



**LOGIC  
MASTERS**  
Deutschland e.V.

[www.logic-masters.de](http://www.logic-masters.de)

## World Sudoku Championship 2019 Kirchheim, Germany

### Monday, 30<sup>th</sup> September

09:00 – 09:25	Round 1 Individual: Countdown Classics	25 min	250 points
09:40 – 10:25	Round 2 Individual: World Cup 1	45 min	450 points
10:45 – 11:25	Round 3 Individual: Pieces of Cake and Tough Cookies	40 min	500 points
11:40 – 12:30	Round 4 Individual: All 81	50 min	550 points
14:00 – 15:00	Round 5 Individual: Arrows, Lines and Circles	60 min	600 points
15:15 – 16:05	Round 6 Individual: Double Dutch	50 min	500 points
16:30 – 17:15	Round 7 Individual: World Cup 2	45 min	450 points
17:45 – 18:30	Round 8 Team: Clueless	45 min	1800 points

### Tuesday, 1<sup>st</sup> October

09:00 – 09:40	Round 9 Team: Circle	40 min	1600 points
09:55 – 10:25	Round 10 Team: 3D	30 min	900 points
11:05 – 11:50	Round 11 Individual: World Cup 3	45 min	450 points
12:05 – 12:30	Round 12 Individual: Relay 7×7	25 min	250 points
14:00 – 14:30	Round 13 Individual: Linked	30 min	300 points
15:00 – 15:45	Team Playoffs: Kropki Connection		
16:30 – 18:00	World Cup Playoffs		

# Competition Rules

## Scoring and Bonuses

Points will be awarded only for fully and correctly solved puzzles. In general, there is no partial credit unless stated otherwise in the round's description.

### Individual Rounds

A bonus of 10 points for each full remaining minute will be awarded to any competitor who correctly solves all puzzles in a round. A partial 60% bonus can be awarded if one puzzle is incorrectly solved, under the condition that the puzzle is solved completely or almost completely and the competitor may have believed their solution to be correct. In case of doubt, the decision will be made in favour of the competitor; the decision of the judges is final.

### Team Rounds

A bonus of 40 points for each full remaining minute will be awarded to any team who correctly solves all the puzzles in a round. If there are any mistakes, then no bonus will be awarded.

## Competition Hall Rules

1. All competitors have to sit at their pre-allocated desk in individual rounds. Teams have to work at their pre-allocated desk area for team rounds.
2. Prior to the start of each round, competitors must ensure they are at their desks ready for the start of the round. Late arrivals may not be permitted to enter the competition hall to take part in a round (at the discretion of the organizers).
3. Prior to the start of each round, competitors have to clearly write their name, team and reference number on the front page of their competition booklet into the allocated space. If this information is not complete, then the organizers reserve the right not to award any points to that competitor for that round. Competitors must not open their booklets before the official start of the round.
4. When the signal for the start of the round has been given, competitors may open their booklets and begin solving the puzzles.
5. During each individual round, competitors have to keep silent, unless declaring completion of a round.
6. During team rounds, team members may talk to each other, but should do this with respect to other teams.
7. To declare a round complete, a competitor must close their booklet, clearly state "finished" and raise their arm with the booklet. The competitor's arm must be raised until the booklet is collected. The same rules apply for the team competition.
8. Competitors or teams who complete a round with more than five minutes in advance, are allowed to leave the competition hall quietly.
9. Competitors or teams who complete a round with five minutes or less left are not allowed to leave their desks or tables in order to cause no unnecessary disruption to fellow competitors.
10. When a competitor leaves the competition hall for any reason, they may not be allowed to continue in that round (at the discretion of the organizers).
11. When the signal is given that the round is finished, competitors have to stop solving immediately, close their booklets, put their pens or pencils down and their hands up with their booklets for collecting.
12. At the end of a round, competitors have to remain seated until all booklets have been collected. The signal to get up and leave will be given by the supervisor.
13. Mobile phones and electronic devices are not permitted to use in the competition hall. The devices have to be turned off and must not be placed on the competitor's desk.
14. Only team captains and official observers equipped with a name tag are allowed to enter the competition hall while either individual or team rounds are taking place. Other non-competing participants may enter the competition hall at the discretion of the organizers.
15. Competitors may not use cameras or other recording devices during rounds. Only official observers may do so, at the discretion of the organizers. They have to respect the competitors and not use flash photography or cameras with excessive sounds.
16. When a competitor believes that there is a problem with a puzzle, they must clearly state that puzzle is wrong by writing "Wrong puzzle" next to it. The competitor must not notify the organizers during the round. This will be investigated upon completion of the round.

17. Puzzles can be completed in any order within a round. The points' value of a puzzle is an indication of its expected difficulty, although individual solving experience may differ. The difficulty of an example puzzle does not necessarily reflect the difficulty of the corresponding competition puzzle.

### **Permitted items**

18 Permitted items which can be used in the competition hall (unless stated otherwise) are: pens, pencils, pencil sharpeners, erasers, rulers, blank papers and instruction booklets annotated with notes regarding puzzle instructions and preparation notes.

19. Drinks and snacks are permitted as long as they do not disturb other competitors with a strong smell or rustling packet.

20. It is strictly forbidden to use electronic devices such as music players and headphones or any type of calculator. Use of such equipment may lead to the disqualification of the competitor.

21. Any other items brought into the hall must be kept in a bag on the floor and placed under the competitor's desk, so as not to block the aisles.

### **Marking and Queries**

22. When a round has been evaluated, fully marked booklets are returned to a team member equipped with a country tag at a given location in a given time. Country tags will be distributed to each captain prior the start of the championships.

23. In case of any query after a booklet has been evaluated and returned to a competitor, the query must be raised through a team member with country tag to the organizers in the specified time. The schedule for the queries will be published before the competition. The booklet should be left with the organizers for investigation.

24. Puzzles may be photographed during the marking phase in order to prevent subsequent interventions.

25. Team captains are responsible for ensuring that any information given to them related to the competition is effectively relayed to their team.

### **Breach of Rules**

26. Any breach of these rules may lead to penalty points, or in severe cases to a competitor or team being disqualified from the round or competition.

27. The decision of the WSC tournament director (Richard Stolk) is final.

### **Final Remarks**

28. In case of a major mistake in one of the rounds, organizers reserve the right to cancel the round, either by removing it from the time schedule, or by not awarding any points for it to any of the competitors.

29. The official puzzle booklets will contain one or multiple puzzles per page in the individual rounds. The rules of the puzzle and the corresponding points are always written next to it.

30. The official puzzle booklets will not contain puzzle examples. Therefore, we recommend to bring the Instruction Booklet, which contains an example of every puzzle which will be part of the championship.

31. In the team rounds, the official puzzle booklets may contain neither puzzle rules nor examples. It is advised to bring at least one Instruction Booklet for a team for these rounds.

32. In any case of inconsistency between this Instruction Booklet and the official puzzle booklets, e.g. rules or points, the information in the Instruction Booklet will be considered valid.

33. In the competition hall, a timer counting down to the end of the round will be visible for all the competitors.

### **Puzzle Credits**

Authors will remain anonymous individually until the solutions are distributed. The organisers would like to collectively thank Arvid Baars, Silke Berendes, Stefan Heine, Sebastian Matschke, Christoph Seeliger, Richard Stolk and the World Puzzle Federation for the example and competition puzzles.

## World Sudoku Championship and Sudoku World Cup

This year's World Sudoku Championship will include a separate tournament, namely the Sudoku World Cup.

### World Sudoku Championship

The World Sudoku Championship is the main competition, very similar to previous WSCs. It consists of 10 individual rounds and 3 team rounds. The individual ranking will be determined by the sum of the scores of all individual rounds; there are no individual playoffs. The competitor with the highest total score will be declared World Sudoku Champion. In case of a tie in the top 3, one single tiebreaker puzzle will determine the final ranking. Details will be announced when the situation arises. In case of a tie outside the top 3, all competitors with the same total score will share the same rank.

The team ranking will be determined by the sum of the individual scores of the four team members, plus the scores of the team rounds. The four teams with the highest total scores will qualify for the team playoffs. In case of a tie, all teams tied for fourth place will qualify for the team playoffs.

### Team Playoffs

Teams will start the playoff with time offsets based on the preliminary results: The team that has qualified as fourth starts the playoffs exactly three minutes later than the team that has qualified as first. The other teams start with an offset based on the number of points of the preliminary rounds, related to the number of points of the first qualified team and the fourth qualified team.

The playoffs consist of two different puzzles. It is up to the team to decide in which order the puzzles are solved and which team members work on which puzzle. This may even vary during the playoffs. When both puzzles are finished they notify the judges to enter the submission period. The entire solution will then be checked over the next two minutes. After two minutes, if the solution is correct, the team is declared winner, or second or third. If the solution is incorrect, the judges will return the puzzles to the team, without notifying in which of the puzzles is a mistake. Teams can resubmit a returned puzzle at any time, and will again enter the submission period.

The team playoffs end when three teams have finished. If this has not happened after 60 minutes, the playoffs will be aborted; the final ranking is determined by (a) scored points where a  $6 \times 6$  Sudoku is worth 50 points and a  $9 \times 9$  Sudoku is worth 115 points, (b) total team score of the preliminary rounds.

### Sudoku World Cup

The Sudoku World Cup is a new knockout tournament, partly included in the World Sudoku Championship, and replaces the individual playoffs from previous years. It starts with three regular puzzle rounds. In the first round, all players compete. After the first round, the top 100 competitors advance to round 2. The second and third round are similar, with 40 respective 10 competitors advancing. For the ranking in each round only the scores of the current round are considered, results of earlier rounds are not counted.

In case of a tie after round 1 or round 2, anyone tied for 100<sup>th</sup> or 40<sup>th</sup> place will advance to the next round. For round 3 the situation is different: If there is a tie for 10<sup>th</sup> place, the competitors who scored better in round 2 will advance, and if that fails to distinguish, the competitors who scored better in round 1 will advance. If there is still a tie after that, a single tiebreaker puzzle will decide who advances; details will be announced when the situation arises.

Competitors who have been eliminated in an earlier round must still join the later rounds and solve the puzzles since these rounds count also as normal WSC rounds.

### Individual Playoffs

The 10 best players of round 3 qualify for the individual playoffs. In the first semifinal the qualified numbers 7-10 compete. The winner advances to the second semifinal and competes with numbers 4-6. The winner of the second semifinal qualifies for the finals, together with the numbers 1-3.

In each of the semifinals and final, 5 sudokus have to be solved in a given order.

When a play-off competitor completes a puzzle, they hand their solved puzzle to a judge to enter the submission period. The entire solution will then be checked over the next minute. After one minute, if the solution is correct, the judge will allow the competitor to begin the next puzzle. If the solution is incorrect, the judge will return the incorrect puzzle to the competitor, without notifying where the mistake is. The competitor can resubmit a returned puzzle at any time, and will again enter the submission period.

When one competitor has solved all puzzles correctly, the round ends. If this has not happened after 30 minutes, the round is aborted. In this case, the winner of the round or the final is determined by (a) number of correctly solved puzzles, (b) time of the last correct submission, (c) total score of the three preliminary World Cup rounds.

# Round 1 Individual: Countdown Classics

25 minutes – 250 points

- 1.1 Classic Sudoku .....25 points
- 1.2 Classic Sudoku .....20 points
- 1.3 Classic Sudoku .....20 points
- 1.4 Classic Sudoku .....25 points
- 1.5 Classic Sudoku .....35 points
- 1.6 Classic Sudoku .....30 points
- 1.7 Classic Sudoku .....30 points
- 1.8 Classic Sudoku .....30 points
- 1.9 Classic Sudoku .....35 points

## 1.1 – 1.9 Classic Sudoku

Place a digit from 1 to 9 into each of the empty cells, so that each digit appears exactly once in each row, column and outlined 3×3 block.

1	2							
3	4		5		7	9		
			6				5	
	9	8	7				4	
	6				3	2	1	
	8				4			
		4	8		5		6	7
							8	9

1	2	5	3	4	9	8	7	6
3	4	6	5	8	7	9	2	1
8	7	9	6	1	2	3	5	4
2	9	8	7	5	1	6	4	3
4	1	3	2	6	8	7	9	5
5	6	7	4	9	3	2	1	8
6	8	1	9	7	4	5	3	2
9	3	4	8	2	5	1	6	7
7	5	2	1	3	6	4	8	9

# Round 2 Individual: World Cup 1

## 45 minutes – 450 points

2.1 Classic Sudoku .....	20 points
2.2 Classic Sudoku .....	30 points
2.3 0-9 Kropki Sudoku .....	70 points
2.4 Anti Clone Sudoku .....	65 points
2.5 Consecutive Sudoku .....	30 points
2.6 Extra Regions Sudoku .....	40 points
2.7 Neighbours Sudoku .....	45 points
2.8 Odd/Even Stars Sudoku .....	60 points
2.9 Scattered Sudoku .....	50 points
2.10 Windoku .....	40 points

### 2.1 + 2.2 Classic Sudoku

20 + 30 points

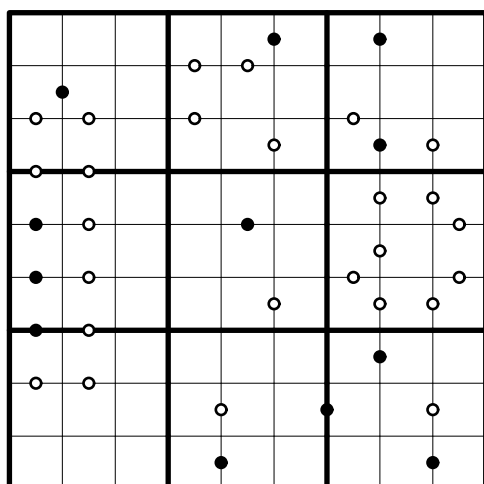
Apply Classic Sudoku rules.

### 2.3 0-9 Kropki Sudoku

70 points

Place a digit from 0 to 9 into each of the empty cells, so that no digit repeats in any row, column or outlined 3×3 box.

A white circle between two cells indicates that the neighbouring digits are consecutive. A black circle between two cells indicates that one of the digits is twice as big as the other digit. The absence of a circle indicates that there is no neighbouring digit that is either consecutive or double.



9	1	5	0	6	3	8	4	7
6	3	8	1	7	5	2	0	9
7	4	0	2	9	8	3	6	5
8	5	3	7	4	6	0	1	2
4	6	1	5	2	9	7	8	3
2	7	9	3	0	1	6	5	4
1	8	6	9	3	7	4	2	0
0	9	4	6	5	2	1	7	8
5	2	7	4	8	0	9	3	6

## 2.4 Anti Clone Sudoku

65 points

Apply Classic Sudoku rules. Digits may not repeat within a dotted outlined area. Digits may also not repeat within dotted outlined areas with the same shape. Rotated and/or reflected areas count as the same shape.

9			6					
								3
	7			1				5
			2				6	
		3				1		
	4				8			
5				3			9	
1								
					2			7

9	1	5	6	8	3	2	7	4
4	8	6	5	2	7	9	1	3
3	7	2	4	1	9	6	8	5
7	5	9	2	4	1	3	6	8
8	6	3	9	7	5	1	4	2
2	4	1	3	6	8	7	5	9
5	2	4	7	3	6	8	9	1
1	3	7	8	9	4	5	2	6
6	9	8	1	5	2	4	3	7

## 2.5 Consecutive Sudoku

30 points

Apply Classic Sudoku rules. In all cases where two neighbouring digits are consecutive, this is indicated with a grey bar.

3								
			3					
		3						
					3			
						3		
								3

9	5	2	4	6	8	1	3	7
3	6	7	1	5	2	4	9	8
8	4	1	3	9	7	5	6	2
5	9	3	7	1	4	2	8	6
6	2	8	5	3	9	7	1	4
1	7	4	2	8	6	3	5	9
4	1	9	8	7	3	6	2	5
2	8	5	6	4	1	9	7	3
7	3	6	9	2	5	8	4	1

## 2.6 Extra Regions Sudoku

40 points

Apply Classic Sudoku rules. Within each coloured region each digit must appear exactly once.

	1	2		7		5	6	
	3	4				7	8	
1				9				2
	5	3				6	1	
	6	7		2		4	9	

7	8	6	1	3	5	9	2	4
9	1	2	4	7	8	5	6	3
5	3	4	9	6	2	7	8	1
3	2	9	8	5	4	1	7	6
1	4	8	6	9	7	3	5	2
6	7	5	2	1	3	8	4	9
2	5	3	7	4	9	6	1	8
8	6	7	3	2	1	4	9	5
4	9	1	5	8	6	2	3	7

## 2.7 Neighbours Sudoku

45 points

Apply Classic Sudoku rules. Digits outside the grid have to be placed in the given order as direct neighbours in the corresponding row or column.

