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CSC 423 – Project 3: Implementation

GitHub: https://github.com/gmserranoe/CSC423.git

Translate the logical data model for the Oracle Enterprise DBMS. (12/09/21)

a. Develop SQL code to create the entire database schema, reflecting the constraints identified in previous steps.

b. Create at least 5 tuples for each relation in your database.

c. Develop 5 SQL queries using embedded SQL (see Python tutorial).

d. Upload all the code and documentation to GitHub.

A. Develop SQL code to create the entire database schema, reflecting the constraints identified in previous steps

Department

```
CREATE TABLE Department(
    deptNo VARCHAR(5) NOT NULL CHECK (deptNo LIKE 'D%'),
    deptName VARCHAR(100) CHECK (deptName LIKE 'Department%'),
    chairName VARCHAR(100),
    faculty_count INT,
    PRIMARY KEY(deptNo) );
```

Student

```
 CREATE TABLE Student(
    studentID VARCHAR(5) NOT NULL CHECK (studentID LIKE 'R%'),
    studentName VARCHAR(100),
    student_initials VARCHAR(4) CHECK (student_initials LIKE '__%'),
    PRIMARY KEY(studentID)  );
```

Major

```
CREATE TABLE Major(
    majorCode CHAR(3) NOT NULL CHECK (majorCode LIKE '___'),
    majorName VARCHAR(100),
    deptNo VARCHAR(5),
    PRIMARY KEY(majorCode),
    FOREIGN KEY(deptNo) REFERENCES Department(deptNo)
    ON DELETE CASCADE  );
```

Event

```
CREATE TABLE Event(
    eventNo VARCHAR(5) NOT NULL CHECK (eventNo LIKE 'EV%'),
    eventName VARCHAR(100),
    start_date date NOT NULL CHECK (start_date >= 2022-12-02),
    end_date date NOT NULL,
    CONSTRAINT chk_date CHECK (end_date > start_date),
    PRIMARY KEY(eventNo) );
```

Department Event

```
CREATE TABLE DeptEvent(
    deptNo VARCHAR(5) NOT NULL CHECK (deptNo LIKE 'D%'),
    eventNo VARCHAR(5) NOT NULL CHECK (eventNo LIKE 'E%'),
    PRIMARY KEY(deptNo, eventNo),
    FOREIGN KEY(deptNo) REFERENCES Department(deptNo)
        ON DELETE CASCADE,
    FOREIGN KEY(eventNo) REFERENCES Event(eventNo)
        ON DELETE CASCADE   );
```

Student Attendance

```
CREATE TABLE StudentAttendance(
    studentID VARCHAR(5) NOT NULL CHECK (studentID LIKE 'R%'),
    eventNo VARCHAR(5) NOT NULL CHECK (eventNo LIKE 'E%'),
    PRIMARY KEY(studentID, eventNo),
    FOREIGN KEY(studentID) REFERENCES Student(studentID)
        ON DELETE CASCADE,
```

```
    FOREIGN KEY(eventNo) REFERENCES Event(eventNo)
        ON DELETE CASCADE );
```

