Government Engineering College, Thrissur
CS333– Application Software Development Lab
Documentation -
Exp 4 – Constraints and Views
Exp 7 - Creation of Views and Assertions

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Experiment 4

AIM

Creating a database to set various constraints.

Description

Relations between the database is already created in the Experiment 1 and 2. In this experiment we will be focusing on setting constraints on tables that were created in the previous experiments.

Constraints that are available in MySQL are Use constraints like Not Null, Primary Key, Unique, Foreign Key.

Note: CHECK command is not supported in some MySQL versions

Output / Screenshots

1. Displaying the Constraints set during Table creation

```
mysql> show tables;
+-----------------------+
| Tables_in_ppm         |
+-----------------------+
| Consultant_Technologies |
| Consultants           |
| Contacts              |
| Customers             |
| Designations          |
| Project_Resources     |
| Project_Technologies  |
| Project_Transaction   |
| Projects              |
| Technology            |
| Users                 |
+-----------------------+
11 rows in set (0.00 sec)
```

```
mysql> describe Consultant_Technologies;
+--------------+---------+------+-----+---------+----------------+
| Field        | Type    | Null | Key | Default | Extra          |
+--------------+---------+------+-----+---------+----------------+
| ID           | int(11) | NO   | PRI | NULL    | auto_increment |
| TechID       | int(11) | NO   | MUL | NULL    |                |
| ConsultantID | int(11) | NO   | MUL | NULL    |                |
+--------------+---------+------+-----+---------+----------------+
3 rows in set (0.00 sec)
```

```
mysql> describe Consultants;
+---------------+--------------+------+-----+---------+----------------+
| Field         | Type         | Null | Key | Default | Extra          |
+---------------+--------------+------+-----+---------+----------------+
| ID            | int(11)      | NO   | PRI | NULL    | auto_increment |
| name          | varchar(200) | NO   |     | NULL    |                |
| phone         | varchar(14)  | NO   |     | NULL    |                |
| email         | varchar(200) | NO   |     | NULL    |                |
| presentAddress| varchar(300) | NO   |     | NULL    |                |
| pAddress      | varchar(200) | NO   |     | NULL    |                |
| highest_edu   | varchar(100) | NO   |     | NULL    |                |
| experience    | int(11)      | NO   |     | 0       |                |
| designation   | int(11)      | NO   | MUL | NULL    |                |
+---------------+--------------+------+-----+---------+----------------+
9 rows in set (0.00 sec)
```

```
mysql> describe Contacts;
+----------------+--------------+------+-----+---------+----------------+
| Field          | Type         | Null | Key | Default | Extra          |
+----------------+--------------+------+-----+---------+----------------+
| Conatct_Person | varchar(200) | NO   |     | NULL    |                |
| ID             | int(11)      | NO   | PRI | NULL    | auto_increment |
| phone          | varchar(14)  | NO   |     | NULL    |                |
| mobile         | varchar(14)  | NO   |     | NULL    |                |
| Email          | varchar(200) | NO   |     | NULL    |                |
| profile_desc   | varchar(300) | NO   |     | NULL    |                |
| CustomerID     | int(11)      | NO   | MUL | NULL    |                |
+----------------+--------------+------+-----+---------+----------------+
7 rows in set (0.00 sec)
```

