

Quiz 10: Query execution (10 points), 10 minutes

Consider joining two relations $R(A,B)$ and $S(A,C)$. Suppose there are M pages of memory available. The size of R and S is $B(R)$ and $B(S)$ blocks respectively. Assume both relations are clustered.

1. [6 points] Write a block-based nested loop join algorithm for performing the join.

(Assume $B(R) \leq B(S)$ & $B(R) > M$)

For each $(M-2)$ blocks br of R do

For each block bs of S do

For each tuple r in br do

For each tuple s in bs do

If r and s join on A then output (r,s)

(It's also correct If you treat S as the outer loop)

2. [4 points] Suppose $M = 102$, $B(R) = 1000$, and $B(S) = 2000$. What is the cost of algorithm if R is the outer relation (relation in the outer loop)? What is the cost if S is the outer relation?

(1) R is the outer relation

$$\text{Total cost} = B(R) + \frac{B(R) \times B(S)}{(M-2)} = 1000 + \frac{1000 \times 2000}{100} = 21,000$$

(2) S is the outer relation

$$\text{Total cost} = B(S) + \frac{B(S) \times B(R)}{(M-2)} = 2000 + \frac{2000 \times 1000}{100} = 22,000$$