

# EXP.7

## NORMALISATION : 1NF, 2NF, 3NF

```
MySQL 8.0 Command Line Cli  X  +  v

mysql> use program
Database changed
mysql> select * from non_normalised_orders;
+-----+-----+-----+-----+
| ORDER_ID | CUSTOMER_NAME | ITEMS          | TOTAL_AMOUNT |
+-----+-----+-----+-----+
| 1        | RAM            | APPLE, BANANA  | 30            |
| 2        | SHYAM          | ORANGE, GRAPES | 40            |
| 3        | RAJ            | MANGO, LEMON   | 60            |
+-----+-----+-----+-----+
3 rows in set (0.00 sec)
```

```
mysql> CREATE TABLE ORDER_1NF(
-> ORDER_ID INT,
-> CUSTOMER_NAME VARCHAR(100),
-> ITEMS VARCHAR(100),
-> TOTAL_AMOUNT INT,
-> PRIMARY KEY (ORDER_ID, ITEMS));
Query OK, 0 rows affected (0.04 sec)

mysql> INSERT INTO ORDER_1NF(
-> ORDER_ID, CUSTOMER_NAME, ITEMS, TOTAL_AMOUNT)
-> VALUES(1, 'RAM', 'APPLE', 30),
-> (2, 'RAM', 'BANANA', 30),
-> (2, 'SHYAM', 'ORANGE', 40),
-> (2, 'SHYAM', 'GRAPES', 40),
-> (3, 'RAJ', 'MANGO', 60),
-> (3, 'RAJ', 'LEMON', 60);
Query OK, 6 rows affected (0.01 sec)
Records: 6  Duplicates: 0  Warnings: 0

mysql> SELECT * FROM ORDER_1NF;
+-----+-----+-----+-----+
| ORDER_ID | CUSTOMER_NAME | ITEMS          | TOTAL_AMOUNT |
+-----+-----+-----+-----+
| 1        | RAM            | APPLE          | 30            |
| 1        | RAM            | BANANA         | 30            |
| 2        | SHYAM          | GRAPES         | 40            |
| 2        | SHYAM          | ORANGE         | 40            |
| 3        | RAJ            | LEMON          | 60            |
| 3        | RAJ            | MANGO          | 60            |
+-----+-----+-----+-----+
```

```
mysql> SELECT * FROM ORDER_1NF;
+-----+-----+-----+-----+
| ORDER_ID | CUSTOMER_NAME | ITEMS          | TOTAL_AMOUNT |
+-----+-----+-----+-----+
| 1        | RAM            | APPLE          | 30            |
| 1        | RAM            | BANANA         | 30            |
| 2        | SHYAM          | GRAPES         | 40            |
| 2        | SHYAM          | ORANGE         | 40            |
| 3        | RAJ            | LEMON          | 60            |
| 3        | RAJ            | MANGO          | 60            |
+-----+-----+-----+-----+
6 rows in set (0.00 sec)

mysql> |
```

