

Algorithm Class Mini-Contest 6

Problem: FOOD

Time Limit: 2.0 seconds

Memory Limit: 64 MB

Problem Description Peanut was touring in a park when he suddenly got lost and is very hungry. The park can be represented as a connected graph with N vertices and M edges. Peanut is currently located at node S and wants to get to node 0 to leave. There are K park rangers in the park, each of them located at a node and it is guaranteed that there is also one located at node S and node 0. There can be more than one park ranger at a node.

Peanut requires one serving of food to traverse one edge, and his backpack can hold at most w servings of food at a time. A park ranger can help Peanut fill up his backpack to the maximum amount he needs. Help Peanut figure out what is the minimum w he needs to leave the park successfully without dying of exhaustion.

Input Format The first line of input will contain four integers, N , M , S and K . The next line of input will contain K integers, representing the nodes where the park rangers are at. The next M lines of input will contain two integers each, describing the endpoints of each edge.

Output Format The output should contain exactly one line with N integers, with the i th integer representing the number of rooms he will visit if he starts at room i .

Limits These are the bounds on the input.

Subtask	Score	Additional Bounds
1	18	$2 \leq N \leq 300, 1 \leq M \leq 300$
2	31	$2 \leq N \leq 2,000, 1 \leq M \leq 2,000$
3	51	$2 \leq N \leq 500,000, 1 \leq M \leq 500,000$
All	-	$2 \leq K \leq N$

Sample Input

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6 7 2 3
0 2 5
0 1
1 2
3 1
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4 5
3 4
2 3
0 5

Sample Output

2