King Saud University
College of Computer and Information Sciences
Department of Information Systems

IS230: Introduction to Database Systems

1st Semester

UniSchedular

Phase # 1

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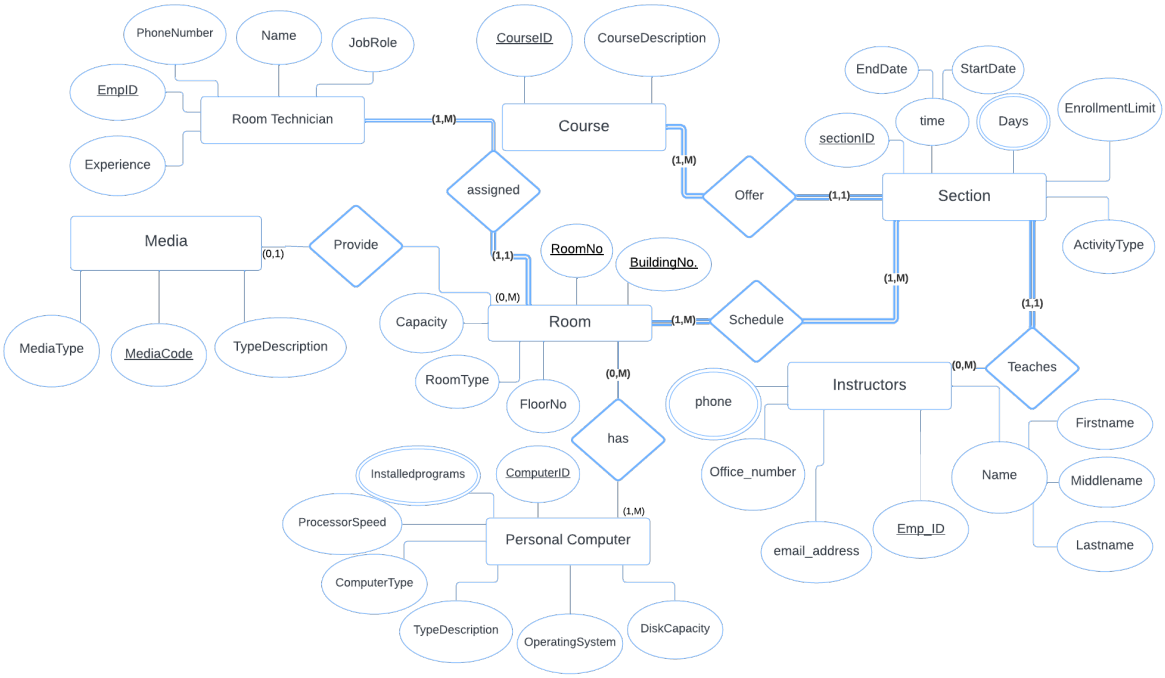
First Semester 2023

Part 1:

a) Entity relationship diagram (ER):



Assumptions:

1. The `Experience` attribute in the `RoomTechnician` entity is a single-value attribute storing a description of the technician's experience.
2. The `Time` attribute in the `Section` entity is a composite attribute that includes the start date and end date of the section.
3. The `Days` attribute in the `Section` entity is a multivalued attribute that stores the days on which the section occurs, allowing for multiple days in a week.
4. The `InstalledPrograms` attribute in the `PersonalComputer` entity is a multivalued attribute, as there can be multiple programs installed on a single computer.
5. The `Phone` attribute in the `Instructor` entity is a multivalued attribute since an instructor may have more than one phone number.

Part 2 :

