

Digital Schoolhouse Puzzle Page

"If I had an hour to solve a problem I'd spend 55 minutes thinking about the problem and 5 minutes thinking about solutions"

Albert Einstein

Welcome to the Digital Schoolhouse Puzzle Page

On this paper, we will investigate a series of puzzles that can be used to promote Computational Thinking. This month we will investigate Santa's Glove Selection conundrum.

Santa's Glove Selection

Santa has 20 gloves in a drawer: 5 pairs of black gloves, 3 pairs of brown, and 2 pairs of grey. Santa selects the gloves in the dark and can check them only after a selection has been made.

What is the smallest number of gloves that Santa needs to select to guarantee getting the following?

- (a) At least one matching pair?
- (b) At least one matching pair of each colour?

Answer:

- (a) 11 gloves.

In the worst case, before Santa selects at least one matching pair, Santa will select 5 black gloves, 3 brown gloves and 2 grey gloves - all for the same hand. The next glove will have to yield a matching pair.

- (a) 19 gloves

In the worst case, before Santa selects one matching pair of each colour, Santa will select all 10 black gloves, all 6 brown gloves and 2 grey gloves for the same hand. The next grey glove will have to yield Santa a matching pair.

Linkage to Computer Science

This puzzle provides a simple example of the worst-case analysis of an algorithm efficiency.

Puzzle 19: Easy

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

Puzzle 20: Medium

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

Puzzle 21: Hard

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

Solutions

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

Puzzle 21: (Hard, difficulty rating 0.64)

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

Puzzle 20: (Medium, difficulty rating 0.50)

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

Puzzle 19: (Easy, difficulty rating 0.36)