		3		6		8		3	
		1		4		3		1	
4	7	3							9
		7						8	
1	6			4				2	
					1				
3	4				8		6		
					5				
9	5			2				3	
		6							5
8	2	5							1

		3		6		8		3		
		1		4		3		1		
4	7	3	2	8	5	4	7	1	6	9
		1	7	6	3	2	9	4	8	5
1	6	9	5	4	1	6	8	2	7	3
		4	8	5	9	1	3	7	2	6
3	4	2	9	1	8	7	6	5	3	4
		6	3	7	2	5	4	9	1	8
9	5	8	1	2	6	9	5	3	4	7
		7	6	9	4	3	1	8	5	2
8	2	5	4	3	7	8	2	6	9	1

## 2.8 Odd/Even Stars Sudoku

60 points

Apply Classic Sudoku rules. If a cell with a star contains an odd digit, all horizontally and vertically adjacent cells contain an even digit. If a cell with a star contains an even digit, all horizontally and vertically adjacent cells contain an odd digit. Cells that are not marked with a star don't have this property.

★	★	★	★	★	★	★	★		
★									3
		4						5	8
	2		3	8		9			
★				5				★	
	1		6	7		4			
6	3					2			
9								★	
	★	★	★	★	★	★	★	★	★

5	8	3	4	7	6	1	2	9	
2	9	6	1	8	5	4	7	3	
1	7	4	9	2	3	6	5	8	
4	2	7	3	1	8	5	9	6	
3	6	9	2	5	4	7	8	1	
8	1	5	6	9	7	3	4	2	
6	3	8	5	4	9	2	1	7	
9	5	2	7	6	1	8	3	4	
7	4	1	8	3	2	9	6	5	



## 2.9 Scattered Sudoku

50 points

Place a digit from 1 to 9 into each of the empty cells, so that each digit appears exactly once in each row, column and outlined region and in the nine grey cells.

		1	2	3	4	5		
	4							1
	3							2
	5							3
	7							6
	9							7
		5	6	7	8	9		

5	8	7	3	1	2	6	9	4
9	6	1	2	3	4	5	8	7
2	4	9	8	6	5	7	1	3
8	3	6	4	5	7	1	2	9
7	5	2	1	4	9	8	3	6
1	7	4	9	8	3	2	6	5
6	9	3	5	2	1	4	7	8
3	2	5	6	7	8	9	4	1
4	1	8	7	9	6	3	5	2

## 2.10 Windoku

40 points

Apply Classic Sudoku rules. Within each coloured region, each digit must appear exactly once.

			2			6	1	
		9	4			3		
	8	1				7	4	
	4	6				8		
	2	7				4		
	3				6	5		
					5			

4	1	3	6	5	7	2	8	9
8	7	5	2	3	9	6	1	4
2	6	9	4	1	8	3	5	7
9	8	1	3	6	2	7	4	5
3	5	2	8	7	4	9	6	1
7	4	6	5	9	1	8	2	3
5	2	7	1	8	3	4	9	6
1	3	8	9	4	6	5	7	2
6	9	4	7	2	5	1	3	8

# Round 3 Individual: Pieces of Cake and Tough Cookies

40 minutes – 500 points

3.1 Classic Sudoku .....	15 points
3.2 Classic Sudoku .....	30 points
3.3 Even Sudoku .....	15 points
3.4 Even Sudoku .....	40 points
3.5 Thermo Sudoku .....	30 points
3.6 Thermo Sudoku .....	75 points
3.7 Distance Sudoku .....	40 points
3.8 Distance Sudoku .....	80 points
3.9 Biggest Neighbours Sudoku .....	65 points
3.10 Biggest Neighbours Sudoku .....	110 points

## 3.1 + 3.2 Classic Sudoku

15 + 30 points

Apply Classic Sudoku rules.

## 3.3 + 3.4 Even Sudoku

15 + 40 points

Apply Classic Sudoku rules. Grey cells contain even digits.

1					9	5		7
	2							
		3				1		4
			4					3
				5				
8					6			
6		8				7		
							8	
4		2	5					9

1	4	6	8	3	9	5	2	7
5	2	7	6	1	4	3	9	8
9	8	3	7	2	5	1	6	4
7	6	1	4	9	8	2	5	3
2	9	4	3	5	1	8	7	6
8	3	5	2	7	6	9	4	1
6	5	8	9	4	3	7	1	2
3	7	9	1	6	2	4	8	5
4	1	2	5	8	7	6	3	9

### 3.5 + 3.6 Thermo Sudoku

30 + 75 points

Apply Classic Sudoku rules. The digits in each thermometer are, from the bulb to the/end, all different and placed in increasing order.

			1	5	
		2			
6		7			
7					
	8	5		1	9
					2
		6			5
		1			
	7	4			

9	2	8	6	3	1	5	4	7
5	7	3	8	2	4	9	6	1
6	1	4	5	7	9	3	2	8
7	9	1	3	8	2	4	5	6
2	8	5	7	4	6	1	9	3
4	3	6	1	9	5	8	7	2
1	4	2	9	6	8	7	3	5
3	5	9	2	1	7	6	8	4
8	6	7	4	5	3	2	1	9

### 3.7 + 3.8 Distance Sudoku

40 + 80 points

Apply Classic Sudoku rules. Clues outside the grid indicate the distance (in steps) between the digits in the corresponding row or column. Digits are placed in order of appearance.

6-3:8								
8-4:7								
9-6:6								
8-4:1								
1-3:3								
4-3:2								
8-5:4								
2-8:5								
5-7:6								
1-9:8								
1-6:4								
3-5:3								
1-8:1								
3-7:2								
1-3:5								
2-5:7								

6-3:8	6	8	5	2	9	4	3	1	7
8-4:7	1	3	2	5	7	6	4	8	9
9-6:6	4	7	9	1	8	3	5	6	2
8-4:1	7	6	3	8	1	5	9	2	4
1-3:3	5	1	8	4	2	9	6	7	3
4-3:2	2	9	4	3	6	7	8	5	1
8-5:4	8	5	7	9	3	1	2	4	6
2-8:5	9	4	1	6	5	2	7	3	8
5-7:6	3	2	6	7	4	8	1	9	5
1-9:8									
1-6:4									
3-5:3									
1-8:1									
3-7:2									
1-3:5									
2-5:7									

### 3.9 + 3.10 Biggest Neighbours Sudoku

65 + 110 points

Apply Classic Sudoku rules. If there are arrows in a cell, they point to all biggest neighbours in the horizontal or vertical neighbouring cells.

		8		5			
	4			1			
2			6				
		5					6
	3						7
8						3	
				9			5
				7			4
			8			7	

1	7	8	9	2	5	6	3	4
9	4	6	7	1	3	5	8	2
2	5	3	6	8	4	9	1	7
7	1	5	3	9	8	4	2	6
6	3	9	4	5	2	8	7	1
8	2	4	1	6	7	3	5	9
4	8	7	2	3	9	1	6	5
3	9	1	5	7	6	2	4	8
5	6	2	8	4	1	7	9	3

# Round 4 Individual: All 81

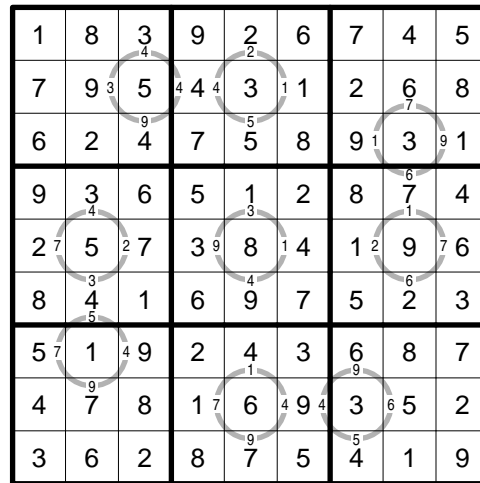
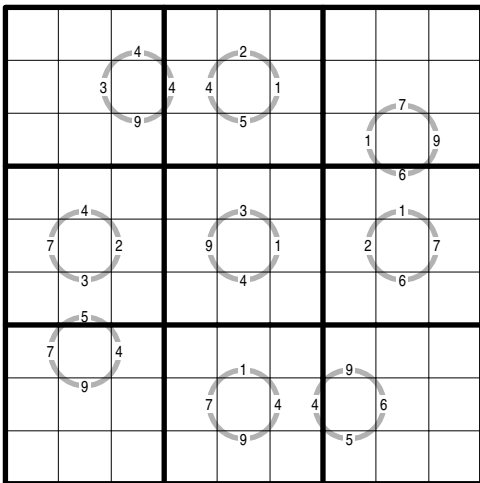
50 minutes – 550 points

- 4.1 Circles Sudoku ..... 30 points
- 4.2 Double Kropki Sudoku ..... 45 points
- 4.3 Greater Than Kropki Sudoku ..... 40 points
- 4.4 Hidden Skyscrapers Sudoku ..... 80 points
- 4.5 Killer Sudoku ..... 70 points
- 4.6 Little Unique Killer Sudoku ..... 85 points
- 4.7 Quadruple Sudoku ..... 25 points
- 4.8 Star Products Sudoku ..... 55 points
- 4.9 Sum by X Sudoku ..... 55 points
- 4.10 Three Is a Crowd Sudoku ..... 65 points

## 4.1 Circles Sudoku

30 points

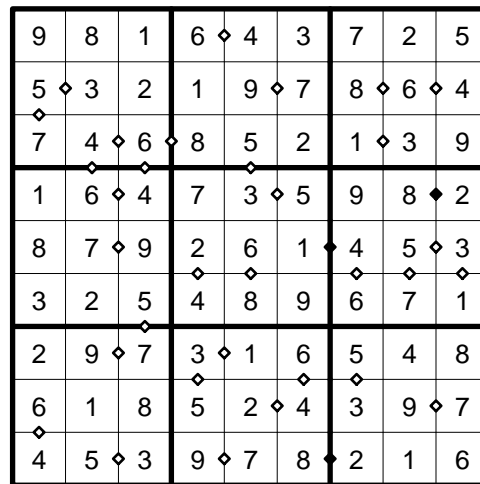
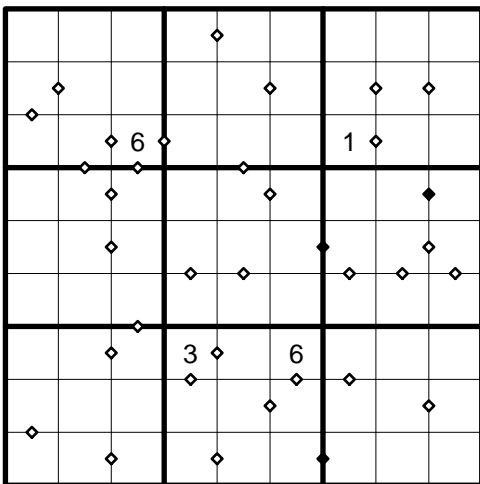
Apply Classic Sudoku rules. The digits on the circles have to be placed in the same order in the four cells that are touched by the circle. The circles may have to be turned in the correct position.



## 4.2 Double Kropki Sudoku

45 points

Apply Classic Sudoku rules. Adjacent cells containing digits with a difference of 2 are marked with a white rhombus. Adjacent cells containing digits with a ratio of 4 are marked with a black rhombus. Adjacent cells without marking must not contain digits with a difference of 2 or a ratio of 4.



### 4.3 Greater Than Kropki Sudoku

40 points

Apply Classic Sudoku rules. In all cases where two digits have a consecutive value or one digit is two times as big as the other digit (or both), a greater than sign is placed. Digits have to be placed in accordance with the sign.

			>	<	<			
	v			<	<	<		
v	v			<	<			
>			<	<				
^								
	>							
	v	^					v	
				^				
	v	<						^
	v							^

2	7	5	>	4	<	8	<	9	6	1	3	
8	6	9		1	<	2	<	3	<	4	7	5
4	>	3	1	5	<	6	<	7	9	2	8	
6	4	>	3	7	9	2			5	8	1	
1	9	2	8	3	5	7	4	6				
7	5	8	6	4	1	3	9	2				
3	8	6	2	7	4	1	5	9				
5	2	<	4	9	1	6	8	3	7			
9	1	7	3	5	8	2	6	4				

### 4.4 Hidden Skyscrapers Sudoku

80 points

Apply Classic Sudoku rules. Each digit represents a skyscraper of the given height. A cell contains one or more arrows if and only if the digit in that cell correctly indicates the number of skyscrapers visible in the direction of the arrow(s). Higher skyscrapers block the view of lower skyscrapers. All possible arrows are given.

							→				←
				↑	→						
				↑	←	→					←
↑				↑	↓	↓					↓
				↑	→	↓					←
	↑			↑	→	←	→				↓
				→	←	←	→				↓
	→			↑	←	↑	→				↑
				→	←	←	→				↑
→							←	→			

2	9	5	4	6	7	8	1	3						
6	4	3	8	↑	1	9	7	2	5					
↑	1	8	7	→	5	↑	2	↓	3	↓	4	6	↓	9
4	5	↑	1	↓	9	7	↑	2	↓	6	3	8		
8	↑	3	9	↑	1	5	6	→	2	4	↓	7		
7	6	2	3	←	4	8	9	5	1	↓				
9	→	1	8	↑	2	↑	3	4	5	7	6			
5	2	6	7	9	1	↓	3	8	↑	4				
→	3	7	4	6	8	5	1	9	2					

### 4.5 Killer Sudoku

70 points

Apply Classic Sudoku rules. The digits placed in each marked cage must sum to the total given in its top-left. Digits must not repeat in cages.

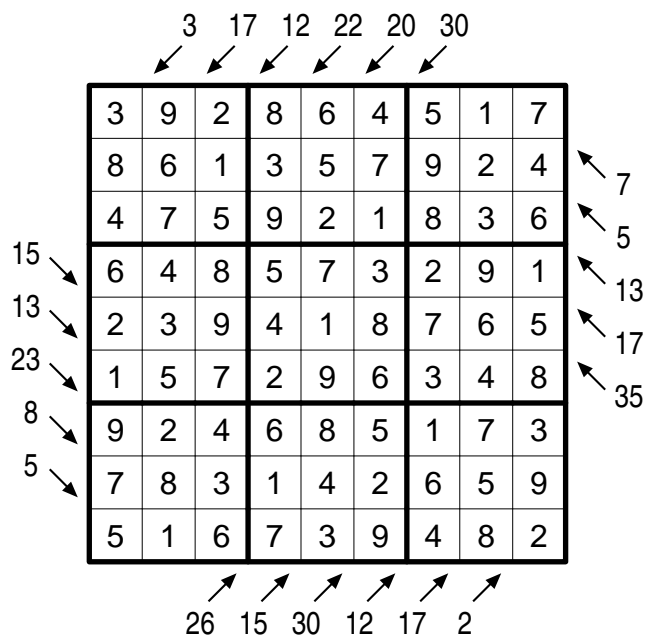
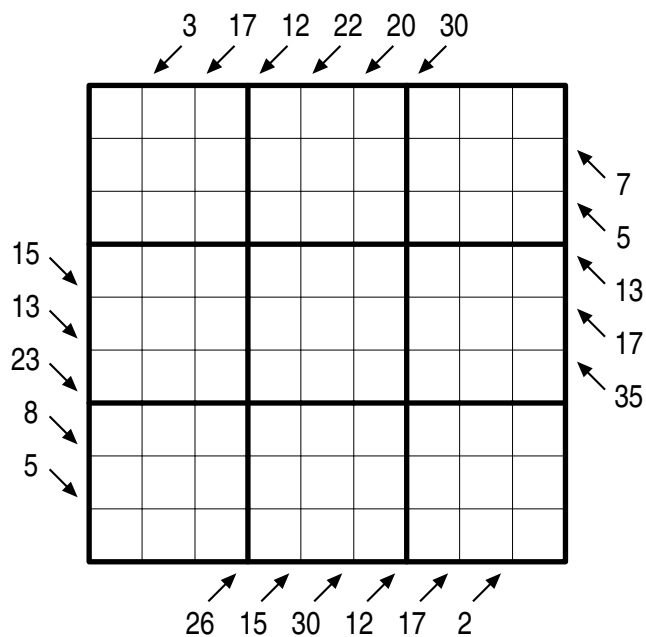
<sup>16</sup>				<sup>12</sup>					<sup>17</sup>		
		<sup>29</sup>									
<sup>23</sup>						<sup>27</sup>					
								2			
			4	2				<sup>10</sup>			
	2	<sup>12</sup>									
				<sup>10</sup>							
<sup>9</sup>											
		<sup>7</sup>					<sup>14</sup>				

<sup>16</sup>	7	9	4	3	<sup>12</sup>	5	6	1	2	<sup>17</sup>	8
	1	3	<sup>29</sup>	5	7	2	8	6	4		9
<sup>23</sup>	6	2	8	9	1	4	<sup>27</sup>	5	7		3
	8	4	7	1	3	5		9	6		2
	9	5	6	4	8	2		7	3	<sup>10</sup>	1
	2	<sup>12</sup>	1	3	6	9	7	8	5		4
	3	6	2	8	7	<sup>10</sup>	1	4	9		5
<sup>9</sup>	4	8	9	5	6	3	2	1	7		
	5	7	<sup>7</sup>	1	2	4	9	3	<sup>14</sup>	8	6

### 4.6 Little Unique Killer Sudoku

85 points

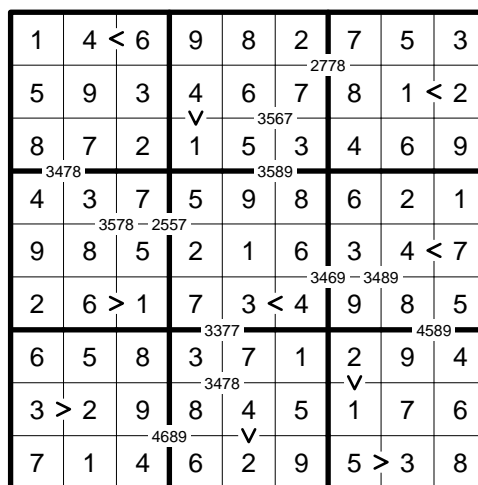
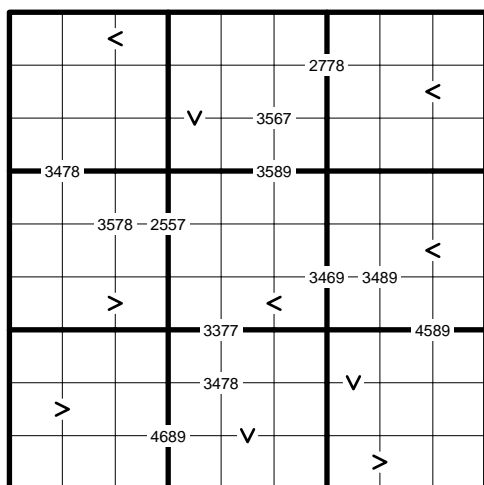
Apply Classic Sudoku rules. Clues outside the grid indicate the sums of digits in the direction of the corresponding arrow. Digits may not repeat within a sum.