3

```
mysql> describe Customers;
+-----------+--------------+------+-----+---------+----------------+
| Field     | Type         | Null | Key | Default | Extra          |
+-----------+--------------+------+-----+---------+----------------+
| Name      | varchar(200) | NO   |     | NULL    |                |
| ID        | int(11)      | NO   | PRI | NULL    | auto_increment |
| phone     | varchar(14)  | NO   |     | NULL    |                |
| email     | varchar(200) | NO   |     | NULL    |                |
| fax       | varchar(14)  | YES  |     | NULL    |                |
| pAddress  | int(11)      | YES  | MUL | NULL    |                |
+-----------+--------------+------+-----+---------+----------------+
6 rows in set (0.00 sec)
```

```
mysql> describe Designations;
+-------------+-------------+------+-----+---------+----------------+
| Field       | Type        | Null | Key | Default | Extra          |
+-------------+-------------+------+-----+---------+----------------+
| ID          | int(11)     | NO   | PRI | NULL    | auto_increment |
| Grade       | varchar(8)  | NO   |     | NULL    |                |
| Designation | varchar(50) | NO   |     | NULL    |                |
+-------------+-------------+------+-----+---------+----------------+
3 rows in set (0.00 sec)
```

```
mysql> describe Project_Resources;
+------------------------------+--------------+------+-----+---------+----------------+
| Field                        | Type         | Null | Key | Default | Extra          |
+------------------------------+--------------+------+-----+---------+----------------+
| ID                           | int(11)      | NO   | PRI | NULL    | auto_increment |
| Project_ID                   | int(11)      | NO   | MUL | NULL    |                |
| Resource_ID                  | int(11)      | NO   | MUL | NULL    |                |
| Hourly_Rate                  | double(12,2) | NO   |     | 0.00    |                |
| Estimate_Effort              | double(12,2) | NO   |     | 0.00    |                |
| Actual_Effort                | double(12,2) | NO   |     | 0.00    |                |
| Relative_Percentage_completed| double(5,2)  | NO   |     | 0.00    |                |
+------------------------------+--------------+------+-----+---------+----------------+
7 rows in set (0.00 sec)
```

```
mysql> describe Project_Technologies;
+-----------+---------+------+-----+---------+----------------+
| Field     | Type    | Null | Key | Default | Extra          |
+-----------+---------+------+-----+---------+----------------+
| ID        | int(11) | NO   | PRI | NULL    | auto_increment |
| ProjectID | int(11) | NO   | MUL | NULL    |                |
| TechID    | int(11) | NO   | MUL | NULL    |                |
+-----------+---------+------+-----+---------+----------------+
3 rows in set (0.00 sec)
```

4

```
mysql> describe Project_Transaction;
+----------------------+--------------+------+-----+-------------------+----------------+
| Field                | Type         | Null | Key | Default           | Extra          |
+----------------------+--------------+------+-----+-------------------+----------------+
| ID                   | int(11)      | NO   | PRI | NULL              | auto_increment |
| Resource_ID          | int(11)      | NO   | MUL | NULL              |                |
| Entry_Date           | datetime     | NO   |     | CURRENT_TIMESTAMP |                |
| Effort_Spent         | decimal(10,2)| NO   |     | 0.00              |                |
| Percentage_Completed | decimal(5,2) | NO   |     | 0.00              |                |
| ProjectID            | int(11)      | NO   | MUL | NULL              |                |
+----------------------+--------------+------+-----+-------------------+----------------+
6 rows in set (0.01 sec)
```

```
mysql> describe Projects;
+------------------+--------------+------+-----+-------------------+----------------+
| Field            | Type         | Null | Key | Default           | Extra          |
+------------------+--------------+------+-----+-------------------+----------------+
| ID               | int(11)      | NO   | PRI | NULL              | auto_increment |
| Title            | varchar(200) | NO   |     | NULL              |                |
| Description      | varchar(300) | NO   |     | NULL              |                |
| CustomerID       | int(11)      | NO   | MUL | NULL              |                |
| PM               | int(11)      | NO   | MUL | NULL              |                |
| status           | int(11)      | NO   |     | NULL              |                |
| estimated_effort | double(10,2) | NO   |     | 0.00              |                |
| estimated_cost   | double(10,2) | NO   |     | 0.00              |                |
| pCompleted       | double(5,2)  | NO   |     | 0.00              |                |
| Start_Date       | datetime     | NO   |     | CURRENT_TIMESTAMP |                |
| Finish_Date      | datetime     | NO   |     | CURRENT_TIMESTAMP |                |
+------------------+--------------+------+-----+-------------------+----------------+
11 rows in set (0.00 sec)
```

```
mysql> describe Technology;
+------------+--------------+------+-----+---------+----------------+
| Field      | Type         | Null | Key | Default | Extra          |
+------------+--------------+------+-----+---------+----------------+
| ID         | int(11)      | NO   | PRI | NULL    | auto_increment |
| Technology | varchar(200) | NO   |     | NULL    |                |
| Version    | varchar(10)  | NO   |     | NULL    |                |
+------------+--------------+------+-----+---------+----------------+
3 rows in set (0.01 sec)
```

