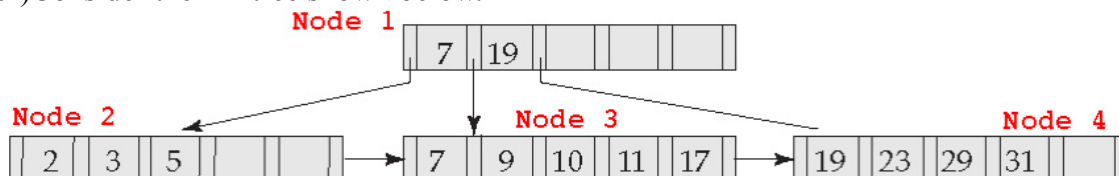


SE305 Database System Technology

Assignment 6 (Due: Oct 30)

1. (20') Suppose we have a B+ tree index consisting of 50,000 entries. Only 30 such entries fit in a block. Create a multilevel index such that the highest level index fits in one block.
2. (15') Assume that each non-leaf node may contain up to 2 keys and 3 pointers, each leaf node may contain a maximum of 2 keys. Construct a B+ tree for the following set of keys: 110,50,445,325,230,135,119,88

3. (20') Consider the B+-tree shown below.



- (a) Enumerate the changes after inserting a tuple with search key 13. Submit answer as:
 - (1) Node 20: added 100 and removed 200.
 - (2) New node added as the third child of Node 1, and contains keys 1000 and 2000.
 - (3) Node 10: deleted.
 - (b) Enumerate the changes after deleting the tuple with search key 3 on the original tree above (not after inserting 13).
4. (15') Consider the issue of interesting orders in optimization. Suppose you are given a query that computes the natural join of a set of relations S. Given a subset S1 of S, what are the interesting orders of S1?
 5. (30') Assume (for simplicity in this exercise) that only one tuple fits in a block and memory holds at most 3 blocks. Show the runs created on each pass of the sort-merge algorithm, when applied to sort the following tuples on the first attribute: (kangaroo, 17), (wallaby, 21), (emu, 1), (wombat, 13), (platypus, 3), (lion, 8), (warthog, 4), (zebra, 11), (meerkat, 6), (hyena, 9), (hornbill, 2), (baboon, 12).