

Breadth-First Search Worksheet

Name: _____

1. What is the worst-case complexity of $BFS(G, s)$, where G is a graph with n vertices and m edges, and s is an arbitrary vertex in G ? Justify your answer.

2. For each of the following, circle True or False. Justify your answer, addressing the key fact(s) or fallacy(s).

T F If s is an arbitrary vertex in a graph G , every node in G will be discovered by calling $BFS(G, s)$.

T F BFS can be used to determine whether or not a graph is bipartite.

T F If $BFS(G, s)$ is performed on a connected graph G , then a shortest path from s to any other vertex v can be constructed by following the parent pointers backwards from v to s .

T F BFS can be thought of as an algorithm template. In other words, different problems can be solved by plugging in different code in the appropriate places within BFS.

T F BFS utilizes a stack to keep track of the vertices that have been discovered.

T F During BFS of a graph G , every edge will be considered twice, regardless of whether G is directed or undirected.

T F During a graph traversal, the only thing we need to know about a vertex is whether or not it has been discovered yet.