

Laboratory 3

Title of the Laboratory Exercise: Database Design

1. Introduction and Purpose of Experiment

Students will design the database schema as per the ER diagram designed in the Laboratory 1 and 2.

2. Aim and Objectives

Aim

Objectives

At the end of this lab, the student will be able to

3. Experimental Procedure

4. Calculations/Computations/Algorithms

Creation of the database

```
DROP TABLE IF EXISTS PROJECT_EXHIBITION;
DROP TABLE IF EXISTS EXHIBITION;
DROP TABLE IF EXISTS PROJECT_STUDENT_REGISTER;
DROP TABLE IF EXISTS PROJEKT;
DROP TABLE IF EXISTS STUDENT;
DROP TABLE IF EXISTS STUDENT_LOGIN;
DROP TABLE IF EXISTS STAFF_LOGIN;

CREATE TABLE STAFF_LOGIN
(
    id INT(5) PRIMARY KEY AUTO_INCREMENT,
    user_name VARCHAR(20) UNIQUE KEY NOT NULL,
    hashed_password CHAR(60) NOT NULL
);

CREATE TABLE STUDENT_LOGIN
(
    id INT(5) PRIMARY KEY AUTO_INCREMENT,
    user_name VARCHAR(20) UNIQUE KEY NOT NULL,
    hashed_password CHAR(60) NOT NULL
);
```

```
CREATE TABLE STUDENT
(
    id INT(5) UNIQUE KEY NOT NULL,
    reg_no CHAR(12) PRIMARY KEY,
    name VARCHAR(30) NOT NULL,
    department ENUM('CSE', 'EEE', 'ECE', 'CIVIL'),
    course ENUM('B.Tech', 'M.Tech') NOT NULL,
    contact_no VARCHAR(10) NOT NULL,
    FOREIGN KEY(id) REFERENCES STUDENT_LOGIN(id)
);

CREATE TABLE PROJEKT
(
    id INT(5) PRIMARY KEY AUTO_INCREMENT,
    project_leader_regno CHAR(12) UNIQUE KEY NOT NULL,
    project_name VARCHAR(100) UNIQUE KEY NOT NULL,
    mentor_name VARCHAR(30) NOT NULL,
    department ENUM('CSE', 'EEE', 'ECE', 'CIVIL') NOT NULL,
    category VARCHAR(30) NOT NULL
);

CREATE TABLE PROJECT_STUDENT_REGISTER
(
    project_id INT(5) NOT NULL,
    student_reg_no CHAR(12) NOT NULL,
    FOREIGN KEY(project_id) REFERENCES PROJEKT(id),
    FOREIGN KEY(student_reg_no) REFERENCES STUDENT(reg_no)
);

CREATE TABLE EXHIBITION
(
    room_id INT(5) PRIMARY KEY AUTO_INCREMENT,
    room_name CHAR(20) UNIQUE KEY NOT NULL,
    capacity INT(5) NOT NULL
);

CREATE TABLE PROJECT_EXHIBITION
(
    room_id INT(5) NOT NULL,
    project_id INT(5) UNIQUE KEY NOT NULL,
    table_no INT(5) CHECK ( table_no > 0 AND table_no < ( SELECT * FROM EXHIBITION WHERE EXHI
BITION.room_id = room_id LIMIT 1 ) ),
    FOREIGN KEY(room_id) REFERENCES EXHIBITION(room_id),
    FOREIGN KEY(project_id) REFERENCES PROJEKT(id)
);
```

Inserting data into the table

```
INSERT INTO `STUDENT_LOGIN` (`id`, `user_name`, `hashed_password`) VALUES
(1, '17ETCS002159', '$2b$10$uVRx4ogFBiOowMljpvEi1ONnd9wWOMtrpgVwqw2Mw8.aNmo6yEU1u'),
(2, '17ETCS002122', '$2b$10$ATp9qxsPWBs0UXDAB1YvK.yTLi4GK1mzpIHBCfSQCQwtXLU/52Pk2'),
(3, '17ETCS002168', '$2b$10$3cfBMD3yRi3YJk.fFGrNY.Yx1RRonj4z2cqg0e2fgZ78yNaqRxFc');

INSERT INTO `STUDENT` (`id`, `reg_no`, `name`, `department`, `course`, `contact_no`) VALUES
(2, '17ETCS002122', 'Prachi Poddar', 'CSE', 'B.Tech', '9856523658'),
(1, '17ETCS002159', 'Satyajit Ghana', 'CSE', 'B.Tech', '7892137665'),
(3, '17ETCS002168', 'Shikhar Singh', 'CSE', 'B.Tech', '9852145896');

INSERT INTO `PROJEKT` (`id`, `project_leader_regno`, `project_name`, `mentor_name`, `department`, `category`) VALUES
(2, '17ETCS002159', 'KrishiAI', 'Chaitra S', 'CSE', 'DL');

INSERT INTO `PROJECT_STUDENT_REGISTER` (`project_id`, `student_reg_no`) VALUES
(2, '17ETCS002159'),
(2, '17ETCS002122'),
(2, '17ETCS002168');

INSERT INTO `EXHIBITION` (`room_id`, `room_name`, `capacity`) VALUES
(1, 'A201', 60);
```

