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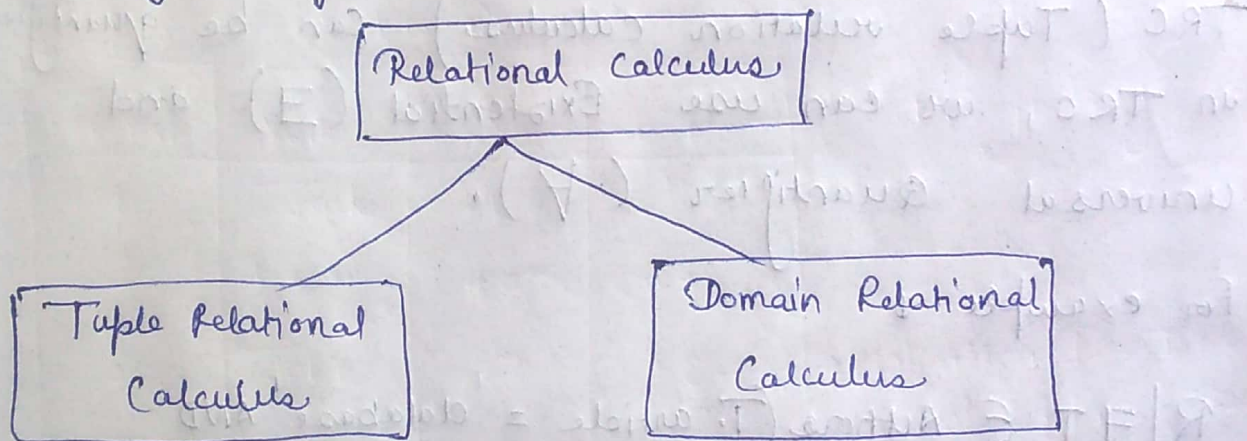
Computer Science (CS 2nd Year)

Subject - DBMS

Relational Calculus

- ⇒ Relational calculus is a non-procedural query language. In the non-procedural query language, the user is concerned with the detailed of how to obtain the end results.
- ⇒ The relational calculus explain what to do but never explains how to do.

Types of Relational Calculus



1) Tuple Relational Calculus :- (TRC)

- ⇒ The tuple relational calculus is specified to select the tuple in a relation. In TRC filtering variable uses the tuple of a relation.
- ⇒ The result of the relation can have one or more tuples.

$$\{T \mid P(T)\} \text{ or } \{T \mid \text{Condition}(T)\}$$

T is the resulting Tuples.

P(T) is the condition used to fetch T.

$\{T.name \mid \text{Author}(T) \text{ AND } T.article = 'database'\}$

output :-

The query selects the tuples from the AUTHOR relation. It returns a tuple with 'name' from Author who has written an article on 'database'.

TRC (Tuple relation calculus) can be quantified in TRC, we can use Existential (\exists) and universal quantifier (\forall).

For example :-

$R \mid \exists T \in \text{Authors} (T.article = 'database' \text{ AND } R.name = T.name) \}$

Output :- This query will yield the same result as the previous one

2) Domain Relational Calculus :- (DRC)

\Rightarrow The second form of relation is known as Domain relational calculus. In domain relational calculus, filtering variable uses the domain of attribute.

⇒ Domain relational Calculus uses the same operator as tuple Calculus. It uses logical connectives (\wedge) And, (\vee) or and \neg (not).

⇒ It uses Existential (\exists) and universal quantifiers (\forall) to bind the variable

Notation \rightarrow

$$\{ a_1, a_2, a_3 \dots a_n \mid P(a_1, a_2, a_3, \dots, a_n) \}$$

where a_1, a_2 are attribute

P stand for formula built by inner attribute

For example \rightarrow

$$\{ \langle \text{article}, \text{Page}, \text{Subject} \rangle \mid \in \text{JAVADBMS} \wedge \text{Subject} = \text{'Database'} \}$$

output:-

This query will yield the article, Page and Subject from the relational JAVADBMS, ~~table~~ where the subject is a Database.

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