5

```
mysql> describe Users;
+-----------+---------------+------+-----+---------+----------------+
| Field     | Type          | Null | Key | Default | Extra          |
+-----------+---------------+------+-----+---------+----------------+
| ID        | int(11)       | NO   | PRI | NULL    | auto_increment |
| username  | varchar(200)  | NO   |     | NULL    |                |
| password  | varchar(1000) | NO   |     | NULL    |                |
| consultant| tinyint(1)    | NO   |     | 0       |                |
| user_id   | int(11)       | NO   | UNI | NULL    |                |
| active    | tinyint(1)    | NO   |     | 1       |                |
+-----------+---------------+------+-----+---------+----------------+
6 rows in set (0.01 sec)
```

2. Trying to Override the constraints

- Trying to insert into Projects Table with NULL and check whether it produces an error

- Also For estimated_effort | estimated_cost | pCompleted | Start_Date | Finish_Date check whether DEFAULT Constraint works

2.1 NOT NULL

```
mysql> INSERT INTO Projects (Title, Description, CustomerID, PM, status) VALUES ("Pide Piper", "Compression Tool", 1, 1, 1);
Query OK, 1 row affected (0.07 sec)
```

2.2 DEFAULT

```
mysql> INSERT INTO Projects (Title, Description, CustomerID, PM, status) VALUES ("Pide Piper", "Compression Tool", 1, 1, 1);
Query OK, 1 row affected (0.07 sec)

mysql> SELECT * FROM Projects ORDER BY ID DESC LIMIT 1;
+----+------------+------------------+------------+----+--------+----------------+----------------+------------+---------------------+---------------------+
| ID | Title      | Description      | CustomerID | PM | status | estimated_effort | estimated_cost | pCompleted | Start_Date          | Finish_Date         |
+----+------------+------------------+------------+----+--------+----------------+----------------+------------+---------------------+---------------------+
|  4 | Pide Piper | Compression Tool |          1 |  1 |      1 |           0.00 |           0.00 |       0.00 | 2020-09-22 11:52:12 | 2020-09-22 11:52:12 |
+----+------------+------------------+------------+----+--------+----------------+----------------+------------+---------------------+---------------------+
1 row in set (0.00 sec)
```

2.3 Trying to add using duplicate PRIMARY KEY

- Try to Insert row into Projects table with duplicate primary key

- Select the last entered row and use it's primary key

```
mysql> INSERT INTO Projects (ID, Title, Description, CustomerID, PM, status) VALUES (4, "Pide Piper", "Compression Tool", 1, 1, 1);
ERROR 1062 (23000): Duplicate entry '4' for key 'PRIMARY'
```

2.4 Non Existing FOREIGN KEY

Try to add a Project with non existing FOREIGN KEY (Non exixting Project Manager)

```
mysql> INSERT INTO Projects (Title, Description, CustomerID, PM, status) VALUES (NULL, NULL, NULL, 1, 1);
ERROR 1048 (23000): Column 'Title' cannot be null
```

- This will give an error - ERROR 1452 (23000): Cannot add or update a child row: a foreign key constraint fails (`ppm`.`Projects`, CONSTRAINT `Projects_ibfk_2` FOREIGN KEY (`PM`) REFERENCES `Consultants` (`ID`))

- Due to PM (FOREIGN KEY to Consultants Table) does not exist

Correct:

```
mysql> INSERT INTO Projects (Title, Description, CustomerID, PM, status) VALUES (NULL, NULL, NULL, 1, 1);
ERROR 1048 (23000): Column 'Title' cannot be null
```

