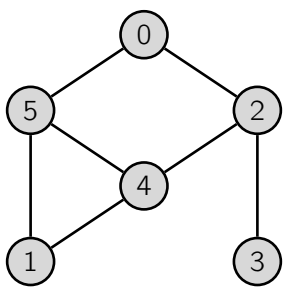
Graphs, BFS, and DFS

Reset Progress Reveal Solutions

1 DFS Start and Finish Time

Consider the following graph:



You start your DFS algorithm at node 0, and assume that the vertices' numbers are used as tie breakers (you visit vertices with smaller numbers first). What is the DFS start time and finish time for each of the vertices?

Vertex 0's start time:

0

Correct

Vertex 0's finish time:

11

Correct

Vertex 1's start time:

5

Correct

Vertex 1's finish time:

8

Correct

Vertex 2's start time:

1

Correct

Vertex 2's finish time:

10

Correct

Vertex 3's start time:

2

Correct

Vertex 3's finish time:

3

Correct

Vertex 4's start time:

4

Correct

Vertex 4's finish time:

9

Correct

Vertex 5's start time:

6

Correct

Vertex 5's finish time:

7

Correct

2 DFS or BFS

Snakey the snake is in the bottom left corner of the grid, and is trying to reach O, the ultimate Oreo.

0	0	0	0	0	0
0	X	0	0	0	0
0	0	X	O	0	0
X	0	X	X	X	0
X	0	0	0	0	0
S	0	0	0	X	0

Snakey can move from her current cell to the adjacent cells (right, left, up, or down) if they exist and are not marked with X (X cells are blocked). However, every time that Snakey moves from one cell to the other, Snakey has to eat a cookie. What is the minimum number of cookies Snakey needs to eat to get to the O?

10

Correct

Consider the general case of this problem, where a grid is given as an input with blocked and available cells and the locations of the Snakey and Oreo, and the goal is to find the minimum number of cookies for Snakey to reach the Oreo. Which algorithm would you use to solve this problem?

- (●) BFS
- ( ) DFS
- ( ) Both of the above

Correct

Assume you have a tree of size n, vertices numbered from 1 to n, rooted at the first vertex, and you want to order the vertices in an array A of size n such that for each vertex v, all the vertices in v's subtree are located in a consecutive subarray of A. Which algorithm would you use to find such ordering?

- ( ) BFS
- (●) DFS
- ( ) Both of the above

Correct

Assume you want to find the connected components of an undirected graph. Which algorithm would you use?

- ( ) BFS
- ( ) DFS
- (●) Both of the above

Correct