

Implementing the database

a. Creating the tables

i. Code:

```
CREATE TABLE Department(  
    department_name VARCHAR(255) NOT NULL CHECK(department_name LIKE  
'Department of %')  
,  
    chair_name VARCHAR(255),  
    num_of_faculty INT,  
    PRIMARY KEY(department_name)  
);  
  
CREATE TABLE Major(  
    major_code CHAR(3) NOT NULL,  
    major_name VARCHAR(255) UNIQUE NOT NULL,  
    department_name VARCHAR(255),  
    PRIMARY KEY(major_code),  
    FOREIGN KEY(department_name) REFERENCES  
Department(department_name) ON DELETE SET NULL  
);  
  
CREATE TABLE Student(  
    stu_id INT NOT NULL,  
    stu_name VARCHAR(255),  
    stu_initials VARCHAR(3) CHECK (length(stu_initials) > 1),  
    PRIMARY KEY(stu_id),  
    CHECK(LENGTH(stu_initials) > 1)  
);  
  
CREATE TABLE Event(  
    event_num INT NOT NULL,  
    event_name VARCHAR(255) UNIQUE NOT NULL,  
    start_date DATE CHECK(start_date > Current_date) UNIQUE NOT  
NULL,
```

```

        end_date DATE,
        PRIMARY KEY(event_num),
        CONSTRAINT GREATER CHECK (end_date > start_date)
    );

CREATE TABLE Hosting(
    department_name VARCHAR(255) NOT NULL,
    event_name VARCHAR(255) NOT NULL,
    PRIMARY KEY(department_name, event_name),
    FOREIGN KEY(department_name) REFERENCES
Department(department_name),
    FOREIGN KEY(event_name) REFERENCES Event(event_name)
);

CREATE TABLE Declaring(
    major_code VARCHAR(3) NOT NULL,
    stu_id INT NOT NULL,
    PRIMARY KEY(major_code, stu_id),
    FOREIGN KEY(major_code) REFERENCES Major(major_code),
    FOREIGN KEY(stu_id) REFERENCES Student(stu_id)
);

CREATE TABLE Attending(
    stu_id INT NOT NULL,
    event_num INT NOT NULL,
    PRIMARY KEY(stu_id, event_num),
    FOREIGN KEY(stu_id) REFERENCES Student(stu_id),
    FOREIGN KEY(event_num) REFERENCES Event(event_num)
);

```

ii. Database Snapshot:

```
The tables are:
('Department',)
('Major',)
('Student',)
('Event',)
('Hosting',)
('Declaring',)
('Attending',)
```

b. Adding the Tuples:

i. Code:

```
departmentTuples = [
    """
        INSERT INTO Department VALUES('Department of Computer Science',
        'Geoff Sutcliffe', 25);
    """,
    """
        INSERT INTO Department VALUES('Department of Marketing', 'John
Smith', 50);
    """,
    """
        INSERT INTO Department VALUES('Department of Mathematics', 'John
Doe', 43);
    """,
    """
        INSERT INTO Department VALUES('Department of Interactive Media',
        'Robert Brown', 82);
    """,
    """
        INSERT INTO Department VALUES('Department of Biology', 'Mary
Williams', 101);
    """,
]

majorTuples = [
    """
        INSERT INTO Major VALUES('CSC', 'Department of
Computer Science', 'Computer Science');
```

```

        """
        """

        INSERT INTO Major VALUES('CMK', 'Department of
Corporate Marketing', 'Marketing');
        """
        """

        INSERT INTO Major VALUES('BIO', 'Department of
Biology', 'Biology');
        """
        """

        INSERT INTO Major VALUES('MTH', 'Department of
Mathematics', 'Mathematics');
        """
        """

        INSERT INTO Major VALUES('GDS', 'Department of
Game Design', 'Interactive Media');
        """
    ]

studentTuples = [
    """
    INSERT INTO Student VALUES(0248, 'Anish Patel', 'AP');
    """
    """
    INSERT INTO Student VALUES(6487, 'Kalpit Mody', 'KM');
    """
    """
    INSERT INTO Student VALUES(0001, 'Dan Smith', 'DS');
    """
    """
    INSERT INTO Student VALUES(2849, 'Aaroh Patel', 'AP');
    """
    """
    INSERT INTO Student VALUES(0302, 'Auric Saha', 'AS');
    """
]

eventTuples = [
    """

