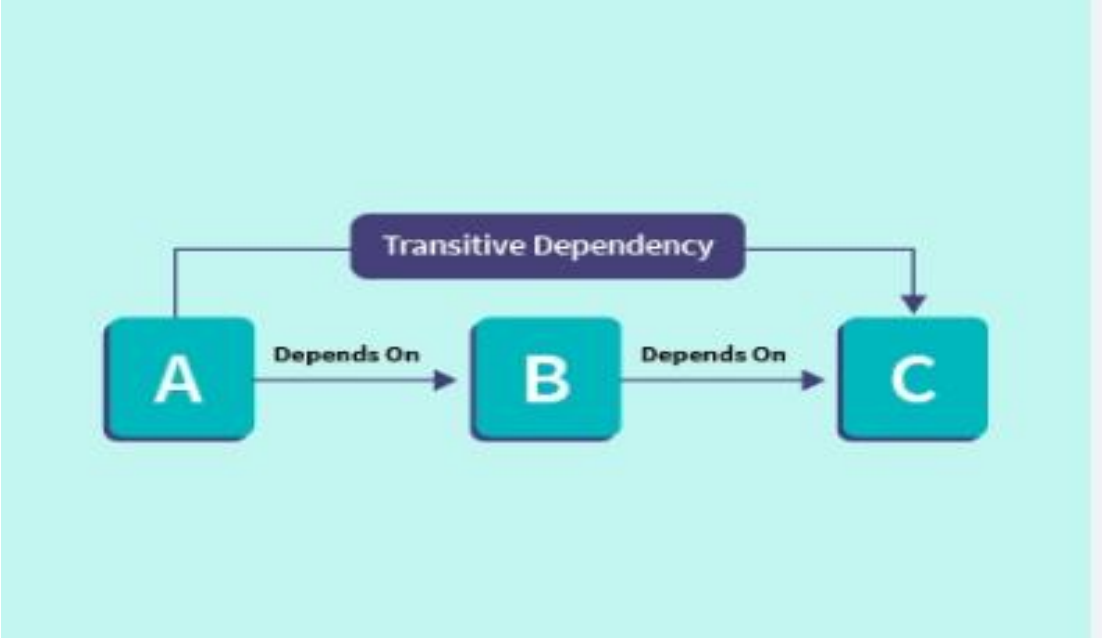
Transitive Dependency in DBMS



A transitive dependency refers to some non-prime attribute other than the candidate key that depends on another non-prime attribute that is dependent entirely on the candidate key.

What is Transitive Dependency in DBMS?

Whenever some indirect relationship happens to cause functional dependency (FC), it is known as Transitive Dependency. Thus, if A -> B and B -> C are true, then A -> C happens to be a transitive dependency.

Thus, to achieve 3NF, one must eliminate the Transitive Dependency.

Note:

The given functional dependency can only be transitive when it is formed indirectly by two FDs. For example,

P -> R happens to be a transitive dependency when the following functional dependencies hold true:

- P -> Q
- Q does not -> P
- Q -> R

The transitive dependency can occur easily only in the case of some given relation of three or more attributes. Such a type of dependency helps us in normalizing the database in their 3rd Normal Form (3NF).

Example

<Show_Telecast>

Show_ID	Telecast_ID	Telecast_Type	CD_Cost ($)
F08	S09	Thriller	50
F03	S05	Romantic	30
F05	S09	Comedy	20

The table above is not in its 3NF because it includes a transitive functional dependency.

Show_ID -> Telecast_ID

Telecast_ID -> Telecast_Type

Thus, the following has a transitive type of functional dependency.

Show_ID -> Telecast_Type

The statement given above states the relation <Show_Telecast> violates the 3NF (3rd Normal Form). If we want to remove this violation, then we have to split the tables for the removal of the transitive functional dependency.

<Show>

Show_ID	Telecast_ID	CD_Cost ($)
F08	S09	50
F03	S05	30
F05	S09	20

<Telecast>

Telecast_ID	Telecast_Type
S09	Thriller
S05	Romantic
S09	Comedy

Now the above relation is in the Third Normal Form (3NF) of Normalization.

Practice Questions on Transitive Dependency in DBMS

1. Which of these anomalies is a result of transitive dependency in a database management system?

A. Deletion

B. Insertion

C. Modification

D. All of the mentioned

Answer: D. All of the mentioned

2. The 4th Natural Form is designed so as to cope up with:

A. Transitive dependency

B. Join dependency

C. Multi-valued dependency

D. None

Answer: A. Transitive dependency

3. For some of the relations, the changing of data can deliver some undesirable consequences known as:

A. Modification anomalies

B. Referential Integrity constraints

C. Transitive dependencies

D. Normal forms

Answer: C. Transitive dependencies

What is transitive dependency in DBMS? Give an example.

The given functional dependency can only be transitive when it is formed indirectly by two FDs. For example,
P -> R happens to be a transitive dependency when the following functional dependencies hold true:

- P -> Q
- Q does not -> P
- Q -> R

What is a transitive and partial dependency?

Transitive dependency occurs when some non-key attribute determines some other attribute. On the other hand, partial dependency occurs when one primary key determines some other attribute/attributes.

What is a non-prime attribute?

A non-prime attribute refers to an attribute that does not happen to be a part of the prime key. Thus, if we follow the second normal form, every non-prime attribute must be fully functionally dependent on the prime key attribute.

What is a full dependency?

A functional dependency (full) refers to a state of database normalization that equates to the standard of normalization of the Second Normal Form. It means that it must meet the requirements of 1NF and all non-key attributes are fully functionally dependent on the primary key.