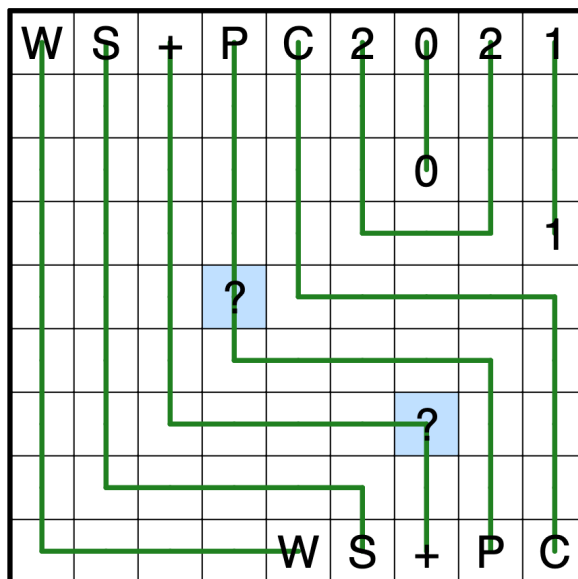


This is the “solution booklet” to the WS+PC 2021 trivia game.

1. (W) Who has been the winner of WSC the most times?
  - a. Kota Morinishi (4 times: 2014, 2015, 2017, 2018) 🏆🏆🏆🏆
  - b. Jan Mrozowski (3 times: 2009, 2010, 2012) 🏆🏆🏆
  - c. Thomas Snyder (3 times: 2007, 2008, 2011) 🏆🏆🏆
  - d. Tiit Vunk (once: 2016) 🏆
  
2. (S) Who is known as the Father of Sudoku?
  - a. Will Shortz (American puzzle creator, chairman of WPF)
  - b. Maki Kaji
  - c. Thomas Snyder (American puzzle creator, 3-time WSC winner, 1 time WPC winner, also known as Dr. Sudoku)
  - d. Tetsuya Nishio (Japanese puzzle creator)
  
3. (+) Approximately how many people registered for this year’s WS+PC as of this point?
  - a. 600
  - b. 800
  - c. 1000 (As of the point of the trivia game, we had 1037 participants across 68 countries registered 🎉)
  - d. 1200
  
4. (P) **Number link** (author: Tantan Dai): Do the two highlighted cells (also marked by the question mark) belong to the same link?
  - a. True
  - b. False (see below)