```

```

        INSERT INTO Event VALUES(001, 'Valentine Day Event',
'2022-02-14', '2022-02-15');
        """
        """

        INSERT INTO Event VALUES(002, 'Homecoming', '2022-11-01',
'2022-11-08');
        """
        """

        INSERT INTO Event VALUES(003, 'Graduation', '2022-05-13',
'2022-05-14');
        """
        """

        INSERT INTO Event VALUES(004, 'Club Fair', '2021-12-17',
'2022-01-18');
        """
        """

        INSERT INTO Event VALUES(005, 'Major Advising', '2022-03-12',
'2022-03-20');
        """
    ]

```

```

hostingTuples = [
    """
        INSERT INTO Hosting VALUES('Department of
Interactive Media', 'Valentine Day Event');
        """
        """

        INSERT INTO Hosting VALUES('Department of
Marketing', 'Homecoming');
        """
        """

        INSERT INTO Hosting VALUES('Department of
Computer Science', 'Graduation');
        """
        """

        INSERT INTO Hosting VALUES('Department of
Biology', 'Club Fair');
        """
        """
    ]

```

```

        INSERT INTO Hosting VALUES('Department of
Computer Science', 'Club Fair');
        """
        """

        INSERT INTO Hosting VALUES('Department of
Mathematics', 'Major Advising');
        """
        """

        INSERT INTO Hosting VALUES('Department of
Marketing', 'Graduation');
        """
        """

        INSERT INTO Hosting VALUES('Department of
Biology', 'Graduation');
        """
        """

        INSERT INTO Hosting VALUES('Department of
Interactive Media', 'Graduation');
        """
        """
    ]

```

```

decalringTuples = [
    """
    INSERT INTO Declaring VALUES('CSC', 6487);
    """
    """

    INSERT INTO Declaring VALUES('CMK', 0248);
    """
    """

    INSERT INTO Declaring VALUES('GDS', 6487);
    """
    """

    INSERT INTO Declaring VALUES('MTH', 0302);
    """
    """

    INSERT INTO Declaring VALUES('BIO', 2849);
    """
    """

    INSERT INTO Declaring VALUES('CSC', 0001);
    """
    """
]

```

```
    """
]

attendingTuples = [
    """
    INSERT INTO Attending VALUES(6487, 003);
    """,
    """
    INSERT INTO Attending VALUES(0001, 004);
    """,
    """
    INSERT INTO Attending VALUES(0248, 004);
    """,
    """
    INSERT INTO Attending VALUES(0302, 003);
    """,
    """
    INSERT INTO Attending VALUES(2849, 005);
    """,
]
```

- ii. Screenshot of each table:

```

('Department',)
      department_name      chair_name  num_of_faculty
0  Department of Computer Science  Geoff Sutcliffe      25
1      Department of Marketing      John Smith      50
2      Department of Mathematics      John Doe      43
3  Department of Interactive Media  Robert Brown      82
4      Department of Biology      Mary Williams     101

('Major',)
      major_code      major_name      department_name
0      CSC      Computer Science  Department of Computer Science
1      CMK      Corporate Marketing      Department of Marketing
2      BIO      Biology      Department of Biology
3      MTH      Mathematics      Department of Mathematics
4      GDS      Game Design  Department of Interactive Media

('Student',)
      stu_id      stu_name  stu_initials
0      248      Anish Patel      AP
1      6487      Kalpit Mody      KM
2      1      Dan Smith      DS
3      2849      Aaroh Patel      AP
4      302      Auric Saha      AS

('Event',)
      event_num      event_name  start_date  end_date
0      1      Valentine Day Event  2022-02-14  2022-02-15
1      2      Homecoming  2022-11-01  2022-11-08
2      3      Graduation  2022-05-13  2022-05-14
3      4      Club Fair  2021-12-17  2022-01-18
4      5      Major Advising  2022-03-12  2022-03-20

