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JFB

Introduction to Computer Science
E13 – Discussion Sections 9 – Week 47

1. Do those problems from week 43 which were not finished then.
2. Page 247: Problem 23.
3. Page 250: Problems 46, 48, 49, 55. For problem 55, discuss preconditions, postconditions, loop invariants and possible improvements.
4. Sequential files: Question 3 on page 427 and Problem 54 on page 436.
5. Merging: Question 1 on page 427.
6. Assume sets of numbers are represented by sequential files sorted on element value. For example, the set $\{4, 7, 13, 9, 2\}$ is represented by a sequential file containing $< 2, 4, 7, 9, 13 >$. Describe algorithms for constructing $A \cup B$ and $(A \cup B) \cup C$ from A, B and C Note that $(A \cup B) \cup C$ can be done by first computing $A \cup B$ and computing the union of this with C. Instead of giving this solution, process the three files simultaneously, as you do with two files.
7. Assume the database relations A and B each are stored as sequential files of tuples, ordered according to attribute X (which is an attribute of both relations).

   Sketch (details not necessary) an algorithm based on merging for executing the statement

   $$C \leftarrow \text{JOIN } A \text{ and } B \text{ where } A.X = B.X$$

8. Assume again that the database relations A and B each are stored as sequential files, but now no longer ordered on the X attribute.

   Describe an algorithm based on nested loops for executing the statement

   $$C \leftarrow \text{JOIN } A \text{ and } B \text{ where } A.X = B.X$$

How many comparisons between tuples are performed (as a function of $|A|$ and $|B|$, the numbers of tuples in each relations)?