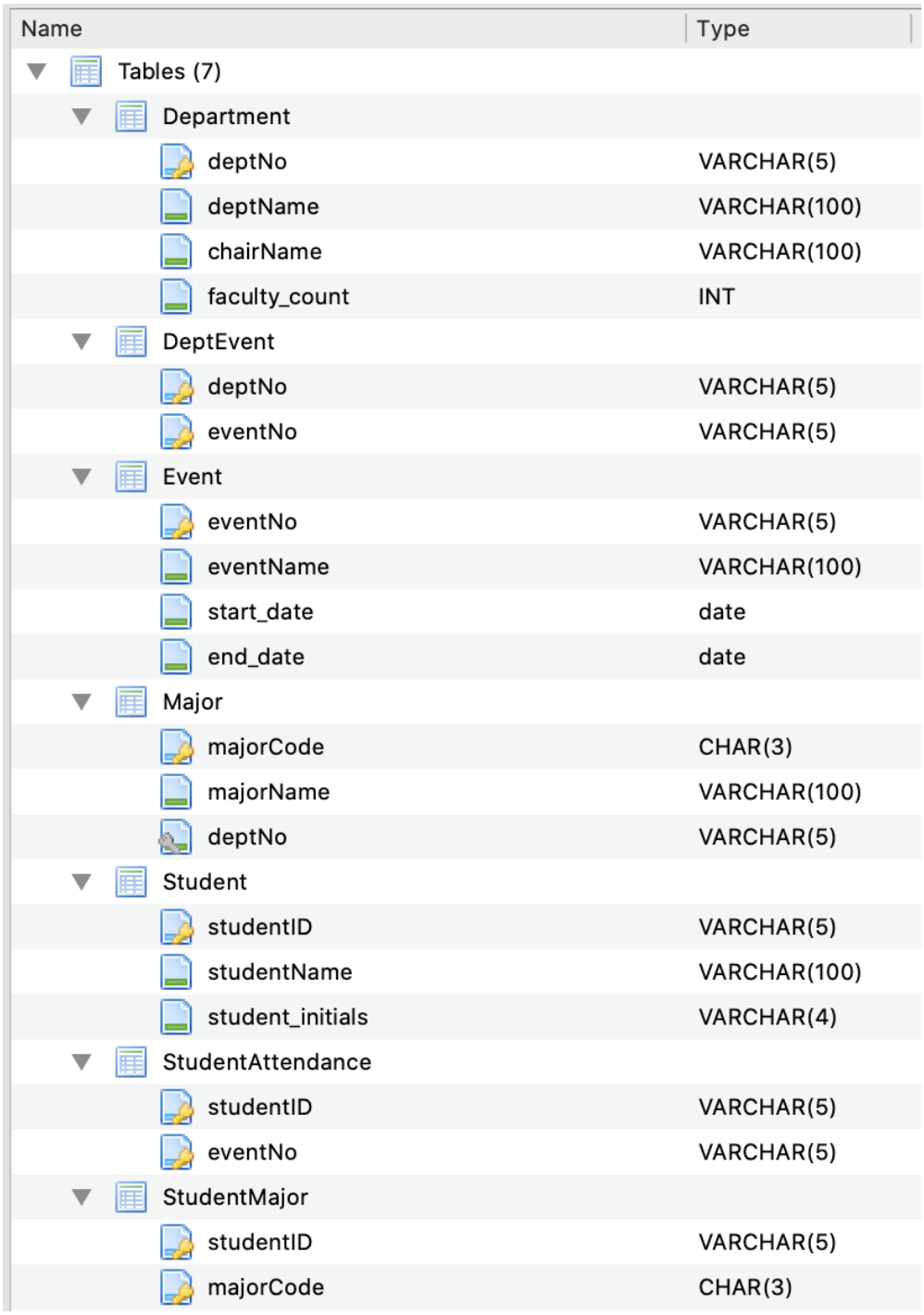
Student Major

---

```
CREATE TABLE StudentMajor(
        studentID VARCHAR(5) NOT NULL CHECK (studentID LIKE 'R%'),
        majorCode CHAR(3) NOT NULL CHECK (majorCode LIKE '___'),
        PRIMARY KEY(studentID, majorCode),
        FOREIGN KEY(studentID) REFERENCES Student(studentID)
                ON DELETE CASCADE,
        FOREIGN KEY(majorCode) REFERENCES Major(majorCode)
                ON DELETE CASCADE );
```