2.5 UNIQUE

Try to override UNIQUE Constraint of user id (FOREIGN KEY) in User Table

```
mysql> SELECT * FROM Users;
+----+------------+----------+------------+---------+--------+
| ID | username   | password                                                                           | consultant | user_id | active |
+----+------------+----------+------------+---------+--------+
|  1 | dkowsikpai | 1f40fc92da241694750979ee6cf582f2d5d7d28e18335de05abc54d0560e0f5302860c652bf08d560252aa5e74210546f369fbbbce8c12cfc7957b2652fe9a75 |          1 |       1 |      1 |
+----+------------+----------+------------+---------+--------+
1 row in set (0.00 sec)

mysql> INSERT INTO Users (username, password, user_id) VALUES (
    -> "pide piper",
    -> "1f40fc92da241694750979ee6cf582f2d5d7d28e18335de05abc54d0560e0f5302860c652bf08d560252aa5e74210546f369fbbbce8c12cfc7957b2652fe9a75",
    -> 1
    -> );
ERROR 1062 (23000): Duplicate entry '1' for key 'user_id'
```

Correct:

```
mysql> INSERT INTO Users (username, password, user_id) VALUES (
    -> "pide piper",
    -> "1f40fc92da241694750979ee6cf582f2d5d7d28e18335de05abc54d0560e0f5302860c652bf08d560252aa5e74210546f369fbbbce8c12cfc7957b2652fe9a75",
    -> 2
    -> );
Query OK, 1 row affected (0.06 sec)
```

7

Experiment 7

AIM

Creation of Views and Assertions

Description

Relations between the database is already created in the Experiment 1 and 2. In this experiment we will be focusing on setting different views that can be created on relations between table using the CREATE VIEW command in SQL

Note: ASSERTION command is not supported in some MySQL versions

Output / Screenshots

1. Project Technology Table Join View - Technologies used in Project

2. Project Consultants - People working in the projects, Project Customer , Displays the relative efforts spent by the consultants on particular project

```
mysql> CREATE VIEW Projects_Consultants AS SELECT
    ->     Projects.ID, Projects.Title, Consultants.ID AS CID, Consultants.name
    -> FROM
    ->     Projects JOIN Consultants
    -> WHERE
    ->     Projects.PM = Consultants.ID;
Query OK, 0 rows affected (0.06 sec)

mysql> CREATE VIEW Projects_Customers AS SELECT
    ->     Projects.ID, Projects.Title, Customers.ID AS Cust_ID, Customers.Name
    -> FROM
    ->     Projects JOIN Customers
    ->     ON Projects.CustomerID = Customers.ID;
Query OK, 0 rows affected (0.07 sec)

mysql> CREATE VIEW Projects_Efforts AS SELECT
    ->     Projects.ID, Projects.Title, Consultants.ID AS CID, Consultants.name, Project_Transaction.Effort_Spent
    -> FROM Projects JOIN Consultants JOIN Project_Transaction
    ->        ON Projects.ID = Project_Transaction.ProjectID
    ->           AND Consultants.ID = Project_Transaction.Resource_ID;
Query OK, 0 rows affected (0.08 sec)
```

Project - Consultants

```
+----+-----------+-----+---------------+
| ID | Title     | CID | name          |
+----+-----------+-----+---------------+
|  1 | Sirius    |   4 | Anna Mull     |
|  2 | Open PPM  |   4 | Anna Mull     |
|  3 | Pide Piper|   1 | Petey Cruiser |
|  4 | Pide Piper|   1 | Petey Cruiser |
|  5 | Pide Piper|   1 | Petey Cruiser |
|  6 | Pide Piper|   1 | Petey Cruiser |
|  7 | Pide Piper|   1 | Petey Cruiser |
+----+-----------+-----+---------------+
7 rows in set (0.00 sec)
```

Project - Customer

```
+----+-----------+---------+-------------------+
| ID | Title     | Cust_ID | Name              |
+----+-----------+---------+-------------------+
|  1 | Sirius    |       1 | Acme Corporation  |
|  2 | Open PPM  |       2 | Soylent Corp      |
|  3 | Pide Piper|       1 | Acme Corporation  |
|  4 | Pide Piper|       1 | Acme Corporation  |
|  5 | Pide Piper|       1 | Acme Corporation  |
|  6 | Pide Piper|       1 | Acme Corporation  |
|  7 | Pide Piper|       1 | Acme Corporation  |
+----+-----------+---------+-------------------+
7 rows in set (0.00 sec)
```

