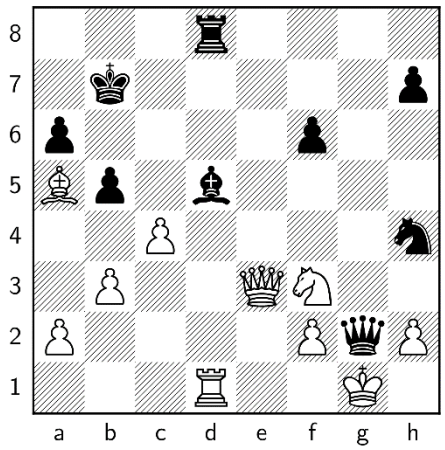
S10.1.B3



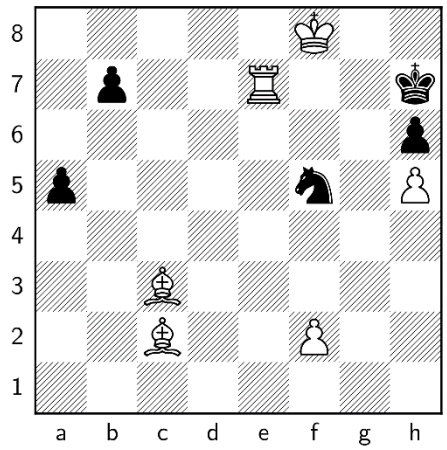
S10.1.B4



S10.1.B5



S10.1.B6

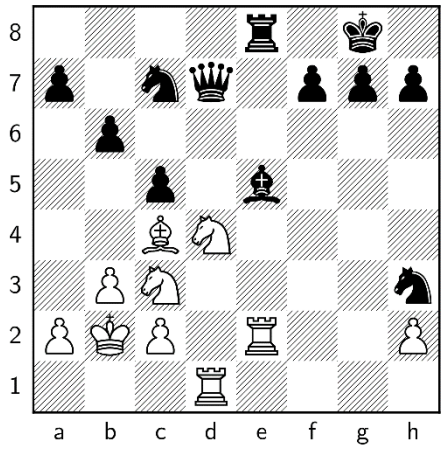


C S10.1.C.L4

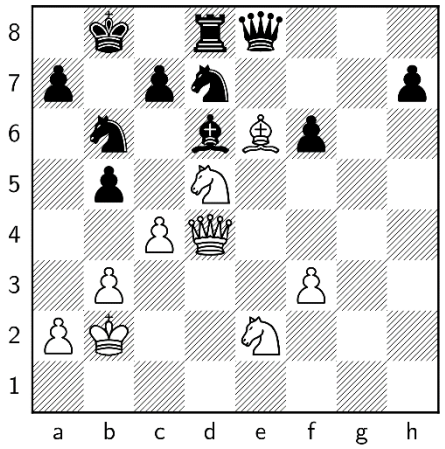
Look closely at the six boards below. Which one does not share any characteristics with the others?

You have 5 minutes.

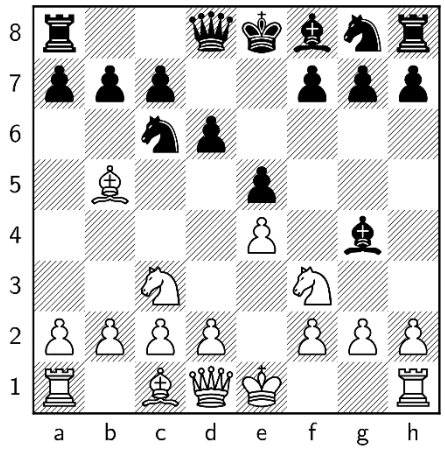
S10.1.C1



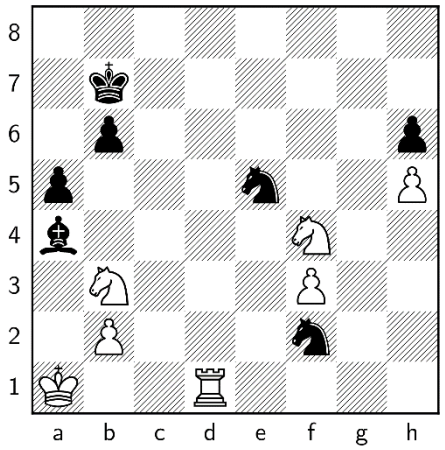
S10.1.C2



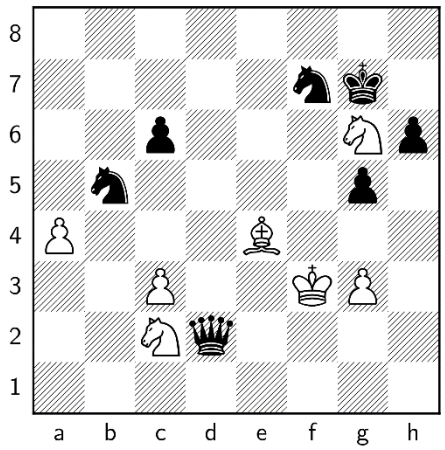
S10.1.C3



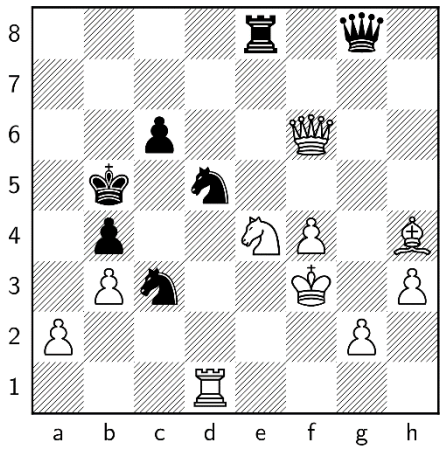
S10.1.C4



S10.1.C5



S10.1.C6

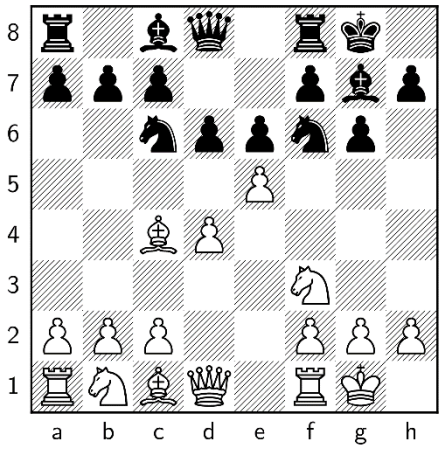


D S10.1.D.L5

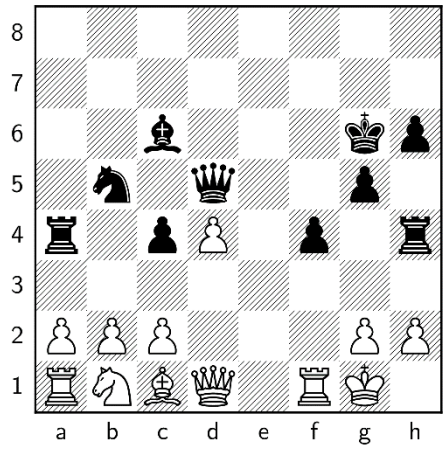
Look closely at the six boards below. Which one does not share any characteristics with the others?

You have 5 minutes.

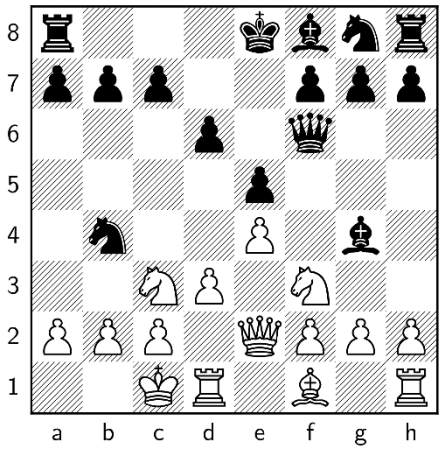
S10.1.D1



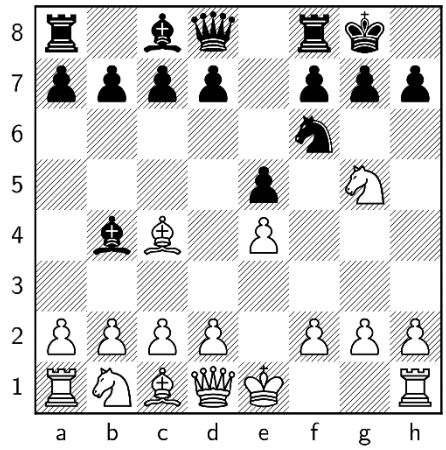
S10.1.D2



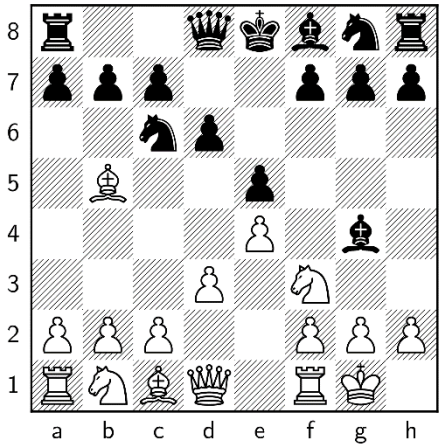
S10.1.D3



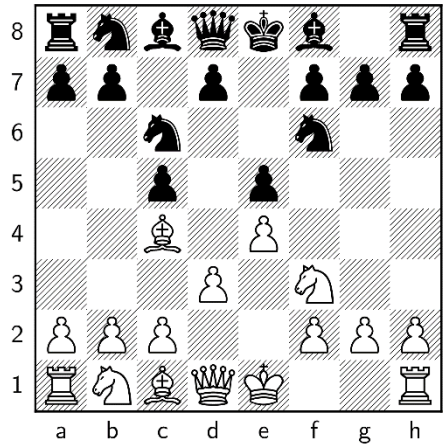
S10.1.D4



S10.1.D5



S10.1.D6

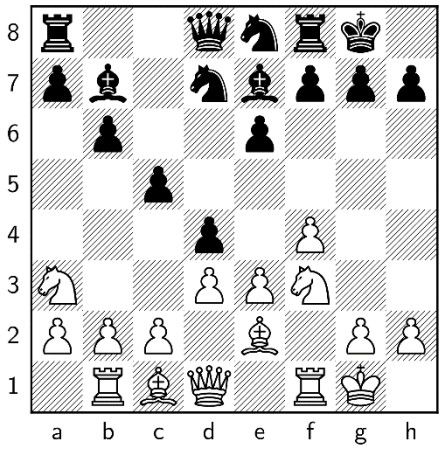


E S10.1.E.L5

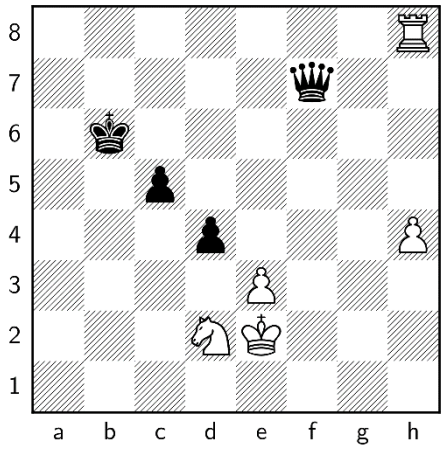
Look closely at the six boards below. Which one does not share any characteristics with the others?

You have 5 minutes.

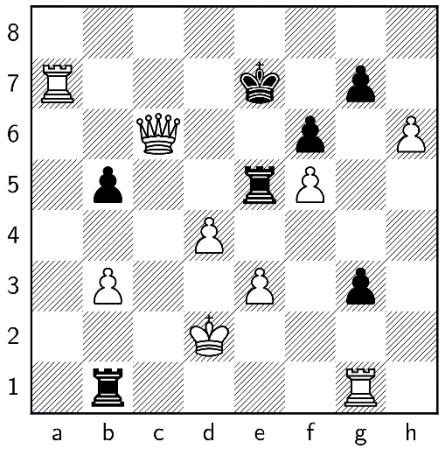
S10.1.E1



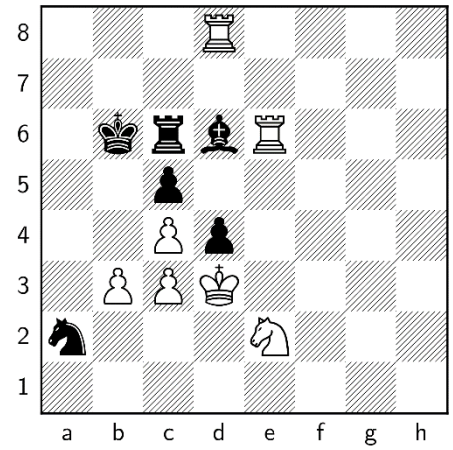
S10.1.E2



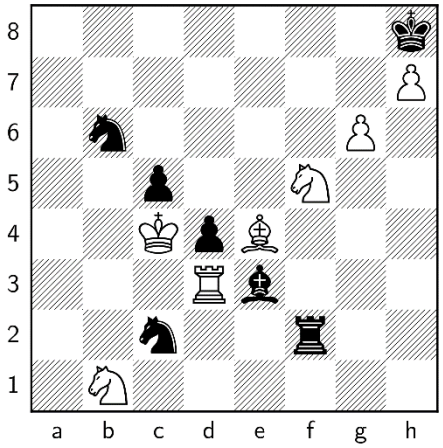
S10.1.E3



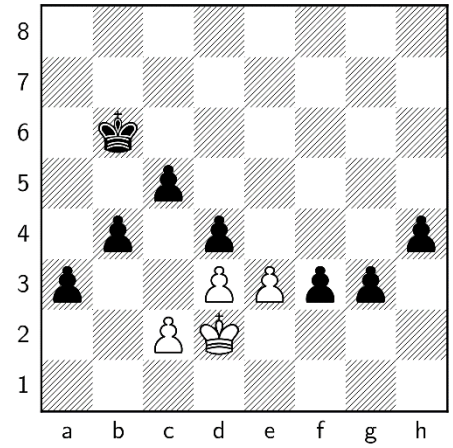
S10.1.E4



S10.1.E5



S10.1.E6



Exercise 10.2: WORKING MEMORY. Color reversal.

Materials: Demo board, stopwatch

Implementation:

The course instructor places pieces on the board. The participants look at them for 30 seconds (this time increases with the number of pieces) and memorize the position.

Now the instructor removes the pieces. The participants must then immediately place the pieces back on the board, but with the colors reversed, e.g., a black queen and a white rook must be placed as a white queen and a black rook.

Time frame:
Per diagram: approx. 3 minutes
Total: approx. 50 to 60 minutes
View of the board: 30 seconds, increasing with the number of pieces

Psychoeducational introduction:

The second exercise block again deals with working memory, as well as impulse control and flexible behavior. This exercise will require you to rethink your approach and suppress automatic behavior. In addictive disorders, it is also important to suppress impulses in order to resist the substance. This exercise can be used to train yourself to counteract problematic habits.

Instructions:

"I will set up some pieces and ask you to memorize the position carefully. After a while, I will remove the pieces from the board. Then I will ask you to put the pieces back in their places, but with the colors reversed."

Level of difficulty:

Parameters used:

Number of pieces, number of different colored pairs of pieces

Level 1: Number of pieces: 2 to 3,
number of different colored pairs of pieces: 0 to 1

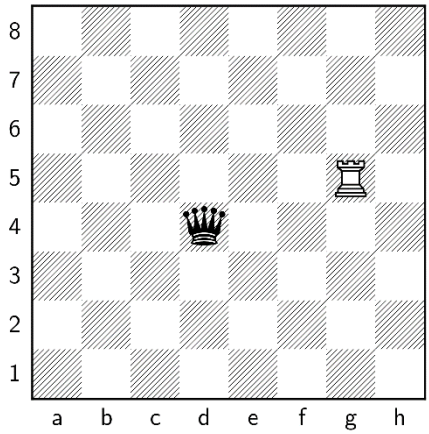
Level 2: Number of pieces: 3 to 4,
number of different colored pairs of pieces: 0 to 1

Level 3: Number of pieces: 4,
number of different colored pairs of pieces: 1

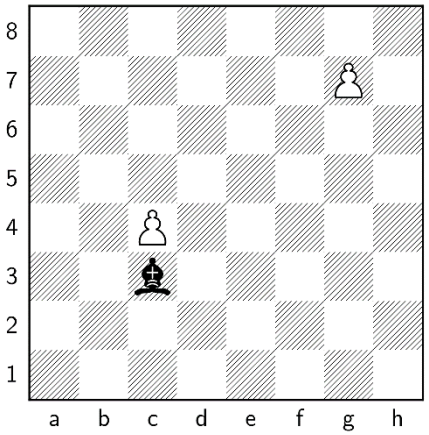
Level 4: Number of pieces: 5,
number of different colored pairs of pieces: 1 to 2

Level 5: Number of pieces: 6 and more,
number of different colored pairs of pieces: 2 and more