*(Results in next page)*

*(Using DB Browser for SQLite to display results)*



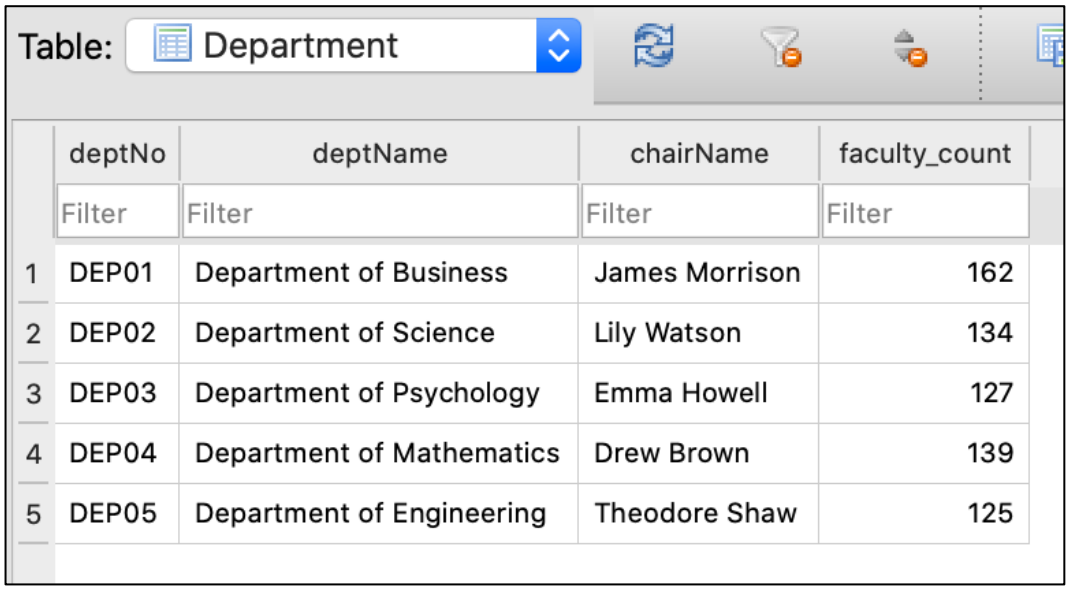
| Name | Type |
|---|---|
| Tables (7) | |
| Department | |
| deptNo | VARCHAR(5) |
| deptName | VARCHAR(100) |
| chairName | VARCHAR(100) |
| faculty_count | INT |
| DeptEvent | |
| deptNo | VARCHAR(5) |
| eventNo | VARCHAR(5) |
| Event | |
| eventNo | VARCHAR(5) |
| eventName | VARCHAR(100) |
| start_date | date |
| end_date | date |
| Major | |
| majorCode | CHAR(3) |
| majorName | VARCHAR(100) |
| deptNo | VARCHAR(5) |
| Student | |
| studentID | VARCHAR(5) |
| studentName | VARCHAR(100) |
| student_initials | VARCHAR(4) |
| StudentAttendance | |
| studentID | VARCHAR(5) |
| eventNo | VARCHAR(5) |
| StudentMajor | |
| studentID | VARCHAR(5) |
| majorCode | CHAR(3) |

B. Create at least 5 tuples for each relation in your database.

Department

---

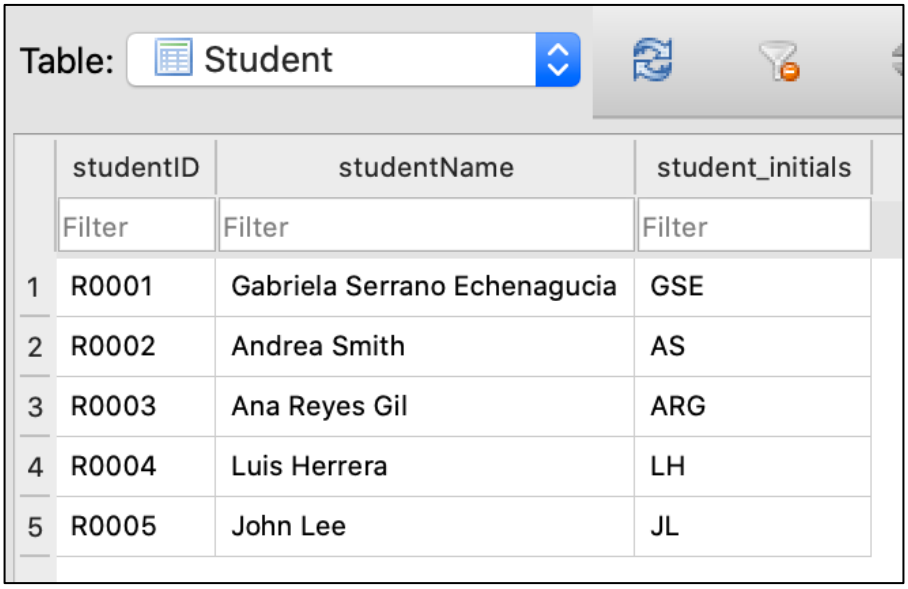
```
INSERT INTO Department
    VALUES ('DEP01', 'Department of Business', 'James Morrison', 162);
INSERT INTO Department
    VALUES ('DEP02', 'Department of Science', 'Lily Watson', 134);
INSERT INTO Department
    VALUES ('DEP03', 'Department of Psychology', 'Emma Howell', 127);
INSERT INTO Department
    VALUES ('DEP04', 'Department of Mathematics', 'Drew Brown', 139);
INSERT INTO Department
    VALUES ('DEP05', 'Department of Engineering', 'Theodore Shaw', 125);
```




| | deptNo | deptName | chairName | faculty_count |
|---|---|---|---|---|
| | Filter | Filter | Filter | Filter |
| 1 | DEP01 | Department of Business | James Morrison | 162 |
| 2 | DEP02 | Department of Science | Lily Watson | 134 |
| 3 | DEP03 | Department of Psychology | Emma Howell | 127 |
| 4 | DEP04 | Department of Mathematics | Drew Brown | 139 |
| 5 | DEP05 | Department of Engineering | Theodore Shaw | 125 |

