Programming Assignment #1

Due Thu October 29th.

Figure 1: A graph with 15 nodes and 3 connected components

In this assignment, you will write two functions that operate over graphs. The graphs will be specified using an adjacency matrix. Recall that the adjacency matrix is a two-dimensional array indexed by vertex id. Each entry in the array points to another array that contains the set of neighbors for the indexed vertex.

You should assume that the names of nodes are available in a vName array indexed by vertex ID. In the graph above, our program will contain a statement of the form vName = Array['A', 'B', ..., 'O']

- Write a function dfsVisit that prints the nodes visited during the Depth First Search traversal of a graph starting from a given node. Your function should take a graph, specified as an adjacency matrix, and a starting vertex as input, and it should return an array containing the names of vertices in the order the DFS traversal visits them.

  Function dfsVisit called on our example graph above with starting vertex A should return an array ['A', 'K', 'B', 'E', 'L', 'M', 'J', 'D']. Other DFS traversal orders are possible and would also be acceptable.

- Write a function nCC that takes a graph, specified as an adjacency matrix, as input and returns the number of connected components in the graph.

  Function nCC called with the adjacency matrix for our example graph should return 3.