DataStructures Exam #1 / (120 min) | **14.06.2020**

Implement a C-language application that handles hotel room management.

1. Write the source code sequence to create a Binary Search Tree structure that represents a hotel with different types of rooms. The insertion key is a **composite key** made of two fields: floor and room number. The insertion of a room is implemented in the main function for at least 10 elements taken from an input file. (**1,5p**)

   The Room structure will be defined so that it should be made of the following fields: floor (Roman numerals), room number, room type, price per night.

2. Write and call the function for extracting the subtree whose root is received as a parameter by specifying the composite insertion key. After extraction, the initially remaining tree will be displayed, as well as the extracted one. (**1p**)

3. Write and call the function for determining the total income for a certain type of room on a certain floor of the hotel, values received as parameters, assuming that the hotel is fully booked. (**1,5p**)

4. Write and call the function to display all the elements in the tree structure grouped by each level in the tree. (**2p**)

5. Write and call the function to display all the rooms grouped by each floor of the hotel, having O(n) complexity for the binary search tree structure. (**3p**)

6. Write the code sequences that free the Binary Search Tree structure along with all the auxiliary structures used for implementing the requirements. (**1p**)

NOTES:

- **Projects with compilation errors will not be evaluated.**
- **Plagiarized implementations will be evaluated with 0 points, regardless of the source.**
- **All requirements must be called and demonstrated in the main () function to be evaluated.**