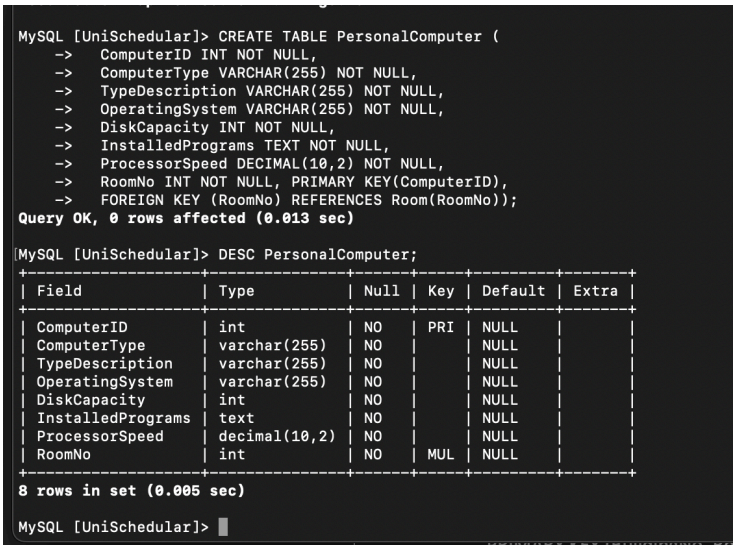
a) SQL script to generate the Database:

```
CREATE TABLE PersonalComputer (
  ComputerID INT NOT NULL,
  ComputerType VARCHAR(255) NOT NULL,
  TypeDescription VARCHAR(255) NOT NULL,
  OperatingSystem VARCHAR(255) NOT NULL,
  DiskCapacity INT NOT NULL,
  InstalledPrograms TEXT NOT NULL,
  ProcessorSpeed DECIMAL(10,2) NOT NULL,
  RoomNo INT NOT NULL, PRIMARY KEY(ComputerID),
  FOREIGN KEY (RoomNo) REFERENCES Room(RoomNo));

CREATE TABLE Room (
  BuildingNo INT NOT NULL,
  RoomNo INT NOT NULL,
  FloorNo INT,
  RoomType VARCHAR(2) NOT NULL,
  Capacity INT NOT NULL,
  TechnicianEmpID INT,
  MediaProvidedCode INT NOT  NULL,
  PRIMARY KEY (BuildingNo, RoomNo),
  FOREIGN KEY (TechnicianEmpID) REFERENCES RoomTechnician(EmpID),
  FOREIGN KEY (MediaProvidedCode) REFERENCES Media(MediaCode)
);


CREATE TABLE Instructors (
    Emp_ID INT NOT NULL,
    Name VARCHAR(50),
    email_Address VARCHAR(100),
    office_Number VARCHAR(10),
    phone VARCHAR(20),
    PRIMARY KEY (Emp_ID)
);


CREATE TABLE Section (
   sectionID INT NOT NULL,
   CourseID INT NOT NULL,
   Instructor_ID INT NOT NULL,
   Room_No INT NOT NULL,
   ActivityType VARCHAR(255),
   Days VARCHAR(255),
   StartDate DATE,
   EndDate DATE,
```

```
    EnrollmentLimit INT NOT NULL,
    PRIMARY KEY(sectionID),
    FOREIGN KEY (Instructor_ID) REFERENCES Instructors(Emp_ID),
    FOREIGN KEY (Room_No) REFERENCES Room(RoomNo),
    FOREIGN KEY (CourseID) REFERENCES Course(CourseID)
);


CREATE TABLE Media (
    MediaCode INT NOT NULL,
    MediaType VARCHAR(50) NOT NULL,
    TypeDescription VARCHAR(255) NOT NULL,
    PRIMARY KEY (MediaCode)
);


CREATE TABLE Course (
  CourseID INT NOT NULL,
  CourseDescription VARCHAR(255) NOT NULL,
  PRIMARY KEY (CourseID)
);



CREATE TABLE RoomTechnician (
    EmpID INT NOT NULL,
    Name VARCHAR(10) NOT NULL,
    JobRole VARCHAR(15) NOT NULL,
    Experience VARCHAR(255) NOT NULL,
    PhoneNumber VARCHAR(20) NOT NULL,
    PRIMARY KEY (EmpID)
);
```

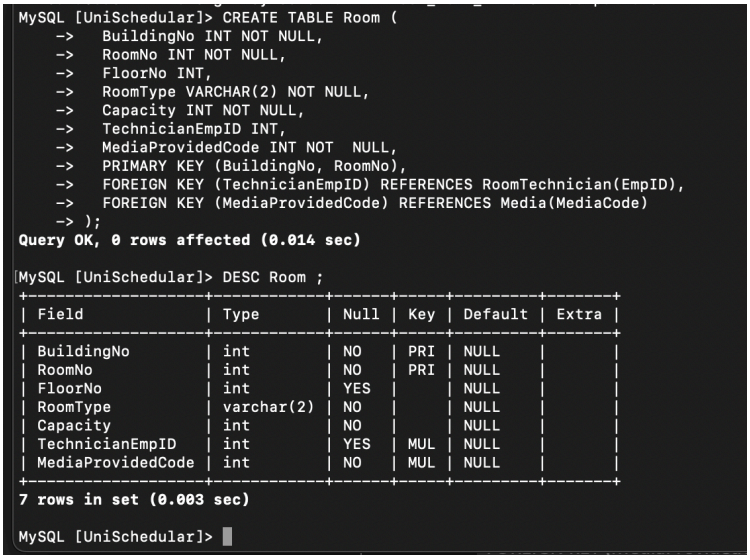
a) Screenshot of applying the SQL script in MariaDB:

