DBMS

Decomposition

Decomposition

A functional decomposition is the process of breaking down the functions of an organization into progressively greater (finer and finer) levels of detail.

In decomposition, one function is described in greater detail by a set of other supporting functions.

The decomposition of a relation scheme R consists of replacing the relation schema by two or more relation schemas that each contain a subset of the attributes of R and together include all attributes in R.

Decomposition helps in eliminating some of the problems of bad design such as redundancy, inconsistencies and anomalies. There are two types of decomposition:

1. Lossy Decomposition 2. Lossless Join Decomposition

Lossy Decomposition:

"The decomposition of relation R into R1 and R2 is lossy when the join of R1 and R2 does not yield the same relation as in R."

One of the disadvantages of decomposition into two or more relational schemes (or tables) is that some information is lost during retrieval of original relation or table.

Consider that we have table STUDENT with three attribute roll_no , sname and department.

STUDENT:

Roll_no	Sname	Dept
111	parimal	COMPUTER
222	parimal	ELECTRICAL

This relation is decomposed into two relation no_name and name_dept :

No_name:

Roll_no	Sname
111	parimal
222	parimal

Name_dept :

Sname	Dept
parimal	COMPUTER
parimal	ELECTRICAL

In lossy decomposition, spurious tuples are generated when a natural join is applied to the relations in the decomposition. stu_joined :

Roll_no	Sname	Dept
111	parimal	COMPUTER
111	parimal	ELECTRICAL
222	parimal	COMPUTER
222	parimal	ELECTRICAL

The above decomposition is a bad decomposition or Lossy decomposition.

Lossless Join Decomposition:

"The decomposition of relation R into R1 and R2 is lossless when the join of R1 and R2 yield the same relation as in R."

A relational table is decomposed (or factored) into two or more smaller tables, in such a way that the designer can capture the precise content of the original table by joining the decomposed parts. This is called lossless-join (or non-additive join) decomposition.

This is also referred as non-additive decomposition.

The lossless-join decomposition is always defined with respect to a specific set F of dependencies.

Consider that we have table STUDENT with three attribute roll_no , sname and department.

STUDENT :

Roll_no	Sname	Dept

111	parimal	COMPUTER
222	parimal	ELECTRICAL

This relation is decomposed into two relation Stu_name and Stu_dept :

Stu_name:

Roll_no	Sname
111	parimal
222	parimal

Stu_dept :

Roll_no	Dept
111	COMPUTER
222	ELECTRICAL

Now ,when these two relations are joined on the comman column 'roll_no' ,the resultant relation will look like stu_joined. stu_joined :

Roll_no	Sname	Dept
111	parimal	COMPUTER
222	parimal	ELECTRICAL