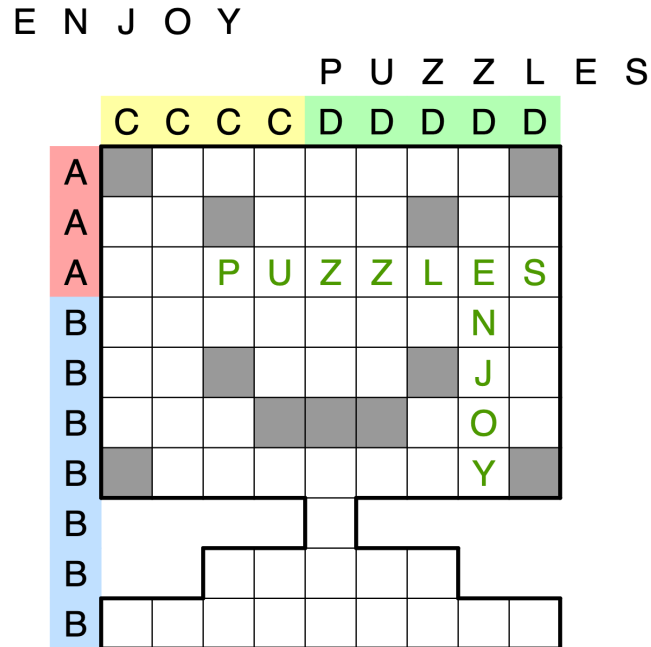


5. (C) (year of the first WSC)+(year of the first WPC)?
- 3996
  - 3998 (2006+1992=3998)
  - 4006
  - 4008
6. (W) Who has been the second place of WSC the most times?
- Tiit Vunk (3 times: 2014, 2015, 2017) 🏆 🏆 🏆
  - Kota Morinishi (4 times: 2011, 2012, 2013, 2019) 😬 🏆 🏆 🏆 🏆
  - Jakub Onderušek (twice: 2010, 2016) 🏆 🏆
  - Yuhei Kusui (twice: 2007, 2008) 🏆 🏆
7. (S) What is the minimum number of givens needed for a classic sudoku to be unique?
- Answer: 17. You can easily find explanations on the Internet 🤖
8. (+) Approximately what percentage of people in this year's WS+PC have never participated in WSPC before?
- 20%
  - 30%
  - 40%
  - 50% (approximately 52.8% of the registered participants indicated that they have never participated in WSPC before) 👍
9. (P) **Akari** (author: Yanzhe Qiu): Where is the light bulb in row 4?
- Column 1-3
  - Column 4-6 (see below) 💡
  - Column 7-8
  - There is no light bulb in row 4

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

10. (C) Which country hosted the first World Sudoku Championship?
- Italy (the first WSC was held in Lucca, Italy in 2006) 🇮🇹
  - USA
  - Czech Republic
  - Slovakia
11. (W) Who has been the winner of the WPC Under 18 category the most times?
- Walker Anderson (3 times: 2017, 2018, 2019) 🏆🏆🏆
  - Ryotaro Chiba 🏆
  - Yanzhe Qiu (4 times: 2013, 2014, 2015, 2016) 🏆🏆🏆🏆
  - Freddie Hand
12. (S) What is the minimum number of distinct given digits required for a classic sudoku?
- Answer: 8. If you only have 7 distinct digits, then the two remaining digits can be swapped. You do not need the 9th digit because you can deduce it from the rest.
13. (+) How many time trials do we have for this year's WS+PC?
- 11
  - 22
  - 33 (thank you Tawan ❤️)
  - 44
14. (P) **Scrabble** (author: Yanzhe Qiu): Which region completely covers the word "PUZZLES"?
- Row 1-3 (see below)
  - Row 4-10

- c. Column 1-4
- d. Column 5-9



15. (C) Which country hosted the first World Puzzle Championship?
- a. Japan
  - b. USA (the first WSC was held in New York City, NY, USA in 1992) 🇺🇸
  - c. Hungary
  - d. Germany
16. (W) Who has been the winner of the WSC Over 50 category the most times?
- a. Taro Arimatsu
  - b. Mark Goodliffe
  - c. David McNeil (4 times: 2014, 2015, 2017, 2019) 🏆🏆🏆🏆
  - d. Zoran Tanasic (once: 2016) 🏆
17. (S) **Classic Sudoku** (author: Prasanna Seshadri): What is the digit in the highlighted cell (also marked by the question mark)?
- a. Answer: 2. First, observe that the 8 in box 1 would be in R2C3. Thus the 9 in box 1 would be in R2C2. Hence the 4 in column 2 would be in R1C2. Now observe that 6 in box 8 would be in R8C4. Hence the highlighted cell (R8C2) cannot be 6, and thus 2 must be placed in the highlighted cell (R8C2) has to be 2.

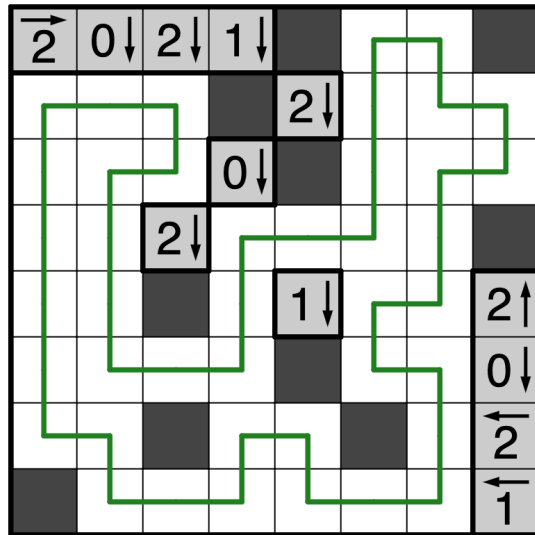
			9		8			
2								4
1	7			5			9	8
	8		2	3	4		5	
	5						7	
	1		5	6	7		8	
4	3			8			6	7
8	?							3
			3		9			









18. (+) How many sudokus are there in total in the sudoku competition at this year's WS+PC?

