

CMSC 424. Homework 3

Due: April 15

Don't forget to read chapter 13!!!!

1. Exercise 13.1. Consider the following SQL query for our bank database
select T.branch_name
from branch T, branch S
where T.assets > S.assets and S.branch_city = "Brooklyn"

Write an efficient relational-algebra expression that is equivalent to this query. Justify your choice.

2. Exercise 13.2. Assume (for simplicity in this exercise) that only one tuple fits in a block and memroy holds at most 3 page frames. Show the runs created on each pass of the sort-merge algorithm, when applied to sort the following tuples on the first attribute: (kangaroo, 17), (wallaby, 21), (emu, 1), (wombat, 13), (platypus, 3), (lion, 8), (warthog, 4), (zebra, 11), (meerka, 6), (hyena, 9), (hornbill, 2), (baboon, 12).
3. Exercise 13.3. Let relations $r_1(A, B, C)$ and $r_2(C, D, E)$ have the following properties: r_1 has 20,000 tuples, r_2 has 45000 tuples, 25 tuples of r_1 fit on one block, and 30 tuples of r_2 fit on one block. Estimate the number of block transfers and seeks required, using each of the following join strategies for $r_1 \bowtie r_2$:
 - i. nested-loop join
 - ii. block nested-loop join
 - iii. merge join
 - iv. hash join