

Lab 4

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Part 1: SQLite using Terminal and SQL

Creating tables

```
sqlite> CREATE TABLE Course (  
...>     course_id INTEGER PRIMARY KEY,  
...>     course_code TEXT UNIQUE NOT NULL,  
...>     course_name TEXT NOT NULL,  
...>     credits INTEGER NOT NULL CHECK (credits > 0)  
...> );  
sqlite> CREATE TABLE Enrollment (  
...>     student_id INTEGER NOT NULL,  
...>     course_id INTEGER NOT NULL,  
...>     enrollment_date TEXT NOT NULL,  
...>     PRIMARY KEY (student_id, course_id),  
...>     FOREIGN KEY (student_id) REFERENCES Student(student_id),  
...>     FOREIGN KEY (course_id) REFERENCES Course(course_id)  
...> );
```

```
sqlite> CREATE TABLE student (  
...>     student_id INT PRIMARY KEY,  
...>     first_name VARCHAR(50) NOT NULL,  
...>     email VARCHAR(100) NOT NULL UNIQUE,  
...>     major VARCHAR(50) NOT NULL  
...> );  
sqlite>  
sqlite> INSERT INTO student (student_id, first_name, email, major)  
...> VALUES  
...> (1001, 'Alice', 'alice.johnson@university.edu', 'Computer Science'),  
...> (1002, 'Bob', 'bob.smith@university.edu', 'Mathematics'),  
...> (1003, 'Carol', 'carol.nguyen@university.edu', 'Physics'),  
...> (1004, 'David', 'david.martinez@university.edu', 'Computer Science'),  
...> (1005, 'Emma', 'emma.brown@university.edu', 'Biology');
```

Inserting values

```
qlite> select * from student;
001|Alice|alice.johnson@university.edu|Computer Science
002|Bob|bob.smith@university.edu|Mathematics
003|Carol|carol.nguyen@university.edu|Physics
004|David|david.martinez@university.edu|Computer Science
005|Emma|emma.brown@university.edu|Biology
qlite> INSERT INTO Course (course_id, course_code, course_name, credits)
...> VALUES
...> (1, 'CS101', 'Introduction to Computer Science', 3),
...> (2, 'MATH201', 'Calculus I', 4),
...> (3, 'ENG150', 'Academic Writing', 2);
qlite> INSERT INTO Enrollment (student_id, course_id, enrollment_date)
...> VALUES
...> (1, 1, '2025-01-10'),
...> (1, 2, '2025-01-10'),
...> (2, 1, '2025-01-11'),
...> (3, 3, '2025-01-12');
qlite> ALTER TABLE Student
...> ADD COLUMN date_of_birth TEXT;
qlite> select * from Course
...> ;
1|CS101|Introduction to Computer Science|3
2|MATH201|Calculus I|4
3|ENG150|Academic Writing|2
qlite> select * from Enrollment;
1|1|2025-01-10
1|2|2025-01-10
2|1|2025-01-11
3|3|2025-01-12
```

Altering tables and sql commands

```
sqlite> ALTER TABLE Student
...> ADD COLUMN date_of_birth TEXT;
sqlite> select * from Course
...> ;
1|CS101|Introduction to Computer Science|3
2|MATH201|Calculus I|4
3|ENG150|Academic Writing|2
sqlite> select * from Enrollment;
1|1|2025-01-10
1|2|2025-01-10
2|1|2025-01-11
3|3|2025-01-12
sqlite> select * from student
...> ;
1001|Alice|alice.johnson@university.edu|Computer Science|
1002|Bob|bob.smith@university.edu|Mathematics|
1003|Carol|carol.nguyen@university.edu|Physics|
1004|David|david.martinez@university.edu|Computer Science|
1005|Emma|emma.brown@university.edu|Biology|
sqlite> .header on
sqlite> select * from student;
student_id|first_name|email|major|date_of_birth
1001|Alice|alice.johnson@university.edu|Computer Science|
1002|Bob|bob.smith@university.edu|Mathematics|
1003|Carol|carol.nguyen@university.edu|Physics|
1004|David|david.martinez@university.edu|Computer Science|
1005|Emma|emma.brown@university.edu|Biology|
sqlite> UPDATE Student
...> SET date_of_birth = '2002-05-14'
...> WHERE student_id = 1;
sqlite> select * from student;
student_id|first_name|email|major|date_of_birth
1001|Alice|alice.johnson@university.edu|Computer Science|
1002|Bob|bob.smith@university.edu|Mathematics|
1003|Carol|carol.nguyen@university.edu|Physics|
1004|David|david.martinez@university.edu|Computer Science|
1005|Emma|emma.brown@university.edu|Biology|
sqlite> UPDATE Student
...> SET date_of_birth = '2002-05-14'
...> WHERE student_id = 1001;
sqlite> select * from student;
student_id|first_name|email|major|date_of_birth
1001|Alice|alice.johnson@university.edu|Computer Science|2002-05-14
1002|Bob|bob.smith@university.edu|Mathematics|
1003|Carol|carol.nguyen@university.edu|Physics|
1004|David|david.martinez@university.edu|Computer Science|
1005|Emma|emma.brown@university.edu|Biology|
```

```
sqlite> select * from student where student_id > 1002;
student_id|first_name|email|major|date_of_birth
1003|Carol|carol.nguyen@university.edu|Physics|
1004|David|david.martinez@university.edu|Computer Science|
1005|Emma|emma.brown@university.edu|Biology|
sqlite> 
```