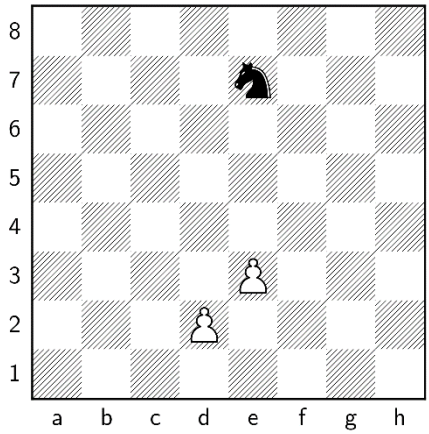
S10.2.1.L1



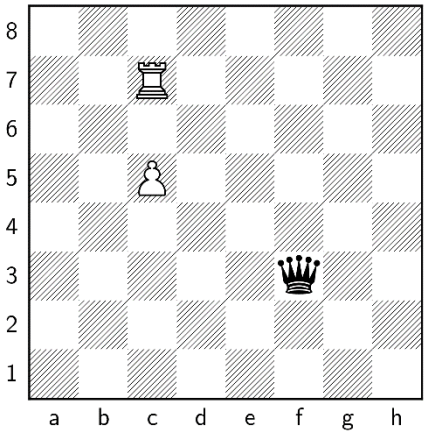
S10.2.2.L1



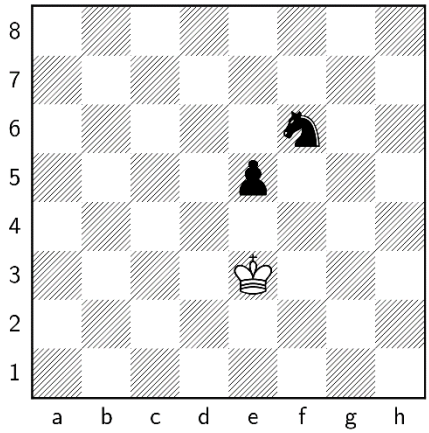
S10.2.3.L1



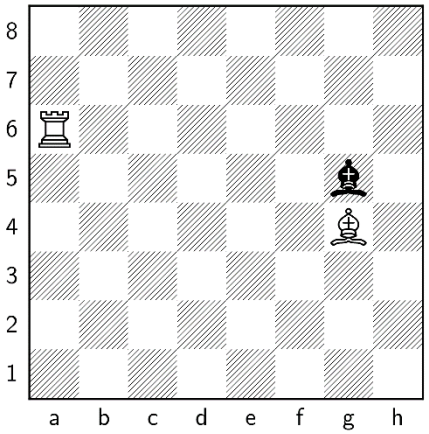
S10.2.4.L1



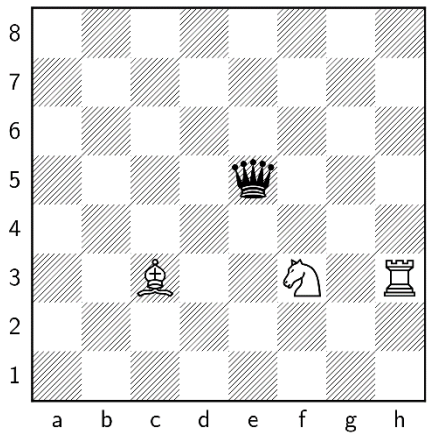
S10.2.5.L1



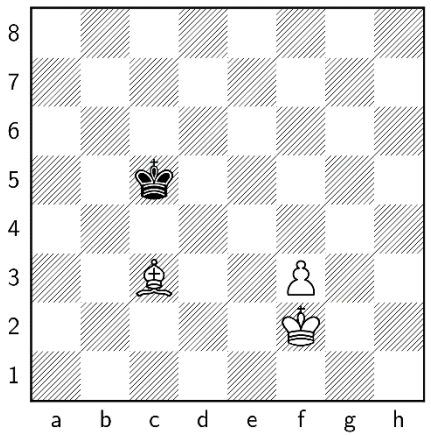
S10.2.6.L2



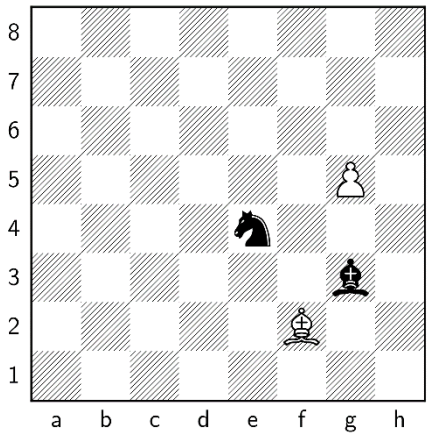
S10.2.7.L2



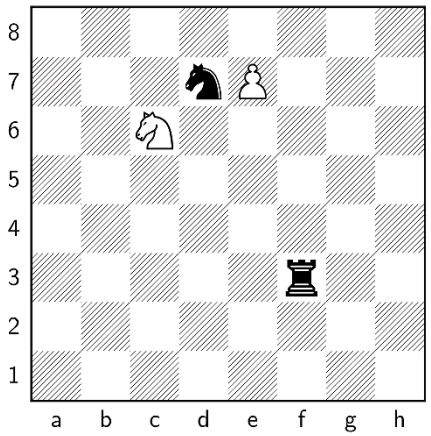
S10.2.8.L3



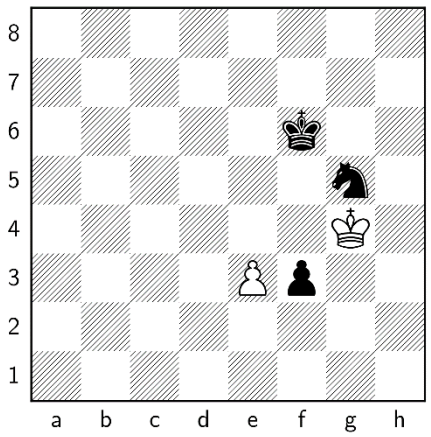
S10.2.9.L3



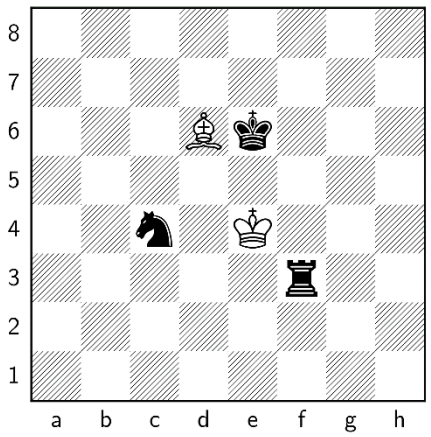
S10.2.10.L3



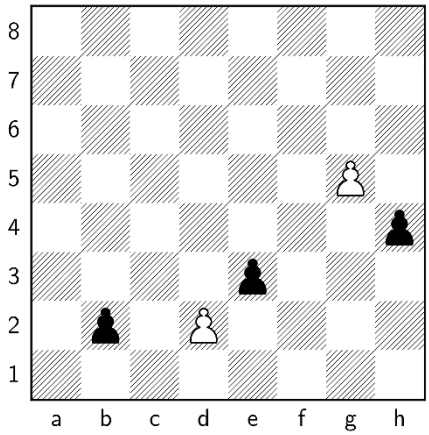
S10.2.11.L4



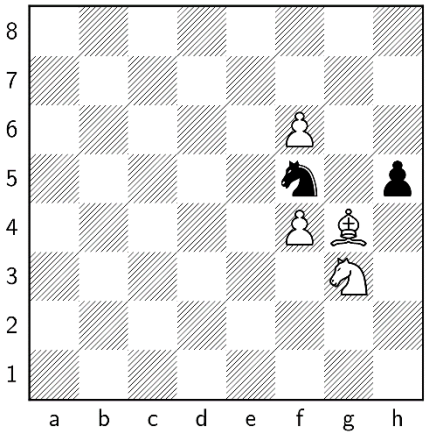
S10.2.12.L4



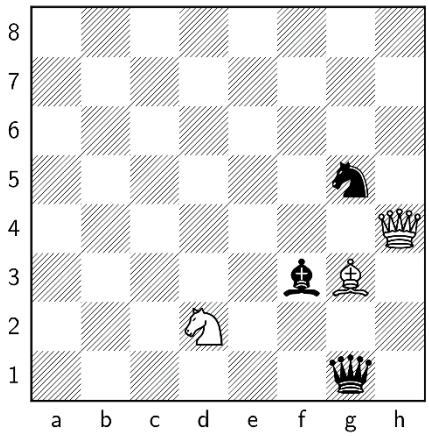
S10.2.13.L4



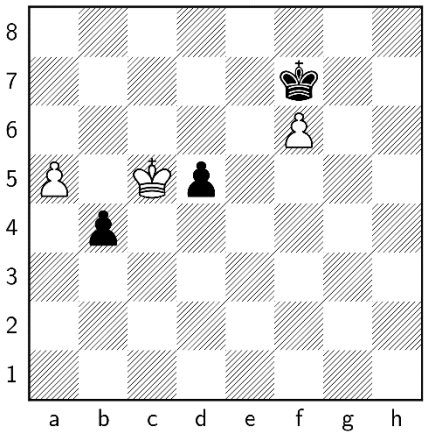
S10.2.14.L5



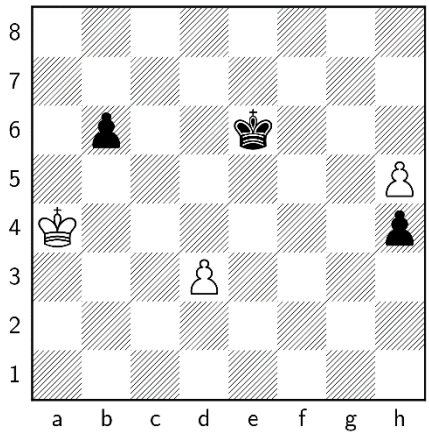
S10.2.15.L5



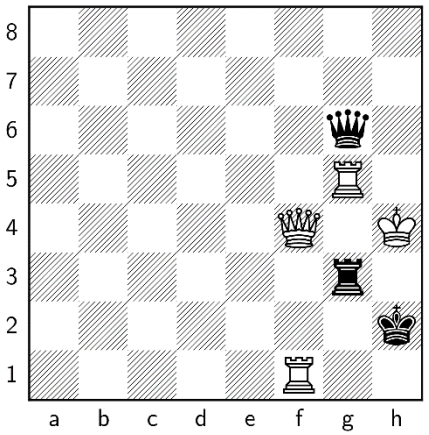
S10.2.16.L5



S10.2.17.L5



S10.2.18.L5



SESSION 11.

Exercise 11.1: REASONING. Problem solving.

Materials: Demo board and/or computer/screen

Implementation:

Ensure that participants know what checkmate means. First, explain checkmate as the basis for solving the diagrams.

Use the board on the computer/screen to display the exercises. Ideally, the participants should announce the square on which the specified piece is to be placed in order to deliver checkmate.

If they have difficulty: Set up the position on the demo board and let the participant place the piece there.

Note: If only the demo board is used, fewer positions can be worked on due to the additional time required for manually setting up and dismantling positions (compared to a computer/screen). However, the practice time should be sufficient.

Time frame:

Explaining the exercise and explaining checkmate: 10 minutes.

The time required for each diagram can vary greatly;

if necessary, allow extra time for individual diagrams (max. 5 minutes);

in general, allow approx. 3 minutes per diagram.

Total time: approx. 60 minutes.

Psychoeducational introduction:

Today we will once again focus on logical reasoning and problem solving. The exercise is different from the previous ones. It also trains your reflective system. Problem solving will also help you in everyday life when dealing with complex situations.

Instructions:

"*Today we are going to train logical thinking and problem-solving. I will now show you a position. Then I will ask you to add a specific piece in such a way that the king is checkmated.*"

Level of difficulty:

Level 1: Pawn
Level 2: Bishop
Level 3: Rook
Level 4: Queen
Level 5: Knight

Procedure for incorrect answers:

If a participant repeatedly makes mistakes, it may be that they are not yet familiar with the conditions for checkmate (see below). In this case, remind the participant of these conditions. Keywords are check, capture, move away, and block.

Solutions:

Pawn	**1**	**2**	**3**	**4**	**5**	**6**
A	d7	g6	e5	c4	c5	g7

Bishop	**1**	**2**	**3**	**4**	**5**	**6**
B	c8	f7	f6	b7,g4	f7	f6

Rook	**1**	**2**	**3**	**4**	**5**	**6**
C	c7,b6	h4,h5	d8,e8	f8	d8,e8	d5,e5

Queen	**1**	**2**	**3**	**4**	**5**	**6**
D	a8	a8	h7	c5	f6	d7

Knight	**1**	**2**	**3**	**4**	**5**	**6**
E	c6	d7	h6	b7	c5	g6

Instructions: Explain checkmate

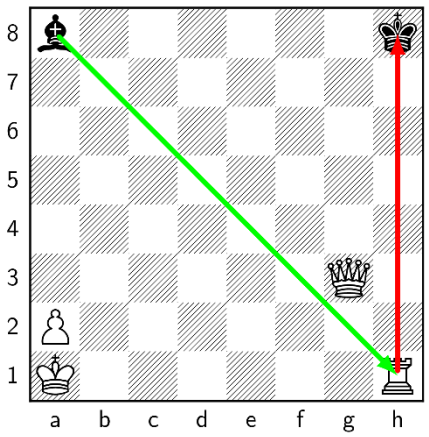
"Two conditions must be met (check):

1. *The opponent´s king must be in check*
   (as explained in session 3).
2. *The check cannot be resolved, that is, it cannot be stopped by:*
   - *a) capturing the attacking piece (the piece that is attacking the king) or*
   - *b) moving the king out of check or*
   - *c) blocking the attack with another piece by placing a piece between the king and the attacker.*

If both conditions are met, the king is checkmated."

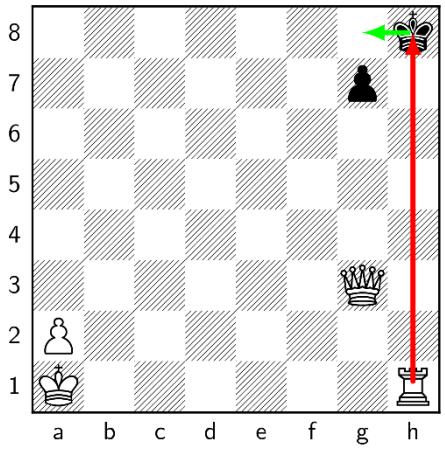
Examples for checking the second condition and explaining checkmate:

S11.1.E1 – Capturing



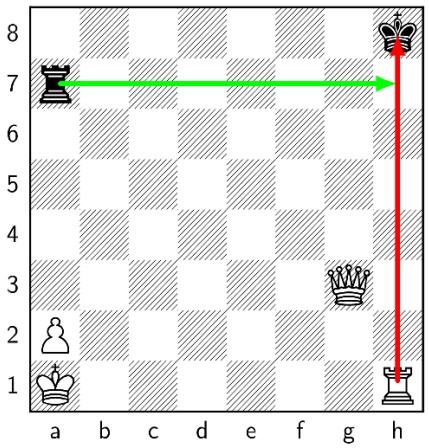
Bishop a8 captures h1

S11.1.E2 – Moving out



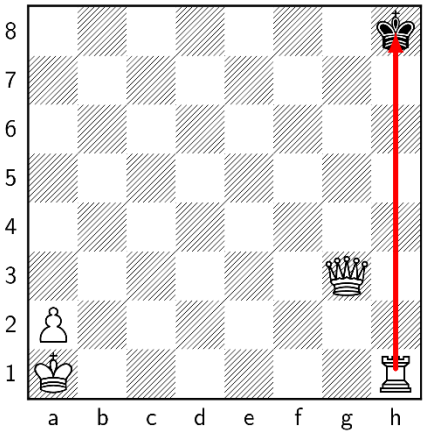
King h8 to g8

S11.1.E3 – Blocking



Rook a7 to h7

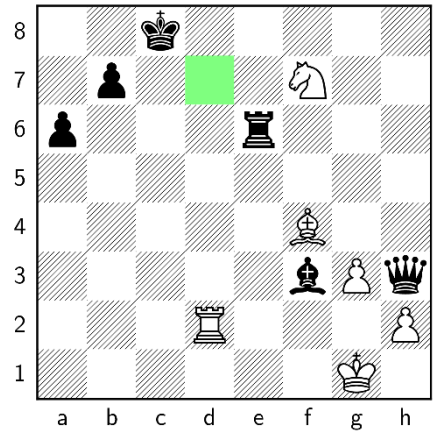
S11.1.E4 – Checkmate



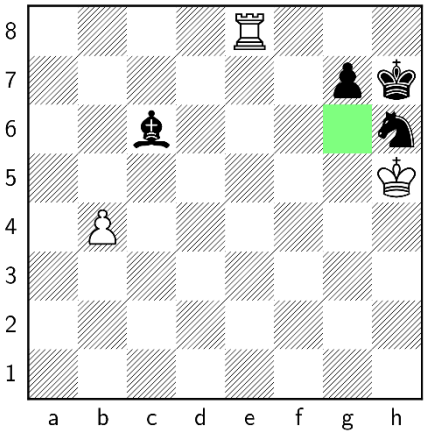
Goal / End of the game

a) On which square should a white pawn be added so that the black king is checkmated?

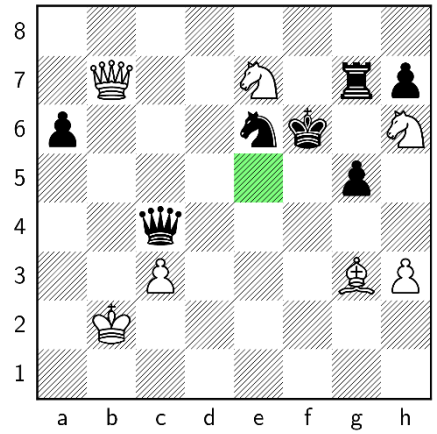
S11.1.1.L1



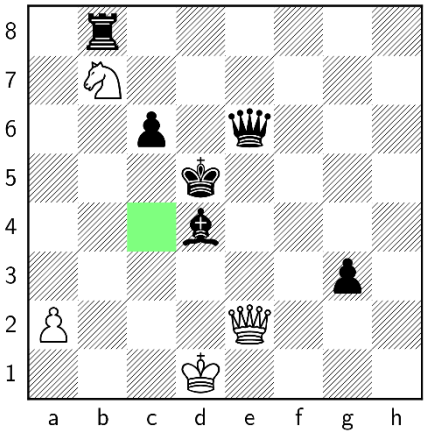
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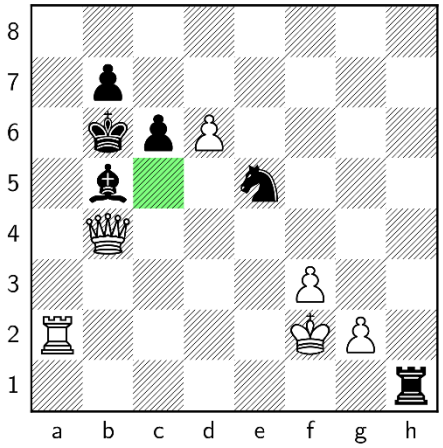
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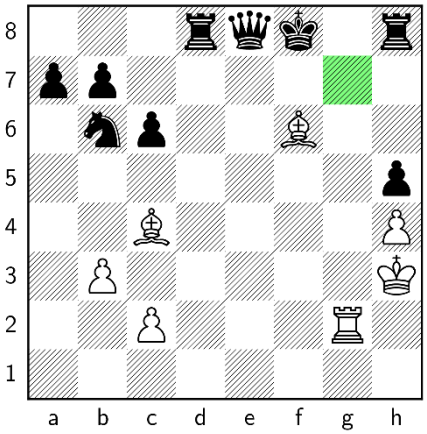
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4



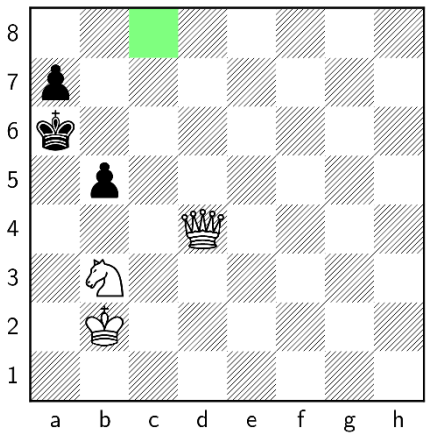
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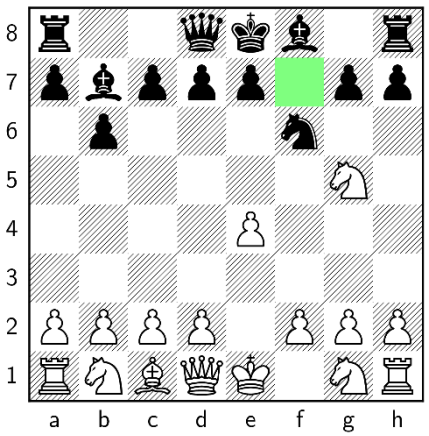
6

b) On which square should a white bishop be added so that the black king is checkmated?

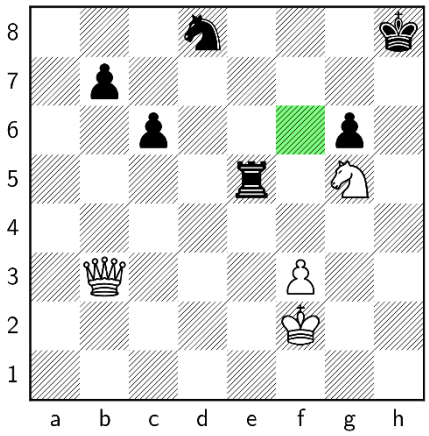
S11.1.2.L2



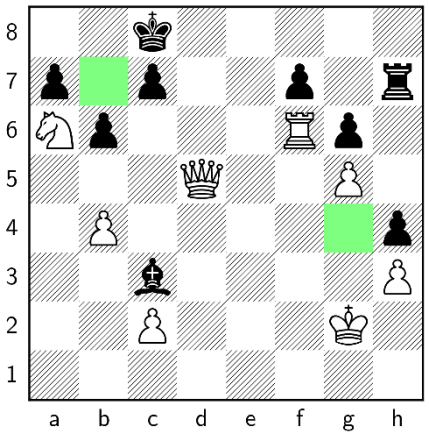
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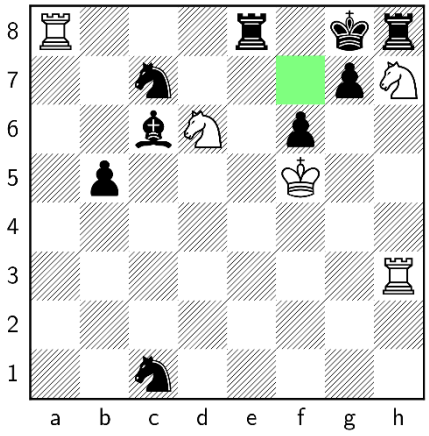
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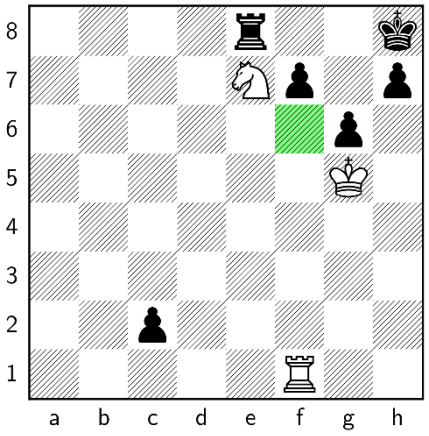
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4



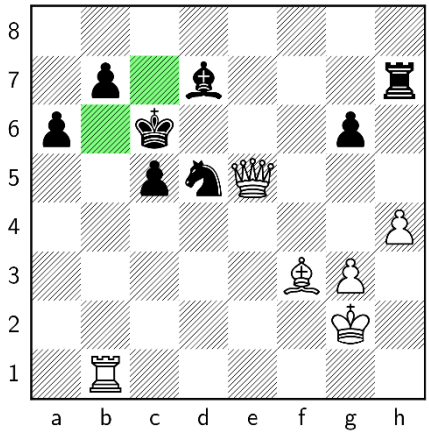
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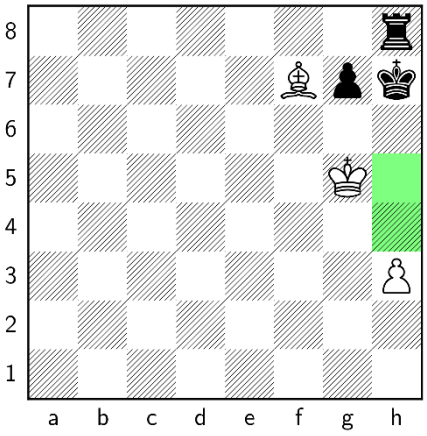
6

c) On which square should a white rook be added so that the black king is checkmated?

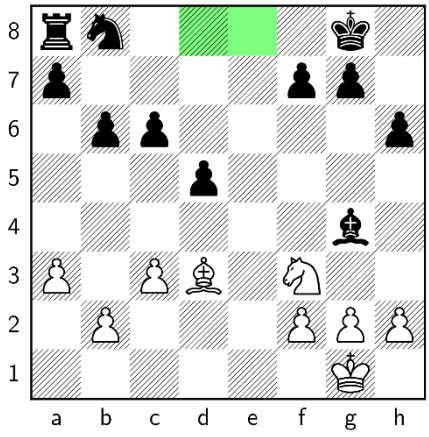
S11.1.3.L3



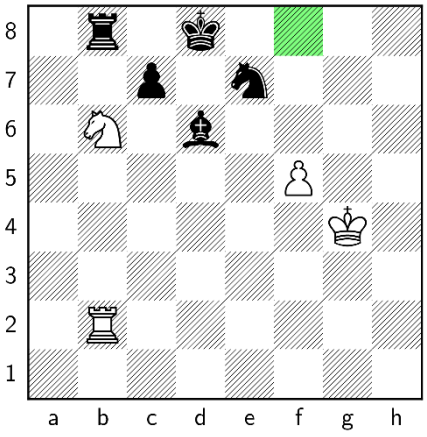
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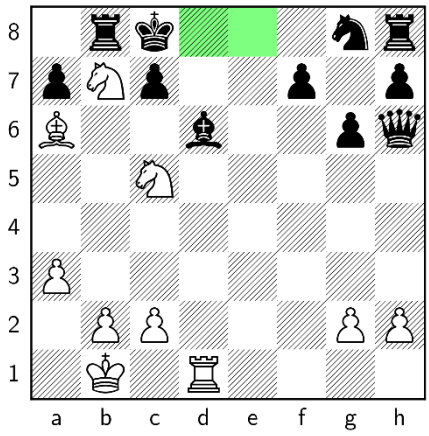
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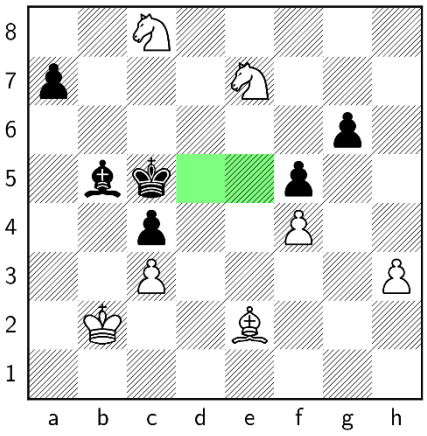
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4



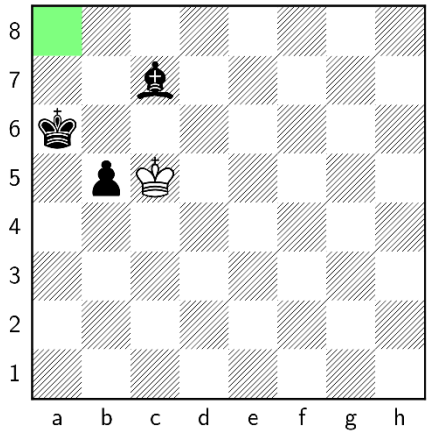
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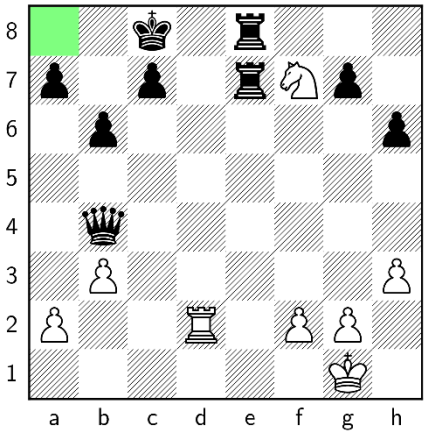
6

d) On which square should a white queen be added so that the black king is checkmated?

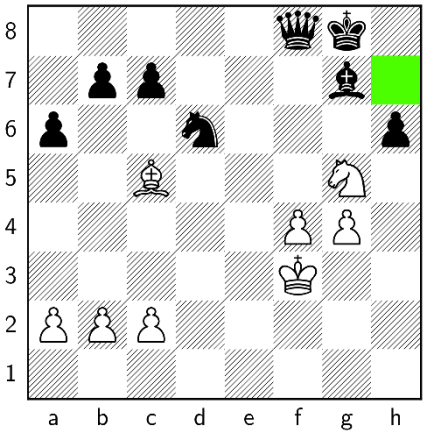
S11.1.4.L4



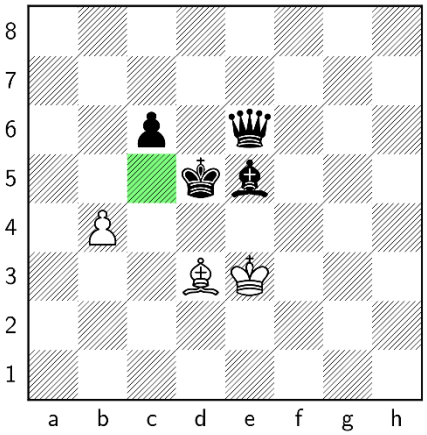
1



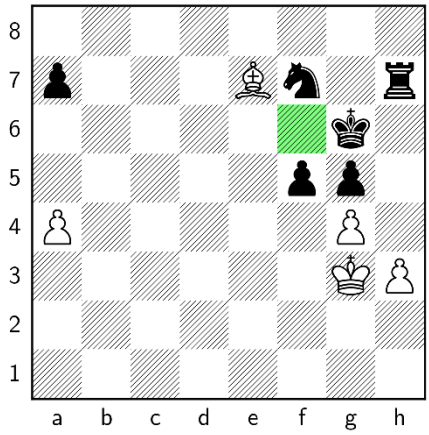
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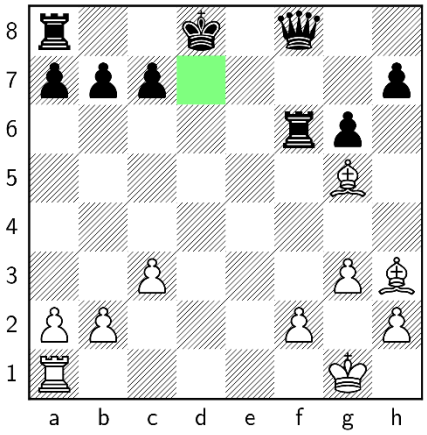
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4



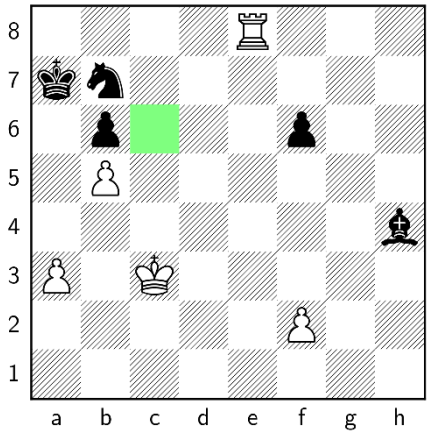
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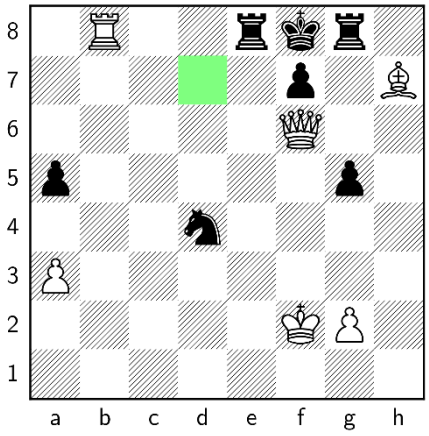
6

e) On which square should a white knight be added so that the black king is checkmated?

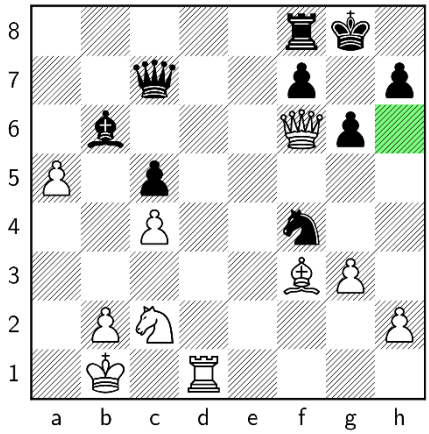
S11.1.5.L5



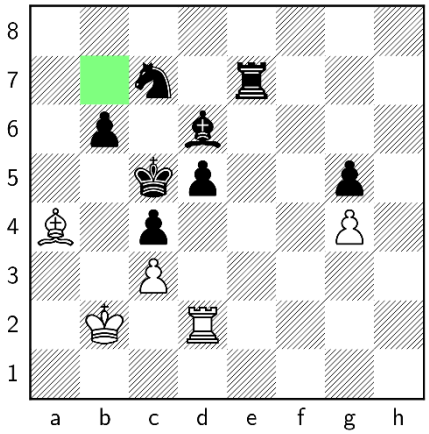
1



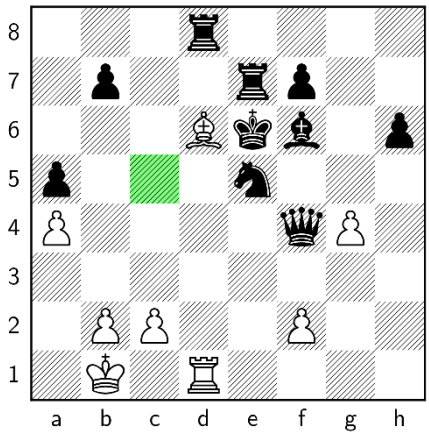
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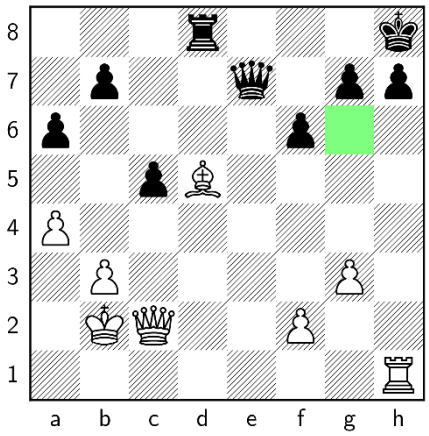
3



4



5



6

Exercise 11.2: WORKING MEMORY. Remembering specific pieces of information.

Materials: Demo board, stopwatch
Implementation:

The course instructor sets up a position on the demo board and asks the participants to memorize it. After one or two minutes—depending on the number of pieces—the position is removed and the following questions are asked, ranging from general to specific (increasing in difficulty), so that the participants have to remember specific pieces of information.

Time frame:

View of the demo board: One to two minutes
Per diagram: approx. 5 to 7 minutes
Total: approx. 25 to 35 minutes

Psychoeducational introduction:

Now we return to the important topic of short-term memory. In addition to simply recalling content, you will answer questions about details of the positions shown, which increases the difficulty.

Instructions:

"Please memorize the position. I will then ask you a few questions about it."

Level of difficulty:
When setting the level of difficulty, the following factors were weighted in descending order:

- Number of pieces (the higher the number, the more characteristics need to be recalled)
- Detailed characteristics (detailed pieces of information that require increased attention and longer viewing times)
- Basic characteristics (sufficient for inclusion in short-term memory, this is the least difficult category)

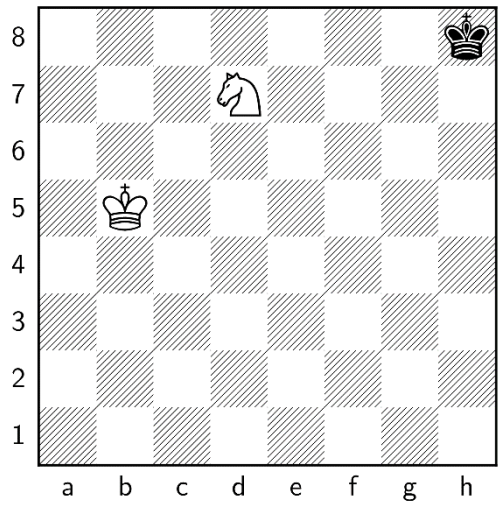
The diagrams have been arranged according to their level of difficulty. In addition, not all positions have the same number of questions. See the overview below:

L1: 3 pieces, 11 detailed characteristics, 15 basic characteristics
L2: 4 pieces, 17 detailed characteristics, 17 basic characteristics
L3: 4 pieces, 19 detailed characteristics, 12 basic characteristics
L4: 5 pieces, 21 detailed characteristics, 12 basic characteristics
L5: 6 pieces, 14 detailed characteristics, 15 basic characteristics

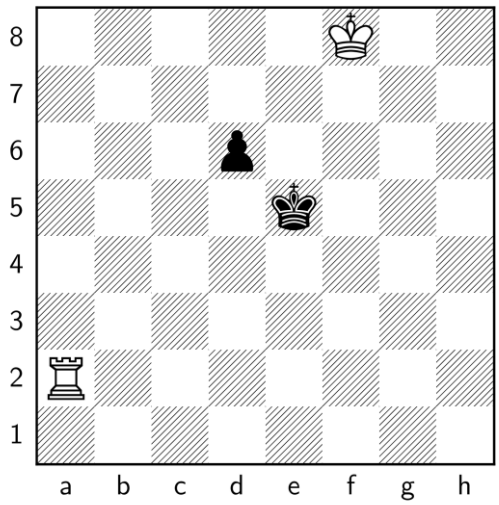
Procedure for incorrect answers:

- If a participant has only partially given the correct answer, the course instructor can confirm this and provide hints for the complete solution.
- If the participant still does not know the answer, another participant from the group should be asked for help.
- If a question proves too difficult for the other participants as well, give the correct answer after all questions have been completed, if possible. However, if this delay is clearly hindering motivation, give the answer immediately and continue with the next question for the participants.

S11.2.1.L1



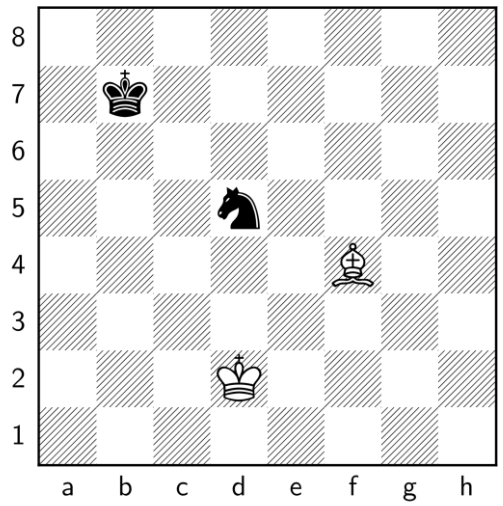
1.	*How many pieces are there on the chessboard?*	**3**
2.	*How many black pieces are there on the chessboard?*	**1**
3.	*How many pawns are there on the chessboard?*	**0**
4.	*One of the pieces is a king. What are the other pieces?*	**knight**
5.	*On which square is the white knight?*	**d7**
6.	*Is there a bishop on the board?*	**No**
7.	*Is there a piece in the lower right quadrant?*	**No**
8.	*On which square is the black king?*	**h8**
9.	*How many pieces are there in the upper right quadrant?*	**1**
10.	*Are there more pieces on black squares or white squares?*	
		On white squares
11.	*What color are the two squares the white pieces are on?*	**White**
12.	*Is there a piece on the g7 square?*	**No**
13.	*What color is the square the black king is on?*	**Black**
14.	*On which files are there no pieces?*	**a, c, e, f, g**
15.	*On which ranks are there no pieces?*	**1 to 4 + 6**



1. *How many pieces are there on the chessboard?* **4**
2. *How many black pieces are there on the chessboard?* **2**
3. *How many white pieces are there on the chessboard?* **2**
4. *How many white pawns are there on the chessboard?* **0**
5. *How many black pawns are there on the chessboard?* **1**
6. *How many white rooks are there on the chessboard?* **1**
7. *Which white pieces are there on the chessboard?* **Rook and king**
8. *Which black pieces are on the chessboard?* **Pawn and king**
9. *What color is the square the black king is on?* **Black**
10. *What color is the square the white king is on?* **Black**
11. *On which files are there no pieces?* **b, c, g, h**
12. *On which ranks are there no pieces?* **1, 3, 4, 7**
13. *On which squares are the two kings?* **e5, f8**
14. *Which square has the white rook?* ***a2***
15. *Name all the squares that have a piece on them and name the piece.*

bKe5, bPd6, wKf8, wRa2

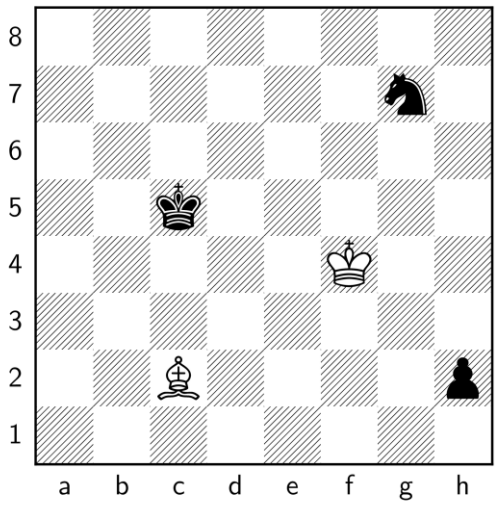
S11.2.3.L3



1. *How many pieces are there on the chessboard?* **4**
2. *How many black pieces are there on the chessboard?* **2**
3. *How many rooks are there on the chessboard?* **0**
4. *How many pawns are there on the chessboard?* **0**
5. *There are two kings. What are the other pieces?* **knight and bishop**
6. *What color are the two squares the black pieces are on?* **White**
7. *What color is the square the white king is on?* **Black**
8. *In which quadrant are there no pieces?*

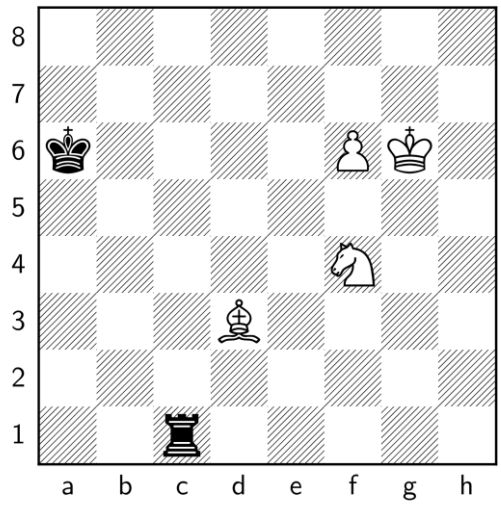
   In the second one (upper right)
9. *On which files are there no pieces?* **a, c, e, g, h**
10. *On which ranks are there no pieces?* ***1, 3, 6, 8***
11. *On which square is the white king?* **d2**
12. *On which square is the black king?* **b7**
13. *Name all the squares that have a piece on them and name the piece.*

    wKd2, wBf4, bNd5,bKb7



1.	*How many pieces are there on the board?*	**5**
2.	*What color is the pawn?*	**Black**
3.	*Are there more pieces on the c-file than on the g-file ?*	**Yes**
4.	*On which square is the white king?*	**f4**
5.	*Is there a rook on the board?*	**No**
6.	*Is there a white pawn on h2?*	**No**
7.	*Is there a piece on d2?*	**No**
8.	*On which files are there no pieces?*	**a, b, d, e**
9.	*Is there a black piece on g7?*	**Yes**
10.	*Where is the white bishop?*	**c2**
11.	*Is there a quadrant with no pieces in it?*	**No**
12.	*The d and e files are free of pieces, true or false?*	**True**
13.	*Which squares have pieces on them?*	**c2, c5, f4, g7, h2**

S11.2.5.L5



1.	*Is there a rook on the board?*	**Yes**
2.	*How many white pieces are on the board?*	**4**
3.	*What color square is the pawn on?*	**Black**
4.	*Is the black king on a white square?*	**Yes**
5.	*Is the knight in the second quadrant?*	**No**
6.	*Is there a piece on g7?*	**No**
7.	*What rank is the white pawn on?*	**The sixth**
8.	*How many pieces are in the second quadrant?*	**2 (wKg6 + wPf6)**
9.	*Is the black rook on c1?*	**Yes**
10.	*How many pieces are in the fourth quadrant?*	**1 (wNf4)**

11. Name all the squares that have a piece on them and name the piece.

bKa6, bRc1, wBd3, wPf6, wNf4, wKg6

SESSION 12.

Exercise 12.1: MEMORY STRATEGIES. Mnemonics.

Materials: Demo board, stopwatch

Implementation:

The instructor shows a position for one minute. The participants memorize the position. The instructor then removes the pieces and asks one of the participants to reconstruct the position.

