

National Institute of Technology Calicut
Department of Computer Science and Engineering
CS3095D DBMS Lab

Test II

Time: 60 mins

Submission III – B+ Tree
Set C

Total Marks: 8

Part A

Answer all questions

1. B+ Trees provide efficient random access as well as sequential access. State whether the statement is TRUE/FALSE with proper justification. **(1 mark)**

2. Consider the following statements associated with a B+ Tree of order 4:
 - I. A non-leaf node other than the root should have at least 2 keys.
 - II. Both the leaf nodes as well as the internal nodes can have at most 4 keys.Then, which among the following is correct.
 - a. Both I and II are TRUE
 - b. I is TRUE, but II is FALSE
 - c. I is FALSE, but II is TRUE
 - d. Both I and II are FALSE **(1 mark)**

3. With the help of an example, explain the following cases associated with the insertion and deletion of keys in a B+ Tree:
 - a. Case I: The height of the tree gets increased by one **(1 mark)**
 - b. Case II: The height of the tree gets decreased by one **(1 mark)**

Part B

(Use C/C++ for implementing the following question. Two test cases will be provided during evaluation. Each test case carries 2 marks.)

Question: Implement a B+ Tree, of order 4, which uses alphabets (A to Z) as its key values. The B+ Tree should incorporate the following functionalities:

Insert – To insert a key value into the B+ Tree

Search – To search for a key value in the B+ Tree. If the key value is found, return TRUE. Else, return FALSE.

Print – To display the elements, including the duplicates, currently present in the B+ Tree (**in-order traversal**)

(2 x 2 = 4 marks)