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I. (A) A table that stores various statistics of the relations in this database.

(B). A temporarily defined (logical) table which is used later in other queries as if it's a real table.

(C). The ~~tab~~ query that defines the view is actually being executed and stored on disk, so, it's like any of other (base) tables from which the view is defined.

(D). Probability of any two tuples (one from R, one from S) actually form a pair in the resulting relation after $R \bowtie S$.

(E). logical query plan: the algebraic representation of how to answer an query, derived from the parsing tree.

physical query plan: the logical query plan annotated by physical operators, specifying algorithms to be used by each of logical operator in the logical query plan.

difference: One logical query plan can be implemented by many physical query plan.
For example, the logical query plan might involve a join operator, but we have multiple join algorithm (e.g. merge join, nest-loop join, etc.) to implement it.

II:

(A) ii) We reduce the size of total situations to consider; that is, reduce the number of join order ~~to~~ whose cost we try to estimate. Thus, we can make the search process (searching for the least costly join order) more efficient.

(ii). Obviously, since we're not searching over all possible join orders, the true (global) optimal join order might not be found.

(B). (i). $3\,B(R) = 30{,}000$ disk I/O's

(ii). $3\,B(R) = 30{,}000$ disk I/O's

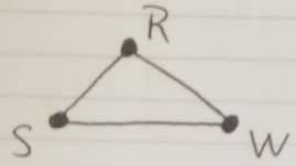
(iii). Yes, there is only one requirement for a two-phase multiway sort algorithm: $\frac{B(R)}{M} \leq M-1 \overset{\text{appro.}}{\iff} B(R) \leq M^2$ and this is satisfied in this problem. It doesn't differe in terms of disk I/O's needed for sorting attribute. It's alway $3 \cdot B(R)$ without counting the final write-back.

(C). i). advantage: since the referring attribute is the primary key of some other relation, we can uniquely identify the tuple it's referring to by following the reference.

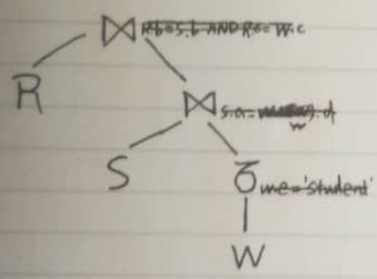
(ii). disadvantage: • it's just, in general, a stricter constraint;
• need to worry about behavior when the tuple it's referring to is deleted or modified.

III:

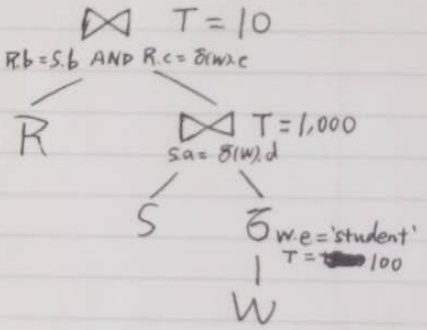
1(a). query graph:



(b).



(c).



IV:

(1). C

(2). B

(3). A