

L2T03 Design and Build a Relational Database.

Compulsory Task 1

Solutions:

1. Normalisation is the process used to remove redundant data (duplicate data) in a database. This may include modifying data or creating smaller tables, which may link with each other using relations. We use normalisation because it prevents user from having undesirable characteristics like insert delete and update anomalies, it helps in removing duplicate data and because data is not duplicate user only needs to search one record and make necessary changes if needed.

2. The table or relation is said to be in 1NF when it does not have any multivalued attributes. This means if an attribute in a table have more than one value associated with it, the relation violates the rule of 1NF.

3. For a table or relation to be in 2NF it must follow all the rules of 1NF and relation must not contain any partial dependency. A partial dependency is the dependency in which non-prime attribute is dependent on any subset of candidate key of table.

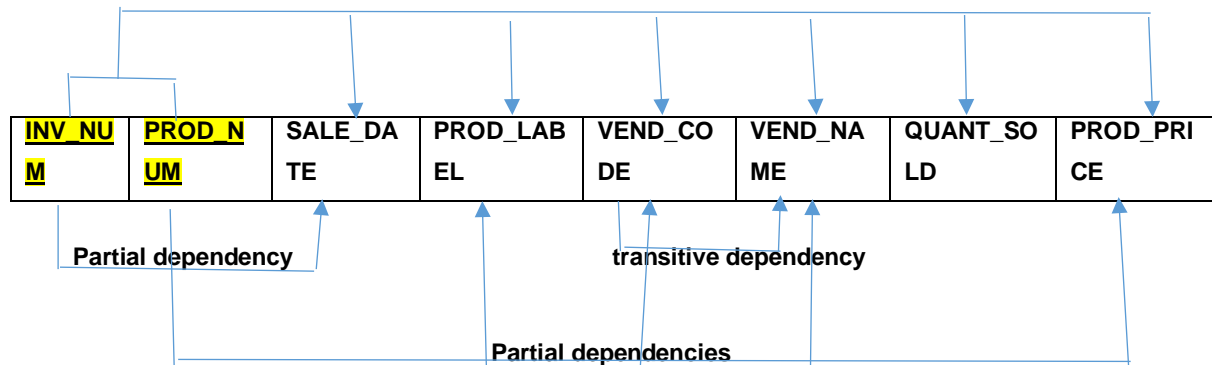
4. A table is in 3NF when there is no transitive dependency and the table is already in 2NF. To shed more light on Transitive dependency, let us consider an example, If $X \rightarrow Y$ (Y is functionally dependent on X) and $Y \rightarrow Z$ (Z is functionally dependent on Y) then $X \rightarrow Z$ is called transitive dependency.

5. Draw its dependency diagram and identify all dependencies (including transitive and partial dependencies).

Assume:

- a). the table does not contain repeating groups.
- b). any invoice number may reference more than one product.

Hint: This table uses a composite primary key.



Primary Key → INV_NUM and PROD_NUM

Partial dependency → INV_NUM and SALE_DATE

Transitive dependency → VEND_CODE and VEND_NAME

Partial dependencies → PROD_NUM, PROD_LABEL, VEND_CODE, VEND_NAME and PROD_PRICE

6. Remove all partial dependencies and draw the new dependency diagrams. Identify the normal forms for each table structure you created.

Assume:

- a. any given product is supplied by a single vendor.
- b. a vendor can supply many products.

From a and b, we can conclude the following dependency exists:

PROD_NUM → PROD_LABEL, PROD_PRICE, VEND_CODE, VEND_NAME

Table name: PRODUCT

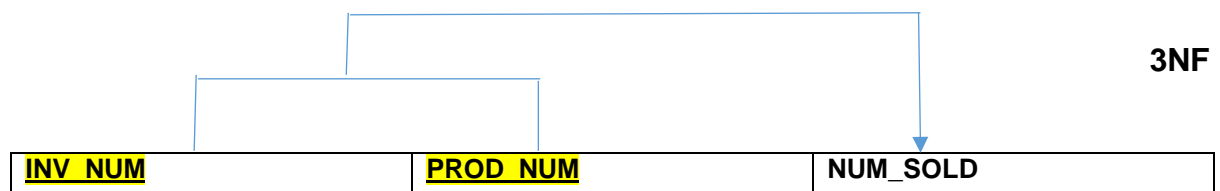


Table name: INVOICE

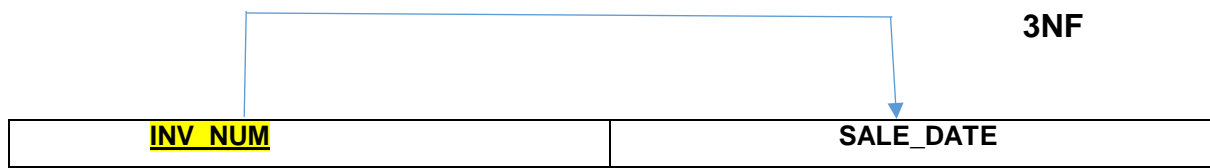


Table name: ASSIGNMENT



This is a 2NF because it contains a transitive dependency.

7. Remove all transitive dependencies and draw the new dependency diagrams. Identify the normal forms for each table structure you created.

Table name: PRODUCT

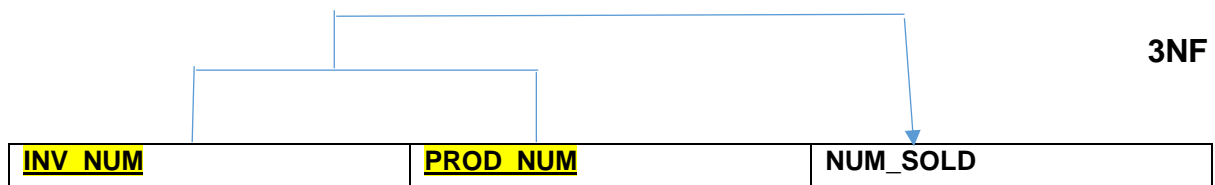


Table name: INVOICE

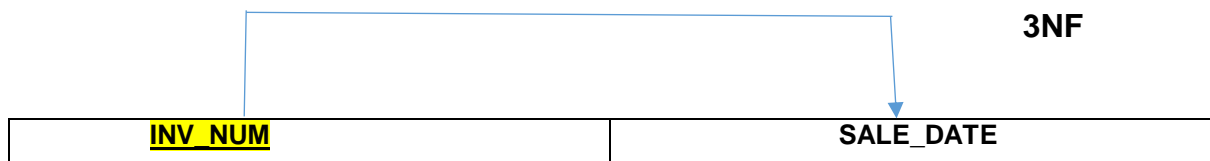


Table name: VENDOR

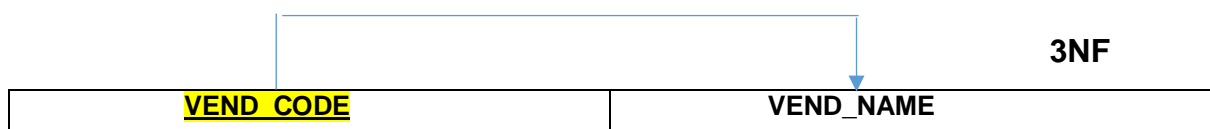


Table name: ASSIGNMENT