While maintaining the correctly reconstructed position, the instructor adds one or more pawns and repeats the above procedure as many times as specified by the them.

The time limit for viewing the board can be increased if necessary to allow for the addition of pieces.

Time frame:

The first exercise package (specified below) is sufficient for the exercise, which has taken about 40 to 45 minutes so far. The second exercise package is a supplement, which takes another 15 to 20 minutes to complete.

Psychoeducational introduction:

As in the last session, we will once again be focusing on memory functions. Today, we will be practicing an exercise similar to the one we did in the first half of the six-week training program. You will once again be applying techniques that will help you to perform such tasks more effectively.

Instructions:

"I will set up a position. Please try to memorize the position and then reconstruct it. You can use memorization strategies you have already learned or, if necessary, new ones to help you."

Level of difficulty:
The following parameters are used:

- Number of pieces (only pawns)
- Number of colors

There are several exercise packages. A package is a series of diagrams that build on each other and belong together in terms of additions. There is a basic framework of several pieces to which additions are made.

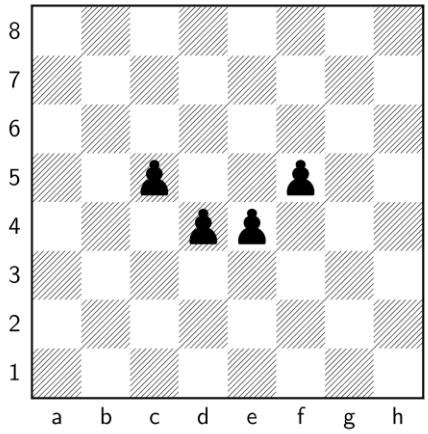
Exercise package 1, diagrams 1 to 12 (S12.1.1 to S12.1.12)
Exercise package 2, diagrams 13 to 18 (S12.1.13 to S12.1.18)

1: 4–5 pieces, 1 to 2 colors
2: 6–8 pieces, 2 colors
3: 9–11 pieces, 2 colors
4: 12–14 pieces, 2 colors
5: 15 or more pieces, 2 colors

Procedure for incorrect answers:

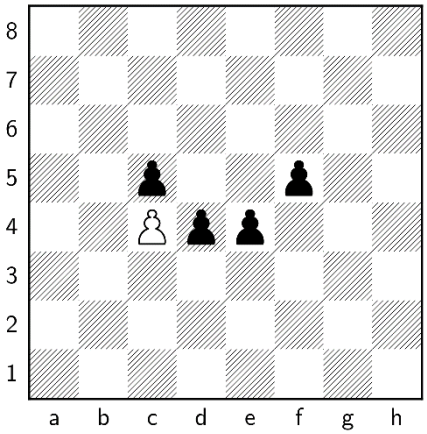
- If a participant has only partially given the correct solution, the course instructor confirms this with praise. He or she then provides assistance with the solution, for example: *“Take a step back,” “What colors are the missing pawns?”*, *“Try to remember.”*
- If the participant still does not know the answer, help can come from the group, with another participant providing support or taking over the exercise.

S12.1.1.L1



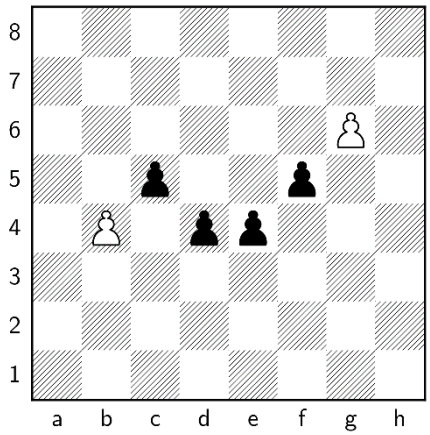
1

S12.1.2.L1



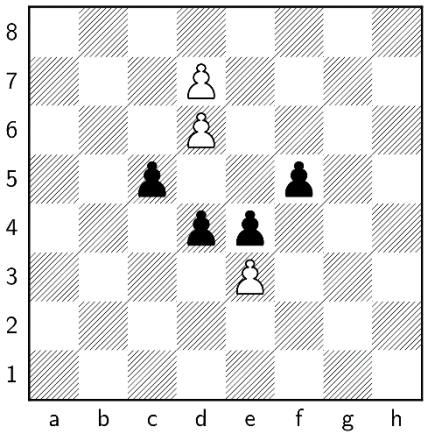
2

S12.1.3.L2



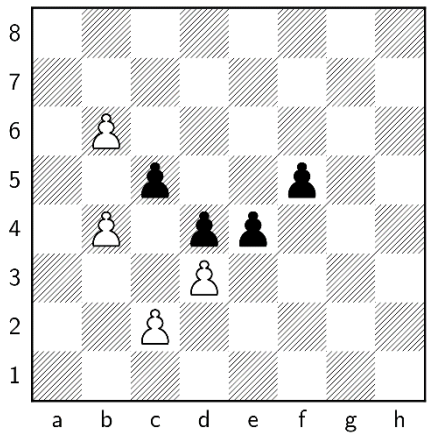
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S12.1.4.L2



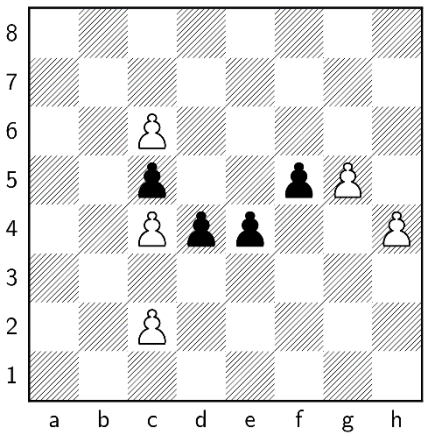
4

S12.1.5.L2



5

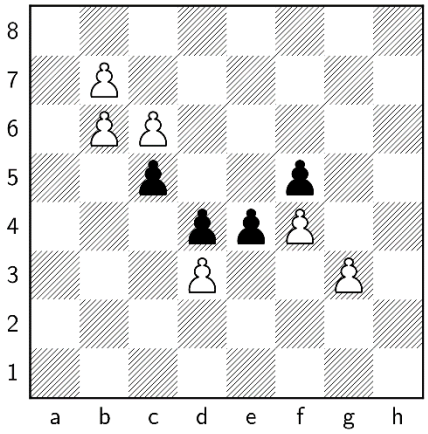
S12.1.6.L3



6

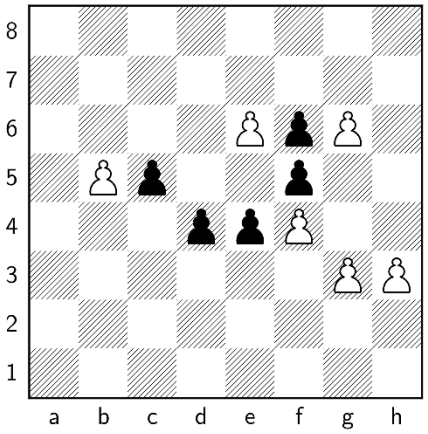
S12.1. L3-L5

S12.1.7.L3



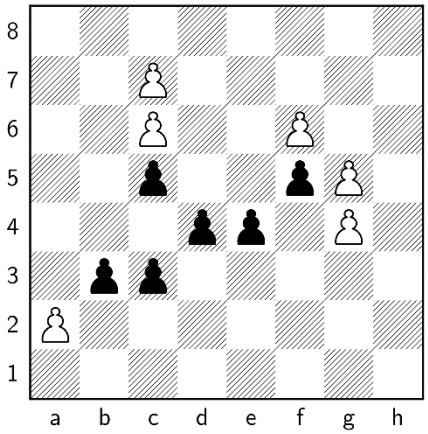
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S12.1.8.L3



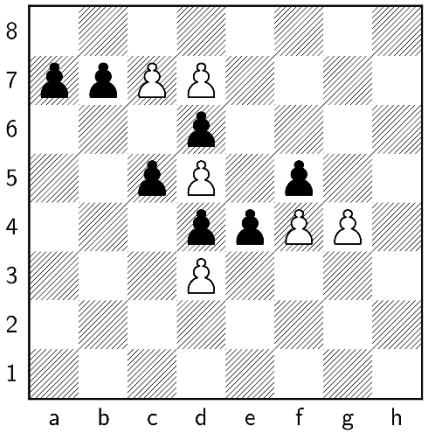
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S12.1.9.L4



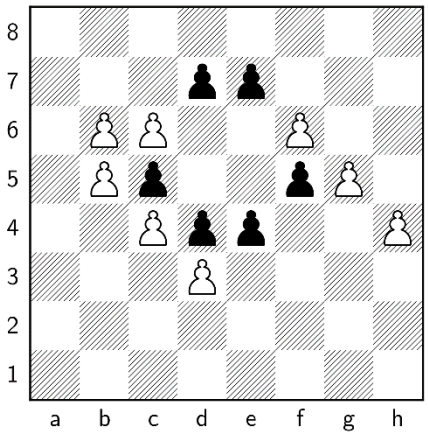
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S12.1.10.L4



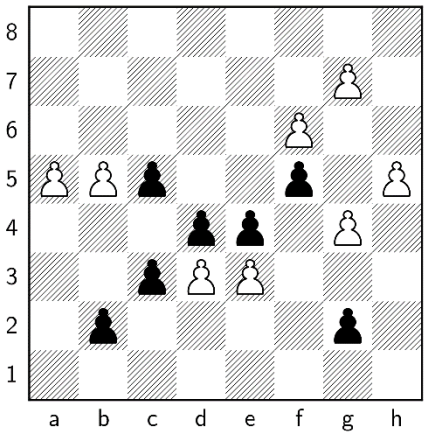
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S12.1.11.L4



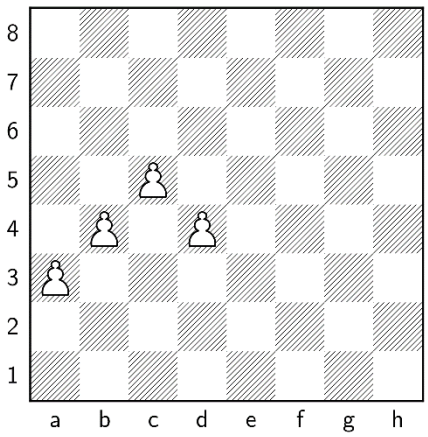
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S12.1.12.L5



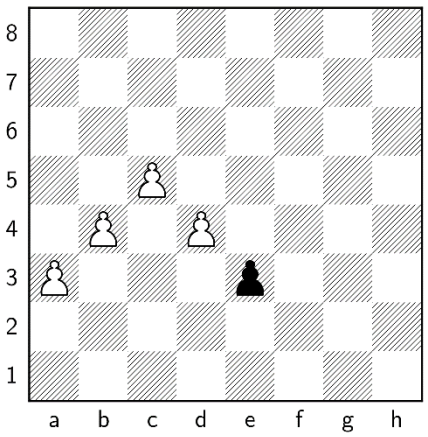
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S12.1.13.L1



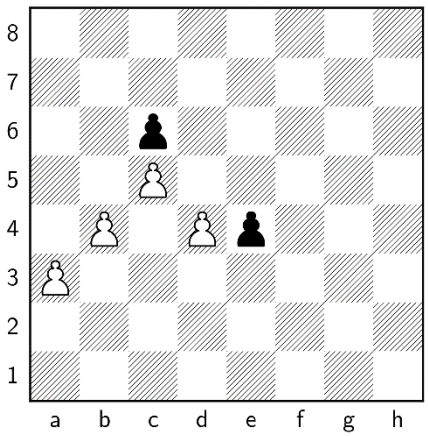
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S12.1.14.L1



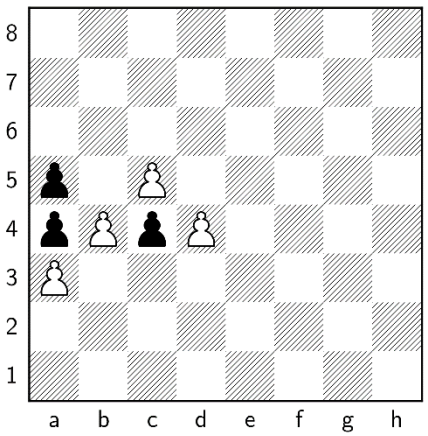
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S12.1.15.L2



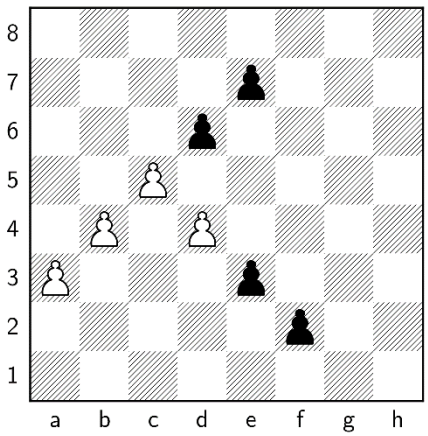
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S12.1.16.L2



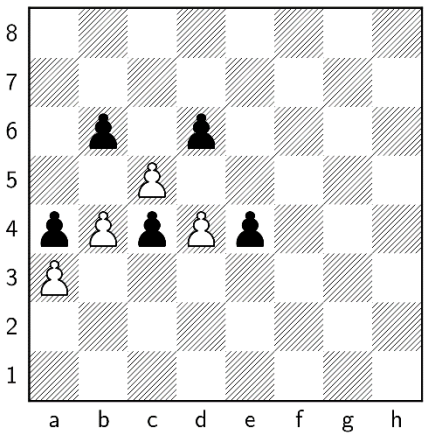
4

S12.1.17.L2



5

S12.1.18.L3



6

Exercise 12.2: EXECUTIVE FUNCTIONS. Impulse control.

Materials: Demo board or computer/screen

Implementation:

- The position is set up by the course instructor (demo board) or shown on the computer.
- Participants should use the pawns as if they were knights, bishops, rooks, or queens. However, they should only name the possible capture moves.
- Give the participants time to look at the position (approx. 30 seconds), then call on a participant to work on it.
- The course instructor marks the moves mentioned with the mouse or by hand on the demo board.
- If there are difficulties, use the demonstration board. In this case, the participant shows the moves on the board.
- Each participant works on one piece.
- There is a methodological note for S12.2.2.L4.

Time frame (here only for computer/screen):

Per piece: approx. 30 seconds (e.g., knight) to two minutes (e.g., queen)

Per position: approx. 8 minutes

Total: approx. 45 minutes when playing through all 6 positions

Practical experience has shown that playing through two to three positions (with all types of pieces) is sufficient, even with regard to a possible feedback round in the final session.

Psychoeducational introduction:

Today's topic is impulse control. The reflective system is trained to suppress impulsive behavior such as short-term rewarding substance use. This exercise is about suppressing automatic behavior. Automatisms and habits play a major role in addictive disorders. This exercise can be used to train the ability to counteract habits.

Instructions:

“Please look at the position. Now imagine that all black pawns could move like knights. Which pieces could Black capture? Please mention all possibilities.“

- - -

“Now imagine that all white pawns could move like bishops. Which pieces could White capture?“

Continue the same way with rooks (white pawns) and queens (black pawns).

Level of difficulty:

1: Knight
2: Bishop
3: Rook
4: Queen
5: not applicable

Solutions:

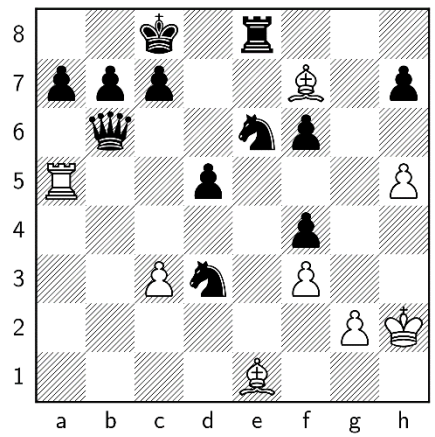
below

Procedure for incorrect answers:

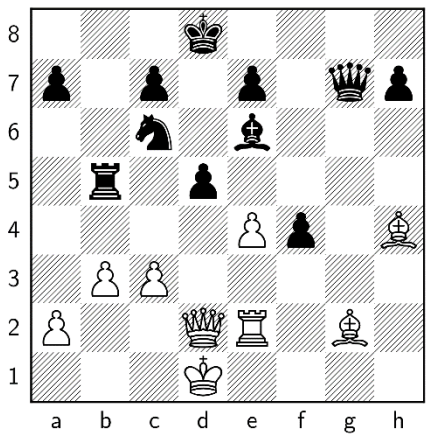
- If participants repeatedly make mistakes, they may not be familiar with the possible moves of the pieces.
- Ask participants to explain their intermediate steps and thought processes and, if necessary, repeat the movement of the pieces.
- Give participants time to figure out the possible moves.

