



Relational Databases

Model Answer Approach

[](http://www.hyperiondev.com/portal/)

# Auto-graded task

## 1. What is normalisation?

Normalisation is a technique used to organise a database efficiently. The goal is to minimise data redundancy and reduce the potential for data anomalies. It involves breaking down a database into smaller, related tables and defining relationships between them. This process improves data consistency and integrity.

## 2. When is a table in 1NF?

A table is in the First Normal Form (1NF) if:

* Each cell contains only one value.
* Each row is unique and identifiable by a primary key.

## 3. When is a table in 2NF?

A table is in the Second Normal Form (2NF) if:

* It meets all the rules of 1NF.
* All non-key attributes are fully dependent on the entire primary key. This means no column depends only on a part of a composite primary key.

## 4. When is a table in 3NF?

A table is in the Third Normal Form (3NF) if:

* It meets all the rules of 2NF.
* All non-key attributes depend only on the primary key and not on other non-key attributes. This removes transitive dependencies.

## 5. INVOICE dependency diagram

The relational scheme for the INVOICE table structure is as shown below:

INVOICE (INV\_NUM, PROD\_NUM, SALE\_DATE, PROD\_LABEL, VEND\_CODE, VEND\_NAME, QUANT\_SOLD, PROD\_PRICE)

The primary key for the table INVOICE is {INV\_NUM, PROD\_NUM}.

The functional dependencies are as follows: 1NF

{INV\_NUM, PROD\_NUM} {SALE\_DATE, PROD\_LABEL, VEND\_CODE, VEND\_NAME, QUANT\_SOLD, PROD\_PRICE}

{INV\_NUM} {SALE\_DATE}

{PROD\_NUM} {PROD\_LABEL, PROD\_PRICE, VEND\_CODE, VEND\_NAME}

{VEN\_CODE} {VEN\_NAME}

Among the dependencies, the partial dependencies are as follows:

{INV\_NUM} {SALE\_DATE}

{PROD\_NUM} { PROD\_LABEL, PROD\_PRICE, VEND\_CODE, VEND\_NAME}

Among the dependencies, the transitive dependencies are as follows:

{VEN\_CODE} {VEN\_NAME}

The dependency diagram is as follows:

Diagram

Description automatically generated

## 6. Remove all partial dependencies and draw the new dependency diagrams

The functional dependencies are as follows: 2NF

{INV\_NUM, PROD\_NUM} { QUANT\_SOLD}

{INV\_NUM} {SALE\_DATE}

{PROD\_NUM} { PROD\_LABEL, PROD\_PRICE, VEND\_CODE, VEND\_NAME}

Among the dependencies, the transitive dependencies are as follows:

{VEN\_CODE} {VEN\_NAME}

Diagram

Description automatically generated

## 7. Remove all transitive dependencies and draw the new dependency diagrams

The functional dependencies are as follows: 3NF

{INV\_NUM, PROD\_NUM} { QUANT\_SOLD}

{INV\_NUM} {SALE\_DATE}

{PROD\_NUM} { PROD\_LABEL, PROD\_PRICE, VEND\_CODE}

{VEN\_CODE} {VEN\_NAME}

Diagram

Description automatically generated