- 85
- 87 (12+15+10+10+10+10+10+10=87) 🧠
- 95
- 97

19. (P) **Yajilin** (author: **Tantan Dai**): How many black squares in total are there in this Yajilin puzzle?

- Answer: 10 (see below)



20. (C) Which year did WSC and WPC first merge?
- 2009
  - 2010
  - 2011 (WSC and WPC first merged in 2011 in Eger, Hungary) 
  - 2012
21. (W) Who has been the winner of the WPC Over 50 category the most times?
- David McNeil (once: 2015) 
  - Stefano Forcolin (twice: 2013, 2014)  
  - Ulrich Voigt (Ulrich has won WPC 11 times, but he hasn't joined the Over 50 category yet)
  - Taro Arimatsu (4 times: 2016, 2017, 2018, 2019)    
22. (S) Dots mark the difference between two digits. What value could the dots be? (120s time limit)
- 1 (This sudoku was originally designed as [Consecutive Pair Sudoku](#), created by R Kumaresan)
  - 2 (In column 2, there are two groups of two consecutive dots, one group is between R2C5 and R3C5, and between R3C5 and R4C5. Another group is between R6C5 and R7C5, and between R7C5 and R8C5. If the difference is 2, then one of the groups must only contain odd digits, and the other group must only contain even digits. The group containing even digits must contain 4 and 6. But the first group cannot contain 6, and the second group cannot contain 4. So the difference cannot be 2.)
  - 3 (Note that in column 2, there are two consecutive dots (between R2C2 and R3C2, and between R3C2, R4C2). Possible combinations that satisfy two






consecutive dots with a difference of 3 are 1, 4, 7; 2, 5, 8; and 3, 6, 9. But note that there are 8 and 9 in column 2, and 4 in row 3. So neither of the combinations would work. Thus the difference cannot be 3.)

- d. 4 (Observe that again in column 2. The only combination that satisfies two consecutive dots with a difference of 4 is 1, 5, and 9. But there is a 9 in column 2. So the difference cannot be 4.)

					9	1	
		○	○		6		3
	○			○	1		4
	○			○			
		○	○		3	6	
	8	4					
4			1	○			○
6			4	○			○
	9	8					


23. (+) This question is deleted because only one of the people was in the top 10 of both the competitive portions of WS+PC when the question was constructed, but there were two of them when the trivia game happened. All four of them ended up in the top 10 of both the competitive portions of WS+PC this year. (+) Who is currently in the top 10 in both the competitive portions (sudoku competition and puzzle competition) of WS+PC?
- Ken Endo
  - Kota Morinishi
  - Hideaki Jo
  - Freddie Hand
24. (P) Coded Skyscrapers (author: Tantan Dai): Rank the numerical value of W, S, P, C in ascending order (?<?<?<?).
- Answer:  $P < S < W < C$  The 1 in the bottom row indicates that  $R5C5=5$ . It also means that  $W \neq 1$ ,  $S \neq 1$ , and  $C \neq 1$ . Hence 5 in the first row could only be placed at  $R1C3$ , and thus  $P=1$ . Now since  $P=1$ , we have  $R3C1=5$ . So the 5 in column 2 must be either in  $R2C2$  or  $R4C2$ . Hence S could only be 2, and thus W must be 3. Now notice that in column 4 the 5 cannot be in the last row because of the 5 in  $R5C5$ . Consequently, the only remaining value for C is 4. Therefore we have  $P(1) < S(2) < W(3) < C(4)$ .

