*Summary of topics covered – Week of April 1, 2008*

- Review of heap operations
    - Insert
    - Deletemin

- Other heap operations
    - DecreaseKey
    - IncreaseKey
    - Delete – remove the key at a given position
    - BuildHeap

- Applications of heap
    - Heap sorting
    - Machine scheduling

Review questions:

1) Describe how to build a heap of size 4 using keys a, b, c and d with only three comparisons.

2) The following is an alternative way to remove a key at position j: move the key at A[currentSize] to A[j] and call percolateDown(j). Will this work? If so, prove it. Otherwise, give an example for which it fails.

3) Write a procedure to delete the second smallest key from a min heap. Your procedure should perform only a constant number of additional operations besides calling one of the standard heap operations (the six operations listed above). What is the complexity of your procedure?

4) Obtain the sum of the following series:

    (a) $1 \times 3^1 + 2 \times 3^2 + 3 \times 3^3 + \ldots + n \times 3^n$

    (b) $2^1 + 2^2 + \ldots + 2^m$

5) How many leaves are in a heap with 200 nodes? What is its height?

6) Given the following list of jobs (the list contains their processing times), display how the jobs are assigned to machines by the LPT algorithm:

    (2, 14, 3, 4, 16, 6, 5, 3, 8)