MySQL 8.0 Command Line Cli X + v

```
mysql> CREATE TABLE CUSTOMERS(  
-> CUSTOMER_ID INT PRIMARY KEY,  
-> CUSTOMER_NAME VARCHAR(100));  
Query OK, 0 rows affected (0.05 sec)
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```
mysql> CREATE TABLE ITEMS(  
-> ITEM_ID INT PRIMARY KEY,  
-> ITEM_NAME VARCHAR(100));  
Query OK, 0 rows affected (0.02 sec)  
  
mysql> CREATE TABLE ORDERS(  
-> ORDER_ID INT PRIMARY KEY,  
-> CUTOER_ID INT,  
-> TOTAL_AMOUNT INT,  
-> FOREIGN KEY(CUSTOMER_ID) REFERENCES CUSTOMERS(CUSTOMER_ID));  
ERROR 1072 (42000): Key column 'CUSTOMER_ID' doesn't exist in table  
mysql> CREATE TABLE ORDERS(  
-> ORDER_ID INT PRIMARY KEY,  
-> CUSTOMER_ID INT,  
-> TOTAL_AMOUNT INT,  
-> FOREIGN KEY(CUSTOMER_ID) REFERENCES CUSTOMERS(CUSTOMER_ID));  
Query OK, 0 rows affected (0.03 sec)  
  
mysql> CREATE TABLE ORDER_ITEM_2NF(  
-> ORDER_ID INT,  
-> ITEM_ID INT,  
-> PRIMARY KEY (ORDER_ID, ITEM_ID),  
-> FOREIGN KEY (ORDER_ID) REFERENCES ORDERS(ORDER_ID),  
-> FOREIGN KEY (ITEM_ID) REFERENCES ITEMS(ITEM_ID));  
Query OK, 0 rows affected (0.06 sec)  
  
mysql> INSERT INTO
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MySQL 8.0 Command Line Cli X + v

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-> ORDER_ID INT,  
-> ITEM_ID INT,  
-> PRIMARY KEY (ORDER_ID, ITEM_ID),  
-> FOREIGN KEY (ORDER_ID) REFERENCES ORDERS(ORDER_ID),  
-> FOREIGN KEY (ITEM_ID) REFERENCES ITEMS(ITEM_ID));  
Query OK, 0 rows affected (0.06 sec)
```

```
mysql> INSERT INTO CUSTOMERS (CUSTOMER_ID, CUSTOMER_NAME)  
-> VALUES(101, 'RAM'),(102, 'SHYAM');  
Query OK, 2 rows affected (0.04 sec)  
Records: 2 Duplicates: 0 Warnings: 0  
  
mysql> INSERT INTO ORDERS(TOTAL_AMOUNT)  
-> VALUES(30),(40),(60);  
ERROR 1364 (HY000): Field 'ORDER_ID' doesn't have a default value  
mysql> INSERT INTO CUSTOMERS (CUSTOMER_ID, CUSTOMER_NAME)  
-> VALUES(103, 'RAJ');  
Query OK, 1 row affected (0.01 sec)  
  
mysql> INSERT INTO ORDERS(ORDER_ID, TOTAL_AMOUNT)  
-> VALUES(1, 30), (2,40), (3, 60);  
Query OK, 3 rows affected (0.00 sec)  
Records: 3 Duplicates: 0 Warnings: 0  
  
mysql> INSERT INTO ITEMS (ITEM_ID, ITEM_NAME)  
-> VALUES(111, 'APPLE'), (222, 'BANANA'), (333, 'GRAPES'), (444, 'ORANGE'), (555, 'MANGO'), (666, 'LEMON');  
Query OK, 6 rows affected (0.03 sec)  
Records: 6 Duplicates: 0 Warnings: 0  
  
mysql> INSERT INTO ORDER_ITEM_2NF(ORDER_ID, ITEM_ID)  
-> VALUES(1, 111), (1, 222), (2, 333), (2, 444), (3, 555), (3, 666);  
Query OK, 6 rows affected (0.01 sec)  
Records: 6 Duplicates: 0 Warnings: 0  
  
mysql> |
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MySQL 8.0 Command Line Cli  x  +  v

mysql> SELECT * FROM CUSTOMERS;
+-----+-----+
| CUSTOMER_ID | CUSTOMER_NAME |
+-----+-----+
| 101 | RAM |
| 102 | SHYAM |
| 103 | RAJ |
+-----+-----+
3 rows in set (0.00 sec)

mysql> SELECT* FROM ITEMS;
+-----+-----+
| ITEM_ID | ITEM_NAME |
+-----+-----+
| 111 | APPLE |
| 222 | BANANA |
| 333 | GRAPES |
| 444 | ORANGE |
| 555 | MANGO |
| 666 | LEMON |
+-----+-----+
6 rows in set (0.00 sec)

mysql> SELECT * FROM ORDERS;
+-----+-----+-----+
| ORDER_ID | CUSTOMER_ID | TOTAL_AMOUNT |
+-----+-----+-----+
| 1 | NULL | 30 |
| 2 | NULL | 40 |
| 3 | NULL | 60 |
+-----+-----+-----+
3 rows in set (0.00 sec)

mysql> UPDATE ORDERS
-> SET CUSTOMER_ID = 101
-> WHERE ORDER_ID = 1;
Query OK, 1 row affected (0.04 sec)
Rows matched: 1 Changed: 1 Warnings: 0

mysql> UPDATE ORDERS
-> SET CUSTOMER_ID = 102
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MySQL 8.0 Command Line Cli  x  +  v

-> SET CUSTOMER_ID = 101
-> WHERE ORDER_ID = 1;
Query OK, 1 row affected (0.04 sec)
Rows matched: 1 Changed: 1 Warnings: 0

mysql> UPDATE ORDERS
-> SET CUSTOMER_ID = 102
-> WHERE ORDER_ID = 2;
Query OK, 1 row affected (0.03 sec)
Rows matched: 1 Changed: 1 Warnings: 0

mysql> UPDATE ORDERS
-> SET CUSTOMER_ID = 103
-> WHERE ORDER_ID = 3;
Query OK, 1 row affected (0.01 sec)
Rows matched: 1 Changed: 1 Warnings: 0

mysql> SELECT * FROM ORDERS;
+-----+-----+-----+
| ORDER_ID | CUSTOMER_ID | TOTAL_AMOUNT |
+-----+-----+-----+
| 1 | 101 | 30 |
| 2 | 102 | 40 |
| 3 | 103 | 60 |
+-----+-----+-----+
3 rows in set (0.00 sec)

mysql> SELECT * FROM ORDER_ITEM_2NF;
+-----+-----+
| ORDER_ID | ITEM_ID |
+-----+-----+
| 1 | 111 |
| 1 | 222 |
| 2 | 333 |
| 2 | 444 |
| 3 | 555 |
| 3 | 666 |
+-----+-----+
6 rows in set (0.00 sec)

mysql> |
```

```
MySQL 8.0 Command Line Cli  x  +  v
3 rows in set (0.00 sec)

mysql> SELECT * FROM ORDER_ITEM_2NF;
+-----+-----+
| ORDER_ID | ITEM_ID |
+-----+-----+
| 1 | 111 |
| 1 | 222 |
| 2 | 333 |
| 2 | 444 |
| 3 | 555 |
| 3 | 666 |
+-----+-----+
6 rows in set (0.00 sec)

mysql> SELECT
-> C.CUSTOMER_NAME,
-> O.ORDER_ID,
-> I.ITEM_NAME,
-> O.TOTAL_AMOUNT
-> FROM
-> ORDERS O
-> JOIN
-> CUSTOMERS C ON O.CUSTOMER_ID = C.CUSTOMER_ID
-> JOIN
-> ORDER_ITEM_2NF OI ON O.ORDER_ID = OI.ORDER_ID
-> JOIN
-> ITEMS I ON OI.ITEM_ID = I.ITEM_ID;
+-----+-----+-----+-----+
| CUSTOMER_NAME | ORDER_ID | ITEM_NAME | TOTAL_AMOUNT |
+-----+-----+-----+-----+
| RAM | 1 | APPLE | 30 |
| RAM | 1 | BANANA | 30 |
| SHYAM | 2 | GRAPES | 40 |
| SHYAM | 2 | ORANGE | 40 |
| RAJ | 3 | MANGO | 60 |
| RAJ | 3 | LEMON | 60 |
+-----+-----+-----+-----+
6 rows in set (0.00 sec)

mysql> |
```

```
MySQL 8.0 Command Line Cli  x  +  v

mysql> use program;
Database changed
mysql> CREATE TABLE DEPARTMENTS(
-> DEPT_ID VARCHAR(10) PRIMARY KEY,
-> DEPT_NAME VARCHAR(100));
Query OK, 0 rows affected (0.10 sec)

mysql> CREATE TABLE EMP_SALARY(
-> EMP_ID INT PRIMARY KEY,
-> EMP_NAME VARCHAR(100),
-> DEPT_NO VARCHAR(10),
-> SALARY INT,
-> FOREIGN KEY(DEPT_ID) REFERENCES DEPARTMENTS(DEPT_ID));
ERROR 1072 (42000): Key column 'DEPT_ID' doesn't exist in table
mysql> CREATE TABLE EMP_SALARY(
-> EMP_ID INT PRIMARY KEY,
-> EMP_NAME VARCHAR(100),
-> DEPT_ID VARCHAR(10),
-> SALARY INT,
-> FOREIGN KEY(DEPT_ID) REFERENCES DEPARTMENTS(DEPT_ID));
Query OK, 0 rows affected (0.07 sec)

mysql> INSERT INTO DEPARTMENTS( DEPT_ID, DEPT_NAME)
-> VALUES('D001', 'HR'),
-> ('D002', 'FINANCE');
Query OK, 2 rows affected (0.04 sec)
Records: 2 Duplicates: 0 Warnings: 0

mysql> INSERT INTO EMP_SALARY(EMP_ID, EMP_NAME, DEPT_ID, SALARY)
-> VALUES(1, 'ALICE', 'D001', 5000),
-> (2, 'BOB', 'D002', 6000),
-> (3, 'CAROL', 'D001', 4000);
Query OK, 3 rows affected (0.01 sec)
Records: 3 Duplicates: 0 Warnings: 0

mysql> SELECT * FROM DEPARTMENTS;
+-----+-----+
| DEPT_ID | DEPT_NAME |
+-----+-----+
| D001 | HR |
| D002 | FINANCE |
+-----+-----+
```