Overview, 6 boards S12.2.1 to S12.2.6

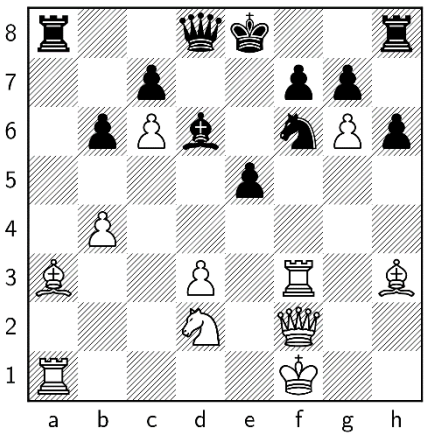
S12.2.1



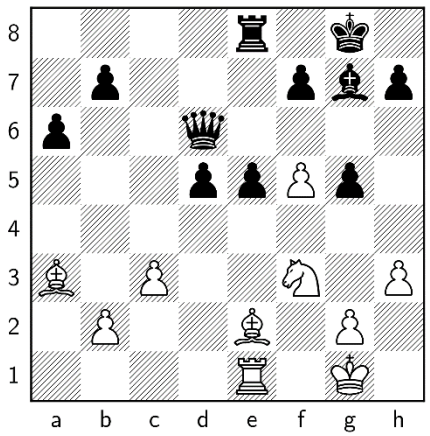
S12.2.2



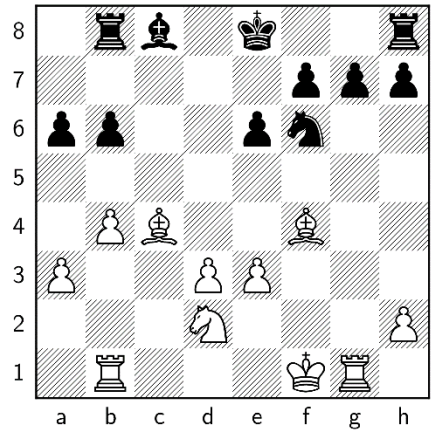
S12.2.3



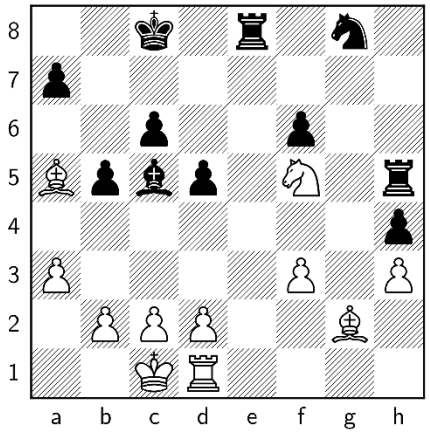
S12.2.4



S12.2.5

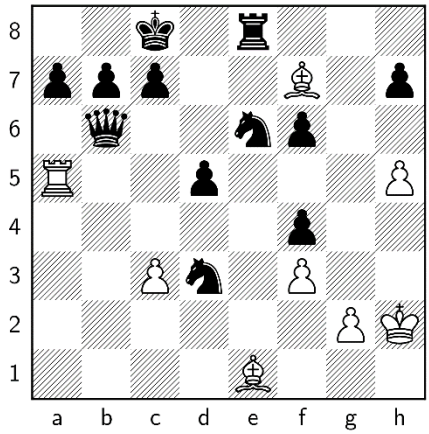


S12.2.6

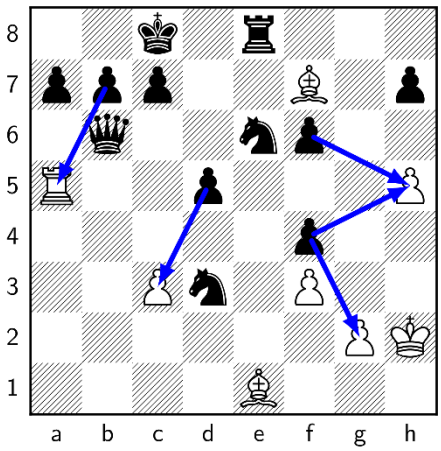


Solutions S12.2.1.LX

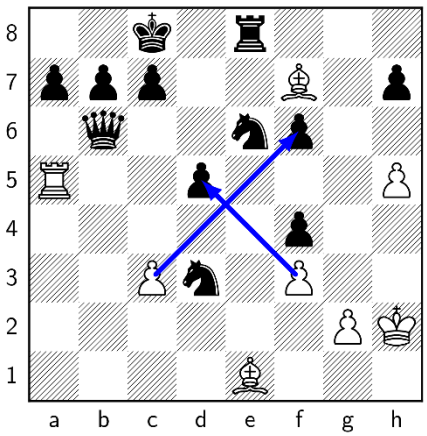
S12.2.1



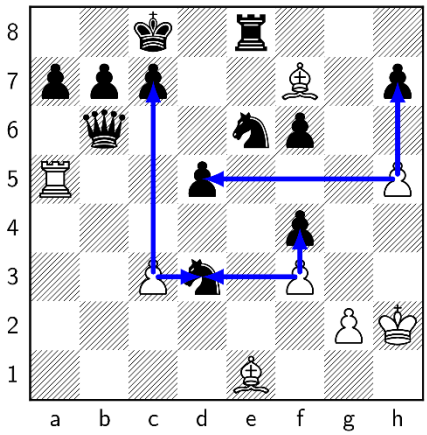
S12.2.1.L1 – Knight



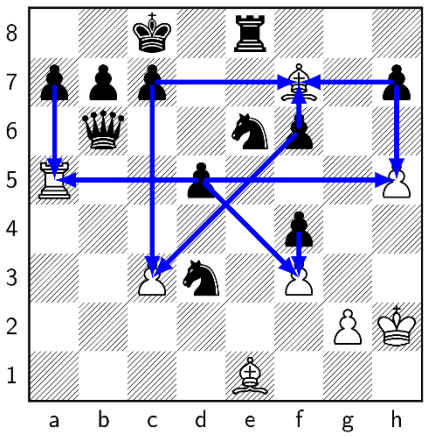
S12.2.1.L2 – Bishop



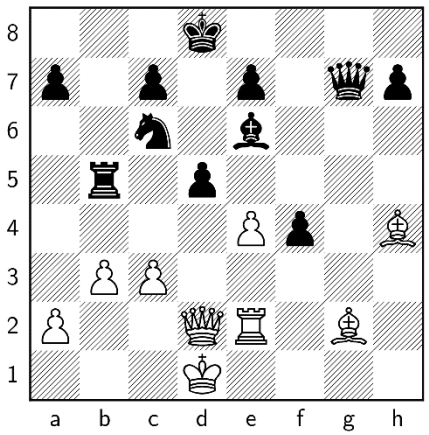
S12.2.1.L3 – Rook



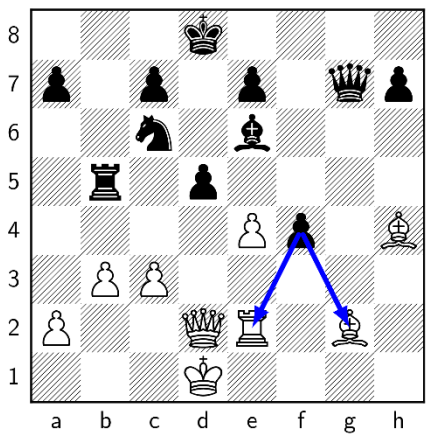
S12.2.1.L4 – Queen



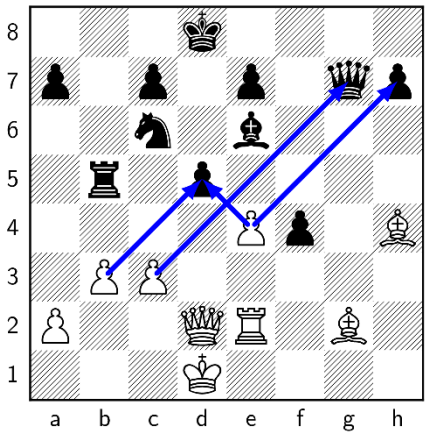
S12.2.2



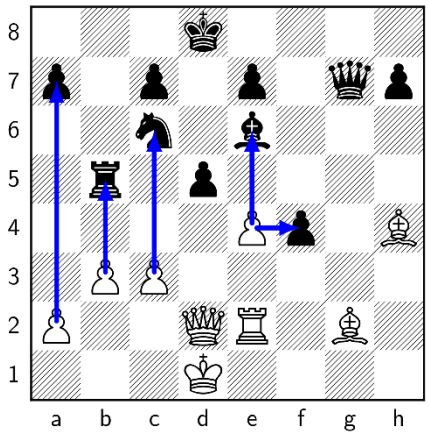
S12.2.2.L1 – Knight



S12.2.2.L2 – Bishop



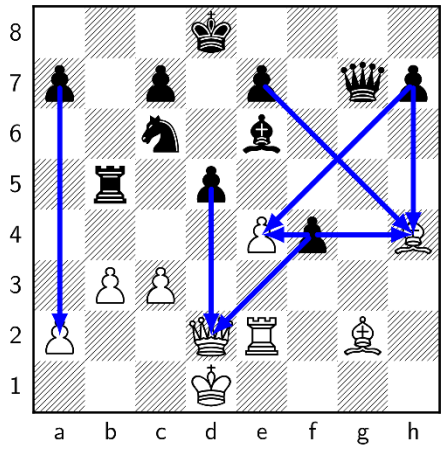
S12.2.2.L3 – Rook



Methodological note for S12.2.2.L4
(Diagram on the right)

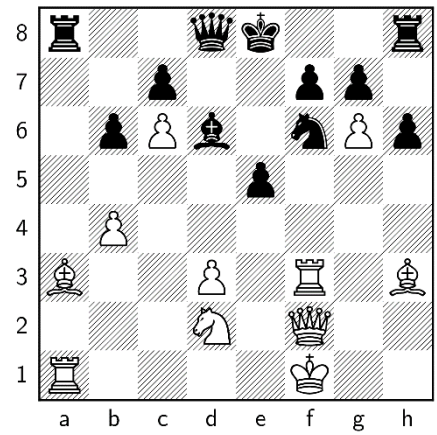
The black pawn d5 is on the same file as the wQ and the bK. Therefore, the capture options d5xb3 and d5xe4 are not marked here. (Illegal move due to check). If participants nevertheless mention these capture options, no correction is necessary. A reference to check is sufficient.

S12.2.2.L4 – Queen

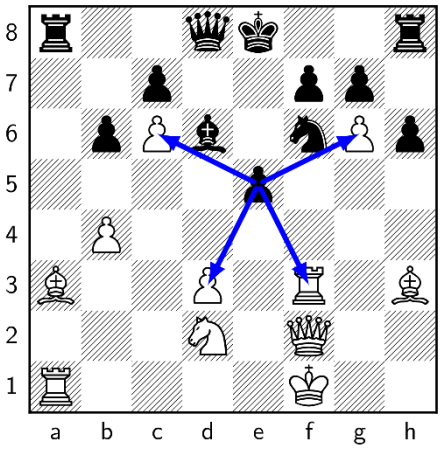


Solutions S12.2.3.LX

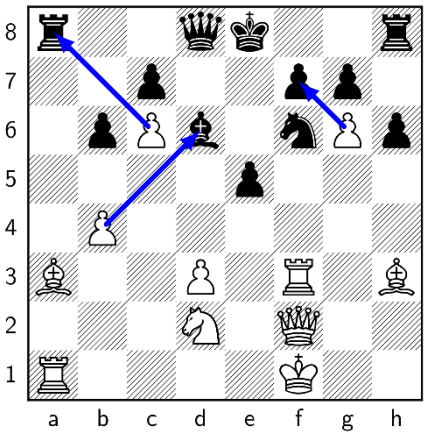
S12.2.3



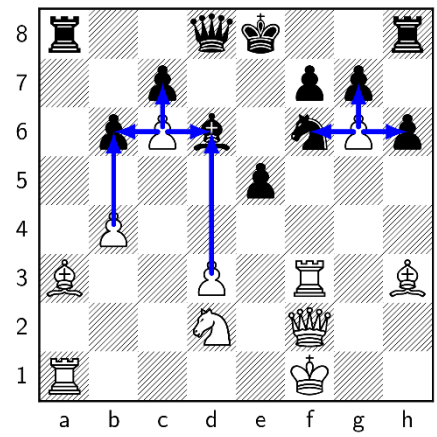
S12.2.3.L1 – Knight



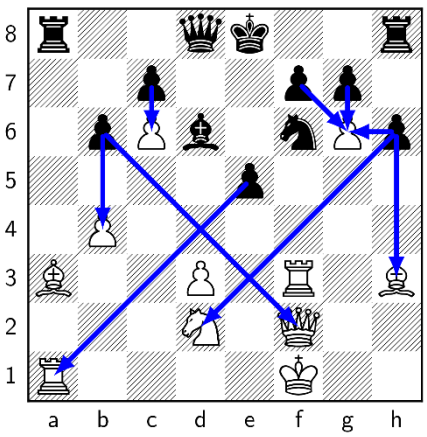
S12.2.3.L2 – Bishop



S12.2.3.L3 – Rook

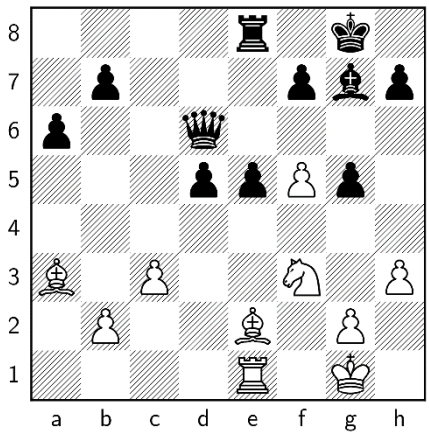


S12.2.3.L4 – Queen

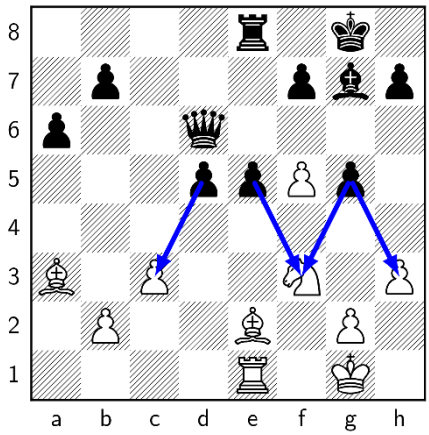


Solutions S12.2.4.LX

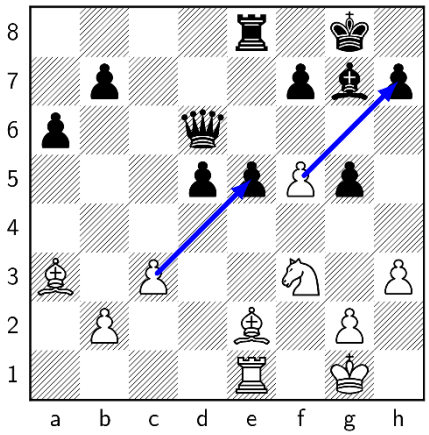
S12.2.4



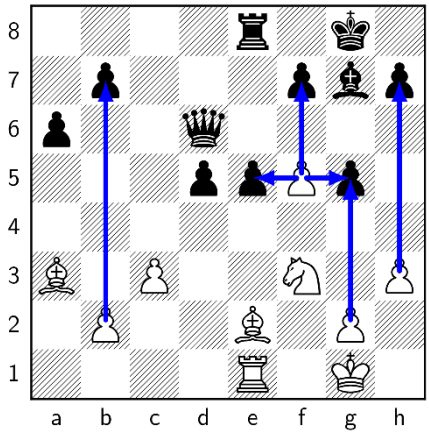
S12.2.4.L1 – Knight



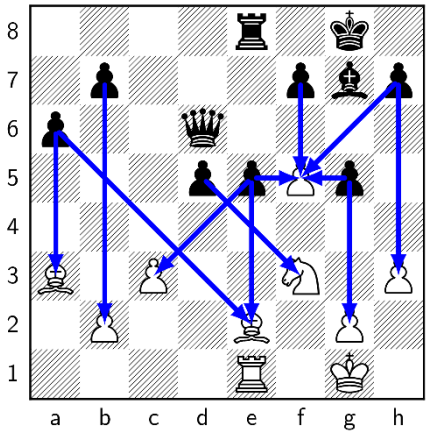
S12.2.4.L2 – Bishop



S12.2.4.L3 – Rook

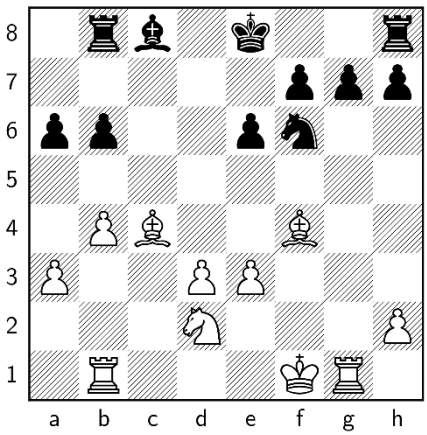


S12.2.4.L4 – Queen

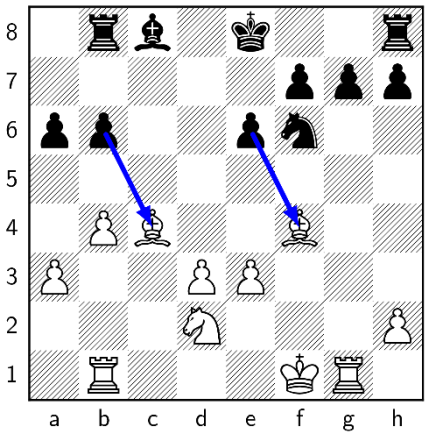


Solutions S12.2.5.LX

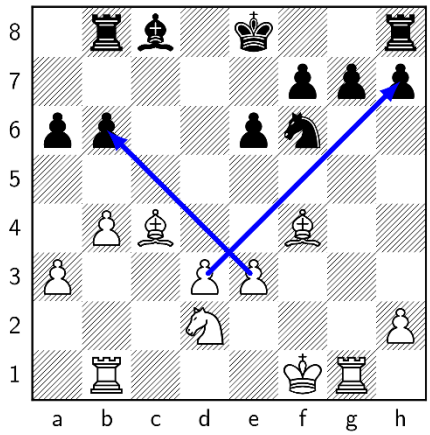
S12.2.5



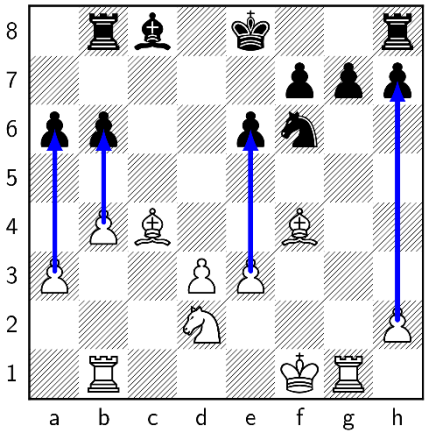
S12.2.5.L1 – Knight



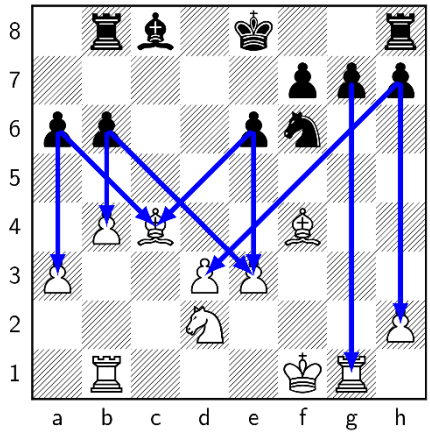
S12.2.5.L2 – Bishop



S12.2.5.L3 – Rook

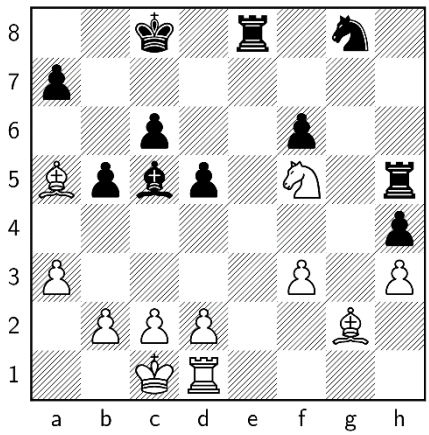


S12.2.5.L4 – Queen

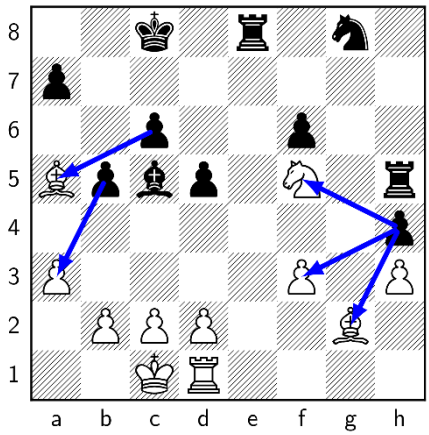


Solutions S12.2.6.LX

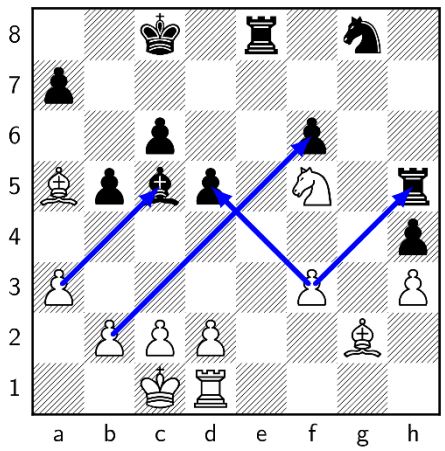
S12.2.6



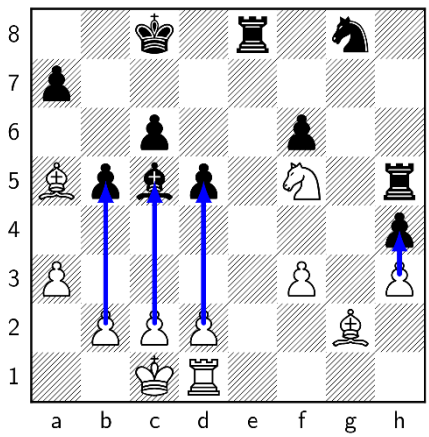
S12.2.6.L1 – Knight



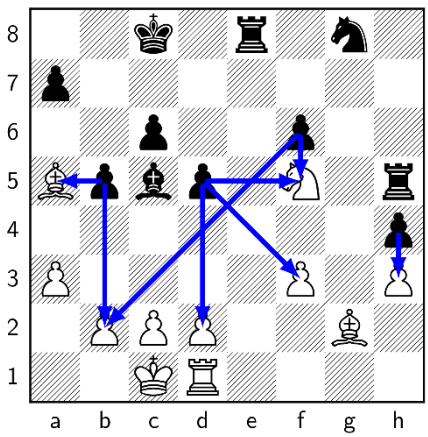
S12.2.6.L2 – Bishop



S12.2.6.L3 – Rook



S12.2.6.L4 – Queen



APPENDIX

Handouts.

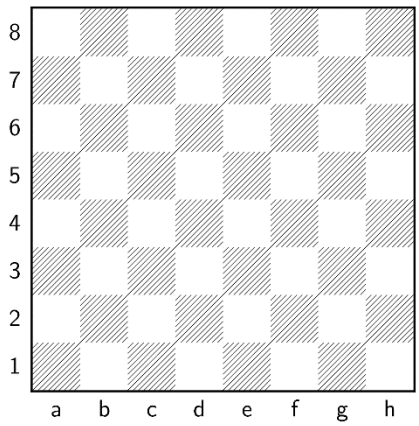
Participant information – chess-based cognitive remediation therapy

Welcome to chess-based cognitive training!

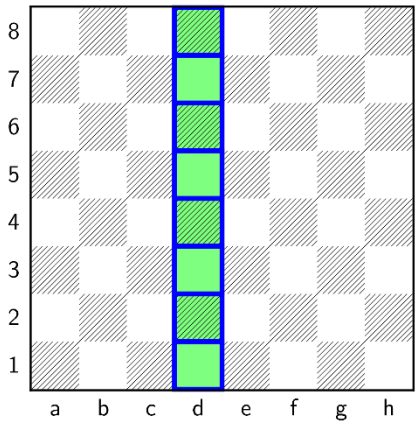
First of all, we would like to thank you for participating and wish you a pleasant time.
About the training process: The training will always take place in a group. You will NOT be actively playing chess here. The aim is not to be better than others or to compete with each other, but to specifically train important cognitive skills.
During the training sessions, you will be asked various questions. You will be called on at random to answer them. Therefore, try to concentrate on each question and not call out answers. If you do not know the correct answer, try to work it out using various strategies. If an answer is correct, the whole group will applaud.

