Birla Institute of Technology and Science-Pilani, Hyderabad Campus
First Semester 2020-2021
Lab Sheet-6
CS G526: Advanced Algorithms and Complexity
Date: 02/12/20

General Instructions: Argue logically. Write it in a manner that explains your logic very clearly. Do not miss steps in between.

Problem-1: [30 pts] Implement a sorted list X using linked list that supports the following operations: (1) Inserting an element in the list in its correct position; (2) Deleting an element from the list if present; (3) reporting the median element of the list. If the size of the list is even, then your program should return the average of two median element.
Example :

input: 3A2A1D2D5A6AM
output:
3
2 3
NULL ← because 1 is not in the list. So deletion is not possible.
3
3 5
3 5 6
5 ← median of the current state of the list.

Problem-2: [30 pts] Given a set S of integers print all subsets (with elements in the sorted order) containing a particular element given as user input. For example, if the input to your program is $\{1, 2, 3\}$ and 2, then your program should output $\{1, 2\}$, $\{1, 2, 3\}$, $\{2\}$, $\{2, 3\}$.

Problem-3: [20 pts] An Eulerian cycle is a cycle which uses each graph edge exactly once. Write a program to check whether a given graph has an Eulerian cycle or not. If the graph does not have a Eulerian cycle, your program should print "NO" else print "YES".