

# 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 finger counting.

### Predicting a Finger Count

A little girl counts from 1 to 1000 using the fingers of her left hand as follows. She starts by calling her thumb 1, the first finger 2, middle finger 3, ring finger 4, and little finger 5. Then she reverses the direction, calling the ringer finger 6, middle finger 7, first finger 8 and her thumb 9, after which she calls her first finger 10, and so on. If so continues to count in this manner, on which finger will she stop?

**Answer: She will stop on her first finger**

Below is how the finger count starts:

Finger	Thumb	First	Middle	Ring	Little	Ring	Middle	first
Count	1	2	3	4	5	6	7	8
Count	9	10	11	12	13	14	15	16
Count	17	18	19	20	21	22	23	24
count	25	26	27	28	29	30	31	32

It is easy to see that the counting falls on the same finger every eighth number called. Therefore, to answer the question, all one needs to do is to find the remainder of the division of 1000 by 8, which is equal to 0. This implies that when the girl reaches 1000, she will be on her first finger. (moving from the middle finger), the same one she will be on while calling any number divisible by 8.

### Linkage to Computer Science

This object of this puzzle is to determine the output of a given algorithm (i.e. the finger count process) for a specific input (i.e. the number 1000).

### Solutions

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

Puzzle 30 (Hard, difficulty rating 0.74)

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

Puzzle 29 (Medium, difficulty rating 0.57)

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

Puzzle 28: (Easy, difficulty rating 0.43)

### Puzzle 28: Easy

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

### Puzzle 29: Medium

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

### Puzzle 30: Hard

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