Student

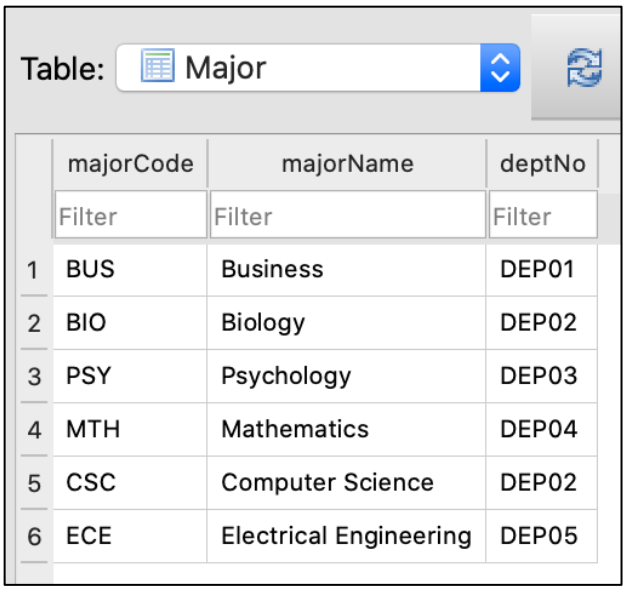
```
INSERT INTO Student
    VALUES ('R0001', 'Gabriela Serrano Echenagucia', 'GSE');
INSERT INTO Student
    VALUES ('R0002', 'Andrea Smith', 'AS');
INSERT INTO Student
    VALUES ('R0003', 'Ana Reyes Gil', 'ARG');
INSERT INTO Student
    VALUES ('R0004', 'Luis Herrera', 'LH');
INSERT INTO Student
    VALUES ('R0005', 'John Lee', 'JL');
```




| | studentID | studentName | student_initials |
|---|---|---|---|
| | Filter | Filter | Filter |
| 1 | R0001 | Gabriela Serrano Echenagucia | GSE |
| 2 | R0002 | Andrea Smith | AS |
| 3 | R0003 | Ana Reyes Gil | ARG |
| 4 | R0004 | Luis Herrera | LH |
| 5 | R0005 | John Lee | JL |

Major

```
INSERT INTO Major
    VALUES ('BUS', 'Business', 'DEP01');
INSERT INTO Major
    VALUES ('BIO', 'Biology', 'DEP02');
INSERT INTO Major
    VALUES ('PSY', 'Psychology', 'DEP03');
INSERT INTO Major
    VALUES ('MTH', 'Mathematics', 'DEP04');
INSERT INTO Major
    VALUES ('CSC', 'Computer Science', 'DEP02');
INSERT INTO Major
    VALUES ('ECE', 'Electrical Engineering', 'DEP05');
```




| | majorCode | majorName | deptNo |
|---|---|---|---|
| | Filter | Filter | Filter |
| 1 | BUS | Business | DEP01 |
| 2 | BIO | Biology | DEP02 |
| 3 | PSY | Psychology | DEP03 |
| 4 | MTH | Mathematics | DEP04 |
| 5 | CSC | Computer Science | DEP02 |
| 6 | ECE | Electrical Engineering | DEP05 |

Event

```
INSERT INTO Event
    VALUES ('EV000', 'Public Speaking 101', '2022-01-31', '2022-02-01');
INSERT INTO Event
    VALUES ('EV001', 'Networking in Business', '2022-03-16', '2022-03-18');
INSERT INTO Event
    VALUES ('EV002', 'Green Day', '2022-03-02', '2022-03-03');
INSERT INTO Event
    VALUES ('EV003', 'Logic and Games', '2022-01-14', '2022-01-15');
INSERT INTO Event
    VALUES ('EV004', 'Spring Hackathon', '2022-02-21', '2022-02-26');
```

