

# 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 look at the Icosian Game.

### Icosian Game

The Icosian Game was invented by the Irish mathematician Sir William Hamilton (1805 – 1865). The game was played on a wooden board with holes representing major world cities and grooves representing connections between them (see Figure 1). The object of the game is to find a circular route that would pass through all the cities exactly once before returning to the starting point.

Can you find such a route?

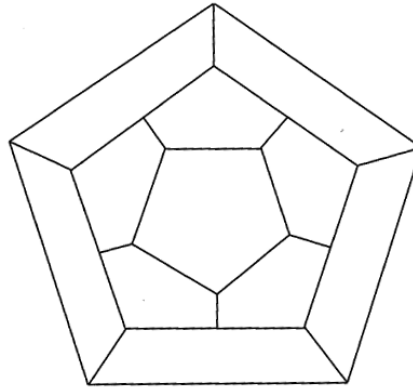
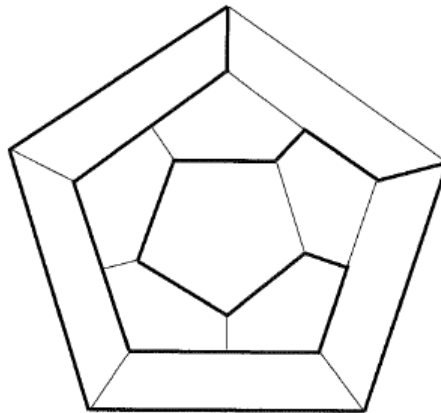


Figure 1

### Answer:

The puzzle has 30 possible solutions, one of which is shown to the side.



### Linkage to Computer Science

This puzzle presents the Hamilton circuit, which is a sequence of adjacent (connected by an edge) vertices in a graph that starts at a vertex, visit each of the other vertices exactly once, and then returns to a starting vertex. Some graphs have Hamilton circuits, whilst some do not.

### Solutions

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

Puzzle 33 (Hard, difficulty rating 0.66)

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

Puzzle 32 (Medium, difficulty rating 0.53)

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

Puzzle 31 (Easy, difficulty rating 0.38)

### Puzzle 31: Easy

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

### Puzzle 32: Medium

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

### Puzzle 33: Hard

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