*ADSA-2022* **Lab Assignment - 3 Duration: 3 Hrs (**Time:2:15PM to 5:30PM **)**

**INSTRUCTIONS**

1. ALL THREE PROBLEMS are COMPULSORY
2. Carefully read all assignment problems.
3. Write only a single main function. You can call the required functions from the main function. Print the list of elements wherever necessary.
4. Name the file as follows: **S2020xxxxx_A03.c**
5. DO NOT zip. Upload a single .c file directly to your submission in the common Google classroom.
6. Don't share or copy the codes. If malpractice is found, you will be awarded Zero.

**QUESTION 1:** **2-Points**

**a)** Using the concept of linked list, write a program that construct a binary tree for the given input array [10,20,50,30,60,80,35,45,77,90,95,98,67,88]

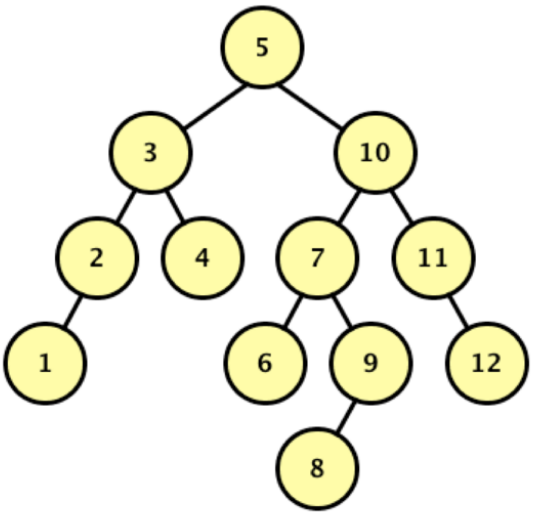
b) For the constructed binary tree, write a program that counts the number of internal and external nodes.

**QUESTION 2:** **2-Points**

Write a c program to sort a given array [*170, 45, 75, 90, 802, 24, 2, 66* ] using radix sort algorithm.

**Question 3:**

a) Construct the following BST. **2-Points**




b) Remove the root node from the above BST and replace it with an appropriate value from the node's **left** child. **[2-Points]**

c) Label each node in the resulting tree with its balance factor and find whether the tree is balanced or not.

**[2-Points]**