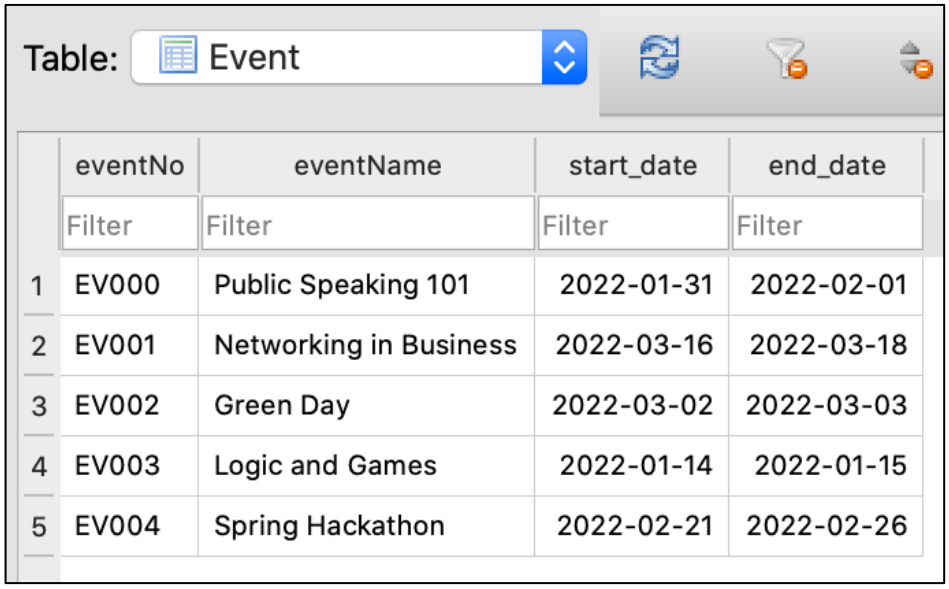
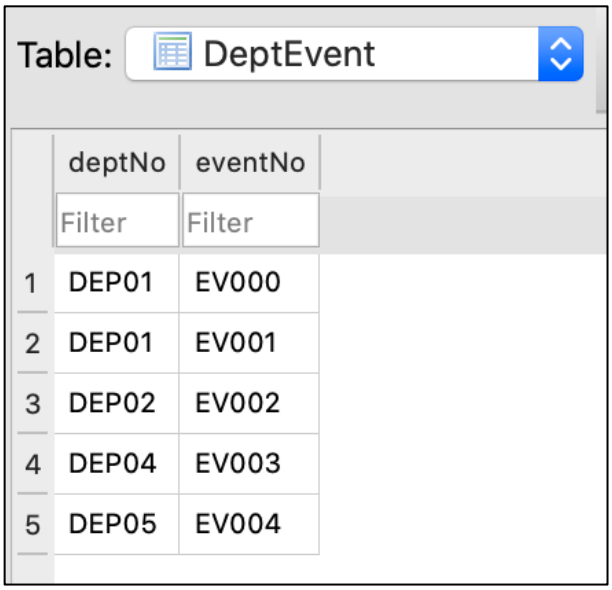


Table: Event

| | eventNo | eventName | start_date | end_date |
|---|---|---|---|---|
| | Filter | Filter | Filter | Filter |
| 1 | EV000 | Public Speaking 101 | 2022-01-31 | 2022-02-01 |
| 2 | EV001 | Networking in Business | 2022-03-16 | 2022-03-18 |
| 3 | EV002 | Green Day | 2022-03-02 | 2022-03-03 |
| 4 | EV003 | Logic and Games | 2022-01-14 | 2022-01-15 |
| 5 | EV004 | Spring Hackathon | 2022-02-21 | 2022-02-26 |

Department Event

```
INSERT INTO DeptEvent
    VALUES ('DEP01', 'EV000');
INSERT INTO DeptEvent
    VALUES ('DEP01', 'EV001');
INSERT INTO DeptEvent
    VALUES ('DEP02', 'EV002');
INSERT INTO DeptEvent
    VALUES ('DEP04', 'EV003');
INSERT INTO DeptEvent
    VALUES ('DEP05', 'EV004');
```



