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

Time: 60 mins **Submission III – B+ Tree** **Total Marks: 8**

Set B

Part A

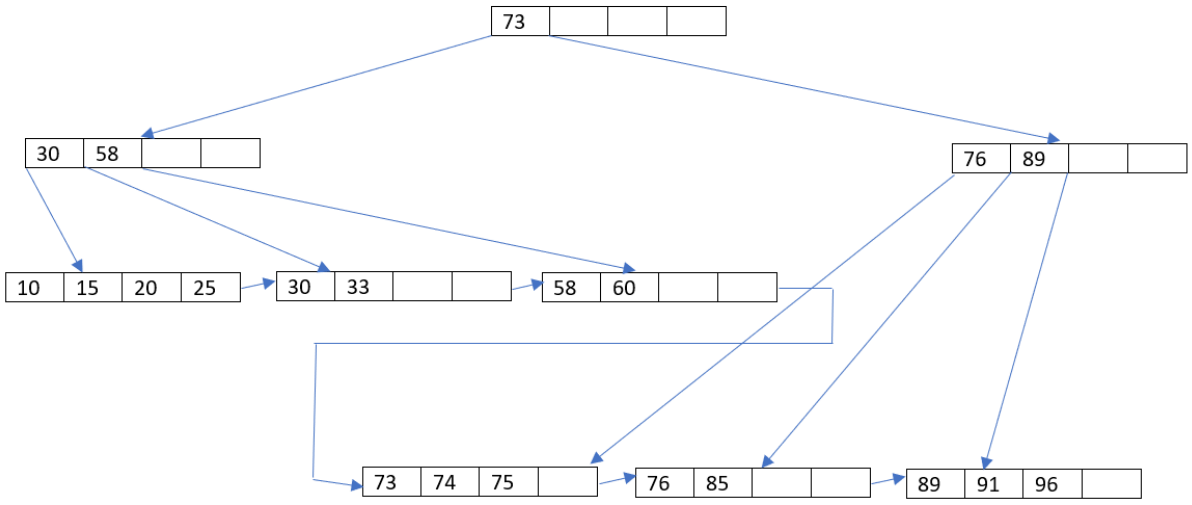
Answer all questions

1. B+ Trees show more efficiency in sequential access. Is the statement TRUE? Explain with proper justification. **(1 mark)**

2. Consider a B+ Tree with an order of 5. Then, identify the statement(s) which is (are) TRUE.
   a. The maximum number of data pointers in a leaf node is 5.
   b. The minimum number of keys in a leaf node is 3.
   c. The minimum number of keys in a non-leaf node (except root) is 2.
   d. The root should have at least 2 child pointers. **(1 mark)**

3. Consider the following B+ Tree of order 5. What is the number of nodes that are to be traversed for the following search operations?

a. 58 **(0.5 marks)**
b. 89 **(0.5 marks)**
c. Keys ≥ 60 **(0.5 marks)**
d. $60 \leq$ Keys ≤ 85 **(0.5 marks)**



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)