### 4.7 Quadruple Sudoku

25 points

Apply Classic Sudoku rules. Each set of four digits in the intersection of two lines indicates the digits that have to be placed in the four adjacent cells. Greater than signs indicate which digit is the greatest/smallest of the two.



### 4.8 Star Products Sudoku

55 points

Apply Classic Sudoku rules. Clues outside the grid indicate the product of digits in all cells marked with stars in the corresponding row or column.

	16	24	60	168	63	54	240	30	20
18	*				*				
28		*	*	*					
240		*		*			*		
60		*	*	*					
32	*				*				*
90					*	*	*		
54			*		*		*		
48					*	*	*		
35				*					*

	16	24	60	168	63	54	240	30	20
18	*2	7	6	5	*9	4	1	8	3
28	5	*1	*4	*7	3	8	9	6	2
240	3	*8	9	*6	2	1	*5	4	7
60	9	*3	*5	*4	6	7	2	1	8
32	*8	6	2	9	*1	5	3	7	*4
90	7	4	1	2	8	*3	*6	*5	9
54	6	5	*3	8	4	*9	7	*2	1
48	4	9	7	1	5	*2	*8	*3	6
35	1	2	8	3	*7	6	4	9	*5

### 4.9 Sum by X Sudoku

55 points

Apply Classic Sudoku rules. Clues outside the grid indicate the sum of the first X digits in the corresponding direction, where X is equal to the digit in the first grey cell from that side.

	6	22	20	41	45	9	7	40	20
8	■								■
27		■						■	
11			■	6		4		■	
40			2	■		■	9		
45					■				
40			5	■		■	3		
30			■	2		7		■	
7		■							■
19	■								■
	16	11	25	41	45	30	27	6	30

	6	22	20	41	45	9	7	40	20	
8	■	2	6	8	3	7	9	1	5	■
27		4	■	9	1	8	2	6	7	■
11		1	7	■	3	6	5	4	2	■
40		7	3	2	■	8	4	1	9	■
45		6	1	4	5	■	9	3	7	■
40		9	8	5	7	2	■	6	3	■
30		8	4	■	6	2	3	7	5	■
7		5	■	2	1	9	6	8	4	■
19	■	3	9	7	4	1	5	8	2	■
	16	11	25	41	45	30	27	6	30	

### 4.10 Three Is a Crowd Sudoku

65 points

Apply Classic Sudoku rules. Clues outside the grid show the three digits that have to be placed in the first three cells from that side. However, exactly one digit of each triplet is wrong. On each side of the grid (top, bottom, left, right) all of the wrong clues are different.

2	1	1	3	1	4	4	1	2
6	2	4	5	4	5	7	7	8
8	6	7	8	9	6	9	8	9

1	4	7								1	2	7	
3	4	8									1	6	7
2	7	9									5	8	9
2	5	7									2	3	6
2	3	6									1	7	9
1	3	6									2	6	9
1	2	5									3	4	9
1	3	8									1	2	4
4	6	8									5	7	8

1	1	5	1	2	4	3	2	1
2	3	8	4	3	5	7	4	5
6	7	9	9	7	9	9	8	6

2	1	1	3	1	4	4	1	2
6	2	4	5	4	5	7	7	8
8	6	7	8	9	6	9	8	9

1	4	7	9	1	4	5	3	6	7	8	2	1	2	7	
3	4	8	8	5	3	7	9	2	4	1	6		1	6	7
2	7	9	2	6	7	8	1	4	5	3	9		5	8	9
2	5	7	7	9	5	2	4	1	8	6	3		2	3	6
2	3	6	4	2	6	9	8	3	1	5	7		1	7	9
1	3	6	3	8	1	6	5	7	2	9	4		2	6	9
1	2	5	1	7	2	3	6	8	9	4	5		3	4	9
1	3	8	5	3	8	4	7	9	6	2	1		1	2	4
4	6	8	6	4	9	1	2	5	3	7	8		5	7	8

1	1	5	1	2	4	3	2	1
2	3	8	4	3	5	7	4	5
6	7	9	9	7	9	9	8	6



# Round 5 Individual: Arrows, Lines and Circles

60 minutes – 600 points

5.1 Alternating Stripes Sudoku .....	35 points
5.2 Arrow Sudoku .....	35 points
5.3 Between Sudoku .....	80 points
5.4 Cloned Strands Sudoku .....	25 points
5.5 Counting Neighbours Sudoku .....	60 points
5.6 Diagonal Sudoku .....	40 points
5.7 German Whispers Sudoku .....	60 points
5.8 Missing Arrow Sudoku .....	50 points
5.9 Mathrax Sudoku .....	60 points
5.10 Odd-Even Bridge Sudoku .....	50 points
5.11 Palindrome Sudoku .....	35 points
5.12 Schaltplan Sudoku .....	35 points
5.13 Search Nine Sudoku .....	35 points

## 5.1 Alternating Stripes Sudoku

35 points

Apply Classic Sudoku rules. “Large” and “small” digits alternate along the grey stripes. A “large” digit is larger than its neighbours on the stripe while a “small” digit is smaller. Digits may repeat on stripes.

		6	9	3				8
9	5						6	2
				6				
		4		1				6
7			4		9			
5				8		2		
			6					
1	7						2	3
6			2		1	9		

2	1	6	9	5	3	4	7	8
9	5	7	1	4	8	3	6	2
3	4	8	7	2	6	5	9	1
8	9	4	5	1	2	7	3	6
7	3	2	4	6	9	1	8	5
5	6	1	3	8	7	2	4	9
4	2	9	6	3	5	8	1	7
1	7	5	8	9	4	6	2	3
6	8	3	2	7	1	9	5	4

## 5.2 Arrow Sudoku

35 points

Apply Classic Sudoku rules. Digits placed in a cell with a circle must be the sum of the digits placed in cells the adjoining arrow passes through. Digits may repeat on arrows.

			↗	9	2			
	1			○	8		6	
		2				9		
○			3					2
	↖			4		↘		
3				5				○
	7				6	↗		
1		8		○			7	
	9		7		↘			

5	8	7	↗	6	9	4	2	3	
9	1	3	4	○	2	8	5	6	
6	4	2	5	8	3	7	9	1	
○	8	5	4	3	9	7	1	6	2
7	↖	2	9	6	4	1	5	3	8
3	6	1	8	2	5	9	4	○	7
4	7	5	2	3	8	6	1	9	
1	3	8	9	○	5	6	2	7	4
2	9	6	7	1	↘	4	3	8	5

## 5.3 Between Sudoku

80 points

Apply Classic Sudoku rules. Digits on each line must have a value between the digits that are placed in the circles at both ends of the line.

6		7		9	○	○		
	2		4	○				
5		4	○			6		○
	5	○		4				○
1	○			5			○	4
○			9			○	7	
○		1			○	4		2
				○	2		8	
		○	○	1	9		7	

6	1	7	2	9	○	8	3	4	5	
3	2	9	4	○	6	5	7	1	8	
5	8	4	○	1	3	7	6	2	○	9
9	5	○	3	7	2	4	8	6	○	1
1	○	7	8	6	5	3	2	○	9	4
○	2	4	6	9	8	1	○	5	7	3
○	8	6	1	5	7	○	9	4	3	2
7	9	5	3	○	4	2	1	8	6	
4	3	○	2	○	8	1	6	9	5	7

## 5.4 Cloned Strands Sudoku

25 points

Apply Classic Sudoku rules. Each strand must have exactly the same sequence of digits. Digits may repeat on strands.

		7	3	9				
	4			8				
8								7
		1						
4	8	2	6	1	7	9	5	3

5	6	7	3	9	2	4	8	1
2	4	3	1	7	8	5	6	9
8	1	9	5	6	4	3	2	7
7	3	4	9	2	5	8	1	6
6	2	8	4	3	1	7	9	5
9	5	1	7	8	6	2	3	4
3	7	6	2	5	9	1	4	8
1	9	5	8	4	3	6	7	2
4	8	2	6	1	7	9	5	3

### 5.5 Counting Neighbours Sudoku

60 points

Apply Classic Sudoku rules. A digit in a cell with a circle indicates the number of different digits in all horizontal, vertical or diagonal neighbouring cells. A digit in a cell with a cross indicates the number of different digits in all diagonal neighbouring cells. All possible circles and crosses are given.

	X	8						
		X	2				○	
	○		X			7	○	X
	X	1	○				○	
○	○	○		3			X	
X	○				○	1		
		7			X			○
			○		2	X		
X		X		○		6		

7	X	8	3	6	5	9	1	4	
6	1	X	4	2	9	7	5	○8	3
3	○5	9	X	4	8	1	7	○6	X
9	X	4	1	○7	2	8	3	○5	6
○5	○8	○6	1	3	9	2	X	4	7
X	○7	3	5	4	○6	1	9	8	
4	6	7	9	1	X	3	8	2	○5
8	9	5	○6	7	2	X	4	3	1
X	3	X	2	8	○5	4	6	7	9

### 5.6 Diagonal Sudoku

40 points

Apply Classic Sudoku rules. On both marked diagonals, each digit must appear exactly once.

			2	4	9			
			8	3	1			
	9	1				8	6	
	8	6				5	3	
	7	5				4	9	
			9	8	2			
			1	7	6			

1	3	2	5	6	7	9	4	8
8	5	7	2	4	9	6	1	3
9	6	4	8	3	1	2	7	5
4	9	1	3	2	5	8	6	7
2	8	6	7	9	4	5	3	1
3	7	5	6	1	8	4	9	2
6	1	3	9	8	2	7	5	4
5	4	8	1	7	6	3	2	9
7	2	9	4	5	3	1	8	6

### 5.7 German Whispers Sudoku

60 points

Apply Classic Sudoku rules. Adjacent digits along the marked line have a difference of at least 5.

	7			9				
3				1				2
			8					7
		1				3		
	9				6			
4			2					1
		7					8	
		7				4		
	8			4				

8	7	2	4	5	9	1	3	6
3	4	9	6	1	7	8	5	2
5	1	6	8	3	2	9	7	4
6	2	1	5	7	8	3	4	9
7	9	3	1	4	6	5	2	8
4	5	8	9	2	3	7	6	1
2	3	4	7	9	1	6	8	5
9	6	7	2	8	5	4	1	3
1	8	5	3	6	4	2	9	7

### 5.8 Missing Arrow Sudoku

50 points

Apply Classic Sudoku rules. The grey lines represent incomplete arrows. The digit on one end of each line is the sum of the other digits on the same line.

	4							8
2		5					6	
	7		1					2
		8		9				
			8		7			
				6		2		
	9				8		5	
		3				4		9
7								3

1	4	6	2	7	5	3	9	8
2	8	5	9	4	3	6	1	7
3	7	9	1	8	6	5	2	4
4	6	8	5	9	2	1	7	3
5	3	2	8	1	7	9	4	6
9	1	7	3	6	4	2	8	5
6	9	1	4	3	8	7	5	2
8	2	3	7	5	1	4	6	9
7	5	4	6	2	9	8	3	1

### 5.9 Mathrax Sudoku

60 points

Apply Classic Sudoku rules. Some intersections of the grid lines are marked by a number and an operator (+, -, ×, /) in a circle. The number is the result of the operation, applied to both pairs of diagonally opposite cells. An "E" in the circle indicates that all four adjacent digits are even; an "O" indicates that all four adjacent digits are odd.


8	6	2	7	5	1	9	3	4
4	3	7	9	2	6	5	8	1
5	1	9	3	8	4	6	7	2
9	7	3	1	4	8	2	5	6
2	4	5	6	9	3	7	1	8
6	8	1	2	7	5	4	9	3
7	9	4	8	3	2	1	6	5
1	5	8	4	6	7	3	2	9
3	2	6	5	1	9	8	4	7

### 5.10 Odd-Even Bridge Sudoku

50 points

Apply Classic Sudoku rules. There are some pairs of circles connected by bridges. **Each connected pair of circles contains one even digit and one odd digit.** The even digit denotes the number of even digits along the bridge and the odd digit denotes the number of odd digits along the bridge. The digits in the circles are not counted. Digits can repeat on the bridges.


8	9	3	2	5	6	1	7	4
6	5	1	3	4	7	9	8	2
4	7	2	8	9	1	3	6	5
7	3	9	4	1	8	5	2	6
2	8	6	9	7	5	4	1	3
5	1	4	6	2	3	7	9	8
1	4	8	7	3	2	6	5	9
9	6	5	1	8	4	2	3	7
3	2	7	5	6	9	8	4	1

### 5.11 Palindrome Sudoku

35 points

Apply Classic Sudoku rules. The digits on the grey lines form a palindromic sequence from one end to the other.

			1					4
		3		2			6	
	5				3			
6						4		
	2						5	
		8						6
			4				7	
	9			3		8		
1					9			

7	6	9	1	8	5	3	2	4
8	1	3	9	2	4	5	6	7
2	5	4	6	7	3	9	8	1
6	7	5	8	9	1	4	3	2
9	2	1	3	4	6	7	5	8
3	4	8	7	5	2	1	9	6
5	3	2	4	1	8	6	7	9
4	9	6	2	3	7	8	1	5
1	8	7	5	6	9	2	4	3

### 5.12 Schaltplan Sudoku

35 points

Apply Classic Sudoku rules. If two grey dots are connected by a line, the digits placed in the cells with the dots are consecutive. All possible dots and lines are given.

1	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	1
•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•

1	4	7	6	9	8	2	3	5
3	8	5	4	7	2	9	6	1
9	2	6	3	5	1	7	8	4
8	9	1	7	3	6	4	5	2
5	6	3	2	1	4	8	9	7
4	7	2	9	8	5	3	1	6
6	3	8	1	2	7	5	4	9
2	5	4	8	6	9	1	7	3
7	1	9	5	4	3	6	2	8

### 5.13 Search Nine Sudoku

35 points

Apply Classic Sudoku rules. Each arrow is pointing in the direction of the digit 9 in the respective row or column, where the digit in the cell with the arrow indicates the distance (with respect to the number of cells) from the arrow to the 9.

2				↓				
	6		→		→			
			↑		7	↓		
		→			5			←
	→			8		↓		
↓			6			↑		
	↑	1			→			
		→		→			7	
			↑					6

2	3	4	9	5	7	6	8	1
5	6	7	1	4	8	2	3	9
1	9	8	2	3	6	7	4	5
8	1	2	7	9	5	3	6	4
4	5	6	3	8	1	9	2	7
3	7	9	6	2	4	1	5	8
7	4	1	5	6	2	8	9	3
6	8	3	4	1	9	5	7	2
9	2	5	8	7	3	4	1	6

# Round 6 Individual: Double Dutch

## 50 minutes – 500 points

- 6.1 Greater Than Consecutive & Max Ascending Sudoku ..... 45 points
- 6.2 Max Ascending & Round Off Sudoku ..... 60 points
- 6.3 Round Off & Full Rank Sudoku ..... 45 points
- 6.4 Full Rank & XVI Sudoku ..... 50 points
- 6.5 XVI & Descriptive Pairs Sudoku ..... 50 points
- 6.6 Descriptive Pairs & Mathrax Sudoku ..... 60 points
- 6.7 Mathrax & Pointing Evens Sudoku ..... 60 points
- 6.8 Pointing Evens & Point to Next Sudoku ..... 45 points
- 6.9 Point to Next & Next to Nine Sudoku ..... 50 points
- 6.10 Next to Nine & Greater Than Consecutive Sudoku ..... 35 points

In this round, each puzzle is a combination of two Sudoku variants. The following variants appear:

### Greater Than Consecutive Sudoku

Apply Classic Sudoku rules. In all cases where the difference between two neighbouring digits is 1, there is a greater than sign between those digits. Digits must be placed in accordance with the signs.

