Time: 1 hour 30 minutes
Start Time: 3:00 PM

**B-JET Training Program**
**Question Paper**
**Set-B**

Marks: 50

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**Note:** Each question has 10 marks.

Please use any standard Computer Programming Language like C/C++, Java, Python etc. to solve the following problems:

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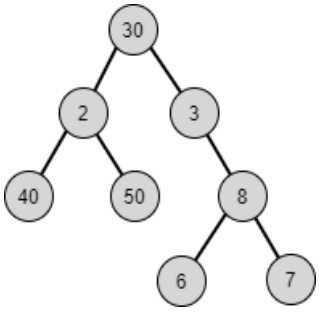
1. Write a simple program using recursion. The program is supposed to do the following: in the given string, consisting if uppercase and lowercase letters and digits, it:

   - Deletes all the non-consonants and digit.
   - Inserts a character "*" before each consonant.
   - Replaces all lowercase consonants with corresponding uppercase ones.

   Non-consonants are letters "A", "E", "I", "O", "U", and the rest are consonants.
   Example:
   Input1: 1A2bcDnajMkW
   Output1: *B*C*D*N*J*M*K*W

   Input2: A1B2C3DEFGH
   Output2: *B*C*D*F*G*H

2. Write a program to find the sum of maximum and minimum level in a binary tree
   Example:
   Input:




   Output: 103

3. Take a string input like "543L24R6" and replace "L" with previous element & "R" with next element(54332466). Write a program to modify string as per L/R & check the string whether it is palindrome or not.
   - Consecutive characters of "L" considered as single one and same as for "R" . i.e. "LLL" replace with "L" and "RRRR" replace with "R". "543LLL24RR6" to "543L24R6"

- If first character is "L" and last character is "R" then remove these characters(L33433R --> 33433).
- If found "RL" in a string should be removed. i.e. "3RL5" to "35"

Example:

Input1: 543L24R6
Output1: 54332466 is not palindrome

Input2: 34L5R43
Output2: 3445443 is palindrome

Input3: L33433R
Output3: 33433 is palindrome

Input4: LL33433RRR
Output4: 33433 is palindrome

Input5: RL36LR73
Output5: 366773 is not palindrome

4. Given two expression in the form of strings. You have to write a program to eliminate all numeric values from string and then compare and check if they are similar.

   Example:

   Input1: "2a-b-(3c-d)" & "5a-b-c+6d"
   Output1: Two expressions are identical

   Input2: "2a-b-(3c-d)" & "5a-b-c-6d"
   Output2: Two expressions are different

5. Suppose you are designing a automatic car controlling system for different brands like BMW, Ford and GMC. Different brands have different types of behaviour in changing gear with respect to speed, speed up rate in pressing an accelerator and slow down rate in applying brakes. Hummer is a sub-brand of GMC and its behaviour is also different from traditional GMC brand. Therefore, your system should be designed in such a way that all of the behaviours are reflected. Write the program from OOD and OOP concept.

   i. **Abstraction:** Define a parent class i.e Car and declare behaviour changeGear, speedUp and applyBrakes.
   ii. **Inheritance:** Define sub-classes for different brands like BMWCar, FordCar and GMCCar
   iii. **Polymorphism:** Apply run-time polymorphism to override the traditional behaviour of GMC brand