	W	S	P	C	
W					
P					2
C					1
	W	S	C	2	1

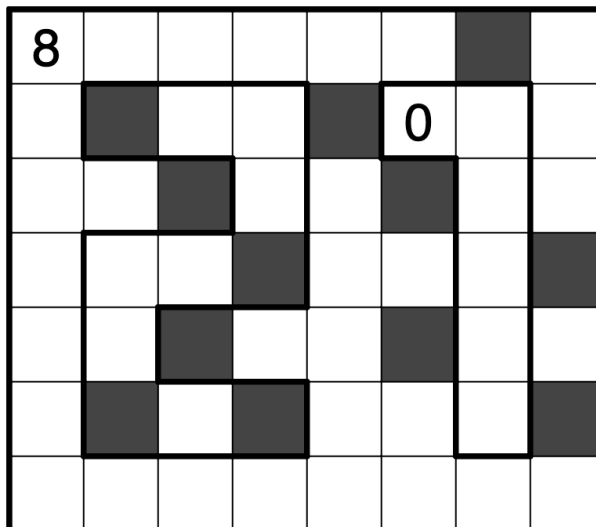
25. (C) Which country has won the WPC team title the most times?
- a. Germany (8 times: 2003, 2005, 2009, 2012, 2014, 2015, 2016, 2018)
    - 
  - b. Japan (twice: 2002, 2017) 
  - c. USA (15 times: 1992, 1995, 1996, 1998, 1999, 2000, 2001, 2004, 2006, 2007, 2008, 2010, 2011, 2013, 2019) 
  - d. Czech Republic (3 times: 1993, 1994, 1997) 
26. (W) How many times did Wei-Hwa Huang win the WPC? (Please enter a number)
- a. Answer: 4 (1995, 1997, 1998, 1999) 
27. (S) What sudoku variant could this solution be?
- a. No touch
  - b. Antiknight (R4C2 and R5C4 are a knight step away, but both contain digit 1)
  - c. Nonconsecutive (R3C8 and R3C9 are adjacent, but differ by 1)
  - d. XV (R2C9 and R3C9 are adjacent, and there is no V mark between them, but they sum up to 5)



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

28. (+) Approximately how many people attempted the round with the most number of starts so far?
- 200
  - 400
  - 600 (As of the point of the trivia game, 653 participants started Sudoku Round 1: Classics) 
  - 800

29. (P) **Heyawake** (author: [Yanzhe Qiu](#)): How many black cells do you need to paint in the region with a shape of 2?
- Answer: 4 (see below)




30. (C) Which country has the tradition of bringing in newcomers each year for WSPC?
- USA
  - Japan (Japanese team always reserves a seat in B team for a newcomer in both WSC and WPC) 🇯🇵
  - China
  - Czech Republic

31. (W) Who shared the same birth date as Palmer Mebane?
- Tom Collyer
  - Tiit Vunk
  - Hideaki Jo (Hideaki and Palmer are both born on November 17th. It was a few hours before their birthday for both of them when they were on the panel.) 🎂
  - Gareth Moore

32. (S) What sudoku variant could this be? (240s time limit)
- Sequence (the longest line cannot be a sequence)
  - Fuzzy Arrow (the longest line cannot be an arrow)
  - Renban (the bottom two lines each contain 5 cells, so 5 must be on both lines. The line that went through the cells R6C5, R6C6, R7C7, R8C8, and R8C9 must have 5 in R7C7. But then the 5 in box 6 must be placed in R6C89. There will then be two 5s on the line that went through the cells R8C5, R8C6, R7C7, R6C8, and R6C9, contradicting the Renban rule)
  - Palindrome (this puzzle was originally designed as a [Palindrome Sudoku](#), created by Mengting Hu. This is a [modified version](#) of the original puzzle. The lines in the original puzzle form the Chinese word “回文,” which means palindrome.)