1. Creating PersonalComputer Tabel:



```
MySQL [UniSchedular]> CREATE TABLE PersonalComputer (
    ->   ComputerID INT NOT NULL,
    ->   ComputerType VARCHAR(255) NOT NULL,
    ->   TypeDescription VARCHAR(255) NOT NULL,
    ->   OperatingSystem VARCHAR(255) NOT NULL,
    ->   DiskCapacity INT NOT NULL,
    ->   InstalledPrograms TEXT NOT NULL,
    ->   ProcessorSpeed DECIMAL(10,2) NOT NULL,
    ->   RoomNo INT NOT NULL, PRIMARY KEY(ComputerID),
    ->   FOREIGN KEY (RoomNo) REFERENCES Room(RoomNo));
Query OK, 0 rows affected (0.013 sec)

MySQL [UniSchedular]> DESC PersonalComputer;
+------------------+---------------+------+-----+---------+-------+
| Field            | Type          | Null | Key | Default | Extra |
+------------------+---------------+------+-----+---------+-------+
| ComputerID       | int           | NO   | PRI | NULL    |       |
| ComputerType     | varchar(255)  | NO   |     | NULL    |       |
| TypeDescription  | varchar(255)  | NO   |     | NULL    |       |
| OperatingSystem  | varchar(255)  | NO   |     | NULL    |       |
| DiskCapacity     | int           | NO   |     | NULL    |       |
| InstalledPrograms | text          | NO   |     | NULL    |       |
| ProcessorSpeed   | decimal(10,2) | NO   |     | NULL    |       |
| RoomNo           | int           | NO   | MUL | NULL    |       |
+------------------+---------------+------+-----+---------+-------+
8 rows in set (0.005 sec)

MySQL [UniSchedular]>
```

2. Creating Room Tabel:



```
MySQL [UniSchedular]> CREATE TABLE Room (
    ->   BuildingNo INT NOT NULL,
    ->   RoomNo INT NOT NULL,
    ->   FloorNo INT,
    ->   RoomType VARCHAR(2) NOT NULL,
    ->   Capacity INT NOT NULL,
    ->   TechnicianEmpID INT,
    ->   MediaProvidedCode INT NOT  NULL,
    ->   PRIMARY KEY (BuildingNo, RoomNo),
    ->   FOREIGN KEY (TechnicianEmpID) REFERENCES RoomTechnician(EmpID),
    ->   FOREIGN KEY (MediaProvidedCode) REFERENCES Media(MediaCode)
    -> );
Query OK, 0 rows affected (0.014 sec)

MySQL [UniSchedular]> DESC Room ;
+------------------+------------+------+-----+---------+-------+
| Field            | Type       | Null | Key | Default | Extra |
+------------------+------------+------+-----+---------+-------+
| BuildingNo       | int        | NO   | PRI | NULL    |       |
| RoomNo           | int        | NO   | PRI | NULL    |       |
| FloorNo          | int        | YES  |     | NULL    |       |
| RoomType         | varchar(2) | NO   |     | NULL    |       |
| Capacity         | int        | NO   |     | NULL    |       |
| TechnicianEmpID  | int        | YES  | MUL | NULL    |       |
| MediaProvidedCode | int        | NO   | MUL | NULL    |       |
+------------------+------------+------+-----+---------+-------+
7 rows in set (0.003 sec)

MySQL [UniSchedular]>
```

3. Creating instructors Tabel:

```
MySQL [UniSchedular]> CREATE TABLE Instructors (
    ->     Emp_ID INT NOT NULL,
    ->     Name VARCHAR(50),
    ->     email_Address VARCHAR(100),
    ->     office_Number VARCHAR(10),
    ->     phone VARCHAR(20),
    ->     PRIMARY KEY (Emp_ID)
    -> );
Query OK, 0 rows affected (0.008 sec)

MySQL [UniSchedular]> DESC Instructors;
+---------------+--------------+------+-----+---------+-------+
| Field         | Type         | Null | Key | Default | Extra |
+---------------+--------------+------+-----+---------+-------+
| Emp_ID        | int          | NO   | PRI | NULL    |       |
| Name          | varchar(50)  | YES  |     | NULL    |       |
| email_Address | varchar(100) | YES  |     | NULL    |       |
| office_Number | varchar(10)  | YES  |     | NULL    |       |
| phone         | varchar(20)  | YES  |     | NULL    |       |
+---------------+--------------+------+-----+---------+-------+
5 rows in set (0.003 sec)

MySQL [UniSchedular]>
```