```

```

('Hosting',)
      department_name      event_name
0  Department of Interactive Media  Valentine Day Event
1      Department of Marketing      Homecoming
2  Department of Computer Science      Graduation
3      Department of Biology      Club Fair
4  Department of Computer Science      Club Fair
5      Department of Mathematics      Major Advising
6      Department of Marketing      Graduation
7      Department of Biology      Graduation
8  Department of Interactive Media      Graduation

('Declaring',)
      major_code  stu_id
0      CSC      6487
1      CMK      248
2      GDS      6487
3      MTH      302
4      BIO      2849
5      CSC      1

('Attending',)
      stu_id  event_num
0      6487      3
1      1      4
2      248      4
3      302      3
4      2849      5

```


c. Creating Queries

i. Questions:

```
queryQuestions = [  
    "List all the events that the student with the stu_id 0001  
    attended.",  
    "How many faculty members are there in the university?",  
    "List the name of the major and department of the major that  
    each student has declared.",  
    "List the number of departments that host each event.",  
    "List the chair names of each major.",  
    "List the event name, department name, and chair of department  
    for all events that are scheduled after March 2022.",  
    "How many people attended event 004?"  
]
```

ii. Written Queries:

```
queryAnswers = [  
    ""  
    SELECT event_name  
    FROM Event e, Attending a  
    WHERE a.stu_id = 0001 AND a.event_num = e.event_num;  
    "",  
    ""  
    SELECT SUM(num_of_faculty)  
    FROM Department;  
    "",  
    ""  
    SELECT s.stu_name, m.major_name, m.department_name  
    FROM Declaring d, Major m, Student s  
    WHERE d.major_code = m.major_code AND d.stu_id = s.stu_id  
    GROUP BY s.stu_name;  
    "",  
    ""  
    SELECT h.event_name, COUNT(h.department_name)  
    FROM Hosting h, Department d  
    WHERE d.department_name = h.department_name  
    GROUP BY h.event_name;  
    "",  
    ""  
]
```

```

"""
SELECT major_name, chair_name
FROM Department d, Major m
WHERE m.department_name = d.department_name
GROUP BY major_name;
""",
"""
SELECT e.event_name, d.department_name, d.chair_name
FROM Event e, Department d, Hosting h
WHERE e.start_date > '2022-03-31' AND e.event_name =
h.event_name AND h.department_name = d.department_name
GROUP BY e.event_name;
""",
"""
SELECT COUNT(stu_id) AS NUM_OF_STUDENTS
FROM Attending
WHERE event_num = 004;
"""
]

```

iii. Snapshot of Output

List all the events that the student with the stu_id 0001 attended.

	event_name
0	Club Fair
1	Major Advising

How many faculty members are there in the university?

	SUM(num_of_faculty)
0	301

List the name of the major and department of the major that each student has declared.

	stu_name	major_name	department_name
0	Aaroh Patel	Biology	Department of Biology
1	Anish Patel	Corporate Marketing	Department of Marketing
2	Auric Saha	Mathematics	Department of Mathematics
3	Dan Smith	Computer Science	Department of Computer Science
4	Kalpit Mody	Computer Science	Department of Computer Science

List the number of departments that host each event.

	event_name	COUNT(h.department_name)
0	Club Fair	2
1	Graduation	4
2	Homecoming	1
3	Major Advising	1
4	Valentine Day Event	1

List the chair names of each major.

	major_name	chair_name
0	Biology	Mary Williams
1	Computer Science	Geoff Sutcliffe
2	Corporate Marketing	John Smith
3	Game Design	Robert Brown
4	Mathematics	John Doe