		∨						∧
	<						>	
		∨						∧
<			<			>		
						∧		
<		∧				∧		∨
	<		<			>		∧
∧	∧	∨						∧
<								>

9	2	6	4	1	8	3	7	5			
		∨					∧				
7	4	<	5	2	6	3	9	>	8	1	
3	1	8	5	9	7	2	4	6			
		∨					∧				
8	<	9	7	3	<	4	1	6	>	5	2
6	3	1	8	2	5	7	9	4			
		∧				∧		∨			
4	<	5	2	6	<	7	9	>	8	1	3
		∧				∧		∧			
1	7	4	9	3	6	>	5	2	8		
	∧	∧	∨						∧		
2	8	3	7	5	>	4	1	6	9		
		∧							∧		
5	<	6	9	1	8	2	4	>	3	7	

### Max Ascending Sudoku

Apply Classic Sudoku rules. Clues outside the grid indicate the length of the longest series of ascending digits in the corresponding direction.

	3	3	4	2	5	4	4	5	3		
4	3								9	2	
6		7							8	3	
2			4					2		5	
3					1					3	
3				8		6				3	
3					5					3	
5			2					3		2	
2		6							5	5	
2	5									1	5
	2	5	3	4	2	2	3	2	6		

	3	3	4	2	5	4	4	5	3	
4	3	2	5	6	8	1	4	7	9	2
6	9	7	1	2	4	5	6	8	3	3
2	6	8	4	9	7	3	2	1	5	5
3	7	5	6	3	1	4	9	2	8	3
3	1	4	9	8	2	6	5	3	7	3
3	2	3	8	7	5	9	1	4	6	3
5	8	1	2	5	6	7	3	9	4	2
2	4	6	3	1	9	8	7	5	2	5
2	5	9	7	4	3	2	8	6	1	5
	2	5	3	4	2	2	3	2	6	

## Round Off Sudoku

Apply Classic Sudoku rules. When considering two digits in each cage as a two-figure number, the number on the top left of each cage must be the result of rounding off the two figure number in the cage to the closest multiple of 10. 1-4 are rounded down, 5-9 are rounded up.

	9	5				2	7	
70							20	
4			1		5			9
6								1
		4				7		
2								6
8			9		3			4
	6	2				1	8	

1	9	5	4	3	6	2	7	8		
70	7	3	6	8	9	2	4	20	1	5
4										
4										
6	7									
5	8	4	3	6	1	7	9	2		
2	1									
8										
9	6	2	7	5	4	1	8	3		

## Full Rank Sudoku

Apply Classic Sudoku rules. From left to right, right to left, top to bottom and bottom to top you can read  $4 \times 9 = 36$  9-digit numbers in the solved Sudoku. A clue gives the position of the 9-digit number starting from there in a list which is created by ordering this 36 numbers starting with the smallest.

	2	17	13	25	6	36	29	24	9	
3										11
8										20
12										26
16										5
21										14
18										23
33										30
31										4
27										35
	28	7	10	15	32	1	22	19	34	

	2	17	13	25	6	36	29	24	9	
3	1	5	4	7	2	9	8	6	3	11
8	2	6	7	1	3	8	4	9	5	20
12	3	8	9	5	4	6	1	2	7	26
16	4	9	8	3	6	7	5	1	2	5
21	6	3	1	2	9	5	7	8	4	14
18	5	7	2	8	1	4	9	3	6	23
33	9	1	5	6	7	3	2	4	8	30
31	8	4	6	9	5	2	3	7	1	4
27	7	2	3	4	8	1	6	5	9	35
	28	7	10	15	32	1	22	19	34	





## Mathrax Sudoku

Apply Classic Sudoku rules. Some intersections of the grid lines are marked by a number and an operator (+, −, ×, /) in a circle. The number is the result of the operation, applied to both pairs of diagonally opposite cells. An “E” in the circle indicates that all four adjacent digits are even; an “O” indicates that all four adjacent digits are odd.


8	6	2	7	5	1	9	3	4
4	3	7	9	2	6	5	8	1
5	1	9	3	8	4	6	7	2
9	7	3	1	4	8	2	5	6
2	4	5	6	9	3	7	1	8
6	8	1	2	7	5	4	9	3
7	9	4	8	3	2	1	6	5
1	5	8	4	6	7	3	2	9
3	2	6	5	1	9	8	4	7

## Pointing Evens Sudoku

Apply Classic Sudoku rules. Clues outside the grid indicate the number of even digits in the direction of the diagonal arrow.


5	9	1	8	6	2	4	7	3
3	6	7	5	9	4	2	1	8
8	2	4	1	7	3	6	5	9
1	3	2	9	8	5	7	4	6
6	4	5	3	1	7	9	8	2
9	7	8	4	2	6	5	3	1
7	5	9	6	3	1	8	2	4
2	8	3	7	4	9	1	6	5
4	1	6	2	5	8	3	9	7

## Point to Next Sudoku

Apply Classic Sudoku rules. If a digit N is placed in a cell containing an arrow, then the digit N+1 must be placed in a cell pointed at by the arrow.

	↑		→	↑		←	↑	
		1	2	3	6	9	←	
	↓	8				3	↓	
	←	5				2	→	
	↑	6				5	↓	
	↓	2	4	7	1	8		
	→	←		↓	↓		→	

6	8	3	1	9	7	4	2	5
2	7	9	5	8	4	6	1	3
5	4	1	2	3	6	9	8	7
9	2	8	7	4	5	3	6	1
4	3	5	6	1	9	2	7	8
7	1	6	3	2	8	5	4	9
3	5	2	4	7	1	8	9	6
8	6	7	9	5	2	1	3	4
1	9	4	8	6	3	7	5	2

## Next to Nine Sudoku

Apply Classic Sudoku rules. Clues outside the grid show all the digits that have to be placed as direct neighbours of the digit 9 in the respective row or column. These clues are placed in ascending order.

		4	3	3	1	1	1		2	
		7	6	5	8	4	3	8	4	6
7	8	1								
2	3		2							
1	5			3						
1	5				4					
6	8					5				
	5						6			
1	8							7		
5	7								8	
	5									9

		4	3	3	1	1	1		2	
		7	6	5	8	4	3	8	4	6
7	8	1	4	5	6	2	8	9	7	3
2	3	6	2	9	3	4	7	8	1	5
1	5	8	7	3	5	9	1	2	6	4
1	5	3	8	6	4	1	9	5	2	7
6	8	7	1	4	2	5	3	6	9	8
	5	9	5	2	8	7	6	3	4	1
1	8	4	6	1	9	8	5	7	3	2
5	7	5	9	7	1	3	2	4	8	6
	5	2	3	8	7	6	4	1	5	9

# Round 7 Individual: World Cup 2

45 minutes – 450 points

7.1 Classic Sudoku .....	35 points
7.2 Classic Sudoku .....	30 points
7.3 1-5-9 Sudoku .....	40 points
7.4 Disjoint Groups Sudoku .....	30 points
7.5 Biggest Neighbours Sudoku .....	65 points
7.6 Double Scattered Sudoku .....	80 points
7.7 Nonconsecutive Sudoku .....	45 points
7.8 Equal Sudoku .....	55 points
7.9 Outside Sudoku .....	30 points
7.10 Triangle Sums Sudoku .....	40 points

## 7.1 + 7.2 Classic Sudoku

35 + 30 points

Apply Classic Sudoku rules.

## 7.3 1-5-9 Sudoku

40 points

Apply Classic Sudoku rules. Digits in the first column indicate in which column digit 1 is placed in the respective row; digits in the fifth column indicate in which column digit 5 is placed in the respective row; digits in the ninth column indicate in which column digit 9 is placed in the respective row.

				3		5		
	4	9	7					
				5	1	2		
	2		6					
		7				8		
				8		6		
	6	3	8					
				9	5	3		
	7		2					

2	1	6	4	8	3	9	5	7
5	4	9	7	1	2	6	8	3
7	3	8	9	6	5	1	2	4
8	2	4	6	9	7	3	1	5
6	5	7	3	2	1	8	4	9
3	9	1	5	4	8	7	6	2
9	6	3	8	5	4	2	7	1
4	8	2	1	7	9	5	3	6
1	7	5	2	3	6	4	9	8

### 7.4 Disjoint Groups Sudoku

30 points

Apply Classic Sudoku rules. No digit can appear in the same position in different 3×3 blocks.

	7	6	4		3	8	9	
	9		2		7		1	
	6	3	1		2	5	4	
	8	2	5		6	9	3	
	1		6		5		2	
	2	7	9		4	6	8	

2	3	4	8	9	1	7	5	6
1	7	6	4	5	3	8	9	2
8	9	5	2	6	7	4	1	3
9	6	3	1	8	2	5	4	7
5	4	1	7	3	9	2	6	8
7	8	2	5	4	6	9	3	1
4	1	8	6	7	5	3	2	9
3	2	7	9	1	4	6	8	5
6	5	9	3	2	8	1	7	4

### 7.5 Biggest Neighbours Sudoku

65 points

Apply Classic Sudoku rules. If there are arrows in a cell, they point to all biggest neighbours in the horizontal or vertical neighbouring cells.

		8	♦		5			♦
	4			1			♦	♦
2			6			♦	♦	
	♦	5		♦	♦		♦	6
	3		♦		♦			7
8		♦		♦			3	♦
		♦	♦		9			5
	♦	♦			7			4
	♦							

1	7	8	♦9	2	5	6	3	♦4
9	4	6	7	1	3	5	♦8	♦2
2	5	3	6	8	4	♦9	♦1	7
7	♦1	5	3	9	♦8	♦4	2	6
6	3	9	♦4	5	2	♦8	7	1
8	2	♦4	1	♦6	7	3	5	♦9
4	8	♦7	♦2	3	9	1	6	5
3	♦9	♦1	5	7	6	2	4	8
5	♦6	2	8	4	1	♦7	9	3

### 7.6 Double Scattered Sudoku

80 points

Place the digits 1-9 in every row, column, bold outlined area and twice in the grey cells.

		7		8		1		
	6							3
5		1		7		4		2
1		4		5		9		6
			8		2			
2								5
	7		9		5		4	

4	2	7	6	8	3	1	5	9
7	6	9	5	1	4	2	3	8
3	5	8	1	6	9	7	2	4
5	8	1	3	7	6	4	9	2
6	9	2	4	3	8	5	1	7
1	3	4	2	5	7	9	8	6
9	1	5	8	4	2	6	7	3
2	4	3	7	9	1	8	6	5
8	7	6	9	2	5	3	4	1

### 7.7 Nonconsecutive Sudoku

45 points

Apply Classic Sudoku rules. Two horizontal or vertical neighbouring digits cannot be consecutive.

	2		3		8		1	
8				1				4
7								3
	8						2	
6								1
9				5				7
	5		4		7		6	

4	2	7	3	6	8	5	1	9
8	6	3	9	1	5	2	7	4
5	9	1	7	4	2	6	3	8
7	1	9	5	2	6	4	8	3
3	8	5	1	7	4	9	2	6
6	4	2	8	3	9	7	5	1
2	7	4	6	8	3	1	9	5
9	3	6	2	5	1	8	4	7
1	5	8	4	9	7	3	6	2

### 7.8 Equal Sudoku

55 points

Apply Classic Sudoku rules. In each dotted cage the sum of the odd digits is equal to the sum of the even digit(s). Digits may not repeat within a cage.

	3							
4								
					6	1	8	
				8				3
3			9					
	6	5	2					
								8
							5	

1	3	8	5	9	4	2	7	6
4	2	6	1	8	7	3	9	5
5	9	7	3	2	6	1	8	4
6	4	2	7	5	8	9	1	3
7	8	9	4	3	1	5	6	2
3	5	1	9	6	2	8	4	7
8	6	5	2	4	9	7	3	1
9	7	3	6	1	5	4	2	8
2	1	4	8	7	3	6	5	9

## 7.9 Outside Sudoku

30 points

Apply Classic Sudoku rules. Digits outside the grid have to be placed in the first three cells from that direction.

										3			6			2												
										1	2	4	5	7	8	9	4	5										
1	5																			2	6							
	7																			1								
6	8																			3	9							
	7																			3								
5	8																			6	7							
	6																			2	9							
4	5																			6	8							
1	6																			2	4							
										2	6	5	9	1	2	5	1	2										
										3		9		5		6		8										

										3			6			2												
										1	2	4	5	7	8	9	4	5										
1	5									1	5	3	4	7	9	2	8	6	2	6								
	7									9	2	7	3	6	8	1	4	5	1									
6	8									6	8	4	5	2	1	9	3	7	3	9								
	7									7	9	2	1	8	6	3	5	4	3									
5	8									5	3	8	2	9	4	7	6	1	6	7								
	6									4	1	6	7	3	5	8	2	9	2	9								
4	5									2	4	5	9	1	3	6	7	8	6	8								
1	6									3	6	1	8	5	7	4	9	2	2	4								
										2	6	5	9	1	2	5	1	2										
										3		9		5		6		8										

## 7.10 Triangle Sums Sudoku

40 points

Apply Classic Sudoku rules. A digit placed on a triangle is the sum of the two digits that are placed in the neighbouring cells on the short sides of the triangle. A square consists of two such triangles. It is part of the puzzle to find out how the two triangles are positioned to form the square. All possible triangles and squares are given.

8		△	3		△		△
		△		■	△		
		△	■		△		
		△		△			
		△		△			8
		△		△		■	
		△		△			
		△		△			4

8	2	7	3	5	1	9	4	6
3	6	5	4	9	7	8	1	2
4	9	1	6	2	8	7	5	3
1	7	8	5	6	4	2	3	9
6	5	3	9	8	2	4	7	1
9	4	2	1	7	3	5	6	8
5	8	4	2	1	6	3	9	7
7	3	6	8	4	9	1	2	5
2	1	9	7	3	5	6	8	4

# Round 8 Team: Clueless

## 45 minutes – 1800 points

8.1 Negative Samurai ..... 5×135 = 675 points

8.2 Clueless Hidden Classic ..... 9×125 = 1125 points

This round contains two puzzles in which a clueless element is included in two different ways.

### 8.1 Negative Samurai

**5×135 points**

The samurai consists of five different sudoku variants that overlap each other with exactly one 3×3 block. The middle puzzle does not contain any given digit. In the competition puzzle the positioning of the individual puzzles is clearly stated. The following variants will appear:

#### Anti Diagonal

**135 points**

Apply Classic Sudoku rules. Each marked diagonal contains exactly three different digits.

		1	3		7	9		
	8			5			7	
	3						2	
		8				6		
	5							9
	6		4				8	
		3	2		8	5		

7	9	4	1	6	2	3	5	8
5	2	1	3	8	7	9	4	6
3	8	6	4	5	9	2	7	1
6	3	9	7	1	4	8	2	5
4	1	8	9	2	5	6	3	7
2	5	7	8	3	6	1	9	4
9	6	2	5	4	1	7	8	3
1	4	3	2	7	8	5	6	9
8	7	5	6	9	3	4	1	2

#### Anti Knight

**135 points**

Apply Classic Sudoku rules. Cells that can be reached by a knight step (chess) cannot contain the same digit.

3				5				4
			2		6			
		6				7		
	8			1			5	
9			4		2			3
	6			3			7	
		9				5		
			8		5			
4				2				7

3	9	2	7	5	1	6	8	4
5	4	7	2	8	6	3	9	1
8	1	6	3	9	4	7	2	5
2	8	3	9	1	7	4	5	6
9	7	5	4	6	2	8	1	3
1	6	4	5	3	8	2	7	9
6	2	9	1	7	3	5	4	8
7	3	1	8	4	5	9	6	2
4	5	8	6	2	9	1	3	7

## Anti Windoku

135 points

Apply Classic Sudoku rules. Each marked grey area contains exactly four different digits.

			8	9	3			
	3						1	
3	2		7		6			9
1								2
5			1		2		8	7
	9						7	
			6	2	7			

6	5	1	8	9	3	7	2	4
9	3	2	4	7	5	6	1	8
8	4	7	2	6	1	5	9	3
3	2	4	7	8	6	1	5	9
1	7	8	5	4	9	3	6	2
5	6	9	1	3	2	4	8	7
7	1	3	9	5	8	2	4	6
2	9	6	3	1	4	8	7	5
4	8	5	6	2	7	9	3	1

## Nonconsecutive

135 points

Apply Classic Sudoku rules. Two orthogonally adjacent cells cannot contain consecutive digits.

	2		3		8		1	
8				1				4
7								3
	8						2	
6								1
9				5				7
	5		4		7		6	

4	2	7	3	6	8	5	1	9
8	6	3	9	1	5	2	7	4
5	9	1	7	4	2	6	3	8
7	1	9	5	2	6	4	8	3
3	8	5	1	7	4	9	2	6
6	4	2	8	3	9	7	5	1
2	7	4	6	8	3	1	9	5
9	3	6	2	5	1	8	4	7
1	5	8	4	9	7	3	6	2

## Non XV

135 points

Apply Classic Sudoku rules. The digits in two orthogonally adjacent cells cannot have a sum of either 5 or 10.

