Objective: Create MySQL schema and tables

Integrate Python application with MySQL schema

Perform basic SQL operations using Python

Database schema and table design:

Create a table '**student**' having fields 'student_id', 'first_name', 'last_name' and 'email'. In this table, 'student_id' is primary key and will be used as foreign key as well

Create a table '**course**', having fields 'course_id', 'course_title' and 'course_credits'. In this table, 'course_id' is unique key and will also be used as foreign key.

Create a table '**registration**'. This table has auto-generated key 'registration_id'. The composite keys 'student_id', 'course_id' and 'enrollment_semester' will be composite keys and will not be repeated. This means that a student cannot enroll in the same course in the same semester more than once. Moreover, student can only enroll in a course if both student and the course exists in their respective tables. You may define this as constraint. If student or course is deleted, that also effects the 'registration' table.

Python integration:

When the application executes, it integrates with database schema (course_registration).

The application displays 7 different options, as shown:

```
C:\Python\python.exe C:/Users/mk_hu/OneDrive/Desktop/Winter2023/CCGC5003W23/Labs/Lab6/Lab6.py

    1.  Display all students
    2.  Diplay all courses
    3.  Display all registrations -students and courses
    4.  Register student in course
    5.  Search Student
    6.  Add student
    7.  End application


Enter your option:      1
```

When option 1 is selected, it displays all enrolled students or error message is displayed, "**Students not enrolled in the institution**".

When option 1 is selected, all enrolled students are displayed in tabular format:

```
Enter your option:      1
                                                                                        Muhammad Khan
                                                                                Student ID:  N01234567
########################################################################################################
                    Student ID                First Name                 Last Name         Email Address

                       N01021                    Andrew                    Dietel          ws@gmail.com
                       N01234                   Kenneth                   Lambert        kl@mydomain.ca
                       N01357                Richardson                      Carl        rc@mydomain.ca
                      N021346                      Gary                   Proctor        gp@mydomain.ca
                       N02345                       Ian                   McLaren        im@mydomain.ca
                       N02648                    Samuel                     Manny        sm@mydomain.ca
                      N059464                   Willaim                 Stallings          ws@gmail.com
                     N0928374                     Larry                   Proctor       lp@lp.humber.ca
                     N0958410                    Andrew                    Dietel          ad@gmail.com
                         N099                   Kenneth                   Lambert             kl@kl.com
                        N0999                   Kenneth                   Lambert        kl@cengage.ca
```

Option 2 displays the courses offered at the institution (if course list exists in the database – or an error message is displayed "**Courses not offered at the institution**")

Option 2 displays all the courses offered at the institution:

```
    5.   Search Student
    6.   Add student
    7.   End application


Enter your option:      2
                                                                                       Muhammad Khan
                                                                                Student ID:  N01234567
######################################################################################################
                            Course Code                           Course Title            Course Credits

                               CCGC5003                Application Programming                         3
                               NEST 210                     Network Automation                         3
                               NEST 257                             Unix Admin                         4
                               TECH 104                     Programming in C++                         3

######################################################################################################
```

Option 3 displays the current registration in the registration table. It displays all students enrolled in different courses over the period of different semesters. If there are no students registered in any course, then course message "**There is no student registered in any course at the institution**".

When choosing option 3, following table is displayed showing all the registrations so far:

```
                                                                                                    Muhammad Khan
                                                                                            Student ID:  N01234567
##################################################################################################################
         Last Name          First Name          Student ID          Course Code          Course Title   Semester enrolled

              Carl          Richardson              N01357             NEST 210    Network Automation         Winter 2023
           McLaren                 Ian              N02345             TECH 104    Programming in C++         Winter 2023
             Manny              Samuel              N02648             TECH 104    Programming in C++         Winter 2023
              Carl          Richardson              N01357             TECH 104    Programming in C++           Fall 2022
           Lambert             Kenneth                N099             NEST 257            Unix Admin           Fall 2023

##################################################################################################################
```

Choosing option 4 allows you to register student in a course. First the conditions are checked if student is enrolled in the institution and the course is offered at the institution, then the student is enrolled in the course.