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

33. (+) Rank the following panelists from the oldest to the youngest:
- Tantan Dai (4th-year college student)
  - Walker Anderson (3rd-year college student)
  - Ryotaro Chiba (2nd-year college student)
  - Freddie Hand (1st-year college student)
34. (P) What is the Nikoli puzzle Norinori based off of?
- Chocolate 
  - Graham Crackers
  - Seaweed Snacks (nori means seaweed in Japanese)
  - Dominos
35. (C) Which year did the Sudoku Grand Prix (GP) start?
- 2012
  - 2013 (Sudoku GP started in 2013. It was hosted on several different websites that year, and moved to the WPF GP site in 2014)
  - 2014
  - 2015
36. (W) Which of the following is Ryotaro Chiba?
- 森西 亨太 (Kota Morinishi)
  - 遠藤 憲 (Ken Endo)
  - 條 秀彰 (Hideaki Jo)
  - 千葉 遼太郎 (Ryotaro Chiba)
37. (S) **Quadruple Sudoku** (author: R Kumaresan): What is the digit in the highlighted cell (also marked by the question mark)?
- 2
  - 5 (first, observe that since there is a 1578 quadruple in box 9 (R89C78), other cells in box 9 cannot be 5. So to satisfy the clues between box 6 and box 9 (R67C89), we must have 5 in one of R6C8 and R6C9. Now notice that 5 in box 3 can only be in column 9 (R123C9), given that the quadruples in box 3 (R12C78) and the quadruples between box 3 and box 6 (R34C78) do not contain 5. Hence 5 cannot be in R6C9 and thus have to be placed in R6C8)
  - 7
  - 9

	4789			1269	
		3678	24		
5				4467	
	3478		1279		
				2579	
				?	
	2489	16		59	
			1679		
	1356			1578	

38. (+) All of the Japanese panelists studies/studied at the University of Tokyo.
- True (Ryotaro Chiba is currently studying at the University of Tokyo. Ken Endo, Hideaki Jo, and Kota Morinishi all graduated from the University of Tokyo as well)
  - False
39. **ABCtje** (author: Tantan Dai): What is the sum of the numbers corresponding to the letters in the word DOE? Please enter an integer.
- Answer: 6. First, notice that DOUDOU = 20, so DOU = 10. Subtracting DOU from SUDOKU, we obtain SUK=24. Hence {S, U, K} = {7, 8, 9}. Then U = 7 and {D, O} = {1, 2}. Now {P, Z, L, E} = {3, 4, 5, 6}. Subtracting PZLE from PUZZLE, we obtain UZ = 31-18 = 13. But since U = 7, we have Z = 6. Now {P, L, E} = {3, 4, 5}. Notice that since PULL = 21 and U = 7, we have PLL = 14. The only combination that achieves this is P = 4 and L = 5. Thus E = 3 and therefore DOE=1+2+3=6.

$$\begin{array}{r}
 \text{S U P P O S E} = 36 \\
 \text{S U D O K U} = 34 \\
 \text{P U Z Z L E} = 31 \\
 \text{D O U D O U} = 20 \\
 \text{P U L L} = 21 \\
 \text{D O E} = ?
 \end{array}$$

40. (C) People from how many different countries have won individual WPC before?
- 5
  - 7 (solvers from Canada🇨🇦, Czech Republic🇨🇪, USA🇺🇸, Germany🇩🇪, Netherlands🇳🇱, Hungary🇭🇺, and Japan🇯🇵 have won individual WPC before)
  - 9
  - 11

41. (W) What is Hideaki's favorite puzzle type?
- Kakuro (Hideaki mentioned during the Japanese Solve Panel that his favorite puzzle type is Kakuro)
  - Tapa (Walker and Palmer's favorite puzzle type)
  - Classic Sudoku (Kota's favorite puzzle type)
  - Curve Data 🤖

42. **Between Sudoku** (author: Akash Doulani): What is the digit in the highlighted cell (also marked by the question mark)?
- Answer: 1. First, notice that 1 cannot be on any line as there is no number among 1-9 that is strictly smaller than 1. So 1 must be in R6C5 in column 5. It is also worth noting that we cannot have a bridge that has 1s on both ends. So R9C2 cannot be 1, and therefore 1 must be in R5C2 in column 2.

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

43. (+) Which country on the Time Trial Country Leaderboard currently has more gold medals than silver medals?
- Japan (At the time of the trivia game, Japan had 11 gold medals and 12 silver medals. They have 12 gold medals and 13 silver medals in the end.)