	7					6		
2			1					9
		1				2		
	1			2				
			4				3	
		4				3		
8				3				7
	3						5	

5	7	9	2	4	8	1	6	3
2	4	3	1	7	6	5	8	9
6	8	1	3	9	5	2	7	4
3	1	8	9	6	2	7	4	5
4	5	7	8	3	1	6	9	2
9	6	2	4	5	7	8	3	1
7	2	4	5	8	9	3	1	6
8	9	5	6	1	3	4	2	7
1	3	6	7	2	4	9	5	8



## 8.2 Clueless Hidden Classic

9×125 points

This puzzle contains nine sudokus and variants, arranged in a square of 3×3 puzzles. The nine middle blocks of the individual puzzles form a 10<sup>th</sup> (classic) sudoku. The respective middle blocks are marked grey for your convenience. In the competition puzzle the positioning of the individual puzzles is clearly stated. The following variants will appear:

### 3× Classic Sudoku

3×125 points

Apply Classic Sudoku rules.

### Between 1 and 9 Sudoku

125 points

Apply Classic Sudoku rules. Clues outside the grid indicate the sum of the digits that have to be placed between the digits 1 and 9 in the respective row or column.

	6	33	13	8	8	35	25	11	12
13									
14		1		3					
19									
24		5		7					
19									
16						2		4	
20									
10						6		8	
20									

	6	33	13	8	8	35	25	11	12
13	7	2	3	4	6	9	8	5	1
14	8	1	4	3	2	5	9	6	7
19	9	6	5	8	1	7	4	2	3
24	4	5	9	7	3	8	6	1	2
19	2	8	6	1	5	4	3	7	9
16	1	3	7	6	9	2	5	4	8
20	5	4	1	2	8	3	7	9	6
10	3	7	2	9	4	6	1	8	5
20	6	9	8	5	7	1	2	3	4

### Consecutive Sudoku

125 points

Apply Classic Sudoku rules. In all cases where the difference between two digits placed in horizontally or vertically adjacent cells is 1, this is marked by a grey bar.

	3							
			3					
						3		
					3			
								3

9	5	2	4	6	8	1	3	7
3	6	7	1	5	2	4	9	8
8	4	1	3	9	7	5	6	2
5	9	3	7	1	4	2	8	6
6	2	8	5	3	9	7	1	4
1	7	4	2	8	6	3	5	9
4	1	9	8	7	3	6	2	5
2	8	5	6	4	1	9	7	3
7	3	6	9	2	5	8	4	1

### Consecutive Circles Sudoku

125 points

Apply Classic Sudoku rules. Digits on each grey circle are all different and they form a strictly increasing sequence with differences of 1. The order of any sequence can be clockwise or anticlockwise. It is part of the puzzle to find out the start and end of the sequence.

1					6		
	○			5		○	
		○					1
				7			4
3			9			○	
4		○					
				7			○
		3					2

1	5	2	7	4	3	6	8	9	
6	○	9	4	8	5	1	2	3	7
8	3	7	○	6	9	2	5	4	1
9	2	8	5	3	7	1	6	4	
7	6	1	2	○	8	4	3	9	5
3	4	5	9	1	6	7	2	8	
4	7	6	1	2	9	8	5	3	
2	8	9	3	7	5	4	○	1	6
5	1	3	4	6	8	9	7	2	

### Next to Nine Sudoku

125 points

Apply Classic Sudoku rules. Clues outside the grid indicate all direct neighbours of the digit 9 in the respective row or column.

		4	3	3	1	1	1		2	
		7	6	5	8	4	3	8	4	6
7	8	1								
2	3		2							
1	5			3						
1	5				4					
6	8					5				
	5						6			
1	8							7		
5	7								8	
	5									9

		4	3	3	1	1	1		2	
		7	6	5	8	4	3	8	4	6
7	8	1	4	5	6	2	8	9	7	3
2	3	6	2	9	3	4	7	8	1	5
1	5	8	7	3	5	9	1	2	6	4
1	5	3	8	6	4	1	9	5	2	7
6	8	7	1	4	2	5	3	6	9	8
	5	9	5	2	8	7	6	3	4	1
1	8	4	6	1	9	8	5	7	3	2
5	7	5	9	7	1	3	2	4	8	6
	5	2	3	8	7	6	4	1	5	9

## Palindrome Sudoku

125 points

Apply Classic Sudoku rules. The digits on the grey lines form a palindromic sequence from one end to the other.

			1					4
		3		2			6	
	5				3			
6						4		
	2						5	
		8						6
			4				7	
	9			3		8		
1					9			

7	6	9	1	8	5	3	2	4
8	1	3	9	2	4	5	6	7
2	5	4	6	7	3	9	8	1
6	7	5	8	9	1	4	3	2
9	2	1	3	4	6	7	5	8
3	4	8	7	5	2	1	9	6
5	3	2	4	1	8	6	7	9
4	9	6	2	3	7	8	1	5
1	8	7	5	6	9	2	4	3

## Perfect Squares Sudoku

125 points

Apply Classic Sudoku rules. A black square means that the digits in the two neighbouring cells form a double digit square number in the reading direction. All possible squares are given.

6						■		5
■		8			■			6
	■		9					1
		■	8		3			
				■	9			
		■				■		
			2		6		■	
		3					5	
	2			■				8
5			■					4

6	3	1	7	8	2	4	■	9	5
■				■					
4	8	7	5	1	9	2	6	3	
2	■	5	9	6	3	4	1	7	8
9	1	■	6	8	5	3	7	4	2
8	7	2	4	■	9	1	3	5	6
3	4	5	2	7	6	8	■	1	9
7	6	3	9	4	8	5	2	1	
1	2	4	3	■	6	5	9	8	7
5	9	8	■	1	2	7	6	3	4

# Round 9 Team: Circle

## 40 minutes – 1600 points

9.1 Classic Sudoku .....	100 points
9.2 Chaos Sudoku .....	100 points
9.3 Anti Diagonal Sudoku .....	100 points
9.4 XV Sudoku .....	100 points
9.5 Classic Sudoku .....	100 points
9.6 Circles Sudoku .....	100 points
9.7 Greater Than Sudoku .....	100 points
9.8 Kropki Sudoku .....	100 points
9.9 Classic Sudoku .....	100 points
9.10 Arrow Sudoku .....	100 points
9.11 Battenburg Sudoku .....	100 points
9.12 Killer Sudoku .....	100 points
9.13 Classic Sudoku .....	100 points
9.14 Quadruple Sudoku .....	100 points
9.15 Thermo Sudoku .....	100 points
9.16 X-Sums Sudoku .....	100 points

This team round contains 16 Sudokus of 9×9, which are linked through shaded cells. The 16 Sudokus are placed in a circle (actually, it is an ellipse). The corresponding shaded cells in two neighbouring Sudokus have to contain the same digits. The cells in the left half of a Sudoku correspond to the cells in its neighbour on the left, the cells in the right half of a Sudoku correspond to the cells in its neighbour on the right.

### 9.1, 9.5, 9.9, 9.13 Classic Sudoku

**4×100 points**

Apply Classic Sudoku rules.

### 9.2 Chaos Sudoku

**100 points**

Place the digits 1-9 exactly once in each row, column and bold outlined region.

2			9		1			8
	7			3			5	
		3				2		
9			7		3			2
	3						7	
5			4		8			9
		4				8		
	8			6			4	
3			8		9			5

2	4	<b>5</b>	9	7	1	<b>6</b>	3	8
8	7	<b>9</b>	2	3	4	<b>1</b>	5	6
<b>6</b>	<b>5</b>	<b>3</b>	<b>1</b>	<b>8</b>	<b>7</b>	<b>2</b>	<b>9</b>	<b>4</b>
9	1	<b>6</b>	7	5	3	<b>4</b>	8	2
4	3	<b>8</b>	6	9	2	<b>5</b>	7	1
5	2	<b>7</b>	4	1	8	<b>3</b>	6	9
7	<b>9</b>	<b>4</b>	<b>5</b>	<b>2</b>	<b>6</b>	<b>8</b>	<b>1</b>	<b>3</b>
1	8	<b>2</b>	3	6	5	<b>9</b>	4	7
3	6	<b>1</b>	8	4	9	<b>7</b>	2	5

### 9.3 Anti Diagonal Sudoku

100 points

Apply classic sudoku rules. Each marked diagonal must contain exactly three different digits.

		1	3		7	9		
8			5				7	
3							2	
	8					6		
5							9	
6			4				8	
	3	2		8	5			

7	9	4	1	6	2	3	5	8
5	2	1	3	8	7	9	4	6
3	8	6	4	5	9	2	7	1
6	3	9	7	1	4	8	2	5
4	1	8	9	2	5	6	3	7
2	5	7	8	3	6	1	9	4
9	6	2	5	4	1	7	8	3
1	4	3	2	7	8	5	6	9
8	7	5	6	9	3	4	1	2

### 9.4 XV Sudoku

100 points

Apply Classic Sudoku rules. All horizontally and vertically neighbouring digits with the sum 10 are marked with X, all horizontally and vertically neighbouring digits with the sum 5 are marked with V. Adjacent cells with no marking must not contain digits whose sum is either 10 or 5.

		1						X
				X		5		X
X						X		X
		X						
		V		X				
				7				
						V		
X								
V		6		V				
X								2

5	2	1	3	8	7	9	4	X	6		
3	9	7	1	6	X	4	5	8	X	2	
6	X	4	8	5	2	9	X	1	7	X	3
1	7	2	6	X	4	3	8	9	5		
8	6	3	9	7	5	4	2	1			
9	5	4	8	1	2	V	3	6	7		
2	X	8	9	7	5	1	6	3	4		
4	V	1	6	2	V	3	8	7	5	9	
7	X	3	5	4	9	6	2	1	8		

### 9.6 Circles Sudoku

100 points

Apply Classic Sudoku rules. The digits on the circles have to be placed in the same order in the four cells that are touched by the circle. The circles may have to be turned in the correct position.

		3	4	4	2			
				9	5	1		
							7	9
								6
		7	4	2	9	3	1	7
				3	4			6
		5						
		7	4					
				9	1	4	9	6
				7	4			5

1	8	3	9	2	6	7	4	5						
7	9	3	5	4	4	3	1	1	2	6	8			
6	2	4	7	5	8	9	1	3	9	1				
9	3	6	5	1	2	8	7	4						
2	7	5	2	7	3	9	8	1	4	1	2	9	7	6
8	4	1	6	9	7	5	2	3						
5	7	1	4	9	2	4	3	6	8	7				
4	7	8	1	7	6	4	9	4	3	6	5	2		
3	6	2	8	7	5	4	1	9						

### 9.7 Greater Than Sudoku

100 points

Apply Classic Sudoku rules. Digits have to be placed in accordance with the “greater than” signs.

		>		> 2		<	<	
v	v	v		^	v		v	
	<			>		>	<	
v		v	v	^	^	^		v
		<		>	<	<	>	
>				>		<		
2		>		< 8		>		1
	^	^		^	v		v	
		<		<	>	<		
^	^		v	^	v	^	v	v
		<		<		>		
v	^	v	v		v	v	^	
		<		< 7 >		>	<	

7	9 > 5	3 > 2	4	1 < 6 < 8
v	v	v	^	v
6 < 8	4	9 > 5	1	3 > 2 < 7
v	v	v	^	^
3	1 < 2	7 > 6 < 8		5 < 9 > 4
5 > 4	9	2 > 1	7	6 < 8
	^	v	^	v
2	6 > 3	4 < 8	5	9 > 7
	^	^	^	v
1	7 < 8	6 < 9 > 3		2 < 4
4	2 > 1	8	3 < 9	7 > 5
^	^	v	^	v
9	3 < 7	5	4 < 6	8 > 1
v	^	v	v	v
8	5 < 6	1 < 7 > 2		4 > 3 < 9

### 9.8 Kropki Sudoku

100 points

Apply Classic Sudoku rules. A white circle between two cells indicates that the neighbouring digits are consecutive. A black circle between two cells indicates that one of the digits is twice as large as the other digit. The absence of a circle indicates that there is no neighbouring digit that is either consecutive or double.

8	7	3	6	1	5	9	2	4
		o					o	
6	1	•	2	•	4	•	8	o
			o				•	
4	9	5	3	7	2	8	6	1
o				o				
3	o	4	7	o	8	6	1	o
							•	
9	6	1	o	2	5	3	o	4
							o	7
5	2	8	o	9	4	7	o	6
								•
2	5	9	7	3	8	1	4	6
								o
7	o	8	•	4	1	o	2	6
							•	3
1	3	•	6	o	5	9	4	7
							o	8
								2

### 9.10 Arrow Sudoku

100 points

Apply Classic Sudoku rules. Digits placed in a cell with a circle must be the sum of the digits placed in cells the adjoining arrow passes through. Digits may repeat on arrows.

			↗	9	2			
	1			○	8		6	
		2				9		
○				3			2	
			↖	4		↘		
3				5			○	
	7				6			
1		8		○		7		
	9		↙					

5	8	7	↗	6	9	4	2	3
9	1	3		○	7	2	8	5
6	4	2		5	8	3	7	9
○	8	5	4	3	9	7	1	6
7	↖	9		6	4	1	5	3
3	6	1		8	2	5	9	4
4	7	5		2	3	8	6	1
1	3	8		9	○	5	6	2
2	9	6		7	1	↙	4	3

### 9.11 Battenburg Sudoku

100 points

Apply Classic Sudoku rules. Everywhere 2 odd and 2 even digits form a checkerboard pattern, a Battenburg marking is given. If there is no marking, the above pattern is not allowed.

9								2
	9							2
		6					9	
	5							6
		9						
			9					
3								5

9	4	7	3	8	6	5	1	2
6	1	8	2	5	4	7	3	9
5	2	3	1	7	9	8	4	6
7	9	1	5	6	3	4	2	8
2	3	6	8	4	1	9	5	7
8	5	4	7	9	2	1	6	3
4	7	9	6	2	5	3	8	1
1	6	5	9	3	8	2	7	4
3	8	2	4	1	7	6	9	5

### 9.12 Killer Sudoku

100 points

Apply Classic Sudoku rules. The digits placed in each marked cage must sum to the total given in its top-left. Digits must not repeat in cages.

16				12				17
								2
			4	2				10
2								
9								
								14

16	7	9	4	3	12	5	6	1	2	17	8
	1	3	5	7		2	8	6	4		9
	6	2	8	9		1	4		5	7	3
	8	4	7	1	3	5		9	6		2
	9	5	6	4	8	2		7	3	10	1
	2	1	3		6	9	7	8	5		4
	3	6	2	8	7	10	1	4	9		5
	4	8	9	5	6		3	2	1		7
	5	7	1	2	4		9	3	14	8	6

### 9.14 Quadruple Sudoku

100 points

Apply Classic Sudoku rules. Each set of four digits in the intersection of two lines indicates the digits that have to be placed in the four adjacent cells.


2	3	9	4	5	6	1	8	7
1	4	7	2	8	3	5	6	9
8	6	5	1	9	7	4	3	2
9	2	6	3	4	8	7	1	5
3	7	8	5	2	1	9	4	6
4	5	1	7	6	9	3	2	8
5	9	3	8	1	2	6	7	4
7	8	4	6	3	5	2	9	1
6	1	2	9	7	4	8	5	3

9.15 Thermo Sudoku

100 points

Apply Classic Sudoku rules. The digits in each thermometer are, from the bulb to the/end, all different and placed in increasing order.

			1	5		
		2				
6			7			
7						
	8	5			1	9
						2
			6			5
			1			
		7	4			

9	2	8	6	3	1	5	4	7
5	7	3	8	2	4	9	6	1
6	1	4	5	7	9	3	2	8
7	9	1	3	8	2	4	5	6
2	8	5	7	4	6	1	9	3
4	3	6	1	9	5	8	7	2
1	4	2	9	6	8	7	3	5
3	5	9	2	1	7	6	8	4
8	6	7	4	5	3	2	1	9

9.16 X-Sums Sudoku

100 points

Apply Classic Sudoku rules. Clues outside the grid indicate the sum of the first X digits placed in the corresponding direction, where X is equal to the first digit in that direction.