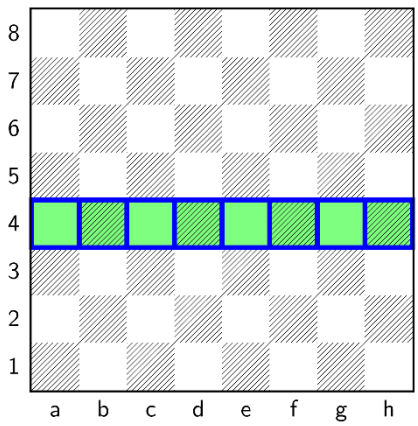
We will work with the demonstration chessboard (short: demo board). It looks like this:

The chessboard[3]

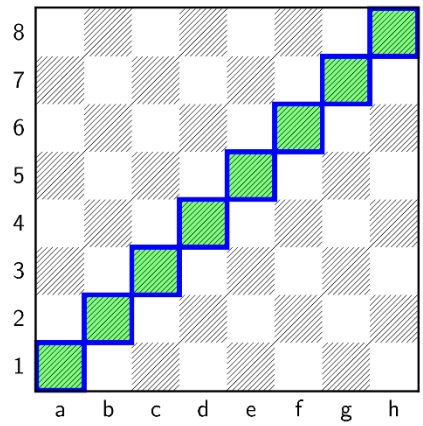


It is divided into 8 files (a-h) and 8 ranks (1-8).

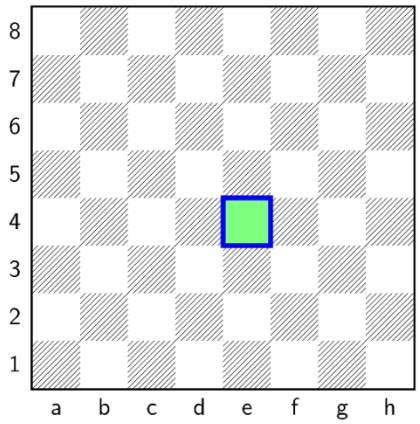




There are also diagonals.
When a piece moves along a diagonal, it never leaves its own color square.



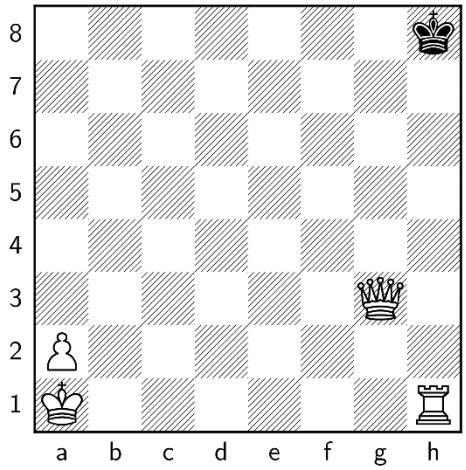
[3] The chess diagrams in this manual were created using LaTeX and the chessboard package Fischer, U. (2023). *chessboard (Version 5.12) [LaTeX-Paket]*. https://ctan.org/pkg/chessboard.



We name a square by first announcing its file and then its rank. In the example, the square is e4.

In training, the 1st and 2nd ranks are always at the bottom, the 7th and 8th ranks are always at the top; the a-file is always on the left and the h-file is always on the right. The square at the bottom right is always white.

What is checkmate?
Checkmate occurs when the king is attacked by an opponent's piece and can no longer defend itself against this check:



In chess there are 6 different white and black pieces[4]. Even though we have different colors on the board and for the pieces, we still speak of white and black squares and pieces.



Pawn
Value: 1 point



Knight
Value: 3 points



Bishop
Value: 3 points



Rook
Value: 5 points



Queen
Value: 9 points



King
Value: 0 points
(not applicable)

We hope you enjoy the training. If you have any further questions, please contact the course instructor.

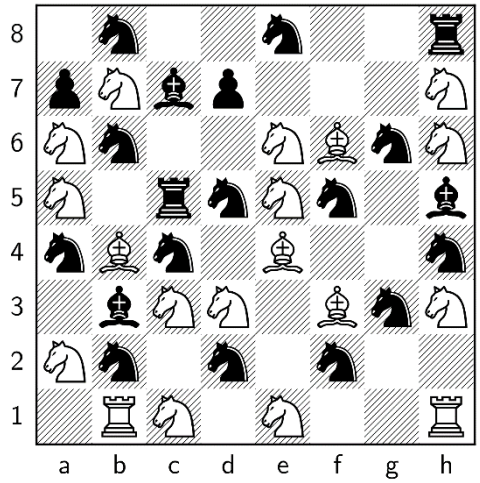
[4] The demo board pieces in this manual are reproduced with the kind permission of Texma, https://texma.pl

Worksheets

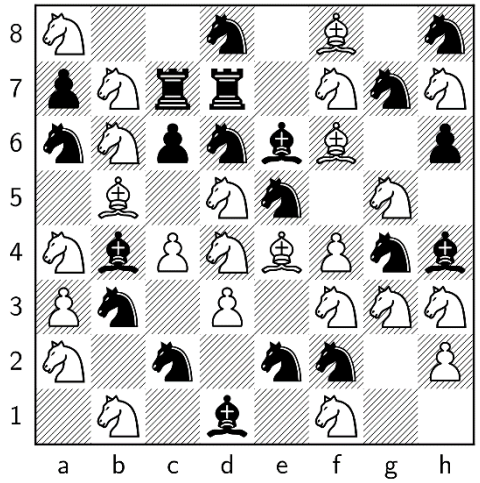
Worksheet Exercises 4.2

Worksheet Sustained Attention. Position and quantification

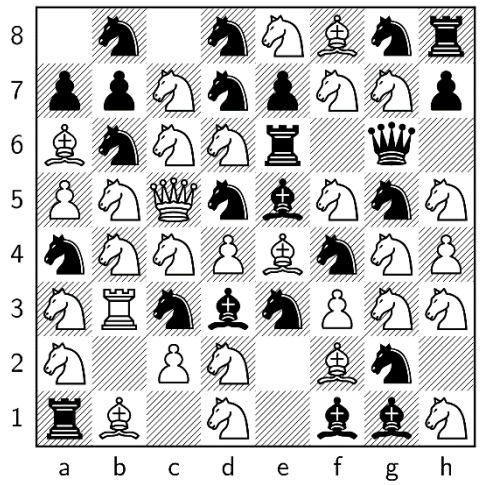
In this exercise, you must mark the white knight on white squares. You have 3 minutes to complete this exercise.



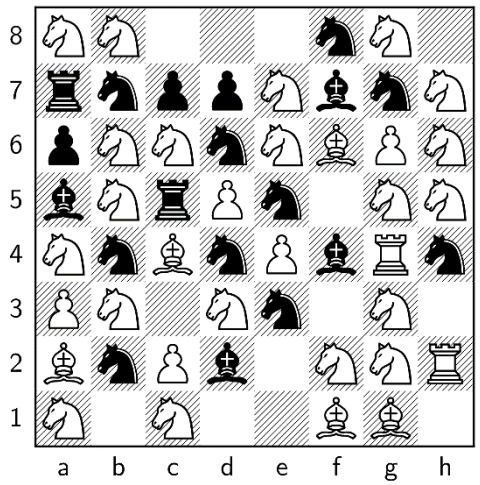
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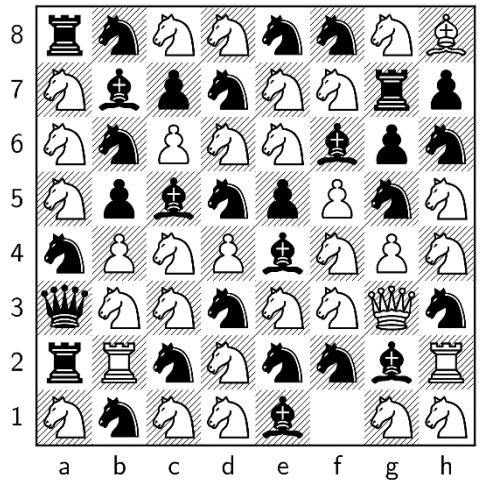
B



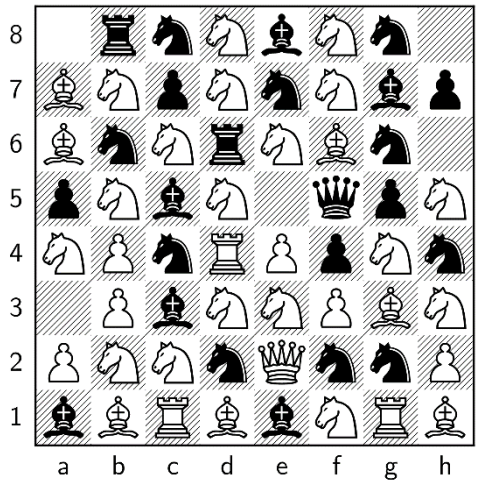
C



D

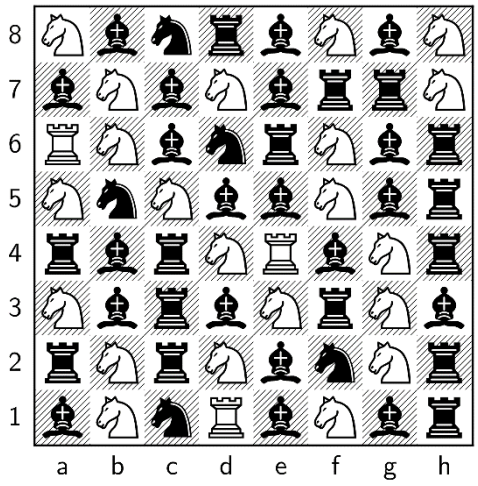


E

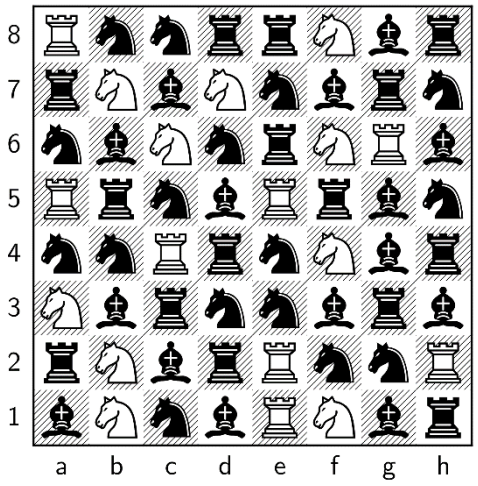


F

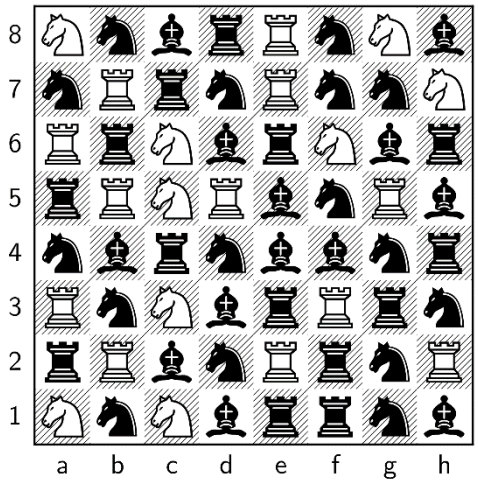
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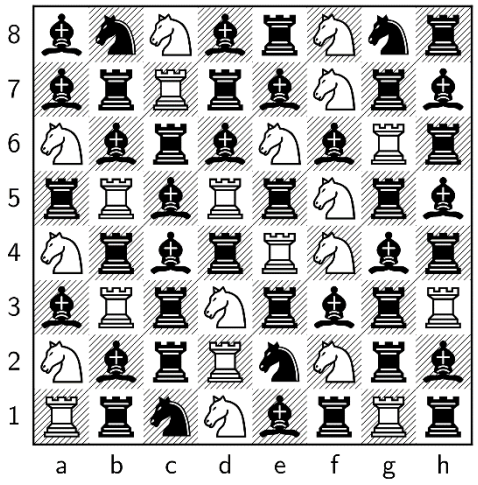
A



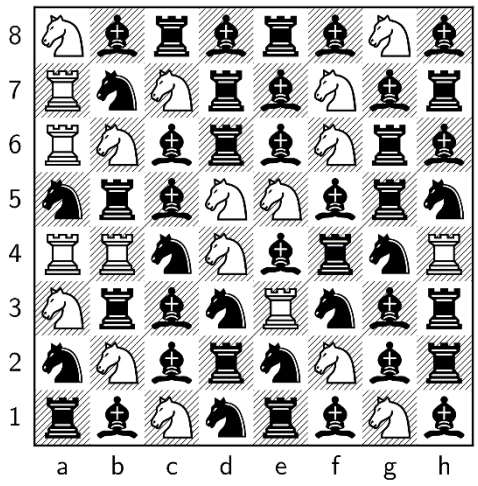
B



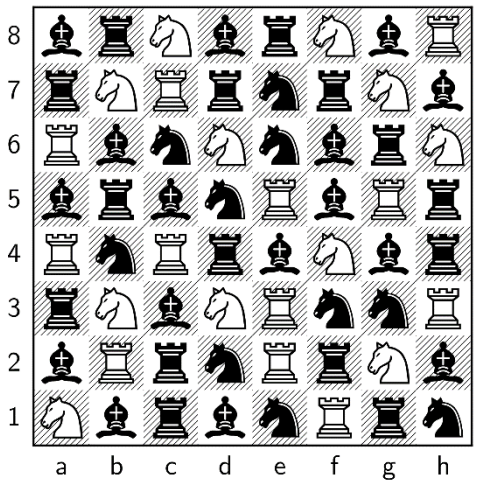
C



D



E

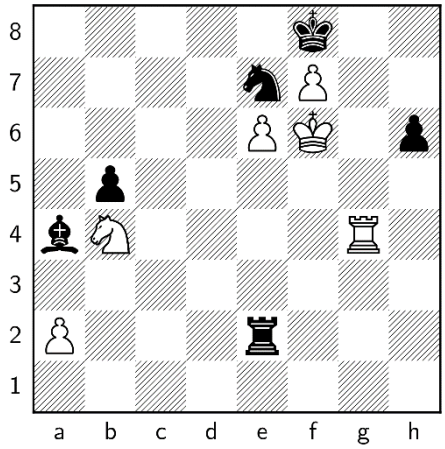


F

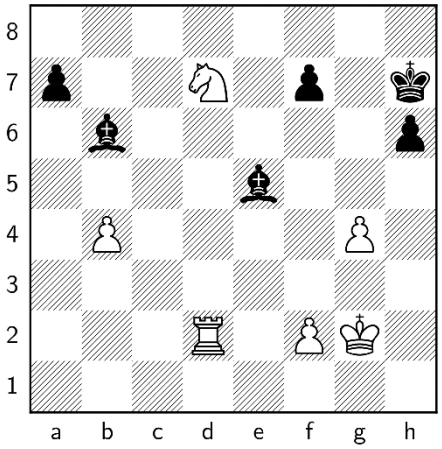
Worksheet Exercises 7.3

Worksheet Executive functions. Organization. Working memory

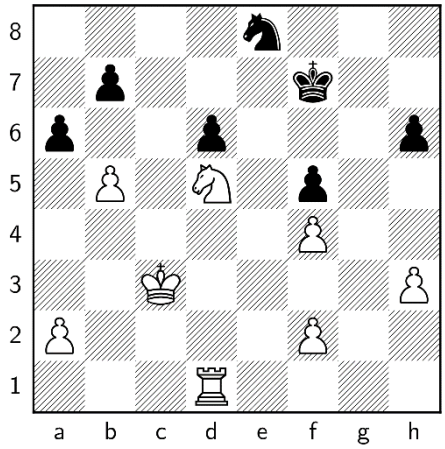
Please determine the value of the white pieces for each board (A to F). Then arrange the boards in order from highest value to lowest. You have six minutes to do this.



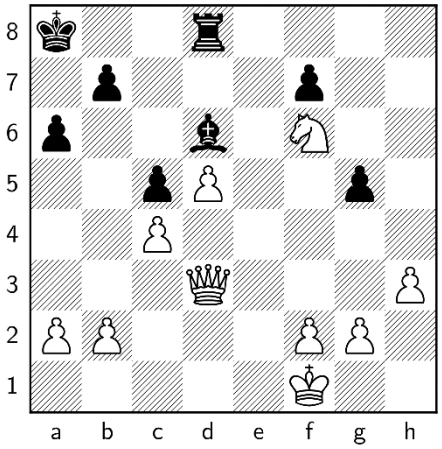
A



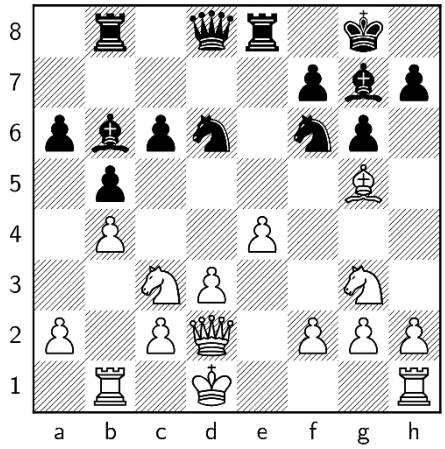
B



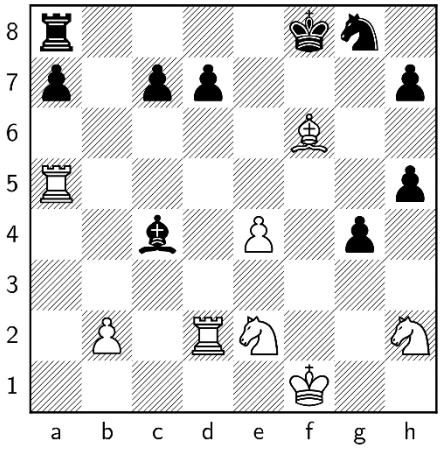
C



D



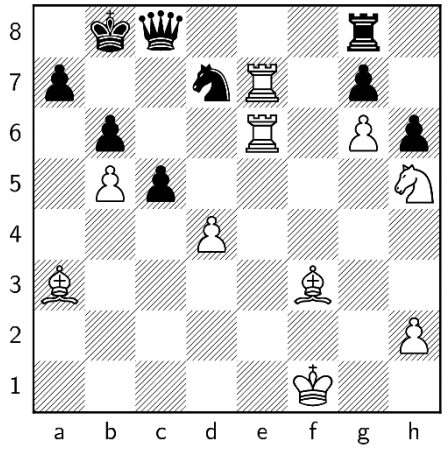
E



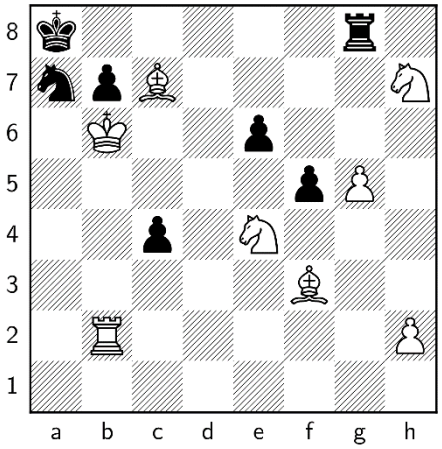
F

Order: _____

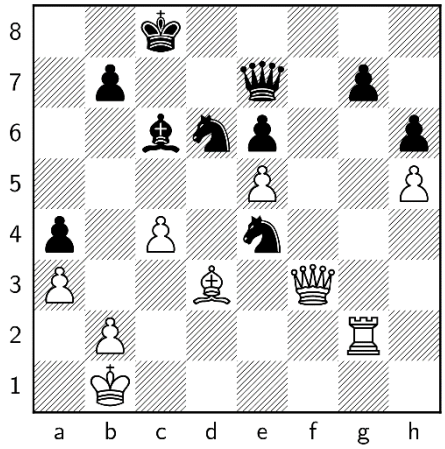
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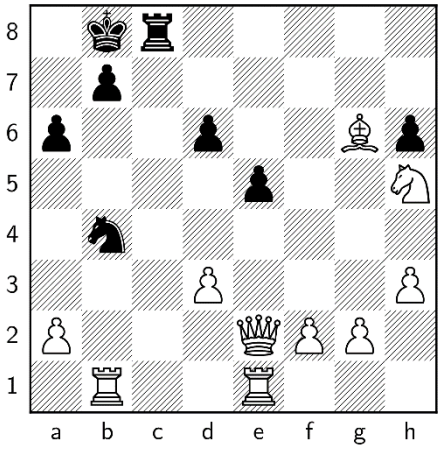
A