- b. United Kingdom (At the time of the trivia game, the United Kingdom had 3 gold medals and 2 silver medals. They have 5 gold medals and 3 silver medals in the end.) 🇬🇧
  - c. USA (At the time of the trivia game, the USA had 2 gold medals and 4 silver medals, which also lasted to the end.)
  - d. France (At the time of the trivia game, France had 2 gold medals and 3 silver medals, which also lasted to the end.)
44. (P) Tapa: Serkan Yurekli // Balance Loop: Prasanna Seshadri // Aqre: Eric Fox // Castle Wall: ??
- a. Thomas Snyder
  - b. Palmer Mebane (the names are the creators of the given puzzle types, and Palmer created Castle Wall) 🧠
  - c. Nikoli
  - d. Serkan Yurekli
45. (C) Which one of the following is not a tradition of WSPC?
- a. Football (usually happens after WPC) ⚽
  - b. Scavenger Hunt/Puzzle Hunt (although it happened in 2019 Kirchheim, Germany, scavenger hunt/puzzle hunt is not usually a tradition of WSPC)
  - c. Karaoke (usually happens after WPC awarding ceremony/closing ceremony) 🎤
  - d. Sightseeing (usually happens between WSC and WPC) 🌄
46. (W) What is the first name of this person? (Capitalize the first letter)
- a. Answer: Prasanna 🌟



47. **ER Fortress** (author: [Yanzhe Qiu](#)): Which cell in the extra region is 6? (120s time limit)

- a. A5
- b. C2 (First, note that the 1 in the extra region must be placed in A6 since 1 cannot be placed in a grey cell with an adjacent white cell. Using the Fortress rule, the 2 in the extra region has to be placed in D2, with 1s placed in D1 and E2. Now similarly, we have 3 in B6 with 2 being placed in B5 and C6. Now the 6 in box 3 must be placed in C2 or D3 using the Fortress rule. Hence the 6 in box 2 cannot be placed in one of the grey cells. It thus has to be put into B4 by the Fortress rule. Hence A5 has to be 5. Then C2 and D3 have possibilities of 4 and 6, and C1 and C3 contain 3 and 5. Since C2 has to be bigger than both C1 and C3, i.e., 3 and 5, it has to be 6.)
- c. D2
- d. D3

	1	2	3	4	5	6
A						
B						
C						
D						
E						
F						

48. (+) What is the variant that Bakpao asked TiiT about during Sudoku Solver's Panel?

(Please enter two capitalized letters)

- a. Answer: GT. (TiiT is constantly FAST at GT, and so we wanted to know his secret methods for solving GT. Bakpao did not ask TiiT during the panel, but Tantan asked for him anyways 😊)

49. (P) Capsules (author: [Yanzhe Qiu](#)): What is ?# (Values of the symbols)

- a. Answer: +C. (We start with the top right corner of the puzzle. Note that the + in the L shape means that its bottom left corner (R4C9) cannot be +. So the + in the N shape must be in the other 4 cells (R4C8, R5C6, R5C7, R5C8). These 4 cells are all adjacent or diagonally adjacent to R4C7. So R4C7 cannot be +, and thus the + in the W shape has to be in one of R3C7, R3C8, and R2C8. These 3 cells are all adjacent to or diagonally adjacent to R2C7. So R2C7 cannot be +. Therefore the + in the P shape has to be in R1C7, i.e., the highlighted cell marked

with a question mark. Now let's look at the bottom right corner of the puzzle. Using the adjacency rule, we have  $R9C2 = R9C4 = R7C5 = R6C3$ . The only possibility in these cells is C. Thus the highlighted cell marked by # is C. )

W	C	W	S	+		?			
S	P	+	C	W					
+	C	S	P	+					+
P	W	+	W	C					
C	S	P	S	P					
					W	C	W	S	+
					S	P	+	C	W
					+	C	S	P	+
	#				P	W	+	W	C
+					C	S	P	S	P

50. (C) What is the song that we usually sing together at the end of each WSPC karaoke night?
- Byron's Sudoku Song (epic, but not the ending song)
  - Wonderwall
  - Bohemian Rhapsody (people sing it every year, but not necessarily at the end)
  - Canadian Anthem (😏 check out the experienced puzzle solvers panel for more details)