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CS410

HW 3

1) R: 1 Tb S: 100 Gb

a) There are $2 \cdot 10^8$ block transfers because each read/written once (in S).
In R there will be $2 \cdot 10^9$ block transfers
 $= 2.200 \text{ m block transfers total}$

Disk Seek: $B/S = \frac{100 \text{ Gb}}{16} = 166$

S: $= \frac{100 \text{ Gb}}{166} = \boxed{100 \text{ disk seeks}}$

R: $\boxed{1,000 \text{ disk seeks}}$

b) The number of block transfers during build and probe phase is 1.1 Tb

and the number of Disk Seeks is
 $= 2 \cdot 15 \text{ buckets} = \boxed{30}$

2)

a) There will be $1 \text{ Tb} / 16 \text{ Gb} = \lceil 62.5 \rceil = 63$ initial runs. Block transfers: $2 \cdot 63 = 126 \text{ m}$ and there will be $2 \cdot 63 = \underline{126 \text{ disk seeks}}$

b) There will be 8 merge passes ($= 63/8 \lceil 7.875 \rceil = 8$) and 126m block transfers

3)

a) Block transfers: $\boxed{1.1 \text{ TB (1000M disk blocks)}}$

Disk sectors: $B.S: 16M/2 = 8M \text{ blocks}$

$$\frac{1000M}{8M} = \boxed{125 \text{ disk sectors}}$$

b) It is more advantageous to use merge join as it requires for less block transfers ($1000M < 2200M$)

4)

$$\pi_{A,G}(R \bowtie S \bowtie T) = \pi_{A,G}(R \bowtie T)$$

5) $R(A,B) \quad S(A,B)$

$$a) \pi_A(R \cap S) = \pi_A(R) \cap \pi_A(S)$$

$$R(A) \cap S(A) = R(A) \cap S(A)$$

$$(A) = (A)$$

TRUE ✓

$$b) \sigma_\theta(R \cup S) = \sigma_\theta(R) \cup \sigma_\theta(S)$$