

CS372 Spring 2019 Assignment #5.

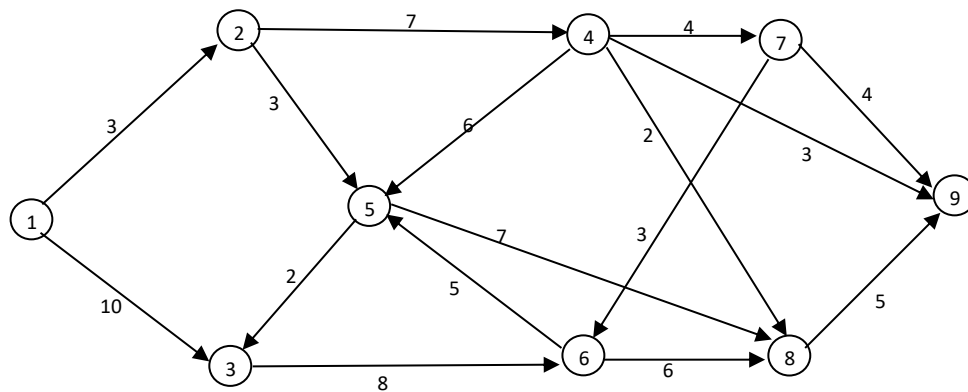
Due: at the beginning of the lecture on Thursday, March 21st.

You may do this assignment in groups of 2 or individually.

1. Build a min-heap heap by inserting elements one at a time in the following order 53, 8, 15, 16, 4, 21, 5, 22, 1. Show all your steps - draw a binary tree representing the heap after each insertion. Represent the resulting heap as

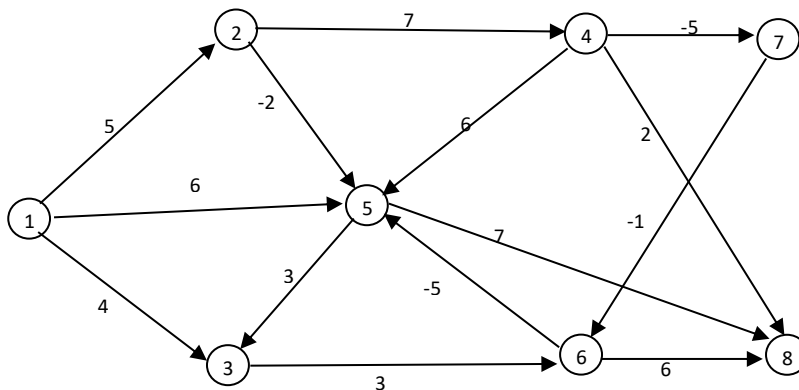
- a binary tree and
- as an array.

2. Suppose Dijkstra's algorithm is run on the following graph, starting at node 1.



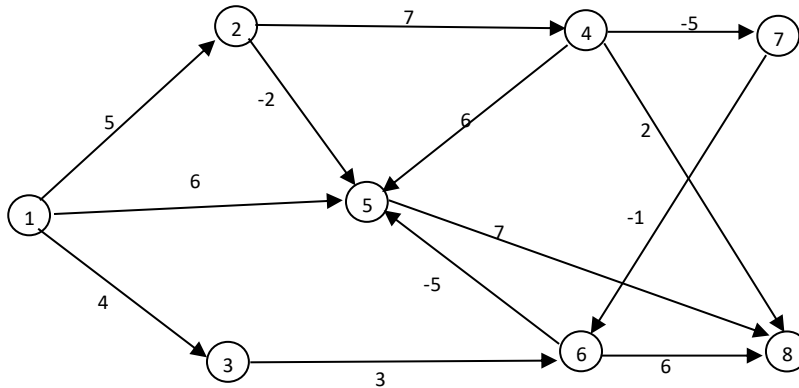
- Draw a table showing the intermediate distance values of all the nodes at each iteration of the algorithm.
- Show the final shortest-path graph.

3. Suppose Bellman-Ford algorithm is run on the following graph, starting at node 1.



- Draw a table showing the intermediate distance values of all the nodes at each iteration of the algorithm.
- Show the final shortest-path graph.

4. Run the shortest paths in DAGs algorithm on the following DAG, starting at node 2. Note: We do NOT start at node 1, we start at node 2.



- (a) Show all your steps including
- the result of linearization and
 - draw a table showing the intermediate distance values of all the nodes at each iteration of the algorithm.
- (b) Show the final shortest-path graph.

5. Exercise 4.4

6. Exercise 4.8.

What to submit:

- Submit answers to all the questions on paper.