Data structure and Programming II

TP12: Tree data strcutre

- Objective:
  - To practice implementing tree data structure in program to improve performance of the program with insert and search operations
  - Apply C++ programming
- Individual work
- Submit to Moodle (do not zip)
  - *A pdf report (cover, exercise and solution with screenshot)*
  - *Source codes*

Deadline:
6 days

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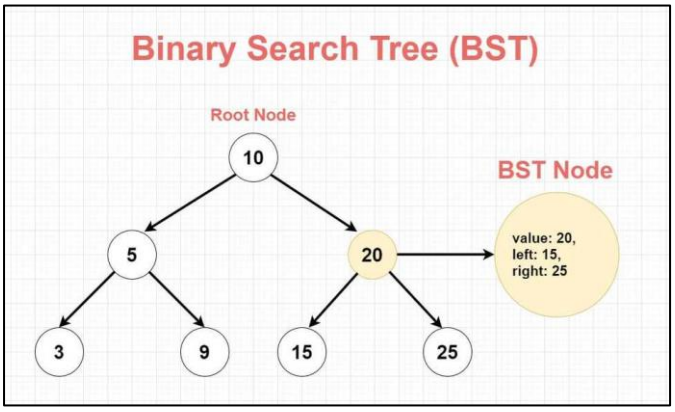
1. Suppose that we want to store ID of ITC students in a binary search tree (BST). Create a data structure for this program. **Hint:** Create element for the tree, insert function, traverse the tree via in-order, preorder or post-order method.

2. Random 20 numbers in this ranges [10 – 1000] then store in a binary search tree. Display data from this free using in-order traversal method and also write them to a file (txt or CSV).

3. Create a binary search tree (BST) data structure that can store numbers. Read data from the file below and store in this tree. Then
   a. Display data using pre-order traversal.
   b. Display data using in-order traversal.
   c. Display data using post-order traversal.

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99
2
7
8
0
-1
99
1
5
```

Remark: In Binary search tree, larger numbers are stored on the right while smaller numbers are stored on the left.

4. Ask a user for a number, say n. Then loop n times to get names and ages of n students. Store names of students into a binary search tree.
    a. Display data in the tree using in-order traversal. Write those data into a file (txt or CSV).
    b. Find the student who has the youngest age.
    c. Find the student who has the oldest age.

5. Create a file containing 20 employees' info, where each employee has employee ID (starting with emp001), first name, last name, position, gender and phone number.
    - Read data from this file then store in a binary search tree.
    - Write a function to search for an employee based on his/her employee ID. This function asks a user to input an employee ID to be searched in the tree.
    - Test your program and call the search function above