Project – Effort

```
+----+-----------+-----+-----------------+--------------+
| ID | Title     | CID | name            | Effort_Spent |
+----+-----------+-----+-----------------+--------------+
|  2 | Open PPM  |   1 | Petey Cruiser   |        22.00 |
|  2 | Open PPM  |   2 | Anna Sthesia    |        10.00 |
|  2 | Open PPM  |   3 | Paul Molive     |        10.00 |
|  2 | Open PPM  |   4 | Anna Mull       |        15.00 |
|  2 | Open PPM  |   5 | Gail Forcewind  |        25.20 |
|  2 | Open PPM  |   6 | Paige Turner    |         5.00 |
|  2 | Open PPM  |   7 | Walter Melon    |         2.00 |
|  2 | Open PPM  |   8 | Nick R. Bocker  |        25.00 |
|  1 | Sirius    |   9 | Alex Fleix      |        26.00 |
+----+-----------+-----+-----------------+--------------+
9 rows in set (0.01 sec)
```

3. Consultant Designation Details

```
mysql> CREATE VIEW Consultant_Designation AS SELECT
    -> Consultants.ID, Consultants.name, Designations.ID AS Desig_ID, Designations.Designation, Designations.Grade
    -> FROM
    -> Consultants JOIN Designations ON Consultants.designation = Designations.ID;
Query OK, 0 rows affected (0.09 sec)
```

```
+----+-----------------+----------+-------------------+-------+
| ID | name            | Desig_ID | Designation       | Grade |
+----+-----------------+----------+-------------------+-------+
|  1 | Petey Cruiser   |        1 | CEO               | 1     |
|  2 | Anna Sthesia    |        2 | Accounts Manager  | 2     |
|  3 | Paul Molive     |        3 | Design Manager    | 2     |
|  4 | Anna Mull       |        4 | Project Manager   | 2     |
|  5 | Gail Forcewind  |        5 | Marketing Manager | 2     |
|  6 | Paige Turner    |        7 | CFO               | 1     |
|  7 | Walter Melon    |        8 | Android Developer | 3     |
|  8 | Nick R. Bocker  |        9 | Data Analyst      | 3     |
|  9 | Alex Fleix      |        6 | Web Developer     | 3     |
+----+-----------------+----------+-------------------+-------+
9 rows in set (0.00 sec)
```

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4. Alternate contact Information related to each project

```
mysql> CREATE VIEW Project_Customer_Alt_Contacts AS SELECT
    -> Projects.ID, Projects.Title, Customers.ID AS Cust_ID, Customers.Name, Contacts.phone
    -> FROM
    -> Projects JOIN Customers JOIN Contacts
    ->      ON Projects.CustomerID = Customers.ID
    ->           AND Customers.ID = Contacts.CustomerID
    ->           AND Customers.pAddress <> Contacts.ID;
Query OK, 0 rows affected (0.04 sec)
```

```
+----+-----------+---------+------------------+------------+
| ID | Title     | Cust_ID | Name             | phone      |
+----+-----------+---------+------------------+------------+
|  1 | Sirius    |       1 | Acme Corporation | 7759478389 |
|  2 | Open PPM  |       2 | Soylent Corp     | 3277574011 |
|  3 | Pide Piper |      1 | Acme Corporation | 7759478389 |
|  4 | Pide Piper |      1 | Acme Corporation | 7759478389 |
|  5 | Pide Piper |      1 | Acme Corporation | 7759478389 |
|  6 | Pide Piper |      1 | Acme Corporation | 7759478389 |
|  7 | Pide Piper |      1 | Acme Corporation | 7759478389 |
+----+-----------+---------+------------------+------------+
7 rows in set (0.00 sec)
```