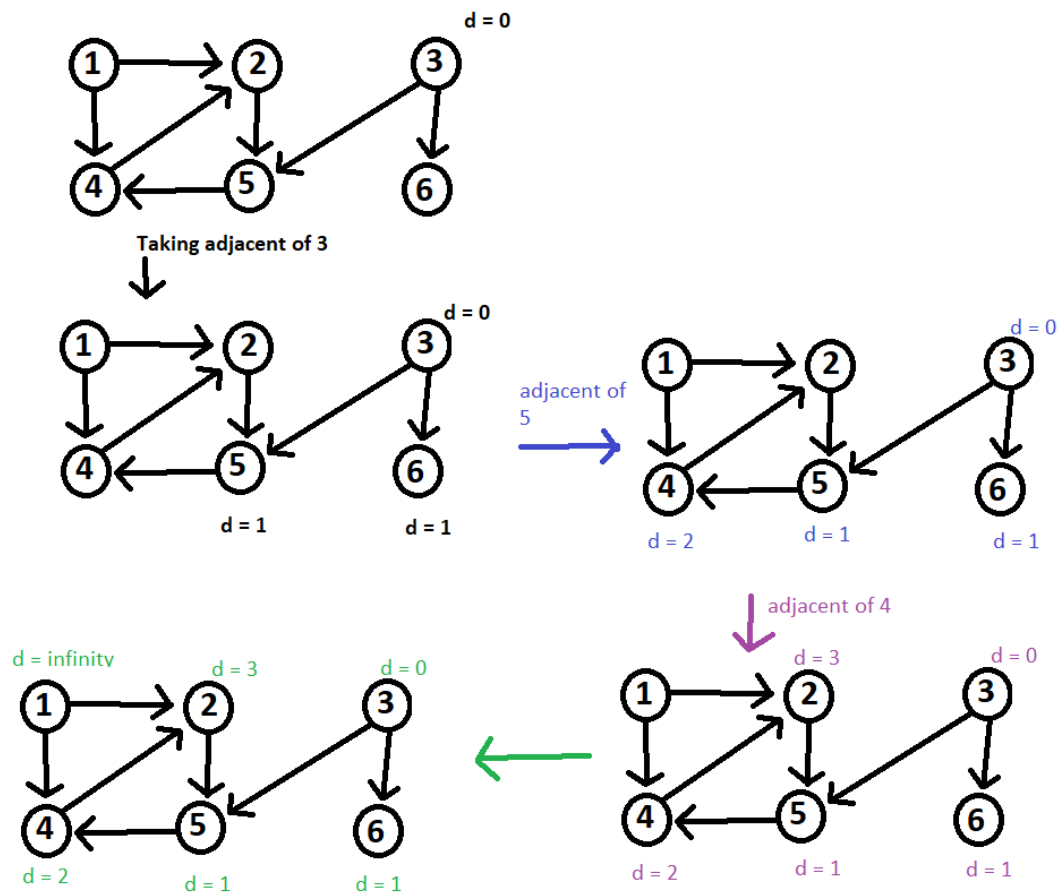


COMP 3270 Introduction to Algorithms

Homework 4

1. BFS

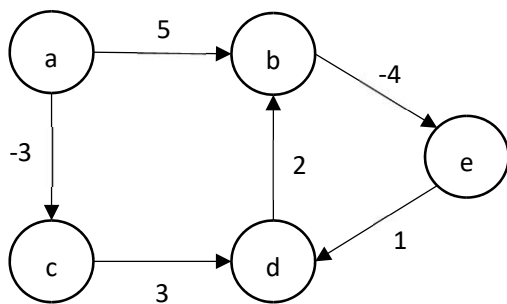
- a. Run Breadth First Search on the directed graph below using vertex 3 as the source. Show the priority queue after each iteration of the **while** loop and the final d values.



- b. Explain briefly why the complexity of BFS is $O(V+E)$.

Because while BFS, each vertex is visited once at most and each time a vertex is explored we need to visit each edge from the current vertex so each edge can be visited twice and thus it takes $O(V+E)$ time to explore each vertex and edge.

2. Bellman-Ford Algorithm Consider the following graph



- a. Give the adjacency matrix of the graph.

	a	b	c	d	e
a	0	5	-3	∞	∞
b	∞	0	∞	∞	-4
c	∞	∞	0	3	∞
d	∞	2	∞	0	∞
e	∞	∞	∞	1	0

- b. Run Bellman-Ford algorithm on the graph, using vertex a as the source. In each pass, relax the edges in the order (a, b) , (a, c) , (d, b) , (c, d) , (d, e) , (e, d) .