	8	41	27	32	30	9	27		
17								12	
19								41	
								35	
36									
30								31	
								8	
8									
39								6	
20								36	
	29	18		8	38		32	16	33

	8	41	27	32	30	9	27			
17	3	8	6	9	7	5	1	2	4	12
19	4	9	5	1	2	6	3	7	8	41
	1	7	2	4	3	8	9	5	6	35
36	8	2	3	5	1	4	7	6	9	
30	6	1	4	3	9	7	2	8	5	31
	9	5	7	8	6	2	4	1	3	8
8	2	6	8	7	4	3	5	9	1	
39	7	3	9	6	5	1	8	4	2	6
20	5	4	1	2	8	9	6	3	7	36
	29	18		8	38		32	16	33	



Battenburg Sudoku

		3						9
			6					
6			3					
3				8				
	2			4				
	9				2			
		9			3			
						7		
		8						
			1			8		

Killer Sudoku

	11		6	20		8		
			13		5			
8								14
				10				
	17					14		
9							7	

Classic Sudoku

		5			9	7		
	7				3		6	
3						4		8
						2		
				2			9	
				4			8	
			5		8			1
				1				5
9			7		4			6

7	1	3	4	2	8	5	6	9
9	8	2	6	1	5	3	7	4
6	5	4	3	9	7	2	8	1
3	4	6	5	8	1	9	2	7
5	2	7	9	4	6	1	3	8
8	9	1	7	3	2	4	5	6
4	7	9	8	5	3	6	1	2
1	3	8	2	6	9	7	4	5
2	6	5	1	7	4	8	9	3

8	11	7	4	6	3	20	5	9	8	2	6	1
5	3	9		1	2		6	7	8		4	
6	2	1	13	7	8	5	4	5	9		3	
8	7	9	2	6	4		1	8	3	14		5
1	6	3	8	10	7	5	4	2			9	
4	8	5	9	3	2	1	7	6				
9	17	4	6	2	1	7	14	3	5		8	
9	3	1	7	5	9	8	6	7	4		2	
2	5	8	4	6	3	9	1				7	

4	8	5	1	6	9	7	3	2
1	7	2	4	8	3	5	6	9
3	6	9	2	5	7	4	1	8
6	9	3	8	7	1	2	5	4
5	4	8	3	2	6	1	9	7
2	1	7	9	4	5	6	8	3
7	2	6	5	9	8	3	4	1
8	3	4	6	1	2	9	7	5
9	5	1	7	3	4	8	2	6

Here is an example of how the link works:

# Round 10 Team: 3D

## 30 minutes – 900 points

10.1 3D Sudoku ..... 900 points

The goal of this round is to enter all or at least as many digits as possible on a three-dimensional object.

This three-dimensional object is the central part of a construction, which contains various Sudokus of size  $9 \times 9$ .

The following instructions apply for one or more of the provided Sudoku parts and their boundaries. For different parts of one Sudoku different rules may apply. The central object does not contain any specific symbols, signs or drawings; it consists of blank cells only and only classic Sudoku rules apply for this part.

4	1	5	9
3	2	9	7
6	7	8	2
5	8	1	4

The diagonal arrows point from a larger digit to a smaller one. Diagonal lines without an arrowhead connect the same digits.

4	1	5
3	2	9
6	7	8

Green cells contain only even digits.

4	1	5
○	●	9
3	○	2
●	○	8
6	○	7

A white circle between two cells indicates that the neighbouring digits are consecutive. A black circle between two cells indicates that one of the digits is twice as large as the other digit. The absence of a circle indicates that there is no neighbouring digit that is either consecutive or double.

4	1	5
3	2	9
6	7	8

Digits have to be placed in accordance with the greater-than-signs.

7	3	22
4	1	5
3	2	9
13	6	8

The digits placed in each marked cage must sum to the total given in its top-left. Digits must not repeat in cages.

	3	6	4
4	4	1	5
7	3	2	9
2	6	7	8

Clues outside the grid indicate the difference between the largest and the smallest digit in the first three cells from that side.

8	2	5	9
3	1	9	7
6	7	4	2
5	8	1	4

Digits placed in a cell with an arrowhead must be the sum of the digits placed in cells the adjoining arrow passes through. Digits may repeat on arrows.

**Attention 1:**

Points will be rewarded only for the digits entered on the central object. The provided Sudoku parts need not to be filled completely.

**Attention 2:**

In the end, not the entire construction, but only the central object is collected and checked.

**Attention 3:**

Do not enter any digits on the central object before you know exactly how and at which position the central object has to be built into the construction!

**Scoring**

If

1. all digits have been entered completely correctly on the central object,
2. the entire construction has been completely assembled,
3. the construction with built-in central object is held up with a clear "FINISH",

900 points are rewarded. For every full minute of remaining playing time 40 additional bonus points are rewarded.

**Partial scoring**

In case the construction is not finished, 16 points are given for each cell of the central object that is correctly filled. In case a cell contains a wrong digit, 16 points are deducted.

The individual parts of the construction are put together and secured with rubber bands ([www.werkhaus.de](http://www.werkhaus.de)).

# Round 11 Individual: World Cup 3

## 45 minutes – 450 points

11.1 Classic Sudoku .....	25 points
11.2 Classic Sudoku .....	25 points
11.3 0-9 Frame Sudoku .....	95 points
11.4 Battenburg Sudoku .....	30 points
11.5 Chaos Sudoku .....	45 points
11.6 Edge Product Sudoku .....	30 points
11.7 First Seen Odd/Even Sudoku .....	70 points
11.8 Magic Squares Sudoku .....	30 points
11.9 Mini Diagonals Sudoku .....	35 points
11.10 Serbian Frame Sudoku .....	65 points

### 11.1 + 11.2 Classic Sudoku

**25 + 25 points**

Apply Classic Sudoku rules.

### 11.3 0-9 Frame Sudoku

**95 points**

Place digits 0-9 in every cell such that no digit is repeated in any row, column or 3×3 block. Clues outside the grid indicate the sum of the digits in the first three cells from that side.

	3	20	17	5	16	16	20	6	13	
19										11
7										22
14										6
8										20
15				5						12
21										13
10										20
7										14
21										11
	12	16	10	16	5	16	9	14	22	

	3	20	17	5	16	16	20	6	13	
19	2	9	8	0	6	4	7	1	3	11
7	0	4	3	2	1	7	9	5	8	22
14	1	7	6	3	9	5	4	0	2	6
8	6	0	2	9	4	3	8	7	5	20
15	8	3	4	6	5	0	2	9	1	12
21	9	5	7	1	8	2	6	3	4	13
10	3	6	1	4	2	9	5	8	7	20
7	5	2	0	7	3	6	1	4	9	14
21	4	8	9	5	0	1	3	2	6	11
	12	16	10	16	5	16	9	14	22	

### 11.4 Battenburg Sudoku

30 points

Apply Classic Sudoku rules. Everywhere 2 odd and 2 even digits form a checkerboard pattern, a Battenburg marking is given. If there is no marking, the above pattern is not allowed.

9								2
			2		4			
		3		7		8		
	9						2	
		6				9		
	5						6	
		9		2		3		
			9		8			
3								5

9	4	7	3	8	6	5	1	2
6	1	8	2	5	4	7	3	9
5	2	3	1	7	9	8	4	6
7	9	1	5	6	3	4	2	8
2	3	6	8	4	1	9	5	7
8	5	4	7	9	2	1	6	3
4	7	9	6	2	5	3	8	1
1	6	5	9	3	8	2	7	4
3	8	2	4	1	7	6	9	5

### 11.5 Chaos Sudoku

45 points

Place the digits 1-9 exactly once in each row, column and bold outlined region.

2			9	1				8
	7			3				5
		3				2		
9			7	3				2
	3						7	
5			4	8				9
		4				8		
	8			6			4	
3			8	9				5

2	4	5	9	7	1	6	3	8
8	7	9	2	3	4	1	5	6
6	5	3	1	8	7	2	9	4
9	1	6	7	5	3	4	8	2
4	3	8	6	9	2	5	7	1
5	2	7	4	1	8	3	6	9
7	9	4	5	2	6	8	1	3
1	8	2	3	6	5	9	4	7
3	6	1	8	4	9	7	2	5

### 11.6 Edge Product Sudoku

30 points

Apply Classic Sudoku rules. Clues outside the grid indicate the product of the digits placed in the first two cells from that side.

	27		42		7		10	18		12	
15											4
8						3					35
		9									8
24											54
						1					
21			4								18
12											8
	6		32		21		12				5

	27		42		7		10	18		12	
15	3	5	6	7	8	2	9	1	4		4
8	9	8	7	1	4	5	2	6	3		
	2	4	1	6	9	3	8	5	7		35
	8	1	9	3	6	7	5	4	2		8
24	4	6	2	9	5	1	7	3	8		
	5	7	3	8	2	4	1	9	6		54
21	7	3	5	4	1	8	6	2	9		18
	1	9	8	2	3	6	4	7	5		
12	6	2	4	5	7	9	3	8	1		8
	6		32		21		12				5

### 11.7 First Seen Odd/Even Sudoku

70 points

Apply Classic Sudoku rules. Odd clues outside the grid indicate the first odd digit from that direction. Even clues indicate the first even digit from that direction.

5	8		8	4	3	2	6			7	6
9	6		6				8			5	8
5	8		5				1			1	2
1	2		2				4			3	4
3	4		4	8	7	6	2			9	2

9 1 7 3 7  
4 8 4 6 2

5	8		8	4	3	2	6			7	6
9	6		6				8			5	8
5	8		5				1			1	2
1	2		2				4			3	4
3	4		4	8	7	6	2			9	2

9 1 7 3 7  
4 8 4 6 2

### 11.8 Magic Squares Sudoku

30 points

Apply Classic Sudoku rules. Three of the given 3×3-blocks form a magic square, which means that the sum of both diagonals, the three horizontal lines of three cells and the three vertical lines of three cells is the same.

			8			1		
				9			2	
					7			3
1						2		
	6						3	
		9						1
3			7					
	4			8				
		7			9			

2	9	4	8	6	3	1	7	5
7	5	3	1	9	4	6	2	8
6	1	8	5	2	7	9	4	3
1	7	5	4	3	8	2	6	9
8	6	2	9	5	1	7	3	4
4	3	9	2	7	6	5	8	1
3	8	6	7	1	5	4	9	2
9	4	1	6	8	2	3	5	7
5	2	7	3	4	9	8	1	6

### 11.9 Mini Diagonals Sudoku

35 points

Apply Classic Sudoku rules. There are mini diagonals of three cells each drawn in the grid. The sum of the digits on each diagonal is given on the top of the diagonal.

9			8	19			15	23		9
	*			*	5		*			
			9							
19	4		8				19	8		8
	*			1			*			
			8					7		
8			8	16		3	19	19		19
	*		5	*			*			

9	3	7	5	8	19	8	6	2	15	23	9	4	1	9
	8	2	9	1	4	5	7	6	3					
	1	6	4	9	3	7	2	5	8					
19	6	4	1	8	2	7	9	8	3	5	8			
	9	5	7	3	1	8	6	2	4					
	2	3	8	4	5	6	1	7	9					
8	4	9	2	8	16	8	3	19	19	5	1	7	19	
	7	1	6	5	9	4	3	8	2					
	5	8	3	7	2	1	4	9	6					

### 11.10 Serbian Frame Sudoku

65 points

Apply Classic Sudoku rules. Clues on the left and the right of the grid indicate the sum of the digits to be placed in the second and third cell in the corresponding direction. Clues above and below the grid indicate the sums of the digits to be placed in the third and fourth cell in the corresponding direction.

			10			9	9			10	7			
12														15
5														6
12														
15														
														9
3														7
12														14
			11	7	10		6				11			

			10			9	9			10	7			
12	1	8	4	5	3	2	9	6	7					15
	7	5	9	1	4	6	3	2	8					
5	6	3	2	9	7	8	5	1	4					6
12	5	4	8	6	2	1	7	9	3					
15	3	9	6	4	8	7	1	5	2					
	2	1	7	3	5	9	8	4	6					
	9	6	3	8	1	4	2	7	5					9
3	8	2	1	7	6	5	4	3	9					7
12	4	7	5	2	9	3	6	8	1					14
			11	7	10		6				11			

# Round 12 Individual: Relay 7×7

## 25 minutes – 250 points

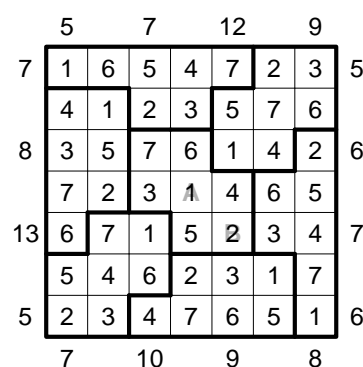
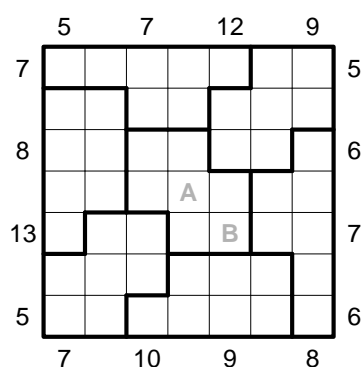
- 12.1A Chaos Outside Sums Sudoku ..... 35 points
- 12.1B Toroidal Consecutive Sudoku ..... 35 points
- 12.1C Scattered Rank Sudoku ..... 45 points
- 12.2A Chaos Even Sandwich Sudoku ..... 40 points
- 12.2B Toroidal Odd Sudoku ..... 55 points
- 12.2C Scattered Ordering Sudoku ..... 40 points

### 12.1A Chaos Outside Sums Sudoku

35 points

Place the digits 1-7 exactly once in every row, column and bold outlined area. Clues outside the grid indicate the sum of the first two digits from that side.

*Transpose the value of A and B to the next puzzle.*

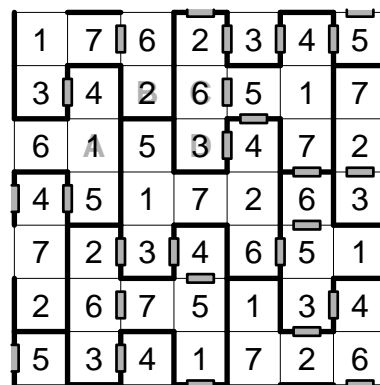
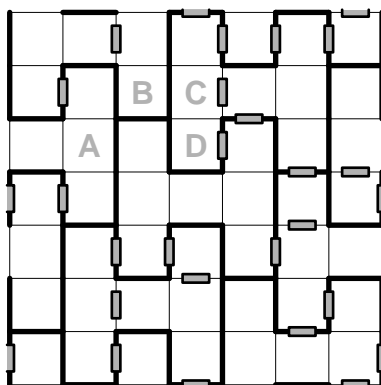


### 12.1B Toroidal Consecutive Sudoku

35 points

Place the digits 1-7 exactly once in every row, column and bold outlined area. Some areas wrap around the grid from left to right and/or from top to bottom. In all cases where the difference between two neighbouring digits is 1, this is marked by a grey bar.

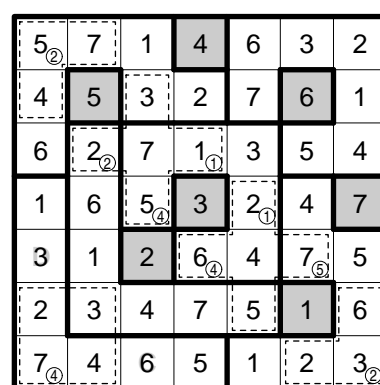
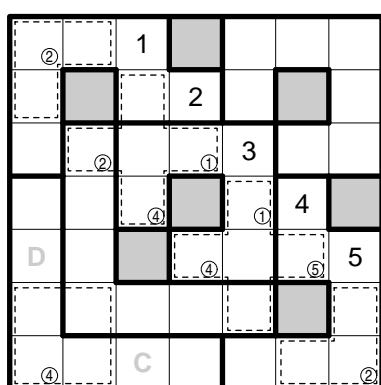
*Transpose the value of C and D to the next puzzle.*



### 12.1C Scattered Rank Sudoku

45 points

Place the digits 1-7 exactly once in every row, bold outlined area and the grey cells. A digit "X" in a circle means that the digit in the cell is the X<sup>th</sup> smallest number in the corresponding cage. Digits cannot repeat within a cage.





### 12.2A Chaos Even Sandwich Sudoku

40 points

Place the digits 1-7 exactly once in every row, column and bold outlined area. Clues outside the grid indicate all digits that have even digits as direct neighbours on both sides in the respective row or column.

*Transpose the value of E and F to the next puzzle.*

			5			3	
	-	1	1	7	-	6	5
-	1						
3	7		2				
-			3		E		
2							
1	5			F		4	
-						5	
5							6

			5			3	
	-	1	1	7	-	6	5
-	1	6	5	3	2	4	7
3	7	5	2	7	4	3	6
-	6	1	3	7	5	2	4
2	3	4	2	6	1	7	5
1	5	7	3	6	5	4	1
-	4	7	1	2	6	5	3
5	2	5	4	1	7	3	6

### 12.2B Toroidal Odd Sudoku

55 points

Place the digits 1-7 exactly once in every row, column and bold outlined area. Some areas wrap around the grid from left to right and/or from top to bottom. Grey cells contain odd digits.

*Transpose the value of G and H to the next puzzle.*

1			3				
	2						
			3				
2			4				
			H				4
						F	
G				1			E

1	4	5	3	6	2	7	
6	2	7	1	4	5	3	
4	5	3	6	2	7	1	
2	7	1	4	5	3	6	
5	3	6	2	7	1	4	
7	1	4	5	3	6	2	
3	6	2	7	1	4	5	

### 12.2C Scattered Ordering Sudoku

40 points

Place the digits 1-7 exactly once in every row, bold outlined area and the grey cells. Place different two-digit-numbers in each dotted outlined box. Boxes are marked in ascending order such that the smallest number is placed in box 1 and the largest number is placed in box 12 (8 in the example).

