Principles of Distributed and Parallel Database Systems

Primary Horizontal Fragmentation

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Objectives

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Realize how queries are processed in distributed databases

Definition

Primary Horizontal Fragmentation is:

$$R_j = \sigma_{Fj}(R), \quad 1 \leq j \leq w$$

- A horizontal fragment R_i of relation R consists of all the tuples of R which satisfy a minterm predicate m_i.

- Given a set of minterm predicates M, there are as many horizontal fragments of relation R as there are minterm predicates.

Correctness of Fragmentation

Completeness

- Decomposition of relation R into fragments R_1, R_2, ..., R_n is complete if and only if each data item in R can also be found in some R_i

Reconstruction

- If relation R is decomposed into fragments R_1, R_2, ..., R_n, then there should exist some relational operator ∇ such that

$$R = \nabla_{1 \le i \le n} R_i$$

Disjointness

- If relation R is decomposed into fragments R_1, R_2, ..., R_n, and data item d_i is in R_j, then d_i should not be in any other fragment R_k ($k \neq j$).