CS 351 DATA ORGANIZATION AND MANAGEMENT

HW2
Date Given : October 20, 2010
Date Due   : October 27, 2010

Important Notes: 1. Please submit the Homework to Room EA 126 on the due date by 5:00 pm (no late submission will be accepted). 2. Answer the questions in the order they are given using a standard size paper. 3. Handwritten submissions are accepted, a word document is preferred. 4. Staple all papers and <u>write your name and SECTION</u> on them.   5. When needed assume/use the parameters/values of IBM 3380.

1. Perform replacement selection sort on the following successively entered records with keys 65, 68, 49, 39, 90, 80 and then continue with the key values 130, 35, 25, 110, 14, 105. Different from what we have done in the class sort the records in descending (decreasing) order. Assume 6-record memory capacity, i.e., the maximum size of the priority queue (max heap) is six nodes. Show enough detail of your steps so that it will be easy to follow.

2. Consider an unsorted file (pile) of size 800 MB. Consider sorting this file using 10 MB of memory. R (record size)= 200 bytes, B (block size)= 2400 bytes. Consider heap sort. What is the nsg: number of sorted segments (also known as "sorted runs") after sorting? How much time is needed for sorting (for generating the sorted segments)?

3. Consider the output (sorted segments of question 2).

a) What is the number of merge passes with p= 2? Show the merge progress (no, of sorted segments, segment size in each pass).

b) How much time is needed to merge sorted segments (excluding s+r)?

c) What is the number of (s+r) operations during merging? What is the total time needed for (s+r)?

4. Answer question number 3 for p= 4?

5. Again consider the same file, i.e., consider the output of question 2. Find merge time for p= number of sorted segments (p= nsg). What is the main memory requirement for this value of p? Is it practical? Explain why?

6. Consider question 2 and now assume that the file that you want to sort is already in the desired order. Consider replacement selection sort and answer the question. How many sorted segments will be formed and what is their expected memory size?

7. Consider question 2 and now assume that the file that you want to sort is in reverse sorted order (for example, you want to sort the input file in ascending –increasing- order, but it is in descending order). Consider replacement selection sort and answer the question. How many sorted segments will be formed and what is their expected memory size?