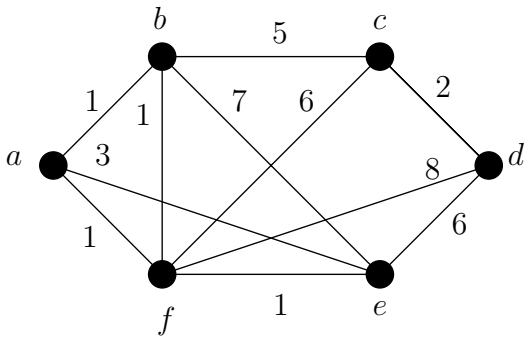
COMP108 Algorithmic Foundations — Tutorial 10

w/c 1st May 2017

Name: _____

Hand in your answer for the question(s) marked "Do this during tutorial" to the demonstrator at the end of the tutorial (even if you haven't finished it). You will get feedback in the next tutorial. Tutorial participation contributes to 5% of overall marks.

1. **[Do this before tutorial]** Consider the following graph G. The label of an edge is the cost (weight) of the edge.



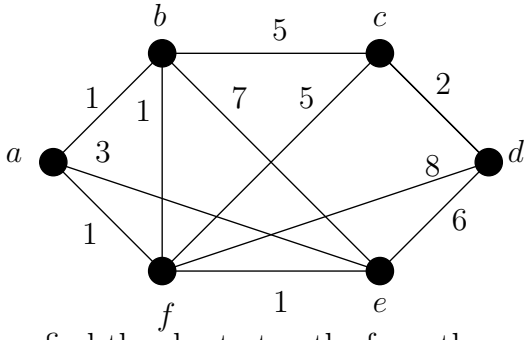
(a) Give a table listing all the edges in ascending order of the costs.

edge											
cost											

(b) Using Kruskal's algorithm, draw a minimum spanning tree (MST) of the graph. Write down the **order of the edges selected**. Break ties by using your table in (a).
If there is more than one solution, you only need to give one of the solutions.
MST:

Order of edges selected:

2. [**Do this during tutorial**] Consider the following graph G. The label of an edge is the cost (weight) of the edge.



Using Dijkstra's algorithm, find the shortest paths from the vertex a to all the other vertices. You need to **draw the edges chosen** and show the **changes of the labels** of the vertices step by step and also the **order of selection of vertices/edges**.
If there is more than one solution, you only need to give one of the solutions.

Changes of labels & Shortest paths found:

Order of edges selected:

3. [**Puzzle**] Consider the following flower with 13 petals. Two players take turns to remove one petal or two adjacent petals. (Note that the second player can take petal from anywhere as long as s/he take either one petal or two adjacent petals.) The player who removes the last petal wins. Design a winning strategy for the second player.