Student Attendance (to events)

```
INSERT INTO StudentAttendance
    VALUES ('R0004', 'EV003');
INSERT INTO StudentAttendance
    VALUES ('R0002', 'EV001');
INSERT INTO StudentAttendance
    VALUES ('R0005', 'EV002');
INSERT INTO StudentAttendance
    VALUES ('R0001', 'EV003');
INSERT INTO StudentAttendance
    VALUES ('R0001', 'EV004');
INSERT INTO StudentAttendance
    VALUES ('R0003', 'EV000');
```

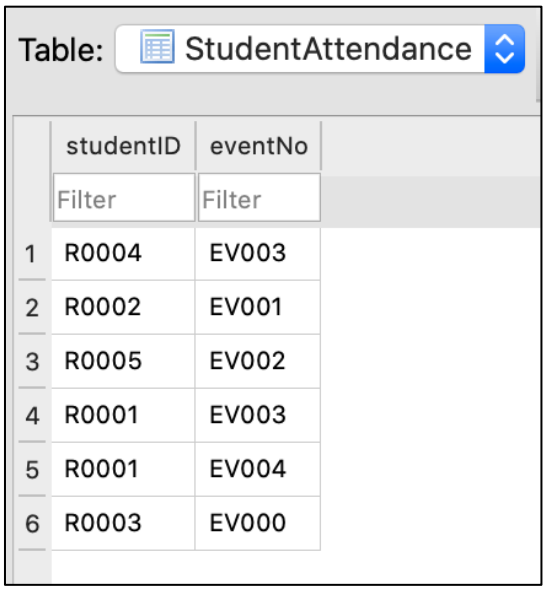


Table: StudentAttendance

| | studentID | eventNo |
|---|---|---|
| | Filter | Filter |
| 1 | R0004 | EV003 |
| 2 | R0002 | EV001 |
| 3 | R0005 | EV002 |
| 4 | R0001 | EV003 |
| 5 | R0001 | EV004 |
| 6 | R0003 | EV000 |

Student Major

```
INSERT INTO StudentMajor
    VALUES ('R0001', 'CSC');
INSERT INTO StudentMajor
    VALUES ('R0002', 'BUS');
INSERT INTO StudentMajor
    VALUES ('R0003', 'PSY');
INSERT INTO StudentMajor
    VALUES ('R0004', 'MTH');
INSERT INTO StudentMajor
    VALUES ('R0005', 'BIO');
```

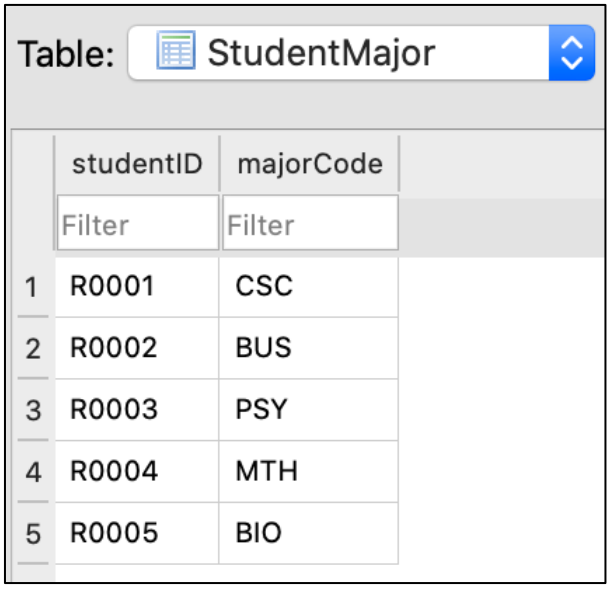


Table: StudentMajor

| | studentID | majorCode |
|---|---|---|
| | Filter | Filter |
| 1 | R0001 | CSC |
| 2 | R0002 | BUS |
| 3 | R0003 | PSY |
| 4 | R0004 | MTH |
| 5 | R0005 | BIO |

