

Homework 11

1 Question 1

Show the result of inserting 10, 12, 1, 14, 6, 5, 8, 15, 3, 9, 7, 4, 11, 13, and 2, one at a time, in an initially empty heap.

2 Question 2

Show the result of building a heap from the array 10, 12, 1, 14, 6, 5, 8, 15, 3, 9, 7, 4, 11, 13, 2 with the linear time `buildHeap` algorithm.

3 Question 3

Give the order of vertices visited in (a) Breadth First Search starting at node *c* (b) Depth First Search starting at node *b* and (c) Dijkstra's Algorithm when starting at node *a* in the graph in Figure 1. Break ties using alphabetical order (i.e. if the algorithm could go to node *c* or *e*, visit *c* first). Show the state of any auxiliary data structure (i.e. stack, queue, or priority queue) after each node is first visited. (5 pts each).

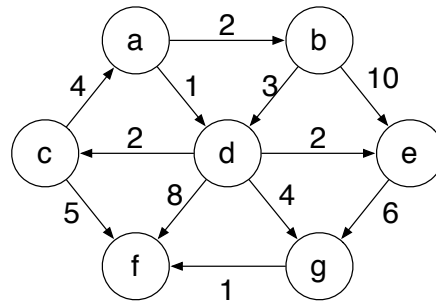


Figure 1: Graph for question 3

4 Question 4

Using either Kruskal's or Prim's algorithm, find the minimum spanning tree in Figure 2. List the edges (as pairs of nodes) in the minimum spanning tree in the order they are added. (Note: this ordering will also be used to determine if you were correctly following the algorithm.)

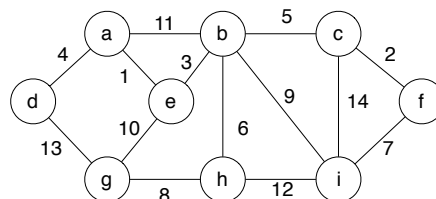


Figure 2: Graph for question 4