DATABASE - SECOND NORMAL FORM (2NF)

Second normal form states that it should meet all the rules for 1NF and there must be no partial dependences of any of the columns on the primary key:

Consider a customer-order relation and you want to store customer ID, customer name, order ID and order detail, and date of purchase:

```
CREATE  TABLE CUSTOMERS(
       CUST_ID     INT                 NOT NULL,
       CUST_NAME VARCHAR (20)       NOT NULL,
       ORDER_ID    INT                 NOT NULL,
       ORDER_DETAIL VARCHAR (20)   NOT NULL,
       SALE_DATE   DATETIME,
       PRIMARY KEY (CUST_ID, ORDER_ID)
);
```

This table is in first normal form, in that it obeys all the rules of first normal form. In this table, the primary key consists of CUST_ID and ORDER_ID. Combined they are unique assuming same customer would hardly order same thing.

However, the table is not in second normal form because there are partial dependencies of primary keys and columns. CUST_NAME is dependent on CUST_ID, and there's no real link between a customer's name and what he purchaged. Order detail and purchage date are also dependent on ORDER_ID, but they are not dependent on CUST_ID, because there's no link between a CUST_ID and an ORDER_DETAIL or their SALE_DATE.

To make this table comply with second normal form, you need to separate the columns into three tables.

First, create a table to store the customer details as follows:

```
CREATE  TABLE CUSTOMERS(
      CUST_ID     INT                 NOT NULL,
      CUST_NAME VARCHAR (20)       NOT NULL,
      PRIMARY KEY (CUST_ID)
);
```

Next, create a table to store details of each order:

```
CREATE  TABLE ORDERS(
      ORDER_ID    INT                 NOT NULL,
      ORDER_DETAIL VARCHAR (20)   NOT NULL,
      PRIMARY KEY (ORDER_ID)
);
```

Finally, create a third table storing just CUST_ID and ORDER_ID to keep track of all the orders for a customer:

```
CREATE  TABLE CUSTMERORDERS(
      CUST_ID     INT                 NOT NULL,
      ORDER_ID    INT                 NOT NULL,
      SALE_DATE   DATETIME,
      PRIMARY KEY (CUST_ID, ORDER_ID)
);
```