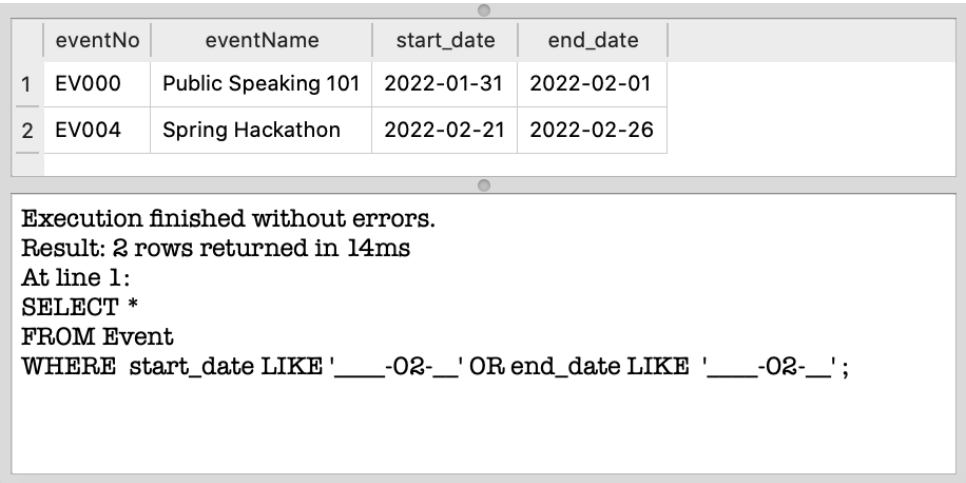
C.  Develop 5 SQL queries using embedded SQL (see Python tutorial).

**List all events that take place in February**

```
SELECT *

FROM Event

WHERE (start_date LIKE '____-02-__') OR (end_date LIKE '____-02-__');
```



| | eventNo | eventName | start_date | end_date |
|---|---|---|---|---|
| 1 | EV000 | Public Speaking 101 | 2022-01-31 | 2022-02-01 |
| 2 | EV004 | Spring Hackathon | 2022-02-21 | 2022-02-26 |

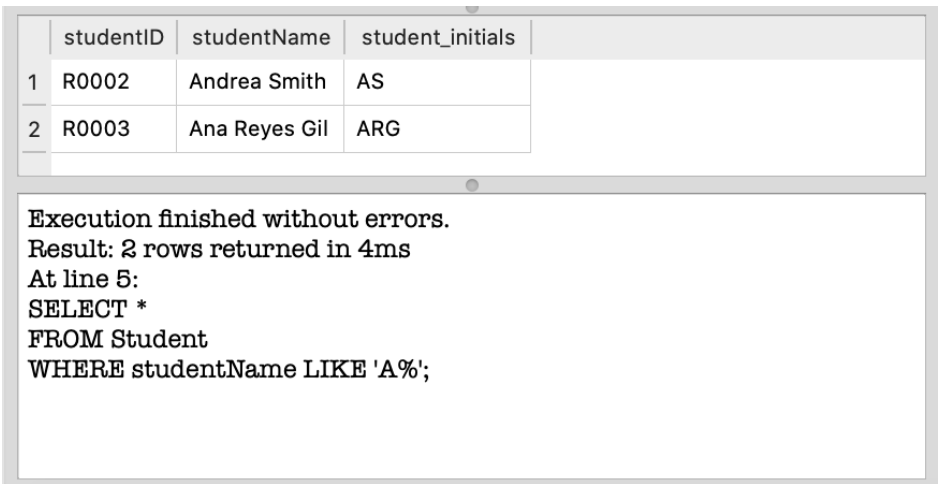
```
Execution finished without errors.
Result: 2 rows returned in 14ms
At line 1:
SELECT *
FROM Event
WHERE  start_date LIKE '____-02-__' OR end_date LIKE  '____-02-__' ;
```

