

CS61B SPRING 2016

SECRET SECTION: WEEK 6

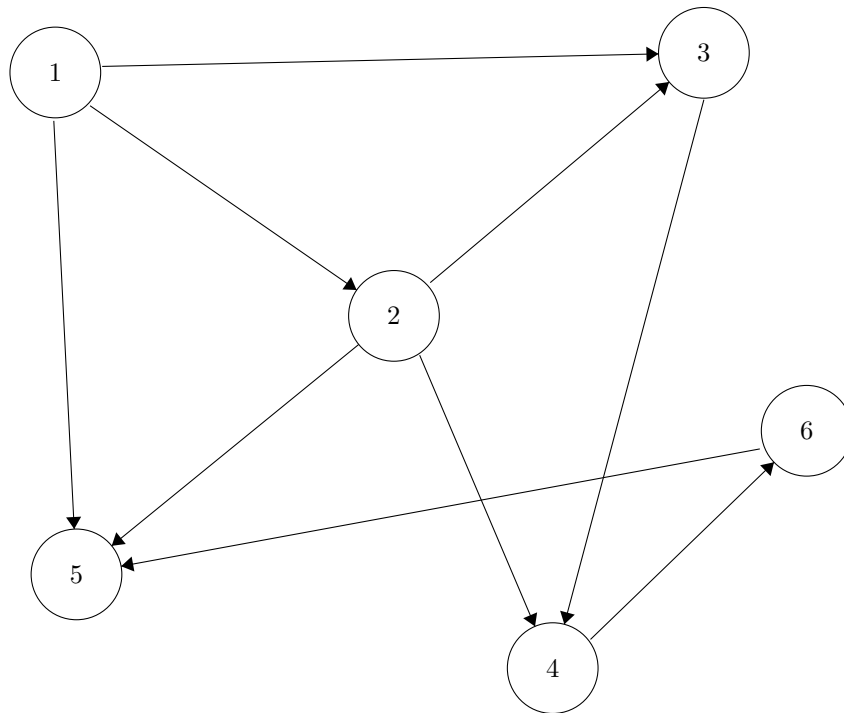
Tutor Team

April 11, 2016

Complete the following problems to the best of your ability. Feel free to work together on them, but try them on your own first!

1 Representations

Consider the graph below.



Construct the following representations for the graph:

- Adjacency Matrix

- List of Edges

- Adjacency List

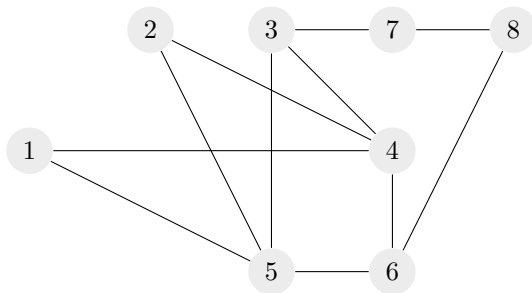
What are the advantages and disadvantages of the different representations? Are some better than others?

2 DFS

- (a) Draw a directed graph whose DFS pre-order traversal is A, B, C, D, E, and whose DFS post-order traversal is C, B, D, E, A. Assume that ties are broken alphabetically.

- (b) What is the runtime complexity? How about space complexity?

3 BFS



?

Let's say we want to find a path from node 1 to every other reachable node.

- (a) In what order does BFS visit the nodes?

(b) Fill in the missing code:

```
1 public class BreadthFirstPaths {
2     private boolean[] marked;
3     private int[] edgeTo;
4     ...
5
6     private void bfs(Graph G, int s) {
7         Queue<Integer> fringe = new Queue<Integer>();
8         fringe.enqueue(s);
9         marked[s] = true;
10        while (!fringe.isEmpty()) {
11            int v = fringe.dequeue();
12            for (int w : G.adj(v)) {
13                if (!marked[w]) {
14                    -----
15                    -----
16                    -----
17                }
18            }
19        }
20    }
21 }
```

(c) What is the runtime complexity? How about space complexity? ?