5						7	
			G		4		
2							
				H			
	3						
4			3				2

5	1	2	6	3	4	7	
3	2	4	7	5	1	6	
6	7	3	5	4	2	1	
2	5	1	4	7	6	3	
1	4	7	2	6	3	5	
7	3	6	1	2	5	4	
4	6	5	3	1	7	2	

# Round 13 Individual: Linked

## 30 minutes – 300 points

13.1 Numbered Rooms Sudoku & Skyscrapers Sudoku ..... 90 points

13.2 X-Sums Sudoku & Little Killer Sudoku ..... 70 points

13.3 Outside Parity Sudoku & Position Sudoku ..... 60 points

13.4 Edge Product Sudoku & Frame Sudoku ..... 80 points

This round contains four sets of two sudoku variants each. In every set there is a row of clues that is equal for both sudokus, marked by circles. Finding the clues in the circles is part of the puzzle. If only one of the puzzles is solved correctly (matching the solution of the puzzle as a whole), 50% of the points are rewarded. The following variants appear (for each set, the top puzzle is shown first):

### 13.1A Numbered Rooms Sudoku

Apply Classic Sudoku rules. Clues outside the grid indicate the digit which has to be placed in the Xth cell in the corresponding direction, where X is the digit placed in the first cell in that direction.

	6	1	1					5	9	2		
6												4
6		1								2		6
5												2
3												3
1					5							1
9												1
4												1
1		4								3		4
4												4
	7	6	5	1	1	9	1	5	8			

	6	1	1					5	9	2		
6	4	2	5	6	3	1	8	7	9			4
6	7	1	8	5	9	4	6	2	3			6
5	9	6	3	8	2	7	4	1	5			2
3	6	5	7	2	1	3	9	8	4			3
1	3	8	1	4	5	9	2	6	7			1
9	2	9	4	7	8	6	3	5	1			1
4	5	3	2	1	4	8	7	9	6			1
1	1	4	6	9	7	2	5	3	8			4
4	8	7	9	3	6	5	1	4	2			4
	7	6	5	1	1	9	1	5	8			

### 13.1B Skyscrapers Sudoku

Apply Classic Sudoku rules. Each digit represents a skyscraper of the given height. Clues outside the grid indicate the number of visible skyscrapers from that direction. Higher skyscrapers block the view of lower skyscrapers.

			1				6					
	2											7
		9			4						2	
			8						5			
2				6		3						2
		6			1						7	
3				4		7						6
			6					4				
		8			5						3	
	9											5
				9						2		

			1				6					
	2	4	5	9	3	1	8	6	7			
	6	9	7	8	4	5	3	2	1			
	3	1	8	7	2	6	5	9	4			
2		7	5	2	6	9	3	1	4	8		2
		8	6	4	5	1	2	9	7	3		
3		1	3	9	4	8	7	6	5	2		6
		5	2	6	3	7	8	4	1	9		
		4	8	1	2	5	9	7	3	6		
		9	7	3	1	6	4	2	8	5		
						9				2		

### 13.2A X-Sums Sudoku

Apply Classic Sudoku rules. Clues outside the grid indicate the sum of the first X digits placed in the corresponding direction, where X is equal to the first digit placed in that direction.

	8	41	27		32	30		9	27	
17										12
19										41
										35
36										
30										31
										8
8										
39										6
20										36
	29	18		8	38		32	16	33	

	8	41	27		32	30		9	27	
17	3	8	6	9	7	5	1	2	4	12
19	4	9	5	1	2	6	3	7	8	41
	1	7	2	4	3	8	9	5	6	35
36	8	2	3	5	1	4	7	6	9	
30	6	1	4	3	9	7	2	8	5	31
	9	5	7	8	6	2	4	1	3	8
8	2	6	8	7	4	3	5	9	1	
39	7	3	9	6	5	1	8	4	2	6
20	5	4	1	2	8	9	6	3	7	36
	29	18		8	38		32	16	33	

### 13.2B Little Killer Sudoku

Apply Classic Sudoku rules. Clues outside the grid indicate the sum of the digits placed in the cells in the direction of the corresponding arrow. Digits may repeat within a sum.

										26	32
	2										
35											
37			5								
		3							8	16	
										9	

										26	32
	3	6	5	1	7	2	8	9	4		
35	1	2	8	6	4	9	5	3	7		
37	9	7	4	5	3	8	2	6	1		
	7	1	6	8	5	4	9	2	3		
	8	5	3	9	2	7	1	4	6	16	
	4	9	2	3	6	1	7	5	8		
	5	4	9	7	1	3	6	8	2		
	6	3	7	2	8	5	4	1	9		
	2	8	1	4	9	6	3	7	5		
										9	

### 13.3A Outside Parity Sudoku

Apply Classic Sudoku rules. Clues outside the grid indicate the number of cells in this direction which contain digits of the same parity, until the first cell with a digit of the other parity.

	2	2	1		5		1	1	2	
5										4
2										1
4			4	8	3	5	1			5
5			9	7		8	6			4
3			2	3		6	7			3
1			5	2		1	3			1
4			7	5	2	3	8			3
3										4
1										2
	2	1	1		4		1	2	2	

	2	2	1		5		1	1	2	
5	5	3	1	9	7	2	4	6	8	4
2	9	7	8	6	1	4	5	3	2	1
4	6	2	4	8	3	5	1	9	7	5
5	3	1	9	7	5	8	6	2	4	4
3	4	8	2	3	9	6	7	1	5	3
1	7	6	5	2	4	1	3	8	9	1
4	1	9	7	5	2	3	8	4	6	3
3	2	4	6	1	8	7	9	5	3	4
1	8	5	3	4	6	9	2	7	1	2
	2	1	1		4		1	2	2	

### 13.3B Position Sudoku

Apply Classic Sudoku rules. Clues outside the grid indicate which of the first three cells in the corresponding direction contains the largest digit.

	3	3	3	3	2	1	1	3	3	
3										3
3				5		4				3
1			8				5			1
1		2			5			9		2
2				9		1				1
3		6			7			4		1
2			5				7			2
2				7		9				2
2										1
	2	3	3		1	2	2	3	3	1

	3	3	3	3	2	1	1	3	3	
3	5	1	6	3	8	7	9	2	4	3
3	2	3	7	5	9	4	8	1	6	3
1	9	4	8	6	1	2	5	3	7	1
1	7	2	1	4	5	8	6	9	3	2
2	3	5	4	9	6	1	2	7	8	1
3	8	6	9	2	7	3	1	4	5	1
2	4	9	5	1	3	6	7	8	2	2
2	6	8	2	7	4	9	3	5	1	2
2	1	7	3	8	2	5	4	6	9	1
	2	3	3		1	2	2	3	3	1

### 13.4A Edge Product Sudoku

Apply Classic Sudoku rules. Clues outside the grid indicate the product of the digits placed in the first two cells from that side.

	27	42	7	10	18	12		
15								4
8				3				35
		9						8
24								54
				1				
21			4					18
12								8
	6	32	21	12	5			

	27	42	7	10	18	12				
15	3	5	6	7	8	2	9	1	4	4
8	9	8	7	1	4	5	2	6	3	
	2	4	1	6	9	3	8	5	7	35
	8	1	9	3	6	7	5	4	2	8
24	4	6	2	9	5	1	7	3	8	
	5	7	3	8	2	4	1	9	6	54
21	7	3	5	4	1	8	6	2	9	18
	1	9	8	2	3	6	4	7	5	
12	6	2	4	5	7	9	3	8	1	8
	6	32	21	12	5					

### 13.4B Frame Sudoku

Apply Classic Sudoku rules. Clues outside the grid indicate the sum of the first three digits in the corresponding direction.

	22	8		10		13	13	
8								13
20								14
			7	6				
19								14
			8	5				
12								14
20								8
	11	16		19		15	13	

	22	8		10		13	13			
8	5	1	2	9	7	8	4	3	6	13
20	9	4	7	6	2	3	8	1	5	14
	8	3	6	5	1	4	7	9	2	
	2	5	3	7	4	6	1	8	9	
19	4	7	8	1	9	2	6	5	3	14
	6	9	1	8	3	5	2	4	7	
	7	2	4	3	5	1	9	6	8	
12	1	6	5	2	8	9	3	7	4	14
20	3	8	9	4	6	7	5	2	1	8
	11	16		19		15	13			

Here is an example of how the link works (Outside Parity Sudoku & Position Sudoku):

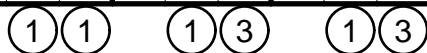
	4	1		1	4		1	4	
2	3			6		1			7
1		9		2		3		1	
1					7				
2		7			6			4	
1				8	1	4			
2		8			2			6	
2			5				1		
1				9		8			
4									



3						2	3		
1					3				
1	7								
3	4			2		7			
2		6			8			7	
2				6		5			3
1									5
2					6				
3			8	1					

2 1 1 3 2 3

	4	1		1	4		1	4	
2	3	5	4	6	9	1	2	8	7
1	6	9	7	2	8	3	4	1	5
1	2	1	8	4	7	5	6	3	9
2	5	7	2	3	6	9	8	4	1
1	9	6	3	8	1	4	7	5	2
2	4	8	1	5	2	7	9	6	3
2	8	4	5	7	3	2	1	9	6
1	1	2	6	9	5	8	3	7	4
4	7	3	9	1	4	6	5	2	8



3	1	8	9	4	7	2	3	5	6
1	6	5	4	8	3	1	9	2	7
1	7	2	3	9	5	6	1	4	8
3	4	3	5	2	1	7	6	8	9
2	2	6	1	3	8	9	5	7	4
2	8	9	7	6	4	5	2	1	3
1	9	1	6	7	2	8	4	3	5
2	3	7	2	5	6	4	8	9	1
3	5	4	8	1	9	3	7	6	2

2 1 1 3 2 3

# Team Playoffs: Kropki Connection

This team round consists of two puzzles with nine interacting sudokus. They are connected through Kropki dots:

- A white circle between two grids indicates that the neighbouring digits are consecutive.
- A black circle between two grids indicates that one of the digits is twice as big as the other digit.
- The absence of a circle indicates that there is no neighbouring digit that is either consecutive or double. Digits may also be equal in both grids.
- Be aware that between digits 1 and 2 the circle can be either white or black.

Individual puzzles can have multiple solutions, but because of the Kropki connection, there is only one unique solution for the whole puzzle.

For all puzzles, regular Sudoku rules apply: Place the digits 1-6 / 1-9 in each row, column and  $2 \times 3$  /  $3 \times 3$  block. The rules for each of the individual puzzles are given below. In the competition puzzle the positioning of the individual puzzles is clearly stated. The following variants will appear:

## Puzzle 1 ( $6 \times 6$ )

**Anti Knight Sudoku:** Cells that can be reached by a (chess) knight step may not contain the same digit.

**Arrow Sudoku:** Digits placed in a cell with a circle must be the sum of the digits. placed in cells the adjoining arrow passes through. Digits may repeat on arrows.

**Clone Sudoku:** In grey areas with the same shape, all digits on equal places must be identical.

**Diagonal Sudoku:** Place the digits from 1 to 6 in every row, column,  $2 \times 3$  block and the main diagonals.

**Killer Sudoku:** The digits placed in each marked cage must sum to the total given in its top-left. Digits must not repeat in cages.

**Nonconsecutive Sudoku:** Horizontally and vertically adjacent cells cannot contain consecutive digits.

**Perfect Squares Sudoku:** A black square means that the digits in the two neighbouring cells form a double digit square number in the reading direction. All possible squares are given.

**S, as in Sudoku:** In the cells with letters, a digit can only be placed if it contains that letter when spelled in English. 1 = ONE; 2 = TWO; 3 = THREE; 4 = FOUR; 5 = FIVE; 6 = SIX

**Thermo Sudoku:** The digits in each thermometer are, from the bulb to the/each end, all different and placed in increasing order.

## Puzzle 2 ( $9 \times 9$ )

**Fortress Sudoku:** The digit in a grey cell is larger than each digit in a horizontally or vertically adjacent white cell.

**Low Sudoku:** The smallest digits in every  $3 \times 3$ -block have to be placed in the grey cells.

**Odd/Even Count Sudoku:** A digit in a grey cell indicates the number of cells around it (horizontally, vertically and diagonally) that contain digits of the same parity as the digit in that grey cell. All possible grey cells are given.

**Offset Sudoku:** The digit on the right side of a grey cell indicates the position of the digit in the grey cell in the row below it.

**Ordering Sudoku:** Place different two-digit-numbers in each dotted outlined box. Boxes are marked in ascending order such that the smallest number is placed in box 1 and the largest number is placed in box 18.

**Renban Sudoku:** Digits in each coloured area form a Renban group (a group of consecutive numbers, in random order).

**Round Off Sudoku:** When considering two digits in each cage as a two-figure number, the number on the top left of each cage must be the result of rounding off the two figure number in the cage to the closest multiple of 10. 1-4 are rounded down, 5-9 are rounded up.

**Small Neighbours Sudoku:** A digit in a grey cell is larger than all its horizontal and vertical neighbouring digits. All grey cells are given.

**Sum 100 Sudoku:** In each row, the sum of (multi-digit) numbers in the dotted outlined cages is exactly 100.

## Anti Knight Sudoku

Apply Classic Sudoku rules. Cells that can be reached by a (chess) knight step may not contain the same digit.

1					2
		2			
	3				
			4		
				5	
6					

1	6	5	3	4	2
3	4	2	5	6	1
5	3	4	2	1	6
2	1	6	4	3	5
4	2	1	6	5	3
6	5	3	1	2	4

## Arrow Sudoku

Apply Classic Sudoku rules. Digits placed in a cell with a circle must be the sum of the digits placed in cells the adjoining arrow passes through. Digits may repeat on arrows.

		○	↖		
			1		
↙		5			○
○			3		↗
		2			○
			○		

1	5	○4	↖2	6	3
3	2	6	1	4	5
↙2	3	5	4	1	○6
○4	6	1	3	5	↗2
5	1	2	6	3	4
6	4	3	○5	2	1

## Clone Sudoku

Apply Classic Sudoku rules. In grey areas with the same shape, all digits on equal places must be identical.

			3		
				4	
		6			5
1					
	4				
		1			

2	6	4	3	5	1
5	1	3	6	4	2
4	2	6	1	3	5
1	3	5	2	6	4
6	4	2	5	1	3
3	5	1	4	2	6

## Diagonal Sudoku

Place the digits from 1 to 6 in every row, column, 2×3 block and the main diagonals.

				6	
1		2			
				5	
	3				
			5		6
	5				

5	4	3	2	6	1
1	6	2	3	4	5
2	1	4	6	5	3
6	3	5	1	2	4
4	2	1	5	3	6
3	5	6	4	1	2

## Killer Sudoku

Apply Classic Sudoku rules. The digits placed in each marked cage must sum to the total given in its top-left. Digits must not repeat in cages.

6		9		10	
	15		8		
10			19		8
	8				
14				14	
		5			

6	2	3	5	4	6	1		
	15		8					
10	4	2	3	19	5	1	8	6
	8							
14	5	1	2	6	14	3	4	
		5						
	3	6	4	1	2	5		



### Nonconsecutive Sudoku

Apply Classic Sudoku rules. Horizontally and vertically adjacent cells cannot contain consecutive digits.

1					
	2				
			5		
		5			
				6	
					5

1	5	3	6	2	4
4	2	6	3	5	1
6	4	2	5	1	3
3	1	5	2	4	6
5	3	1	4	6	2
2	6	4	1	3	5

### Perfect Squares Sudoku

Apply Classic Sudoku rules. A black square means that the digits in the two neighbouring cells form a double digit square number in the reading direction. All possible squares are given.

	■				
	■	■			■
		■			■
1					4
	■		■		

5	1	2	4	6	3
3	■	6	■	4	1
2	4	3	5	1	■
6	5	1	3	4	2
1	2	■	5	6	3
4	3	■	6	2	■

### S, as in Sudoku

Apply Classic Sudoku rules. In the cells with letters, a digit can only be placed if it contains that letter when spelled in English.

1 = ONE; 2 = TWO; 3 = THREE;  
4 = FOUR; 5 = FIVE; 6 = SIX

O	N	E			
			T	W	O
F			T		
	I			S	
E		V			T
	E		E		

<sup>O</sup> 2	<sup>N</sup> 1	<sup>E</sup> 3	4	5	6
5	4	6	<sup>T</sup> 3	<sup>W</sup> 2	<sup>O</sup> 1
<sup>F</sup> 4	6	1	<sup>T</sup> 2	3	5
3	<sup>I</sup> 5	2	1	<sup>S</sup> 6	4
<sup>E</sup> 1	2	<sup>V</sup> 5	6	4	<sup>T</sup> 3
6	<sup>E</sup> 3	4	<sup>E</sup> 5	1	2

### Thermo Sudoku

Apply Classic Sudoku rules. The digits in each thermometer are, from the bulb to the/end, all different and placed in increasing order.

