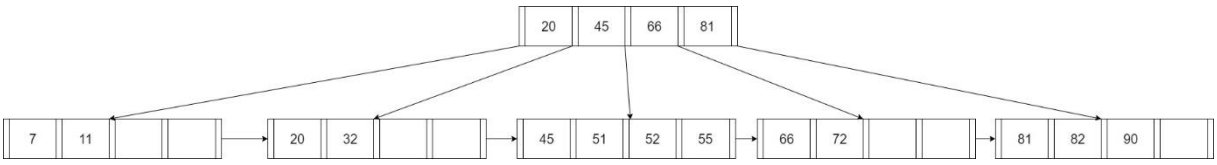
CS 353 Spring 2023
Homework 6
Due: May 18, Thursday till midnight
You will use the Moodle course page for submission of this assignment

Q.1 [48 pts, 12 pts each] Given the following B+ tree. The maximum number of pointers for each node of the tree is 5.

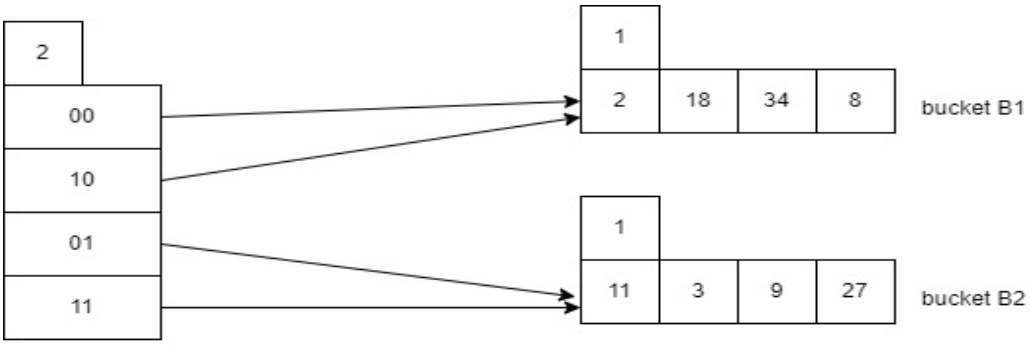


For the following insertion/deletion operations you should use the algorithms discussed in the class.

(a) Draw the resulting tree after deleting the entry with search key value k = 66 and then inserting entries with search key values k = 5, 9 and 12 successively.
(b) Draw the resulting tree after inserting entries with search key values k = 10 and 15, and then deleting the entry with search key value k = 20 **from the original tree**.
(c) Draw the resulting tree after inserting entries with search key values k = 85 and 95 **into the original tree**.
(d) Draw the resulting tree after deleting the entry with search key value k = 11 **from the resulting tree in part (c)**.

Q.2 [52 pts, 26 pts each]

Given an extendable hash index with the following contents. Each bucket can contain at most 4 key values and the hash value of a search key x is the binary value of x. <u>The least significant bit</u> of a hash value is used during insertion.



(a) What is the minimum number of key value insertions that will cause the bucket address table to double? Provide one such sequence of insertions and give the final contents of the index structure.
(b) What is the maximum number of key value insertions that will cause the bucket address table to double? Provide one such sequence of insertions and give the final contents of the index structure.