

CS 575 – Topics in Database Systems, Homework 5

This is an individual assignment. No hand-written submissions will be accepted.

1. Consider an extendible hash structure where a bucket can hold up to three records. Initially the structure is empty and the global depth is 1. Sketch the extendible hash structure after the records given below (in the same order shown) have inserted.

Following are the search key values inserted to the extendible hash structure.

3,8,11,14,15,16,17,19,20,33,43,48,23,21,46

Your initial hash function is given by $h_1(x) = x \bmod 7$

For example, for the search key 3, the hash value in binary is given by $h(3) = 3 = 00011$

- a) Display the final global depth and final local depth of all the buckets after each insertion.
2. Construct a B-tree for the following set of key values: (4, 5, 6, 7, 10, 12, 14, 19, 20, 21, 23)
Assume that the tree is initially empty and values are added in ascending order. Construct B-trees for the cases where the number of pointers that will fit one node is as follows:
 - a. three
 - b. four
 - c. Six

Using the b tree created in part b, delete 4, 5 and 6. Show the steps along the way