Part 2: Using python

```
sqlite.py
C:\Users\hp> Downloads > sqlite.py > ...
1  import sqlite3
2
3  con=sqlite3.connect("lab1.db")
4  cursor=con.cursor()
5
6  cursor.execute('''
7      create table if not exists Student(
8          student_id integer primary key,
9          first_name varchar(100),
10         email varchar(100),
11         major varchar(50)
12     )'''
13 )
14
15 cursor.execute('''
16     CREATE TABLE if not exists Course (
17         course_id INTEGER PRIMARY KEY,
18         course_code TEXT UNIQUE NOT NULL,
19         course_name TEXT NOT NULL,
20         credits INTEGER NOT NULL
21     )'''
22 )
23
24 cursor.execute('''
25     CREATE TABLE if not exists Enrollment (
26         student_id INTEGER NOT NULL,
27         course_id INTEGER NOT NULL,
28         enrollment_date TEXT NOT NULL,
29         PRIMARY KEY (student_id, course_id),
30         FOREIGN KEY (student_id) REFERENCES Student(student_id)
```

```
File Edit Selection View Go ... Search
C:\Users\hp> Downloads > sqls.py > ...
30 FOREIGN KEY (student_id) REFERENCES Student(student_id),
31 FOREIGN KEY (course_id) REFERENCES Course(course_id)
32 )'''
33 )
34
35 cursor.execute('''
36 INSERT INTO student (student_id, first_name, email, major)
37 VALUES
38 (1001, 'Alice', 'alice.johnson@university.edu', 'Computer Science'),
39 (1002, 'Bob', 'bob.smith@university.edu', 'Mathematics'),
40 (1003, 'Carol', 'carol.nguyen@university.edu', 'Physics'),
41 (1004, 'David', 'david.martinez@university.edu', 'Computer Science'),
42 (1005, 'Emma', 'emma.brown@university.edu', 'Biology')'''
43 )
44
45 cursor.execute('''
46 INSERT INTO Course (course_id, course_code, course_name, credits)
47 VALUES
48 (1, 'CS101', 'Introduction to Computer Science', 3),
49 (2, 'MATH201', 'Calculus I', 4),
50 (3, 'ENG150', 'Academic Writing', 2)'''
51 )
52
53 cursor.execute('''
54 INSERT INTO Enrollment (student_id, course_id, enrollment_date)
55 VALUES
56 (1, 1, '2025-01-10'),
57 (1, 2, '2025-01-10'),
58 (2, 1, '2025-01-11'),
59 (3, 3, '2025-01-12')'''
60 )
```

```
File Edit Selection View Go ... Search
C:\Users\hp> Downloads > sqls.py > ...
62
63 cursor.execute("SELECT * FROM Student")
64 rows = cursor.fetchall()
65
66 print("ID\tName\tEmail\tMajor")
67 print("-" * 70)
68 for r in rows:
69     print(f"{r[0]}\t{r[1]}\t{r[2]}\t{r[3]}")
70
71 cursor.execute("""
72 SELECT first_name, major
73 FROM Student
74 WHERE major = 'Computer Science'
75 """)
76 rows = cursor.fetchall()
77
78 print("\nName\tMajor")
79 print("-" * 30)
80 for r in rows:
81     print(f"{r[0]}\t{r[1]}")
82
83 cursor.execute("ALTER TABLE Student ADD COLUMN phone VARCHAR(15)")
84
85 con.commit()
86 con.close()
87
88
```

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```
PS C:\Users\hp\downloads> python sqls.py
```

ID	Name	Email	Major
1001	Alice	alice.johnson@university.edu	Computer Science
1002	Bob	bob.smith@university.edu	Mathematics
1003	Carol	carol.nguyen@university.edu	Physics
1004	David	david.martinez@university.edu	Computer Science
1005	Emma	emma.brown@university.edu	Biology

Name	Major
Alice	Computer Science
David	Computer Science

```
PS C:\Users\hp\downloads>
```