

**CS619 Advanced Data Structures and Algorithms Laboratory**  
**Autumn 2024**  
**Assignment 6**  
**Maximum marks: 10**

### **Objective**

The objective of this assignment is to implement verification of properties of a B-tree.

### **Tasks**

You are given a sequence of distinct keys. The claim is that it is a pre-order traversal of a B-tree. (The pre-order traversal of a B-tree will be explained in the lab). Your task is to build a B-tree (assuming that the sequence is a pre-order traversal of a proper B-tree) and to verify all the properties of B-tree to confirm that it is a proper B-tree. The minimum degree  $t$  of the B-tree is fixed and it is 2.

**Task 1:** Create a B-tree from the given pre-order traversal. If this is not possible, then print the first key that is causing a violation.

**Task 2:** Print the post-order traversal of the (claimed) B-tree that you constructed.

**Task 3:** Check whether all leaves are at the same depth - print all nodes violating the property - lists of keys in nonconforming nodes are sufficient.

**Task 4:** Check whether every node has at least 1 key and at most 3 keys. - print all nodes violating the property - lists of keys in nonconforming nodes are sufficient.

### **Evaluation**

The maximum marks for this assignment is 10 (3+2+3+2). Viva is an essential part of the evaluation. A plagiarism test will be conducted after the deadline and if found guilty a “-10” mark will be awarded to the corresponding students and may be forwarded to the disciplinary action committee in grave cases.

### **Submission**

Your program must be submitted through moodle on or before 22nd October. You have to submit the same code that you show to the instructor. You can use two lab sessions (15 Oct and 22 Oct) and the time in between for implementation. Viva will be conducted on 22nd October.