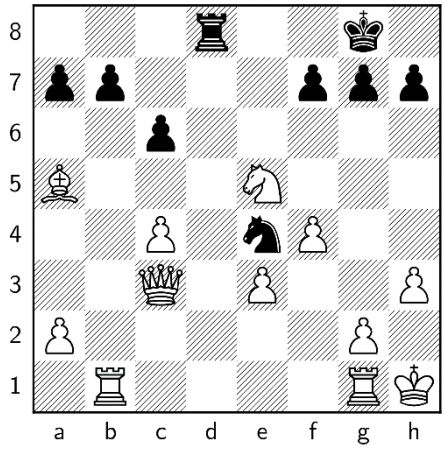
B



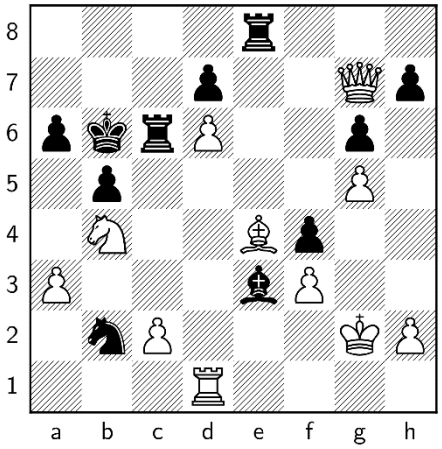
C



D



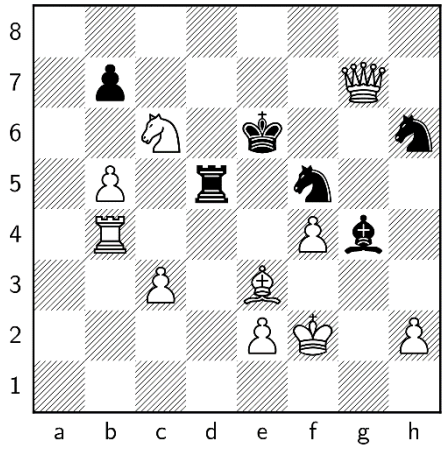
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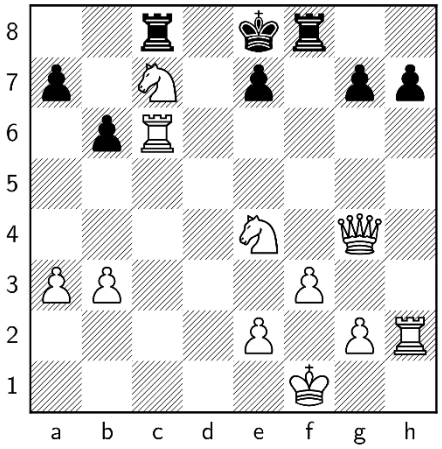
F

Order:_____

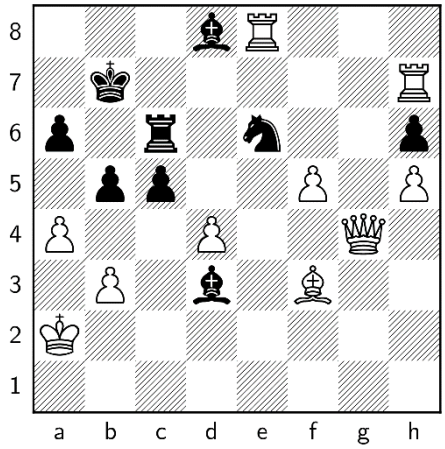
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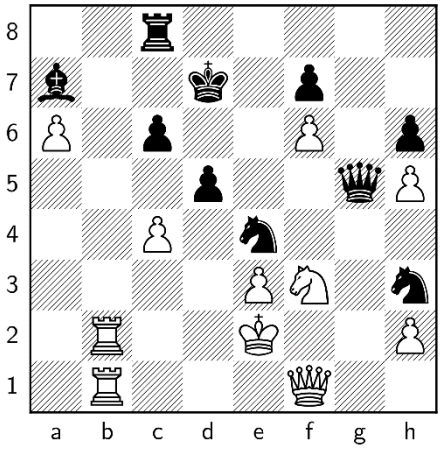
A



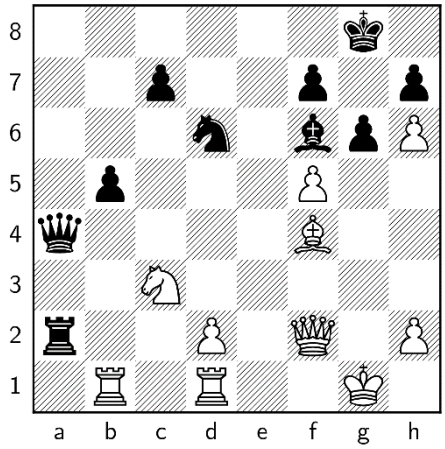
B



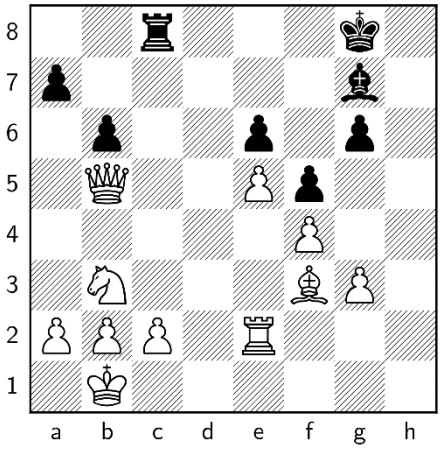
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D



E



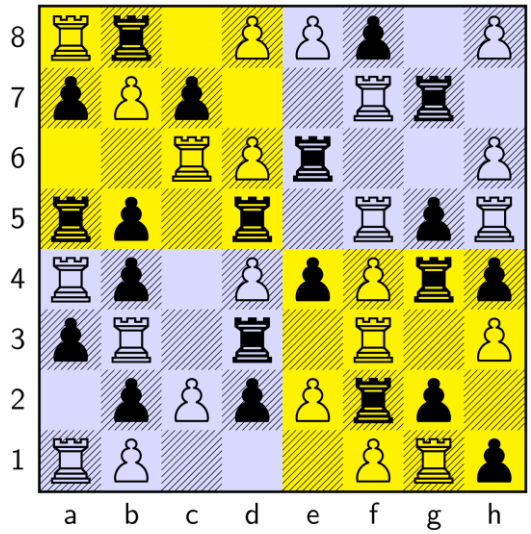
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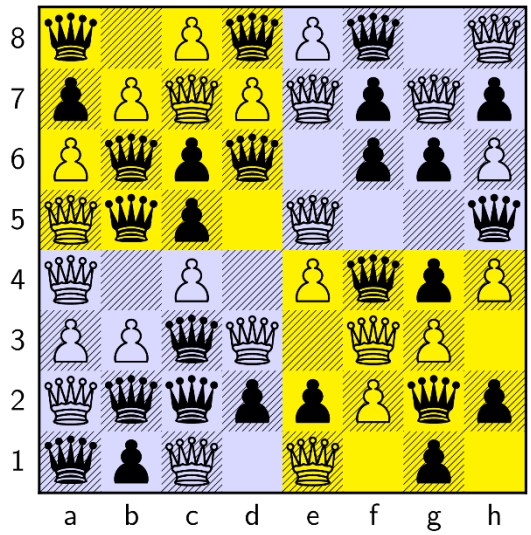
Order:_____

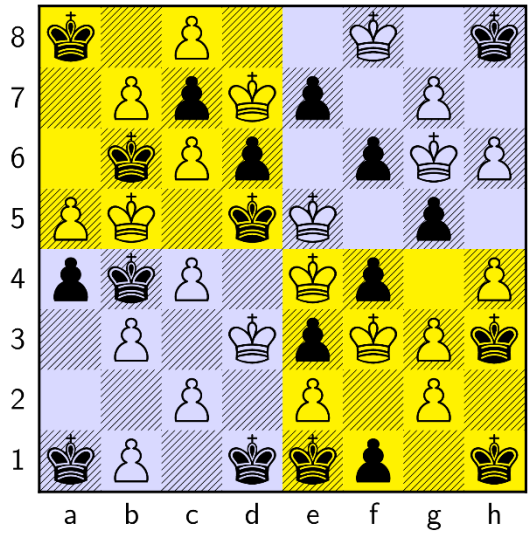
Worksheet Exercises 9.1

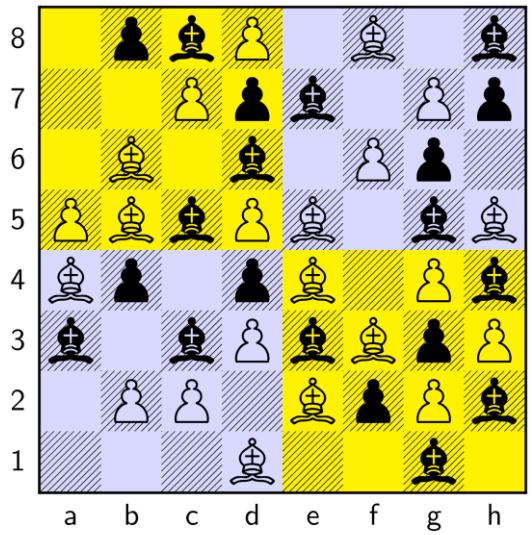
Worksheet Attention strategies. 2 colors
Visual tracking. Systematic exploration

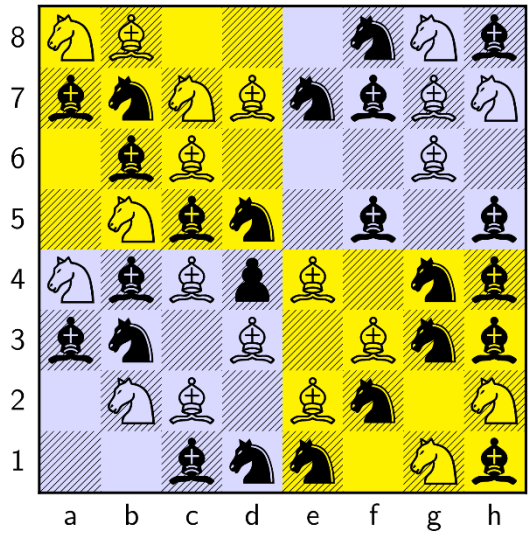
Worksheet, 2 colors for better visibility when printed

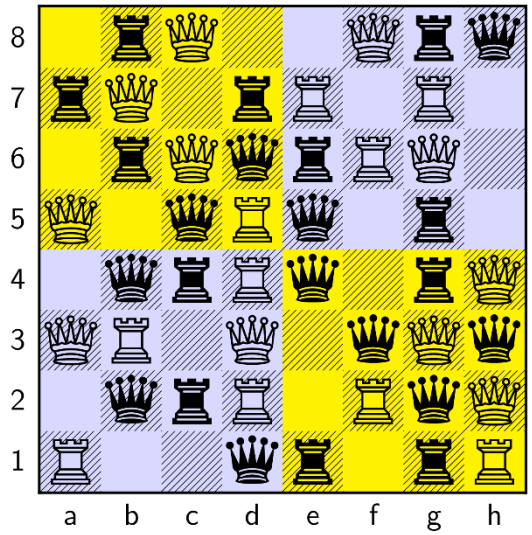








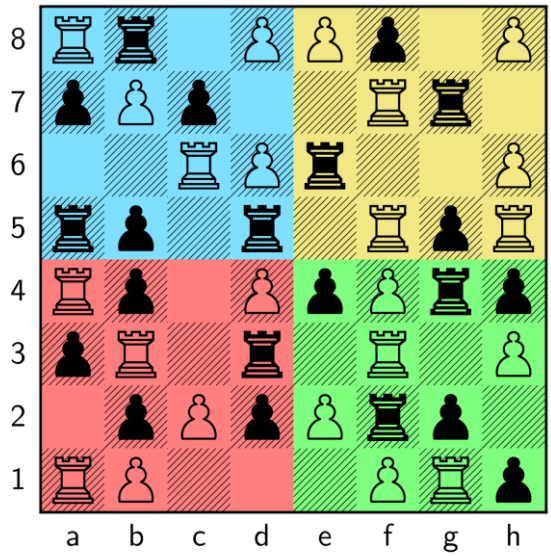


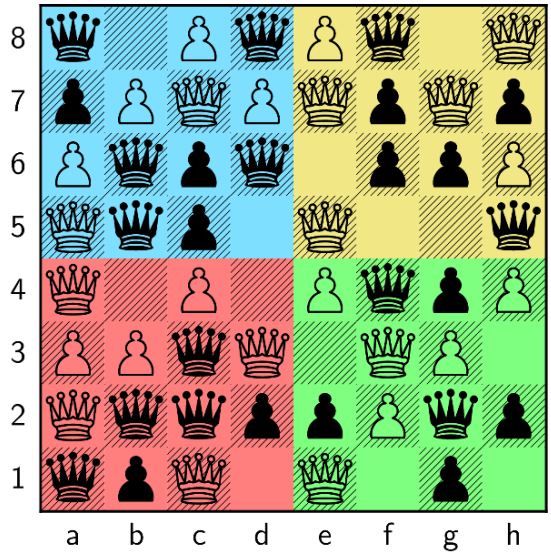


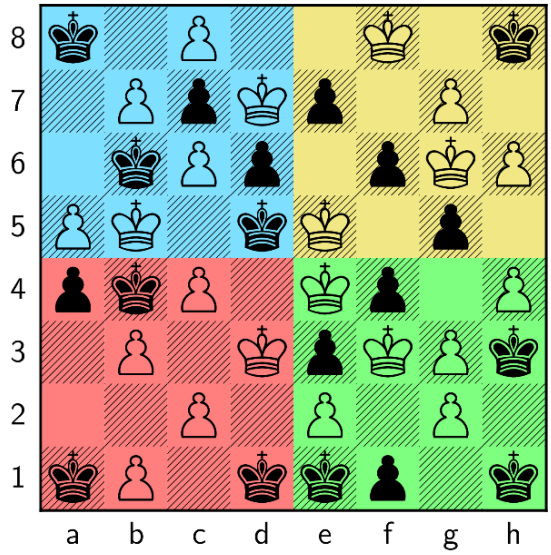
Worksheet Exercises 9.1

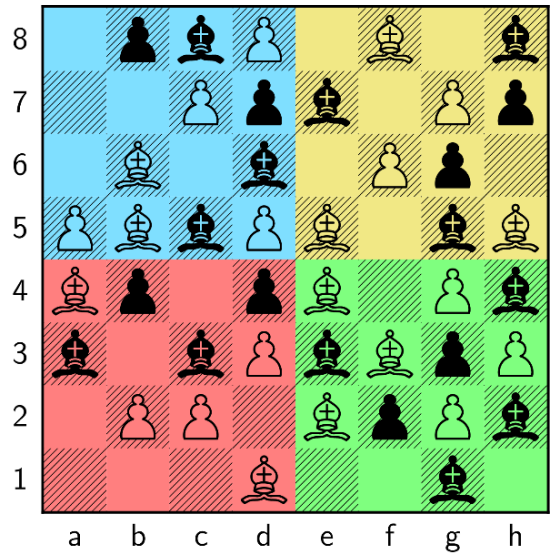
Worksheet Attention strategies. 4 colors
Visual tracking. Systematic exploration

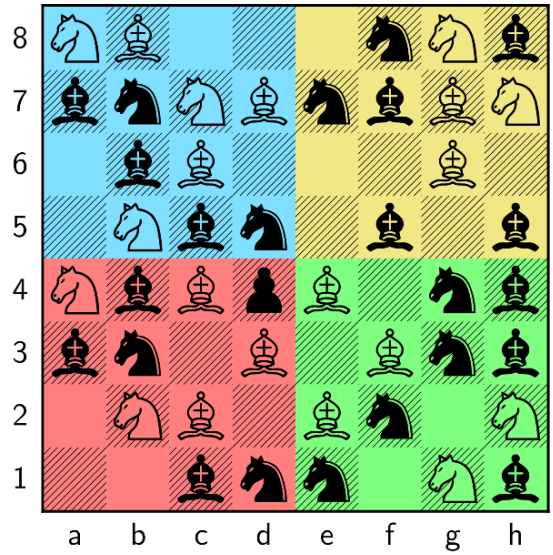
Worksheet, 4 colors for high-quality printouts

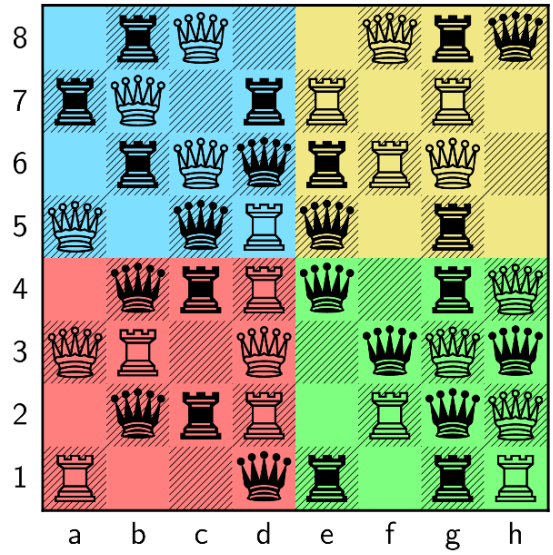












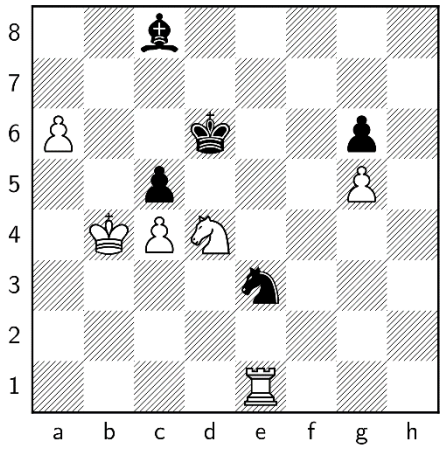
Worksheet Exercises 10.1

Worksheet Reasoning. Recognizing unique characteristics

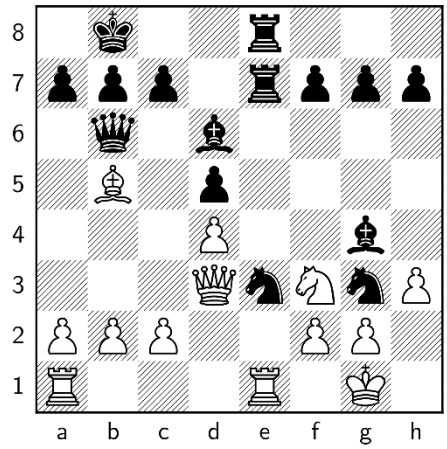
Example sheet S10.1.Ex

Look closely at the six boards below. Which one does not share any characteristics with the others?

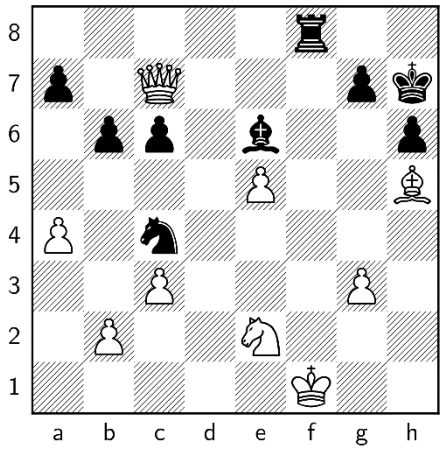
You have 5 minutes.



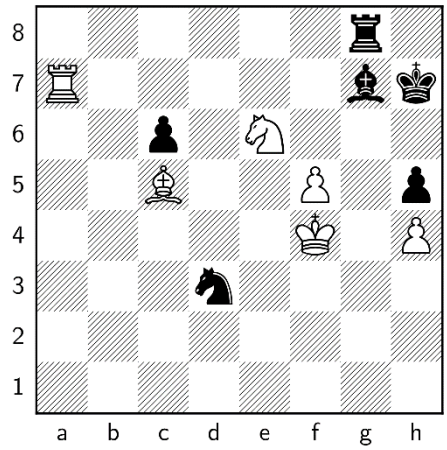
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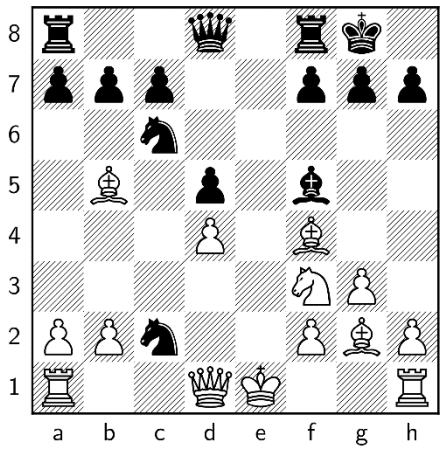
2



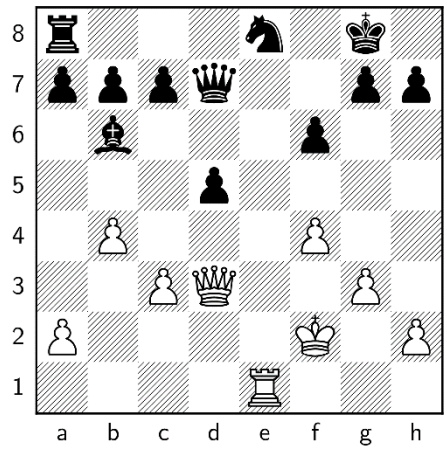
3



4



5

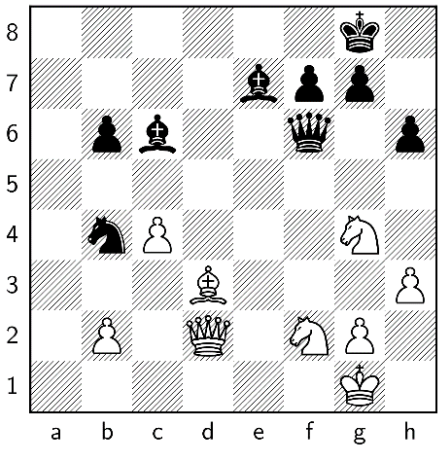


6

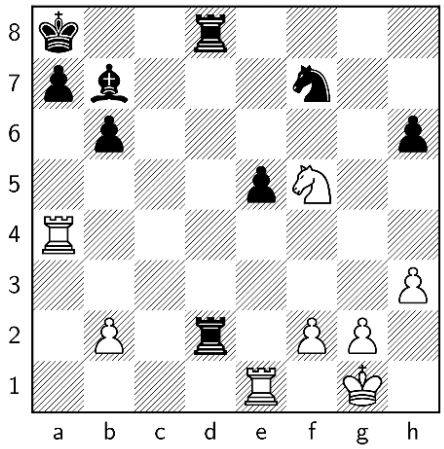
Sheet A

Look closely at the six boards below. Which one does not share any characteristics with the others?