This option (option 4) result is shown below (following shows when student is not enrolled in the institution based on student ID):

```
Lab6
    5.  Search Student
    6.  Add student
    7.  End application


Enter your option:       4
Enter student ID:        N00000
Enter course ID:         NEST 257
Enter semester of enrollment:       Fall 2023
Student with student ID N00000 does not exist - cannot register

    1.  Display all students
    2.  Diplay all courses
    3.  Display all registrations -students and courses
    4.  Register student in course
    5.  Search Student
    6.  Add student
    7.  End application
```

When choosing option 4, if both the student as well as the course exist, then student is enrolled in the course. This is shown below:

```
Enter your option:      4
Enter student ID:       N02648
Enter course ID:        NEST 257
Enter semester of enrollment:       Winter 2024
Student with student ID N02648 exists ....
Course with Course ID NEST 257 exists ....
Course with ID NEST 257 and student with student ID N02648, both exist ..
Student with ID N02648 registered the course with course ID NEST 257

    1.  Display all students
    2.  Diplay all courses
    3.  Display all registrations -students and courses
    4.  Register student in course
    5.  Search Student
    6.  Add student
    7.  End application
```

When choosing option 5, a student can be searched in the institution. Following scenario shows that when option 5 was selected and student did not exist, the message to that effect is displayed:

```
    2.  Diplay all courses
    3.  Display all registrations -students and courses
    4.  Register student in course
    5.  Search Student
    6.  Add student
    7.  End application


Enter your option:      5
Please enter student ID to search information:  N00000
Student having student ID N00000 is not enrolled in the institution

    1.  Display all students
    2.  Diplay all courses
    3.  Display all registrations -students and courses
    4.  Register student in course
    5.  Search Student
```

In another scenario, when student is already enrolled in the institution, the application (when choosing option 5) displays following:

```
Enter your option:      5
Please enter student ID to search information:  N01357
Student already enrolled in the institution
                  Student ID                  First Name                  Last Name                Email Address

                      N01357                  Richardson                       Carl              rc@mydomain.ca
```

Choosing option 6 allows user to add new student in the institution – if the student is NOT already enrolled based on the student ID.

Following scenario shows that when choosing option 6, and student already exists in the institution, displays the following:

```
Enter your option:      6
Please enter student ID:        N0999
There is student data
```

When choosing option 6, and student is not already in the system, then following message is displayed:

```
Enter your option:      6
Please enter student ID:        N0718293

There is no student data ... ...
```

The option 6 then asks for the student information, as shown below:

```
Enter your option:      6
Please enter student ID:        N0516273
There is no student data ... ...
Enter first name of student to register:    Daniel
Enter last name of student to register:     Sammy
Enter email ID of the student to register:      ds@ds.humber.ca
Student was added or registered .. .. ..

    1.  Display all students
    2.  Diplay all courses
    3.  Display all registrations -students and courses
    4.  Register student in course
    5.  Search Student
    6.  Add student
    7.  End application
```

Following shows if user chooses invalid option:

```
Enter your option:      9
Enter valid choice ... ... ...
```

```
Enter your option:      a
Enter valid choice ... ... ...
```

When user chooses option 7, application ends, displaying the message – "**Application ending now**".

Rubric for Lab 6

Table scripts and screenshots of the three tables (use DESCRIBE table name) to show the table description.

(Generate scripts to create table)	**3 Marks**
Display students –	
If students are in the table	
If students are not in the table	**0.5 Mark + 0.5 Mark**
Display courses –	
If courses are in the table	
If courses are not in the table	**0.5 Mark + 0.5 Mark**
Display all registered students in courses	
If registration table is empty	
If registration table contains data	**1 Mark**
Add student	
Check if student is not already enrolled	
Add student	**1 Mark**
Register Student in a course	
Check if student is enrolled	
Check if course is offered	
Check if student is not already enrolled in the same course	
In the same semester (composite key test)	
Add student if all criteria are met	**2 Marks**
Main application and valid choice checks	
Conditional and control statements	**1 Mark**
Total:	**10 Marks**