## **Exercises**

We suggest you do these on your own. As with any homework problem, though, you may ask the TAs for help.

All solutions must include their writer's STUDENT ID.

**1.** A file contains the following characters with the frequencies as shown. If Huffman Coding is used for data compression, determine Huffman code of each character.

Character	Frequency
а	10
е	15
i	12
о	3
u	4
S	13
t	1

2. Find the minimum spanning tree using Prim's algorithm for each of the graphs below.



**3.** Given the arrival and departure times of all trains that reach a railway station, the task is to find the minimum number of platforms required for the railway station so that no train waits. (write pseudocode, Approach must be Greedy Algorithm).

**Input:** We are given two arrays that represent the arrival and departure times of trains that stop.

Examples:

```
inputs:
arrival[] = {9:00, 9:40, 9:50, 11:00, 15:00, 18:00}
dep[] = {9:10, 12:00, 11:20, 11:30, 19:00, 20:00}
```

Output: 3, There are at-most three trains at a time (time between 11:00 to 11:20)

- **4.** Graph coloring (also called vertex coloring) is a way of coloring a graph's vertices such that no two adjacent vertices share the same color. Your task is to design a Greedy Algorithm that assigns a color to each node which satisfies the above constraint.(write pseudocode, assume we have edges and nodes. V.adj will give us the adjacent nodes.)
- **5.** Which of the following algorithms is more suitable for finding the minimum spanning tree of a solitary graph?(**explain and justify your answer**)

a) Floyd b) Prime c) Kruskal d)Dijkstra

**6.** Consider the following tasks, deadlines and benefits.Use a timed scheduling algorithm to maximize the total profit .

work	deadline	profit
1	2	40
2	4	15
3	3	60
4	2	20
5	3	10
6	1	45
7	1	55