5. Presentation of Results

Now we run the created table sql file to create all the necessary tables with appropriate constraints.

```
mysql> source MYSQL-INF/create_tables.sql
Query OK, 0 rows affected, 1 warning (0.00 sec)

Query OK, 0 rows affected, 1 warning (0.06 sec)

Query OK, 0 rows affected, 1 warning (0.00 sec)

Query OK, 0 rows affected, 1 warning (0.00 sec)

Query OK, 0 rows affected, 1 warning (0.00 sec)

Query OK, 0 rows affected, 1 warning (0.00 sec)

Query OK, 0 rows affected, 1 warning (0.00 sec)

Query OK, 0 rows affected (0.02 sec)

Query OK, 0 rows affected (0.02 sec)

Query OK, 0 rows affected (0.02 sec)

Query OK, 0 rows affected (0.02 sec)

Query OK, 0 rows affected (0.10 sec)

Query OK, 0 rows affected (0.02 sec)

Query OK, 0 rows affected (0.04 sec)

mysql> show tables;
+-----+
| Tables_in_webarch |
+-----+
| EXHIBITION         |
| PROJECT_EXHIBITION |
| PROJECT_STUDENT_REGISTER |
| PROJEKT            |
| STAFF_LOGIN        |
| STUDENT            |
| STUDENT_LOGIN      |
+-----+
7 rows in set (0.00 sec)

mysql> █
```

```

mysql> use webarch;
mysql> source MYSQL-INF/insert_data.sql
Query OK, 3 rows affected (0.05 sec)
Records: 3  Duplicates: 0  Warnings: 0

Query OK, 3 rows affected (0.01 sec)
Records: 3  Duplicates: 0  Warnings: 0

Query OK, 1 row affected (0.01 sec)

Query OK, 3 rows affected (0.01 sec)
Records: 3  Duplicates: 0  Warnings: 0

Query OK, 1 row affected (0.01 sec)

mysql> select * from STUDENT_LOGIN
-> ;
+-----+-----+-----+
| id | user_name | hashed_password |
+-----+-----+-----+
| 1 | 17ETCS002159 | $2b$10$uVRx4ogFBi0owMljpvEi1ONnd9wwOMtrpgVwqw2Mw8.aNmo6yEU1u |
| 2 | 17ETCS002122 | $2b$10$ATp9qxsPWbs0UXDAB1YvK.yTLi4GK1mzpIHBCfS0CQwtXLU/52Pk2 |
| 3 | 17ETCS002168 | $2b$10$3cfBMD3yRi3YJk.fFGrNY.Yx1RRonj4z2cQG0e2fgZ78yNaqRxFkC |
+-----+-----+-----+
3 rows in set (0.00 sec)

mysql> select * from STUDENT;
+-----+-----+-----+-----+-----+-----+
| id | reg_no | name | department | course | contact_no |
+-----+-----+-----+-----+-----+-----+
| 2 | 17ETCS002122 | Prachi Poddar | CSE | B.Tech | 9856523658 |
| 1 | 17ETCS002159 | Satyajit Ghana | CSE | B.Tech | 7892137665 |
| 3 | 17ETCS002168 | Shikhar Singh | CSE | B.Tech | 9852145896 |
+-----+-----+-----+-----+-----+-----+
3 rows in set (0.00 sec)

mysql>

```

6. Analysis and Discussions

The database schema was designed as per the ER diagram designed in the Laboratory 1 and 2. The data or information for the database are stored in tables. Tables are uniquely identified by their names and are comprised of columns and rows. All the seven tables represent seven different entities and their columns represent attributes of the entities. Each table has column "id" as their primary key.

To store users' password hashing is used. Hashing is a one-way encryption that means you cannot get the original text back from the hash because in information security, passwords are recommended to be stored in a hashed format so applications/systems can verify if the correct password is entered without them storing your password. This makes it harder to steal. Because what you don't have has less likelihood of being stolen.

7. Conclusions

SQL stands for Structured Query Language. SQL is used to communicate with a database. According to ANSI (American National Standards Institute), it is the standard language for relational database management systems. SQL statements are used to perform tasks such as update data on a database, or retrieve data from a database. The standard SQL commands such as "Select", "Insert", "Update", "Delete", "Create", and "Drop" were used to accomplish everything that was needed to create the database.

8. Comments

a. Limitations of Experiments

One limitation of SQL is that relations must have a fixed set of columns. This is a frequent annoyance of software developers, and drives the demand for non-relational databases.

SQL allows user to access the data stored in a relational database (your typical RDBMS) or even flat files or hadoop or MongoDB(when using tools like Apache Drill or Hive). Even though SQL concept and syntax remains same across platforms and tools, implementation and limitations of each platform are sometimes very different. The problem increases in scale when performance tuning is concerned.

b. Limitations of Results

None

c. Learning happened

We learnt how to create tables, add data, create database, modify data, using MySQL, and also how to implement a given schema/er diagram in MySQL

Component	Max Marks	Marks Obtained
Viva	6	
Results	7	
Documentation	7	
Total	20	