3	●				
	5				●
		6			
			6		
●				2	
					4

3	●	2	4	6	5
6	5	4	2	3	●
5	3	6	1	4	2
4	2	1	6	5	3
●	4	3	5	2	6
2	6	5	3	●	4

## Fortress Sudoku

Apply Classic Sudoku rules. The digit in a grey cell is larger than each digit in a horizontally or vertically adjacent white cell.

9	2					1		
1							2	
								7
			2		6			
			7		1			
3								
	6							4
		4					3	5

9	2	5	4	3	7	1	6	8
1	4	7	5	6	8	3	2	9
6	8	3	1	2	9	5	4	7
8	5	1	2	4	6	7	9	3
4	7	6	3	9	5	2	8	1
2	3	9	7	8	1	4	5	6
3	1	8	9	5	4	6	7	2
5	6	2	8	7	3	9	1	4
7	9	4	6	1	2	8	3	5

## Low Sudoku

Apply Classic Sudoku rules. The smallest digits in every 3×3-block have to be placed in the grey cells.

	3							
4								
				6	1	8		
				8			3	
3			9					
	6	5	2					
								8
							5	

6	3	8	5	1	4	7	9	2
4	1	2	8	9	7	5	3	6
7	5	9	3	2	6	1	8	4
5	9	6	1	4	8	2	7	3
2	7	4	6	3	5	8	1	9
3	8	1	9	7	2	4	6	5
9	6	5	2	8	1	3	4	7
1	4	3	7	5	9	6	2	8
8	2	7	4	6	3	9	5	1

## Odd/Even Count Sudoku

Apply Classic Sudoku rules. A digit in a grey cell indicates the number of cells around it (horizontally, vertically and diagonally) that contain digits of the same parity as the digit in that grey cell. All possible grey cells are given.

	7							
5		4		2				
	8		6		1			
		5		6		2		
	6		9		5		4	
		1		8		6		
			8		9		2	
				5		8		6
							9	

3	7	6	5	9	4	1	8	2
5	1	4	7	2	8	9	6	3
2	8	9	6	3	1	5	7	4
9	3	5	4	6	7	2	1	8
8	6	2	9	1	5	3	4	7
7	4	1	2	8	3	6	5	9
6	5	3	8	4	9	7	2	1
4	9	7	1	5	2	8	3	6
1	2	8	3	7	6	4	9	5

## Offset Sudoku

Apply Classic Sudoku rules. The digit on the right side of a grey cell indicates the position of the digit in the grey cell in the row below it.

1			7			8	
	9			6			4
	7				5		
9						6	
	3						9
		5				1	
3			1			9	
	8			2			1

1	6	2	4	7	5	9	8	3
5	9	3	2	8	6	1	7	4
4	7	8	3	9	1	5	2	6
9	4	1	8	5	7	3	6	2
8	3	7	6	1	2	4	5	9
6	2	5	9	4	3	7	1	8
3	5	4	1	6	8	2	9	7
7	8	9	5	2	4	6	3	1
2	1	6	7	3	9	8	4	5

## Ordering Sudoku

Apply Classic Sudoku rules. Place different two-digit-numbers in each dotted outlined box. Boxes are marked in ascending order such that the smallest number is placed in box 1 and the largest number is placed in box 18 (10 in the example).

<sup>8</sup>		7		9				
				1	2			
8				<sup>2</sup>				
<sup>3</sup>			2				4	
1		<sup>10</sup>		<sup>9</sup>				
	4					<sup>5</sup>		
	3	<sup>4</sup>						
			4			<sup>6</sup>		
							<sup>7</sup>	

<sup>8</sup>	6	2	7	8	9	4	3	1	5	
4	<sup>5</sup>	3	6	7	1	2	8	9		
8	9	1	3	2	<sup>2</sup>	5	4	7	6	
<sup>3</sup>	5	6	8	2	3	9	1	4	7	
1	7	<sup>10</sup>	9	5	4	<sup>9</sup>	8	6	3	2
3	4	2	1	6	7	9	<sup>5</sup>	5	8	
9	3	<sup>4</sup>	5	7	1	6	8	2	4	
7	1	6	4	8	2	<sup>6</sup>	5	9	3	
2	8	4	9	5	3	7	<sup>7</sup>	6	1	

## Renban Sudoku

Apply Classic Sudoku rules. Digits in each coloured area form a Renban group (a group of consecutive numbers, in random order).

				9				
		7				8		
	1			4			3	
2								1
			9	7	2			
8								5
	8			6			2	
		2				4		
				2				

4	2	5	8	9	3	1	7	6
3	9	7	2	1	6	8	5	4
6	1	8	7	4	5	9	3	2
2	3	9	6	5	8	7	4	1
1	5	4	9	7	2	6	8	3
8	7	6	4	3	1	2	9	5
9	8	1	5	6	4	3	2	7
5	6	2	3	8	7	4	1	9
7	4	3	1	2	9	5	6	8

## Round Off Sudoku

Apply Classic Sudoku rules. When considering two digits in each cage as a two-figure number, the number on the top left of each cage must be the result of rounding off the two figure number in the cage to the closest multiple of 10. 1-4 are rounded down, 5-9 are rounded up.

	9	5				2	7	
70							20	
4	30			1		5	40	9
6		30			100			1
		4				7		
2		100			80			6
8	60		9		3	60		4
30							60	
	6	2				1	8	

1	9	5	4	3	6	2	7	8		
70	7	3	6	8	9	2	4	20	1	5
4	30	2	8	1	7	5	40	3	6	9
6	7	30	3	2	8	100	9	5	4	1
5	8	4	3	6	1	7	9	2		
2	1	100	9	5	4	80	7	8	3	6
8	60	5	7	9	1	3	60	6	2	4
30	3	4	1	6	2	8	9	60	5	7
9	6	2	7	5	4	1	8	3		

## Small Neighbours Sudoku

Apply Classic Sudoku rules. A digit in a grey cell is larger than all its horizontal and vertical neighbouring digits. All grey cells are given.

	7			2		1	
		5				3	
2							
				4		3	
1							7
	3			7			
							5
		2				8	
	8		7				2

8	7	6	9	3	2	5	1	4
9	1	5	4	6	7	3	8	2
2	4	3	8	1	5	7	9	6
6	2	7	5	4	9	1	3	8
1	9	4	6	8	3	2	5	7
5	3	8	2	7	1	6	4	9
4	6	1	3	2	8	9	7	5
7	5	2	1	9	4	8	6	3
3	8	9	7	5	6	4	2	1

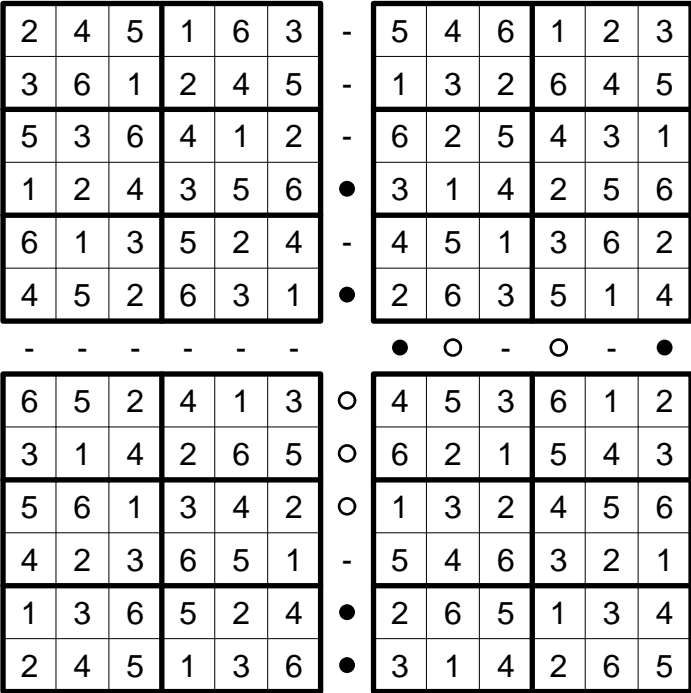
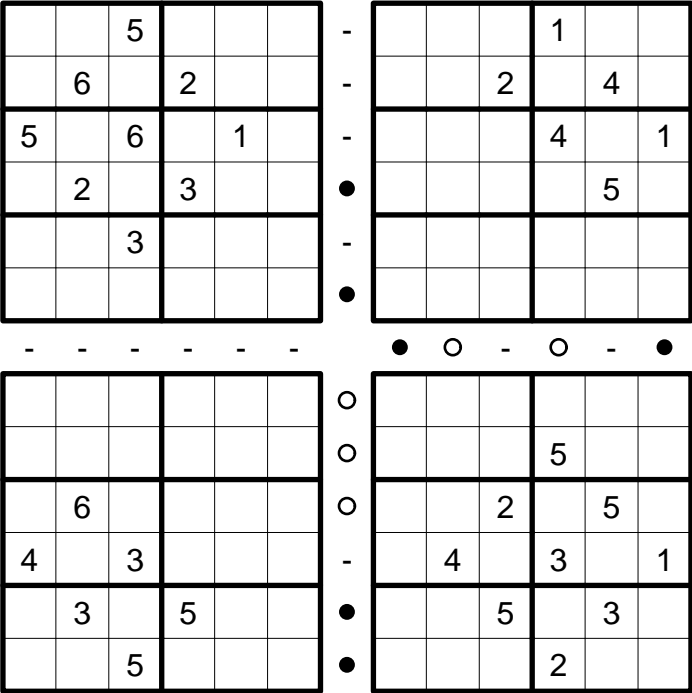
## Sum 100 Sudoku

Apply Classic Sudoku rules. In each row, the sum of (multi-digit) numbers in the dotted outlined cages is exactly 100.

6				9				3
		7				9		
			8		5			
				5				
9								6
				4				
			9		2			
		5				8		
7				8				2

6	5	8	7	9	1	4	2	3
1	2	7	4	3	6	9	8	5
4	3	9	8	2	5	6	1	7
3	8	2	6	5	7	1	4	9
9	7	4	3	1	8	2	5	6
5	1	6	2	4	9	7	3	8
8	4	3	9	6	2	5	7	1
2	9	5	1	7	3	8	6	4
7	6	1	5	8	4	3	9	2

Here is an example of the Kropki Connection with four Classic Sudokus:



# World Cup Playoffs: Semifinal 1

## Classic Sudoku

Apply Classic Sudoku rules.

## Nonconsecutive Sudoku

Apply Classic Sudoku rules. Horizontally and vertically adjacent cells cannot contain consecutive digits.

	2		3		8		1	
8				1				4
7								3
	8						2	
6								1
9				5				7
	5		4		7		6	

4	2	7	3	6	8	5	1	9
8	6	3	9	1	5	2	7	4
5	9	1	7	4	2	6	3	8
7	1	9	5	2	6	4	8	3
3	8	5	1	7	4	9	2	6
6	4	2	8	3	9	7	5	1
2	7	4	6	8	3	1	9	5
9	3	6	2	5	1	8	4	7
1	5	8	4	9	7	3	6	2

## Fortress Sudoku

Apply Classic Sudoku rules. The digit in a grey cell is larger than each digit in a horizontally or vertically adjacent white cell.

9	2					1		
1							2	
								7
			2		6			
			7		1			
3								
	6							4
		4					3	5

9	2	5	4	3	7	1	6	8
1	4	7	5	6	8	3	2	9
6	8	3	1	2	9	5	4	7
8	5	1	2	4	6	7	9	3
4	7	6	3	9	5	2	8	1
2	3	9	7	8	1	4	5	6
3	1	8	9	5	4	6	7	2
5	6	2	8	7	3	9	1	4
7	9	4	6	1	2	8	3	5

## X-Sums Sudoku

Apply Classic Sudoku rules. Clues outside the grid indicate the sum of the first X digits placed in the corresponding direction, where X is equal to the first digit placed in that direction.

	8	41	27		32	30		9	27	
17										12
19										41
										35
36										
30										31
										8
8										
39										6
20										36
	29	18		8	38		32	16	33	

	8	41	27		32	30		9	27	
17	3	8	6	9	7	5	1	2	4	12
19	4	9	5	1	2	6	3	7	8	41
	1	7	2	4	3	8	9	5	6	35
36	8	2	3	5	1	4	7	6	9	
30	6	1	4	3	9	7	2	8	5	31
	9	5	7	8	6	2	4	1	3	8
8	2	6	8	7	4	3	5	9	1	
39	7	3	9	6	5	1	8	4	2	6
20	5	4	1	2	8	9	6	3	7	36
	29	18		8	38		32	16	33	

## Kropki Sudoku

Apply Classic Sudoku rules. A white circle between two cells indicates that the neighbouring digits are consecutive. A black circle between two cells indicates that one of the digits is twice as large as the other digit. The absence of a circle indicates that there is no neighbouring digit that is either consecutive or double.


8	7	3	6	1	5	9	2	4
6	1	2	4	8	9	5	3	7
4	9	5	3	7	2	8	6	1
3	4	7	8	6	1	2	9	5
9	6	1	2	5	3	4	7	8
5	2	8	9	4	7	6	1	3
2	5	9	7	3	8	1	4	6
7	8	4	1	2	6	3	5	9
1	3	6	5	9	4	7	8	2

# World Cup Playoffs: Semifinal 2

## Classic Sudoku

Apply Classic Sudoku rules.

## No Touch Sudoku

Apply Classic Sudoku rules. Equal digits don't touch each other diagonally.

	6		7		1		4	
4				6				1
			4		9			
6		7				3		9
	1						7	
8		3				5		4
			1		8			
1				4				2
	7		2		6		3	

5	6	9	7	8	1	2	4	3
4	2	8	5	6	3	7	9	1
7	3	1	4	2	9	6	8	5
6	4	7	8	1	5	3	2	9
2	1	5	9	3	4	8	7	6
8	9	3	6	7	2	5	1	4
3	5	2	1	9	8	4	6	7
1	8	6	3	4	7	9	5	2
9	7	4	2	5	6	1	3	8

## Anti Diagonal Sudoku

Apply Classic Sudoku rules. Each marked diagonal must contain exactly three different digits.

		1	3		7	9		
	8			5			7	
	3						2	
		8				6		
	5						9	
	6			4			8	
		3	2		8	5		

7	9	4	1	6	2	3	5	8
5	2	1	3	8	7	9	4	6
3	8	6	4	5	9	2	7	1
6	3	9	7	1	4	8	2	5
4	1	8	9	2	5	6	3	7
2	5	7	8	3	6	1	9	4
9	6	2	5	4	1	7	8	3
1	4	3	2	7	8	5	6	9
8	7	5	6	9	3	4	1	2





# World Cup Playoffs: Final

## Classic Sudoku

Apply Classic Sudoku rules.

## Anti Knight Sudoku

Apply Classic Sudoku rules. Cells that can be reached by a knight's move (chess) can't contain the same digit.

3				5				4
			2		6			
		6					7	
	8			1				5
9			4		2			3
	6			3				7
		9					5	
			8		5			
4				2				7

3	9	2	7	5	1	6	8	4
5	4	7	2	8	6	3	9	1
8	1	6	3	9	4	7	2	5
2	8	3	9	1	7	4	5	6
9	7	5	4	6	2	8	1	3
1	6	4	5	3	8	2	7	9
6	2	9	1	7	3	5	4	8
7	3	1	8	4	5	9	6	2
4	5	8	6	2	9	1	3	7

## Thermo Sudoku

Apply Classic Sudoku rules. The digits in each thermometer are, from the bulb to the/end, all different and placed in increasing order.

			1	5				
			2					
6			7					
7								
	8	5			1	9		
								2
			6					5
			1					
		7	4					

9	2	8	6	3	1	5	4	7
5	7	3	8	2	4	9	6	1
6	1	4	5	7	9	3	2	8
7	9	1	3	8	2	4	5	6
2	8	5	7	4	6	1	9	3
4	3	6	1	9	5	8	7	2
1	4	2	9	6	8	7	3	5
3	5	9	2	1	7	6	8	4
8	6	7	4	5	3	2	1	9

## Battenburg Sudoku

Apply Classic Sudoku rules. Everywhere 2 odd and 2 even digits form a checkerboard pattern, a Battenburg marking is given. If there is no marking, the above pattern is not allowed.

9								2
	9							2
		6					9	
	5							6
		9		2		3		
3								5

9	4	7	3	8	6	5	1	2
6	1	8	2	5	4	7	3	9
5	2	3	1	7	9	8	4	6
7	9	1	5	6	3	4	2	8
2	3	6	8	4	1	9	5	7
8	5	4	7	9	2	1	6	3
4	7	9	6	2	5	3	8	1
1	6	5	9	3	8	2	7	4
3	8	2	4	1	7	6	9	5

## Little Killer Sudoku

Apply Classic Sudoku rules. Clues outside the grid indicate the sum of the digits placed in the cells in the direction of the corresponding arrow. Digits may repeat within a sum.

	2							
			5					
		3						8

3	6	5	1	7	2	8	9	4
1	2	8	6	4	9	5	3	7
9	7	4	5	3	8	2	6	1
7	1	6	8	5	4	9	2	3
8	5	3	9	2	7	1	4	6
4	9	2	3	6	1	7	5	8
5	4	9	7	1	3	6	8	2
6	3	7	2	8	5	4	1	9
2	8	1	4	9	6	3	7	5

