Lab -8: mutation testing

1. Install SQLite3 on windows and mac OS
https://www.youtube.com/watch?v=2CAspm7YwTU

2. Mutation testing is a technique used to evaluate the effectiveness of test cases by introducing changes (or mutations) into the code and checking if the test cases can detect those changes.

Our goal is to test this database using mutation testing. To do this, we can perform the following steps:

- Generate a set of mutations: We can introduce mutations to the SQL statements that interact with the database. For example, we can modify the INSERT statement to insert incorrect data or modify the SELECT statement to select incorrect data.
- Run the test suite: We can then run our existing test suite against the original database to ensure that all tests pass.
- Run the mutated test suite: We can then run our test suite against each of the mutations to see if any tests fail. If a test fails against a mutation, then we know that our test suite is effective at detecting that mutation.

3. Suppose we have a database table called users with the following schema:

```
CREATE TABLE users (
   id INTEGER PRIMARY KEY,
   name TEXT,
   email TEXT
);
```

4. We have a test suite that checks that inserting a new user works correctly:

```
-- Test inserting a new user
INSERT INTO users (name, email) VALUES ('Ruchika’, 'ruchika@example.com');
SELECT * FROM users WHERE name = 'Ruchika';
```

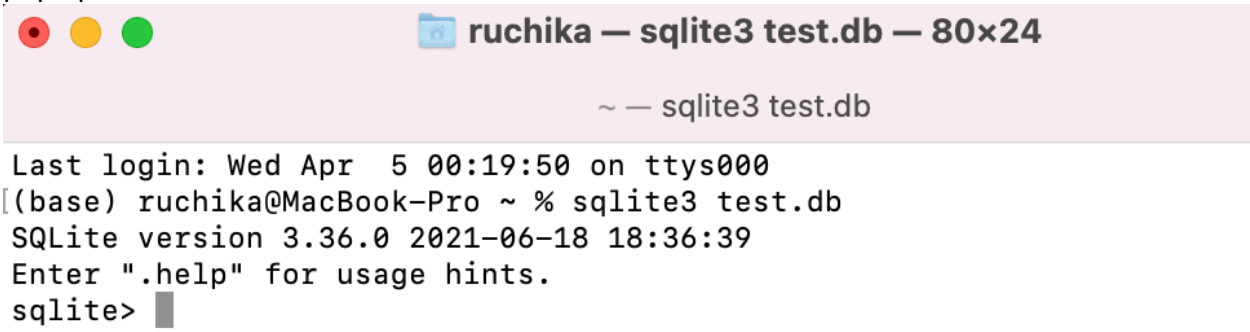
5. To test the effectiveness of the test suite, we can introduce a mutation where we change the test to insert an incorrect email address:

```
-- Test inserting a new user with incorrect email (mutation)
INSERT INTO users (name, email) VALUES ('Jane Doe', 'janedoe@example.com',
'incorrectemail');
SELECT * FROM users WHERE name = 'Jane Doe';
```

6. The above mutation code failed because the INSERT statement contains an additional column incorrect email which does not exist in the users table schema. Therefore, the INSERT statement will not insert any data into the users table and it will result in a syntax error. The SELECT statement will not find any records with the name Jane Doe because the INSERT statement has not added any records to the users table.

7. You have to submit the screenshot of the:

- Sqlite installed properly in your system
- Run **sqlite3 testdb(windws)/sqlite3 test.db(mac)** and the below look like sql editor will pop up like this



- Screenshot of the step 3, 4 and 5 running properly, with results.

Submission: 11th November, 2023 by 9am.