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MySQL 8.0 Command Line Cli  ×  +  ▾

Records: 3  Duplicates: 0  Warnings: 0

mysql> SELECT * FROM DEPARTMENTS;
+-----+-----+
| DEPT_ID | DEPT_NAME |
+-----+-----+
| D001    | HR        |
| D002    | FINANCE   |
+-----+-----+
2 rows in set (0.00 sec)

mysql> SELECT * FROM EMP_SALARY;
+-----+-----+-----+-----+
| EMP_ID | EMP_NAME | DEPT_ID | SALARY |
+-----+-----+-----+-----+
| 1      | ALICE    | D001    | 5000   |
| 2      | BOB      | D002    | 6000   |
| 3      | CAROL    | D001    | 4000   |
+-----+-----+-----+-----+
3 rows in set (0.00 sec)

mysql> SELECT
-> E.EMP_ID,
-> E.EMP_NAME,
-> E.DEPT_ID,
-> D.DEPT_NAME,
-> E.SALARY
-> FROM
-> EMP_SALARY E
-> JOIN
-> DEPARTMENTS D ON E.DEPT_ID = D.DEPT_ID;
+-----+-----+-----+-----+-----+
| EMP_ID | EMP_NAME | DEPT_ID | DEPT_NAME | SALARY |
+-----+-----+-----+-----+-----+
| 1      | ALICE    | D001    | HR        | 5000   |
| 3      | CAROL    | D001    | HR        | 4000   |
| 2      | BOB      | D002    | FINANCE   | 6000   |
+-----+-----+-----+-----+-----+
3 rows in set (0.03 sec)

mysql> |
```