

**CS 166: Database Management Systems**

**FALL 2004**

**HOMEWORK 2**

**Assigned: November 12, 2004**

**DUE: Tuesday November 23, 2004 (3:40pm, OLMH 1208)**

**Problem 1 (10 pts)** What is *sequential flooding* of the buffer pool?

**Problem 2 (10 pts)** Explain the term *prefetching*. Why is it important?

**Problem 3 (80 pts)** Suppose that a page can contain at most four data values and that all data values are integers. Using only B+ trees of order 2 (at least 2 entries and 3 pointers must be occupied in a node), 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 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 overflow page is created.