**List all students whose name starts with ‘A’**

```
SELECT *

FROM Student

WHERE studentName LIKE 'A%';
```

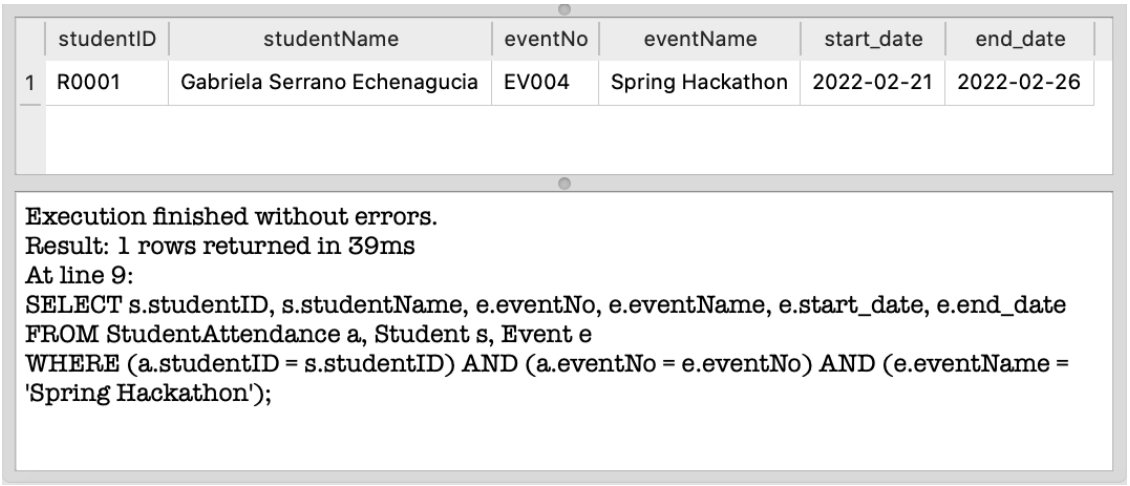


| | studentID | studentName | student_initials |
|---|---|---|---|
| 1 | R0002 | Andrea Smith | AS |
| 2 | R0003 | Ana Reyes Gil | ARG |

```
Execution finished without errors.
Result: 2 rows returned in 4ms
At line 5:
SELECT *
FROM Student
WHERE studentName LIKE 'A%';
```

**List all students who plan to attend the Spring Hackathon**

```
SELECT s.studentID, s.studentName, e.eventNo, e.eventName, e.start_date,
        e.end_date
FROM StudentAttendance a, Student s, Event e
WHERE (a.studentID = s.studentID) AND (a.eventNo = e.eventNo)
        AND (e.eventName = 'Spring Hackathon');
```



| | studentID | studentName | eventNo | eventName | start_date | end_date |
|---|---|---|---|---|---|---|
| 1 | R0001 | Gabriela Serrano Echenagucia | EV004 | Spring Hackathon | 2022-02-21 | 2022-02-26 |

```
Execution finished without errors.
Result: 1 rows returned in 39ms
At line 9:
SELECT s.studentID, s.studentName, e.eventNo, e.eventName, e.start_date, e.end_date
FROM StudentAttendance a, Student s, Event e
WHERE (a.studentID = s.studentID) AND (a.eventNo = e.eventNo) AND (e.eventName =
'Spring Hackathon');
```

**List all details of the Department that has the most faculty**

```
SELECT deptNo, deptName, chairName, MAX(faculty_count) AS faculty_count
FROM Department
WHERE faculty_count = (SELECT MAX(faculty_count) FROM Department)
GROUP BY deptNo, deptName, chairName;
```

*(Result in next page)*

| | deptNo | deptName | chairName | faculty_count |
|---|---|---|---|---|
| 1 | DEP01 | Department of Business | James Morrison | 162 |

```
Execution finished without errors.
Result: 1 rows returned in 14ms
At line 1:
SELECT deptNo, deptName, chairName, MAX(faculty_count) AS faculty_count
  FROM Department
  WHERE faculty_count = (SELECT MAX(faculty_count) FROM Department)
  GROUP BY deptNo, deptName, chairName;
```

**List all students whose major belongs to the Department of Science**

```
SELECT s.studentID, s.studentName, m.majorCode, d.deptName
FROM Student s, Department d, Major m, StudentMajor sm
WHERE (s.studentID = sm.studentID) AND (m.majorCode = sm.majorCode)
    AND (d.deptNo = m.deptNo) AND (d.deptName = 'Department of Science');
```

| | studentID | studentName | majorCode | deptName |
|---|---|---|---|---|
| 1 | R0001 | Gabriela Serrano Echenagucia | CSC | Department of Science |
| 2 | R0005 | John Lee | BIO | Department of Science |

```
Execution finished without errors.
Result: 2 rows returned in 37ms
At line 16:
SELECT s.studentID, s.studentName, m.majorCode, d.deptName
FROM Student s, Department d, Major m, StudentMajor sm
WHERE (s.studentID = sm.studentID) AND (m.majorCode = sm.majorCode) AND
(d.deptNo = m.deptNo) AND (d.deptName = 'Department of Science');
```

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D. Upload all the code and documentation to GitHub.

*GitHub: [https://github.com/gmserranoe/CSC423.git](https://github.com/gmserranoe/CSC423.git)*