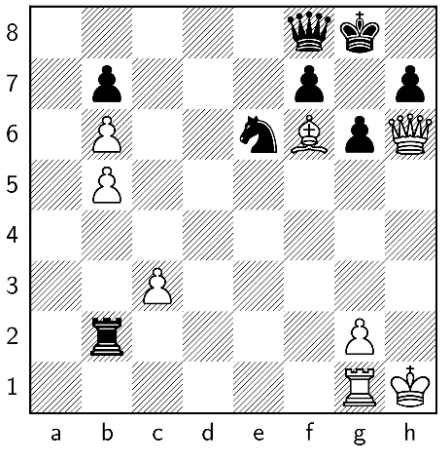
You have 5 minutes.



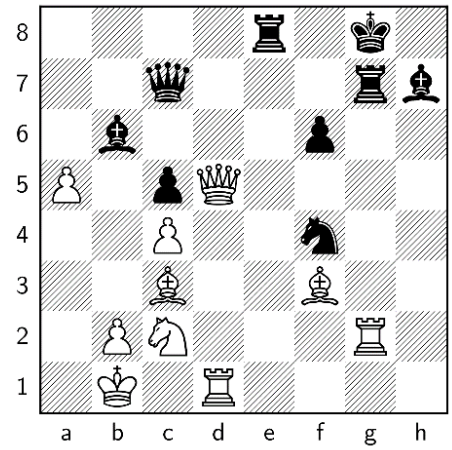
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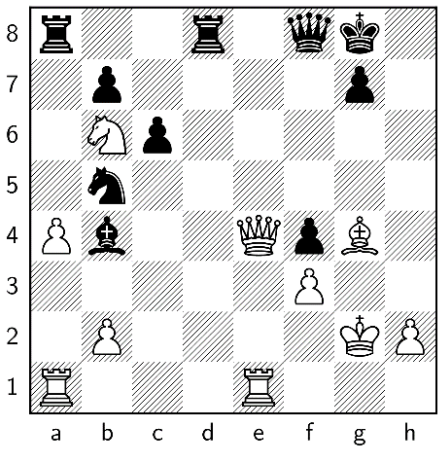
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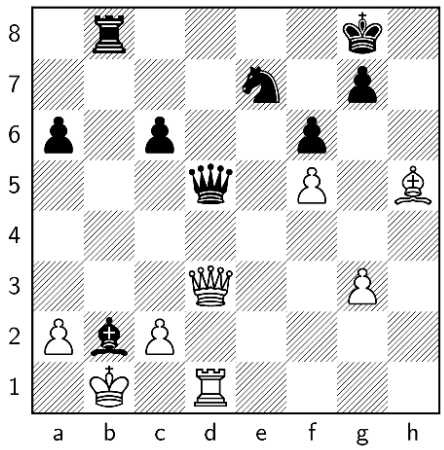
3



4



5

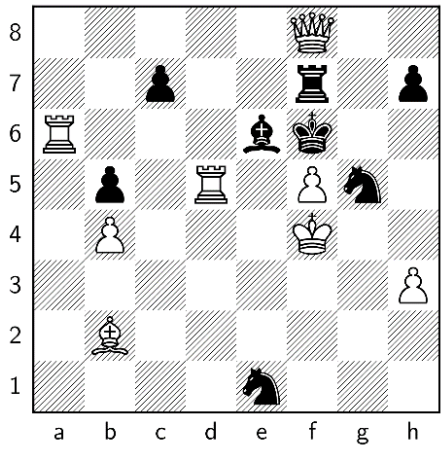


6

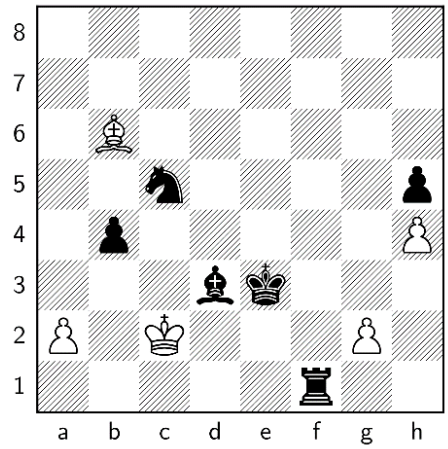
Sheet B

Look closely at the six boards below. Which one does not share any characteristics with the others?

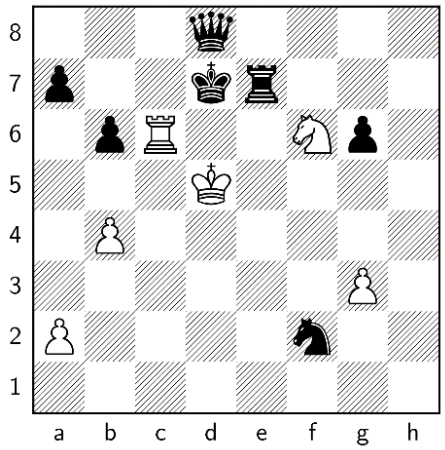
You have 5 minutes.



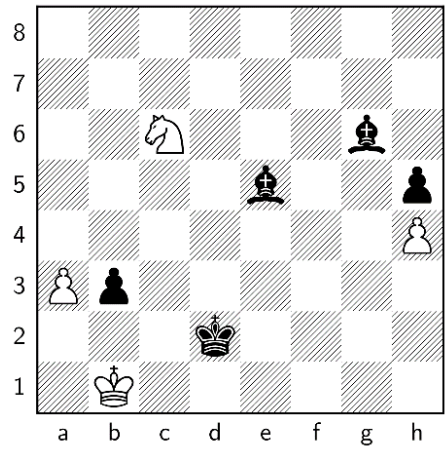
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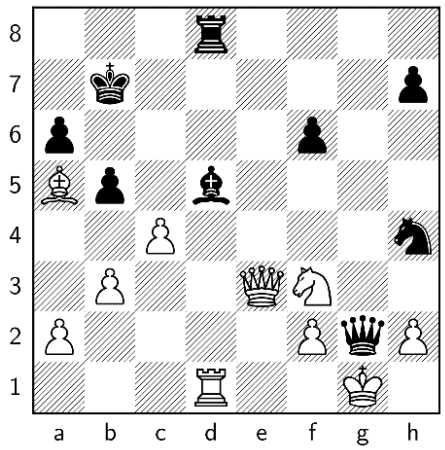
2



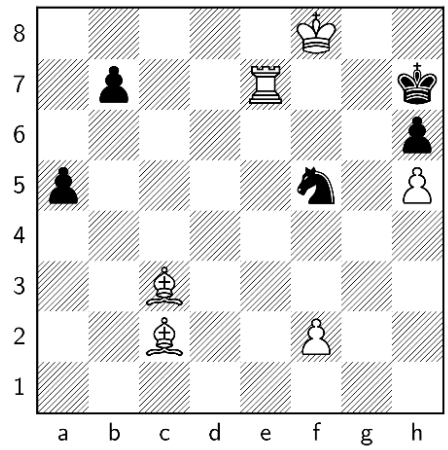
3



4



5

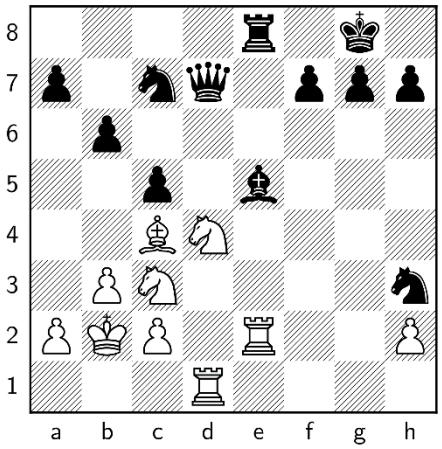


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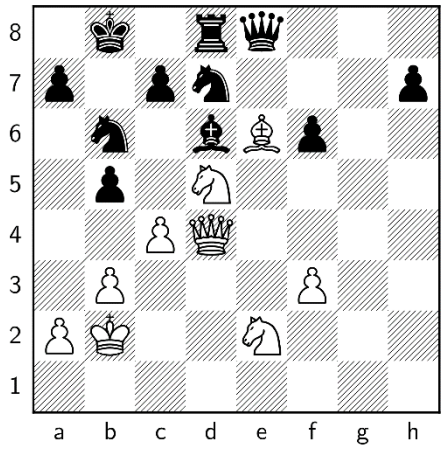
Sheet C

Look closely at the six boards below. Which one does not share any characteristics with the others?

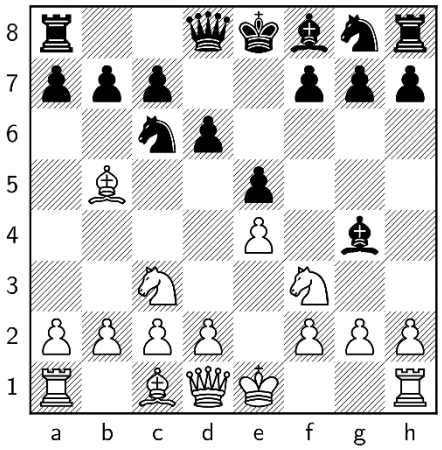
You have 5 minutes.



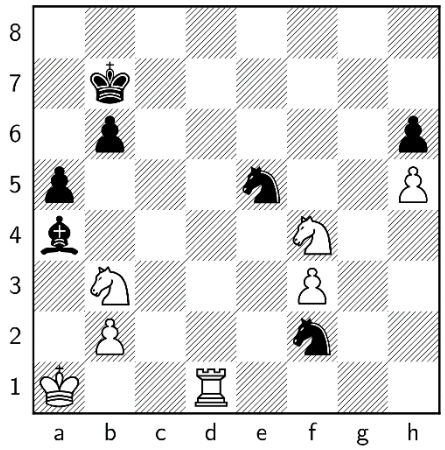
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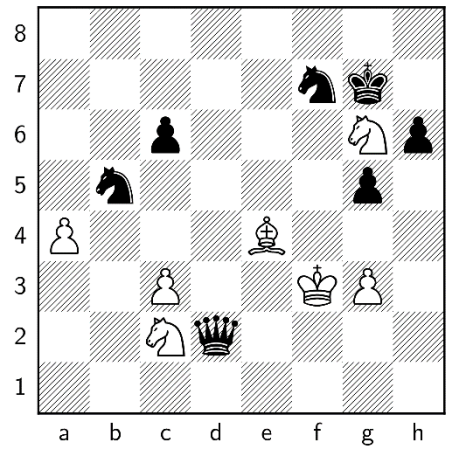
2



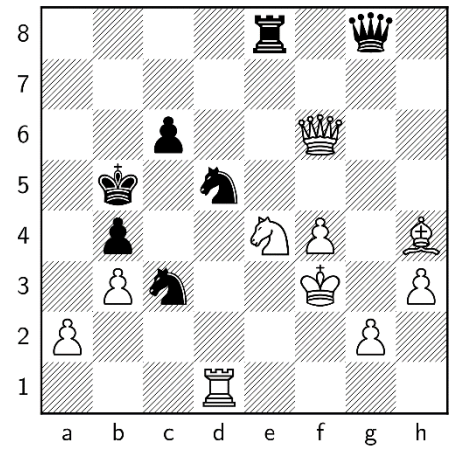
3



4



5

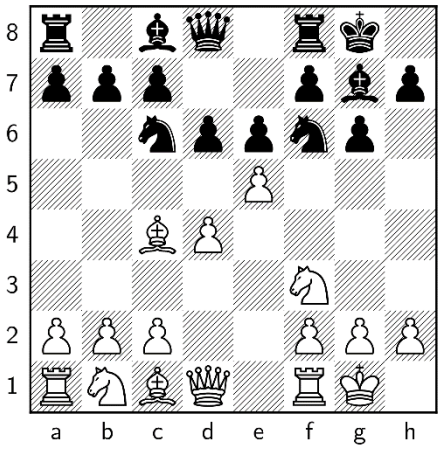


6

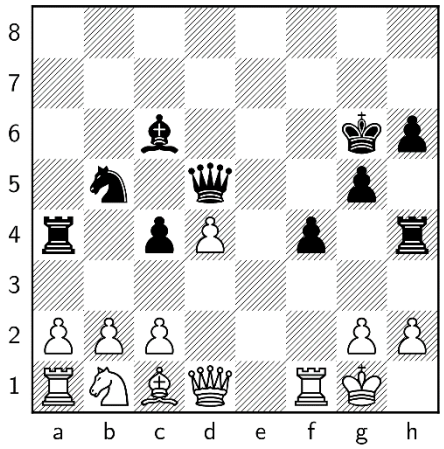
Sheet D

Look closely at the six boards below. Which one does not share any characteristics with the others?

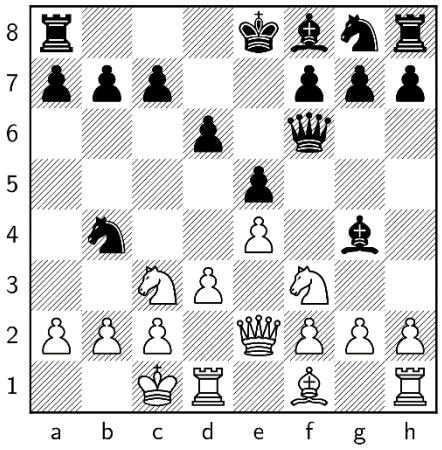
You have 5 minutes.



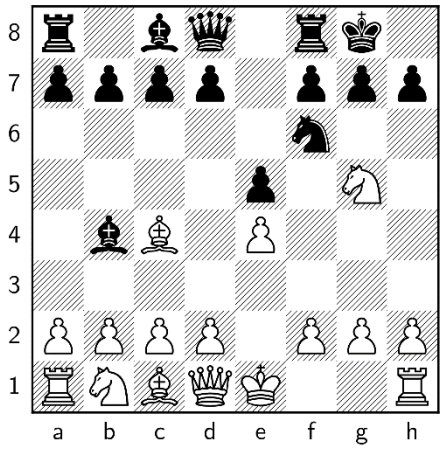
1



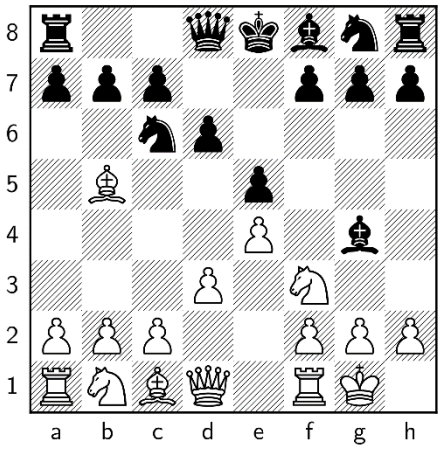
2



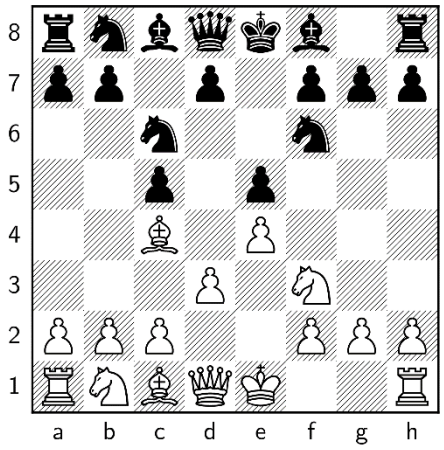
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4



5

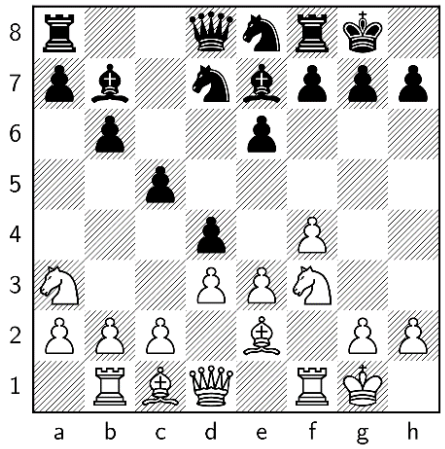


6

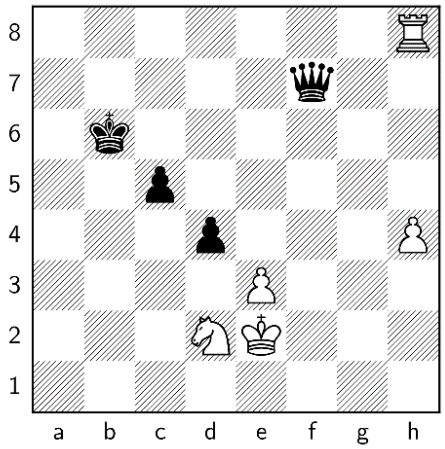
Sheet E

Look closely at the six boards below. Which one does not share any characteristics with the others?

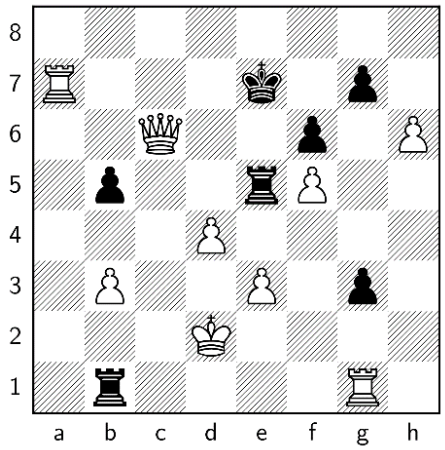
You have 5 minutes.



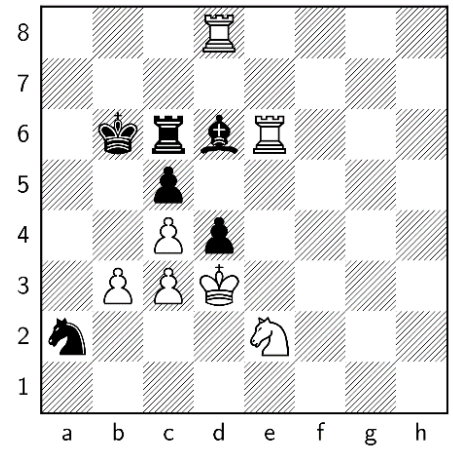
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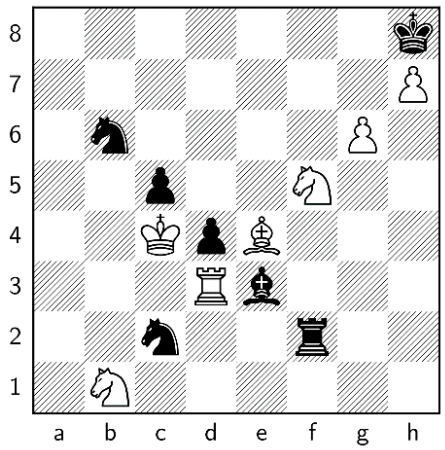
2



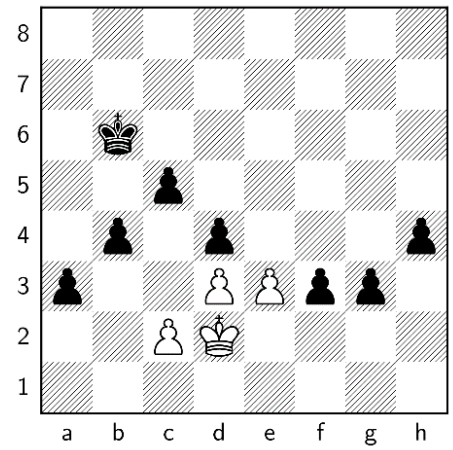
3



4



5



6

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