4. Creating Section Tabel:

```
MySQL [UniSchedular]> CREATE TABLE Section (
    ->   sectionID INT NOT NULL,
    ->   CourseID INT NOT NULL,
    ->   Instructor_ID INT NOT NULL,
    ->   Room_No INT NOT NULL,
    ->   ActivityType VARCHAR(255),
    ->   Days VARCHAR(255),
    ->   StartDate DATE,
    ->   EndDate DATE,
    ->   PRIMARY KEY(sectionID),
    ->   FOREIGN KEY (Instructor_ID) REFERENCES Instructors(Emp_ID),
    ->   FOREIGN KEY (Room_No) REFERENCES Room(RoomNo),
    ->   FOREIGN KEY (CourseID) REFERENCES Course(CourseID)
    -> );
Query OK, 0 rows affected (0.015 sec)

MySQL [UniSchedular]> ALTER TABLE Section
    -> ADD EnrollmentLimit INT NOT NULL;
Query OK, 0 rows affected (0.012 sec)
Records: 0  Duplicates: 0  Warnings: 0

MySQL [UniSchedular]> DESC Section;
+-----------------+-------------+------+-----+---------+-------+
| Field           | Type        | Null | Key | Default | Extra |
+-----------------+-------------+------+-----+---------+-------+
| sectionID       | int         | NO   | PRI | NULL    |       |
| CourseID        | int         | NO   | MUL | NULL    |       |
| Instructor_ID   | int         | NO   | MUL | NULL    |       |
| Room_No         | int         | NO   | MUL | NULL    |       |
| ActivityType    | varchar(255)| YES  |     | NULL    |       |
| Days            | varchar(255)| YES  |     | NULL    |       |
| StartDate       | date        | YES  |     | NULL    |       |
| EndDate         | date        | YES  |     | NULL    |       |
| EnrollmentLimit | int         | NO   |     | NULL    |       |
+-----------------+-------------+------+-----+---------+-------+
9 rows in set (0.003 sec)
```

Note: We did some updates (adding a new column) as shown in the second screenshot.

5. Creating Media Tabel:

```
MySQL [UniSchedular]> CREATE TABLE Media (
    ->   MediaCode INT NOT NULL,
    ->   MediaType VARCHAR(50) NOT NULL,
    ->   TypeDescription VARCHAR(255) NOT NULL,
    ->   PRIMARY KEY (MediaCode)
    -> );
Query OK, 0 rows affected (0.007 sec)

MySQL [UniSchedular]> DESC Media;
+-----------------+--------------+------+-----+---------+-------+
| Field           | Type         | Null | Key | Default | Extra |
+-----------------+--------------+------+-----+---------+-------+
| MediaCode       | int          | NO   | PRI | NULL    |       |
| MediaType       | varchar(50)  | NO   |     | NULL    |       |
| TypeDescription | varchar(255) | NO   |     | NULL    |       |
+-----------------+--------------+------+-----+---------+-------+
3 rows in set (0.003 sec)

MySQL [UniSchedular]>
```

6. Creating Course Tabel:

```
MySQL [UniSchedular]> CREATE TABLE Course (
    ->   CourseID INT NOT NULL,
    ->   CourseDescription VARCHAR(255) NOT NULL,
    ->   PRIMARY KEY (CourseID)
    -> );
Query OK, 0 rows affected (0.008 sec)

MySQL [UniSchedular]>
MySQL [UniSchedular]>
MySQL [UniSchedular]> DESC Course;
+-------------------+--------------+------+-----+---------+-------+
| Field             | Type         | Null | Key | Default | Extra |
+-------------------+--------------+------+-----+---------+-------+
| CourseID          | int          | NO   | PRI | NULL    |       |
| CourseDescription | varchar(255) | NO   |     | NULL    |       |
+-------------------+--------------+------+-----+---------+-------+
2 rows in set (0.003 sec)

MySQL [UniSchedular]>
```

7. Creating RoomTechnician Tabel:

```
MySQL [UniSchedular]> CREATE TABLE RoomTechnician (
    -> EmpID INT NOT NULL,
    -> Name VARCHAR(10) NOT NULL,
    -> JobRole VARCHAR(15) NOT NULL,
    -> Experience VARCHAR(255) NOT NULL,
    -> PRIMARY KEY (EmpID)
    -> );
Query OK, 0 rows affected (0.011 sec)
```

```
MySQL [UniSchedular]> ALTER TABLE RoomTechnician
    -> ADD PhoneNumber VARCHAR(20) NOT NULL;
Query OK, 0 rows affected (0.010 sec)
Records: 0  Duplicates: 0  Warnings: 0

MySQL [UniSchedular]> DESC RoomTechnician ;
+-------------+--------------+------+-----+---------+-------+
| Field       | Type         | Null | Key | Default | Extra |
+-------------+--------------+------+-----+---------+-------+
| EmpID       | int          | NO   | PRI | NULL    |       |
| Name        | varchar(10)  | NO   |     | NULL    |       |
| JobRole     | varchar(15)  | NO   |     | NULL    |       |
| Experience  | varchar(255) | NO   |     | NULL    |       |
| PhoneNumber | varchar(20)  | NO   |     | NULL    |       |
+-------------+--------------+------+-----+---------+-------+
5 rows in set (0.002 sec)
```

Note: We did some updates (adding a new column) as shown in the second screenshot.