

An undirected graph is defined as follows:

$$V = \{ i \mid 0 \leq i < 10 \}$$

$$E = \{ (0,1), (0,3), (1,9), (3,5), (3,7), (4,6), (5,9), (6,8) \}$$

Question 1: How many connected components are in the graph?

Question 2: Which nodes are in the one cycle in this graph (just list the node numbers with spaces between them).

Question 3: Is this graph bipartite?

Question 4: Which of the following is an adjacency matrix for the graph?

A											B											C										
	0	1	2	3	4	5	6	7	8	9		0	1	2	3	4	5	6	7	8	9		0	1	2	3	4	5	6	7	8	9
0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	1
2	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	1	0	1	0	0	3	1	0	0	1	0	1	0	1	0	0	3	1	0	0	0	0	1	0	1	0	0
4	0	0	0	0	0	0	1	0	0	0	4	0	0	0	0	1	0	1	0	0	0	4	0	0	0	0	0	0	1	0	0	0
5	0	0	0	0	0	0	0	0	0	1	5	0	0	0	1	0	1	0	0	0	1	5	0	0	0	1	0	0	0	0	0	1
6	0	0	0	0	0	0	0	0	1	0	6	0	0	0	0	1	0	1	0	1	0	6	0	0	0	0	1	0	0	0	1	0
7	0	0	0	0	0	0	0	0	0	0	7	0	0	0	1	0	0	0	1	0	0	7	0	0	0	1	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	1	0	1	0	8	0	0	0	0	0	0	1	0	0	0
9	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	1	0	0	0	1	9	0	1	0	0	0	1	0	0	0	0

General Graph Clicker Questions

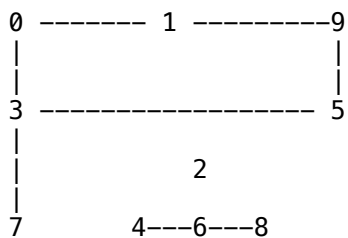
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Question 1. How many connected components are in the graph?

Answer: The easiest way to answer this is to draw the graph:



The answer is three.

Question 2. Which nodes are in the one cycle in this graph?

Answer: Look at the graph above: 0, 1, 3, 5, 9 (not in that order)

Question 3. Is this graph bipartite?

No -- it has an odd cycle, and if you think about it, an odd cycle cannot be in a bipartite graph.

Question 4. Which of the following is an adjacency matrix of the graph?

You can use process of elimination - Matrix A doesn't have $(1,0)$, $(3,0)$, etc. Since the graph is undirected, you need to have entries (i,j) and (j,i) . That rules out matrix A.

Matrix B has self-edges: $(0,0)$, $(1,1)$, etc, which the given graph doesn't have.

Matrix C is good.