1. Suppose we have an index consisting of 50,000 entries. Only 30 such index entries fit in a block. Create a multilevel index such that the highest level index fits in one block.

2. 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. Suppose that a page can contain at most four data values and that all data values are integers. Using only B+ tree of order 2, give examples of each of the following:

   (a) A B+ tree whose height changes from 2 to 3 when the value 25 is inserted. Show your structure before and after the insertion.

   (b) A B+ tree in which the deletion of the value 25 leads to a redistribution. Show your structure before and after the deletion.

   (c) A B+ tree in which the deletion of the value 25 causes a merge of two nodes but without altering the height of the tree.

   (d) An ISAM structure with four buckets, none of which has an overflow page. Further, every bucket has space for exactly one more entry. Show your structure before and after inserting two additional values, chosen so that an overflow page is created.

Please keep in mind:

- This assignment is to be done individually. The honor code is in effect.
- Assignments must be submitted by 5 p.m. on April 7, 2011 through RamCT.
- No late work will be accepted except in exigent situations.
- Your answers must be typed.