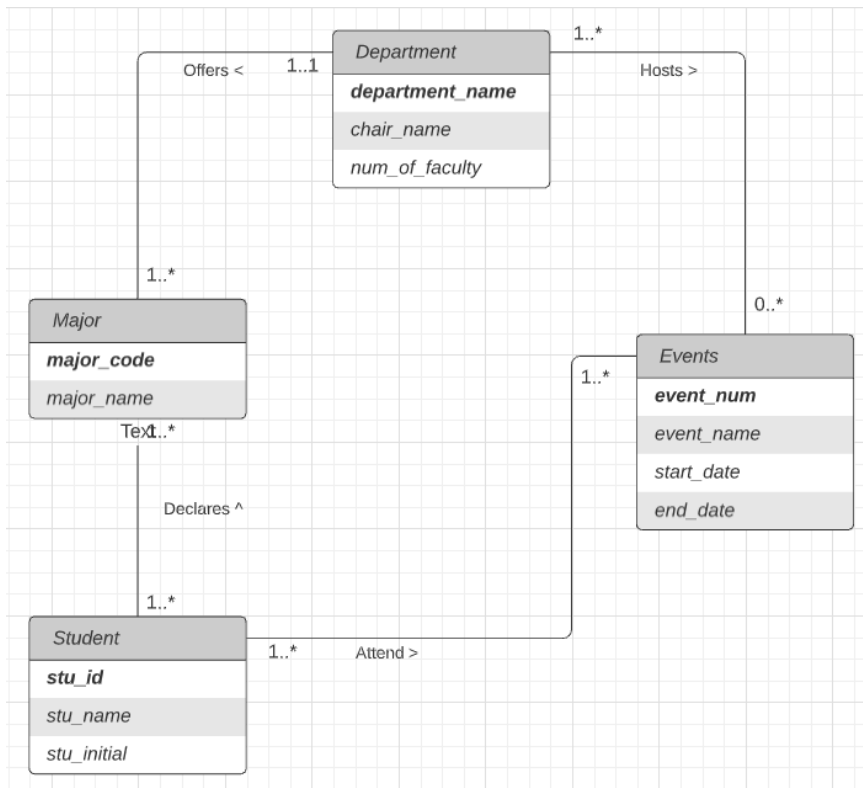
List the event name, department name, and chair of department for all events that are scheduled after March 2022.

	event_name	department_name	chair_name
0	Graduation	Department of Computer Science	Geoff Sutcliffe
1	Homecoming	Department of Marketing	John Smith

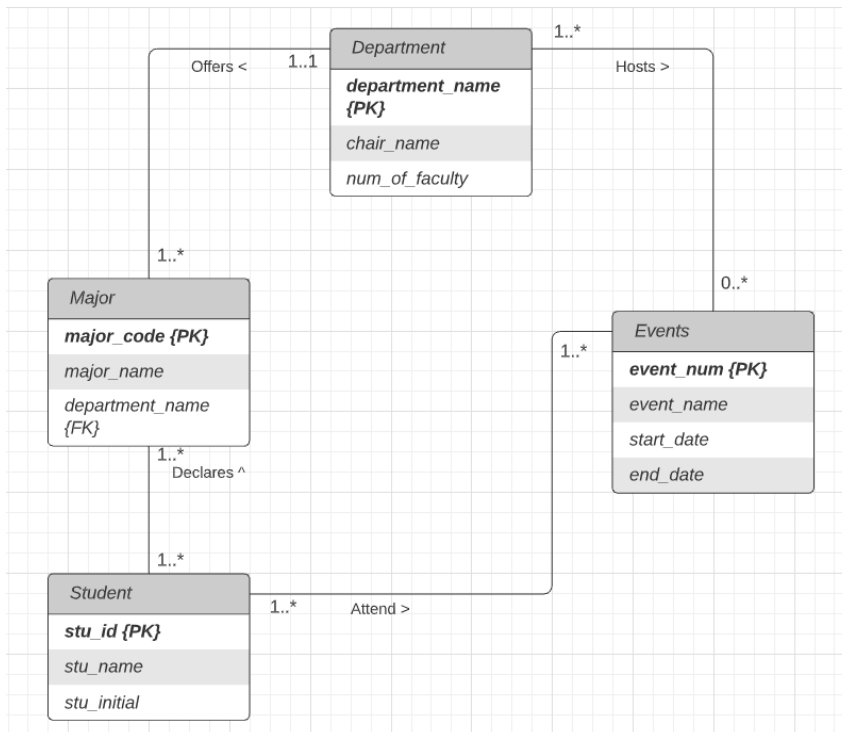
How many people attended event 004?

	NUM_OF_STUDENTS
0	2

Conceptual Design:



Logical Design:



Conclusion:

We have created the physical database using the conceptual and logical models. Many of our assumptions and designs can be seen in the conceptual and logical model reports. We have entered example tuples and created example queries of which all work as intended. We will be able to add more tuples, and we can safely trust the database to ensure all constraints as we have clearly defined them. The next steps would include testing with larger amounts of tuples and user testing with the intended user to ensure all things are functioning properly.

Link to GitHub Repo: <https://github.com/kalpiti56/CSC423-Project-Part-3>