1. Database normalization is a database design principle for organizing data in an organized and consistent way which helps in avoiding redundancy and maintain the integrity of the database. It also helps you eliminate undesirable characteristics associated with insertion, deletion, and updating.

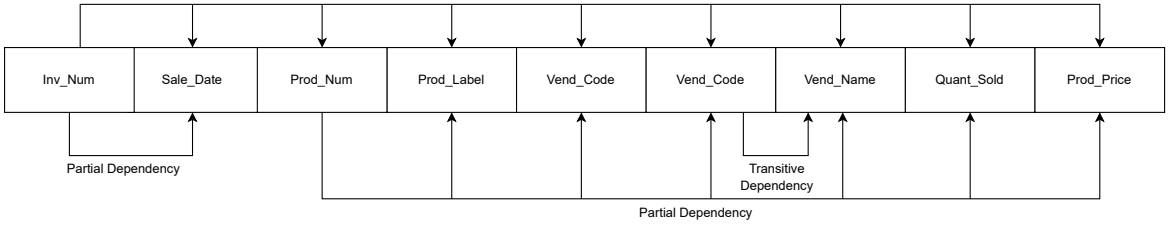
2. For a table to be in the first normal form it must meet the following criteria:
- a single cell must not hold more than one value (atomicity)
- there must be a primary key for identification
- no duplicated rows or columns
- each column must have only one value for each row in the table

3. Since 1NF eliminates repeating groups not redundancy there must be a 2NF table that meets the following criteria:
   - it's already in 1NF
   - has no partial dependency (non-key attributes are fully dependent on a primary key)

4. Since a table in 2NF, it eliminates repeating groups and redundancy but leaves behind the transitive partial dependency. So for a table to be in 3Nf it must:
   - be in 2NF
   - have no transitive partial dependency.

1.

Dependency Diagram:



Dependencies:

Partial-

Inv_Num -> Sale_Date
Prod_Num -> (Prod_Label, Vend_Code, Vend_Name, Prod_Price)

Transitive-

Vend_Code -> Vend_Name

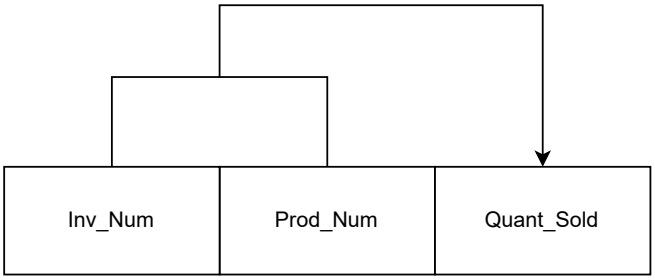
Functional-

Inv_Num, Prod_Num -> (Sale_Date, Prod_Label, Vend_Code, Vend-Name, Quant_Sold, Prod_Price)

6.

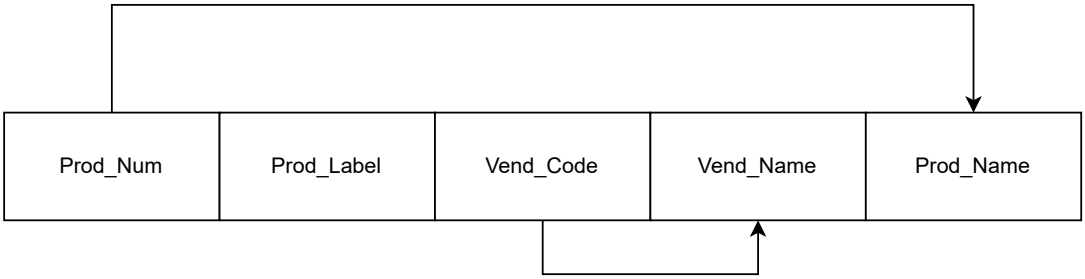
Dependency Diagram:

Table 1



Primary key: Inv_Num + Prod_Num
Foreign keys: Inv_Num (to Table 3), Prod_Num (to Table 2)
Normal form: 3NF

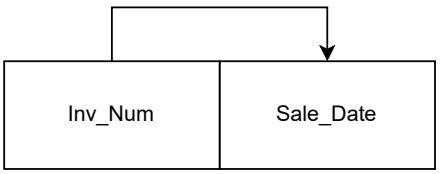
Table 2



Primary key: Prod_Num
Foreign keys: None
Normal form: 2NF - Contains Transitive Dependency

Transitive
Dependency

Table 3



Primary key: Inv_Num
Foreign_keys: None
Normal Form: 3NF

Dependencies:

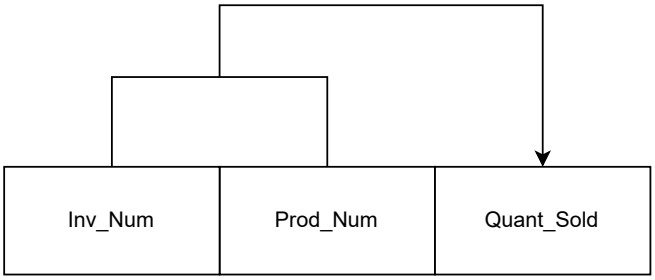
Transitive-

Vend_Code -> Vend_Name

7.

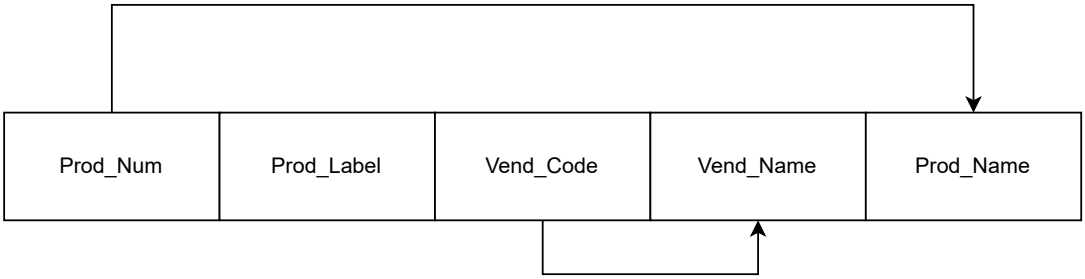
Dependency Diagram:

Table 1



Primary key: Inv_Num + Prod_Num
Foreign keys: Inv_Num (to Table 3), Prod_Num (to Table 2)
Normal form: 3NF

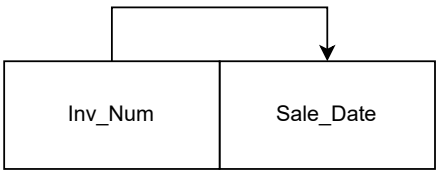
Table 2



Primary key: Prod_Num
Foreign keys: Vend_Code (to Table 4)
Normal form: 3NF

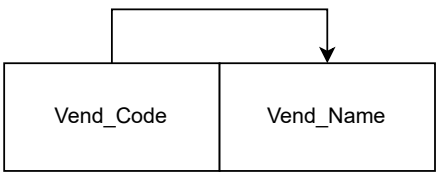
Transitive
Dependency

Table 3



Primary key: Inv_Num
Foreign_keys: None
Normal Form: 3NF

Table 4



Primary key: Vend_Code
Foreign keys: None
Normal_Form: