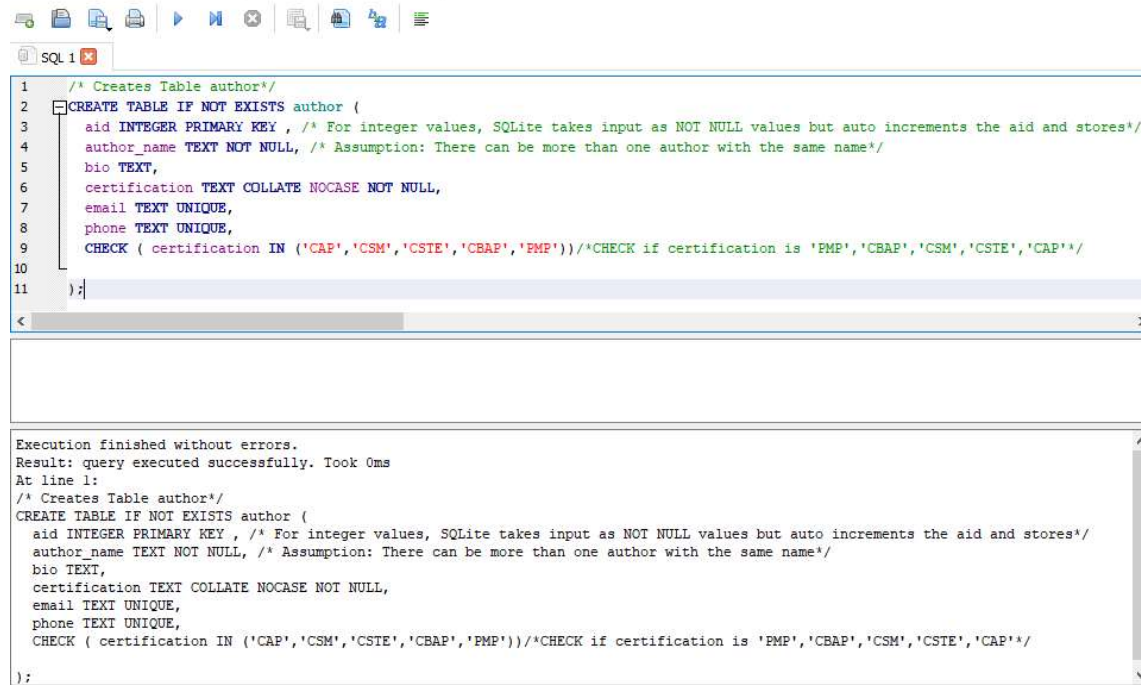


ASSIGNMENT 6

Changes made in existing model:

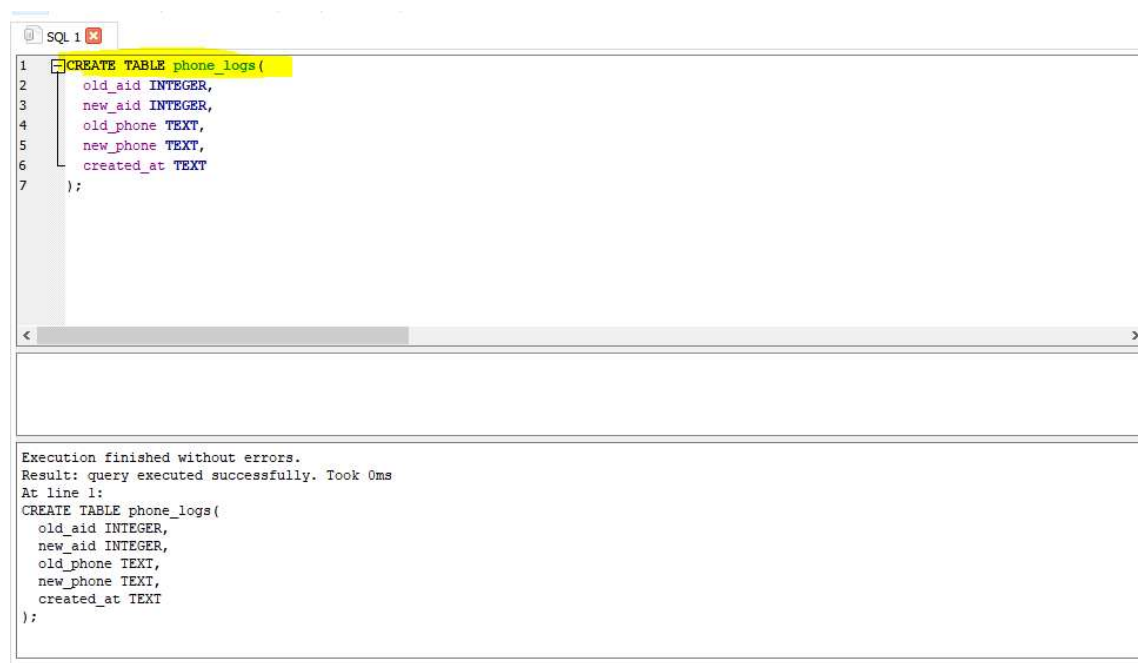
1) Added 2 new attributes – phone and email in the author table



```
1  /* Creates Table author*/
2  CREATE TABLE IF NOT EXISTS author (
3      aid INTEGER PRIMARY KEY, /* For integer values, SQLite takes input as NOT NULL values but auto increments the aid and stores*/
4      author_name TEXT NOT NULL, /* Assumption: There can be more than one author with the same name*/
5      bio TEXT,
6      certification TEXT COLLATE NOCASE NOT NULL,
7      email TEXT UNIQUE,
8      phone TEXT UNIQUE,
9      CHECK ( certification IN ('CAP','CSM','CSTE','CBAP','PMP'))/*CHECK if certification is 'PMP','CBAP','CSM','CSTE','CAP'*/
10 );
11
```

Execution finished without errors.
Result: query executed successfully. Took 0ms
At line 1:
/* Creates Table author*/
CREATE TABLE IF NOT EXISTS author (
aid INTEGER PRIMARY KEY, /* For integer values, SQLite takes input as NOT NULL values but auto increments the aid and stores*/
author_name TEXT NOT NULL, /* Assumption: There can be more than one author with the same name*/
bio TEXT,
certification TEXT COLLATE NOCASE NOT NULL,
email TEXT UNIQUE,
phone TEXT UNIQUE,
CHECK (certification IN ('CAP','CSM','CSTE','CBAP','PMP'))/*CHECK if certification is 'PMP','CBAP','CSM','CSTE','CAP'*/
);

2) Created a table phone_logs to keep track of changes made to a phone number.



```
1  CREATE TABLE phone_logs(
2      old_aid INTEGER,
3      new_aid INTEGER,
4      old_phone TEXT,
5      new_phone TEXT,
6      created_at TEXT
7  );
```

Execution finished without errors.
Result: query executed successfully. Took 0ms
At line 1:
CREATE TABLE phone_logs(
old_aid INTEGER,
new_aid INTEGER,
old_phone TEXT,
new_phone TEXT,
created_at TEXT
);

Trigger 1: To manage a constraint check:

A trigger called `validate_email_before_insert_author` is created on the Table `author` to ensure that only email addresses with `'%@northeastern.edu'` are accepted. When any other email is entered, an alert is sent to the user prompting him to enter a valid email. This trigger is run before `INSERT` operation is performed on the table `author`.

```
CREATE TRIGGER validate_email_before_insert_author
```

```
    BEFORE INSERT ON author
```

```
    BEGIN
```

```
    SELECT
```

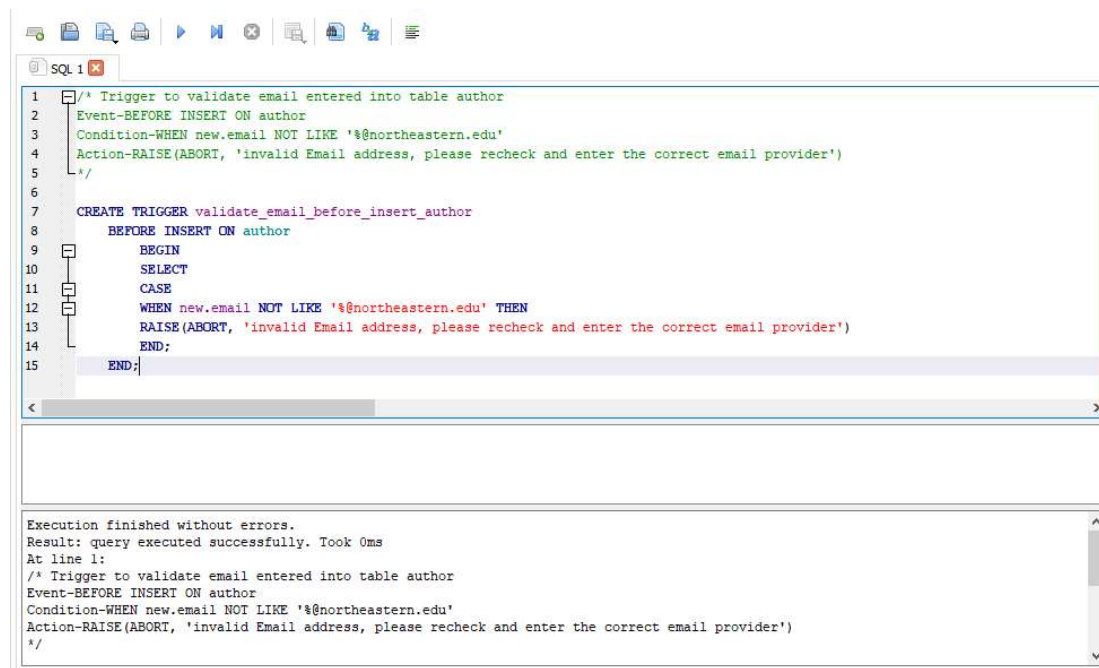
```
    CASE
```

```
    WHEN new.email NOT LIKE '%@northeastern.edu' THEN
```

```
    RAISE(ABORT, 'invalid Email address, please recheck and enter the correct email provider')
```

```
    END;
```

```
END;
```



The screenshot shows a SQL IDE window with a toolbar at the top. The main text area contains the following SQL code:

```
1  /* Trigger to validate email entered into table author
2  Event-BEFORE INSERT ON author
3  Condition-WHEN new.email NOT LIKE '%@northeastern.edu'
4  Action-RAISE(ABORT, 'invalid Email address, please recheck and enter the correct email provider')
5  */
6
7  CREATE TRIGGER validate_email_before_insert_author
8      BEFORE INSERT ON author
9      BEGIN
10         SELECT
11         CASE
12         WHEN new.email NOT LIKE '%@northeastern.edu' THEN
13             RAISE(ABORT, 'invalid Email address, please recheck and enter the correct email provider')
14         END;
15     END;
```

Below the code editor, the execution results are displayed:

```
Execution finished without errors.
Result: query executed successfully. Took 0ms
At line 1:
/* Trigger to validate email entered into table author
Event-BEFORE INSERT ON author
Condition-WHEN new.email NOT LIKE '%@northeastern.edu'
Action-RAISE(ABORT, 'invalid Email address, please recheck and enter the correct email provider')
*/
```

Working of trigger: Gmail and yahoo email address is not accepted, only northeastern.edu is accepted.

```
1 INSERT INTO author (aid,author_name,bio,certification,email,phone)
2 VALUES (6,'John Mathew','Lives in Virginia, writes books on advance mathematics','PMP','johnmathew@gmail.edu','+1 617084532');
```

Execution finished with errors.

Result: invalid Email address, please recheck and enter the correct email provider

At line 1:

INSERT INTO author (aid,author_name,bio,certification,email,phone)

VALUES (6,'John Mathew','Lives in Virginia, writes books on advance mathematics','PMP','johnmathew@gmail.edu','+1 617084532');

SQL 1

```
1 INSERT INTO author (aid,author_name,bio,certification,email,phone)
2 VALUES (6,'John Mathew','Lives in Virginia, writes books on advance mathematics','PMP','johnmathew@yahoo.com','+1 617084532');
```

Execution finished with errors.

Result: invalid Email address, please recheck and enter the correct email provider

At line 1:

INSERT INTO author (aid,author_name,bio,certification,email,phone)

VALUES (6,'John Mathew','Lives in Virginia, writes books on advance mathematics','PMP','johnmathew@yahoo.com','+1 617084532');

```
SQL 1
1  INTO author (aid,author_name,bio,certification,email,phone)
2  (6,'John Mathew','Lives in Virginia, writes books on advance mathematics','PMP','johnmathew@northeastern.edu','+1 617084532');
```

```
Execution finished without errors.
Result: query executed successfully. Took 0ms, 1 rows affected
At line 1:
INSERT INTO author (aid,author_name,bio,certification,email,phone)
VALUES (6,'John Mathew','Lives in Virginia, writes books on advance mathematics','PMP','johnmathew@northeastern.edu','+1 617084532');
```

Trigger 2 - A Trigger is created for audit log of phone numbers. A new table called phone_logs is created to keep track of all the changes to the phone attribute of author. This trigger is called after the UPDATE is performed on the phone number, it stores details of the aid of the author for whom the phone number was updated, the before update phone number, the new updated phone number and the date and time the update was performed.

```
CREATE TRIGGER log_phone_after_update_authorPhone
```

```
    AFTER UPDATE ON author
```

```
        WHEN old.phone <> new.phone
```

```
        BEGIN
```

```
            INSERT INTO phone_logs(
```

```
                old_aid,
```

```
                new_aid,
```

```
                old_phone,
```

```
                new_phone,
```

```
                created_at
```

```
            )
```

```
        VALUES
```

```

(
    old.aid, new.aid, old.phone,new.phone,
    DATETIME('NOW')
);

END;

```

```

1  /*Trigger to keep a log of changes made to author's phone number
2  Event-AFTER UPDATE ON author
3  Condition-When there is a update on phone number
4  Action-Insert the details about the updated phone number, the aid the update is performed for and when the update occurred into :
5  */
6  CREATE TRIGGER log_phone_after_update_authorPhone
7  AFTER UPDATE ON author
8  WHEN old.phone <> new.phone
9  BEGIN
10     INSERT INTO phone_logs (
11         old_aid,
12         new_aid,
13         old_phone,
14         new_phone,
15         created_at
16     )
17     VALUES
18     (
19         old.aid, new.aid, old.phone,new.phone,
20         DATETIME('NOW')

```

Execution finished without errors.
Result: query executed successfully. Took 0ms
At line 1:
/*Trigger to keep a log of changes made to author's phone number
Event-AFTER UPDATE ON author

Working of Trigger: Log of the old phone number, updated phone number along with the date and time of update is logged in the phone_logs table.

Existing data in author table

```
SELECT * FROM author;
```

aid	author_name	bio	certification	email	phone
1	Bruer Abebi	Lives in Netherlands, writes books on mathematics	PMP	brucerMathew@northeastern.edu	+1 6170869321
2	Emad Abolla	Lives in Norway, writes books on electronics	cbap	emadabol@northeastern.edu	+1 6078245354
3	Ali About	Lives in Finland, Wireless Sensor Networks, ...	CSM	aliabour@northeastern.edu	+1 6098242524
4	Michel albren	Lives in Germany, Teaches Applied operations ...	CSM	Michael@northeastern.edu	+1 4015728932
5	Brain Mathwe	Lives in India, Wireless Sensor Networks, Interne...	CSTE	BrianMathr@northeastern.edu	+1 6058275244

Update the phone number of author with aid 1 form '+1 6170869321' to '+1 6078568534'

```
1  UPDATE author
2  SET
3      phone = '+1 6078568534'
4
5  WHERE
6      aid = 1;
```

Execution finished without errors.
Result: query executed successfully. Took 0ms, 1 rows affected

Update phone number of author with aid 5 from '+1 6058275244' to '+1 6078568268'

```
1  UPDATE author
2  SET
3      phone = '+1 6078568268'
4
5  WHERE
6      aid = 5;
```

Execution finished without errors.
Result: query executed successfully. Took 0ms, 1 rows affected

Again update phone number of author with aid 1 from '+1 6078568534' to '+1 4078967265'

```
SQL 1 X
1  UPDATE author
2
3  SET
4      phone = '+1 4078967265'
5
6  WHERE
7      aid = 1;
```

Execution finished without errors.
Result: query executed successfully. Took 0ms, 1 rows affected

Phone number is updated successfully in author table and the log of change is created in phone_logs.

Author table populated with new values:

```
SQL 1 X
1  SELECT * FROM author;
```

	aid	author_name	bio	certification	email	phone
1	1	Bruer Abebi	Lives in Netherlands, writes books on mathematics	PMP	brucerMathew@northeastern.edu	+1 4078967265
2	2	Emad Abolla	Lives in Norway, writes books on electronics	cbap	emadabol@northeastern.edu	+1 6078245354
3	3	Ali Abour	Lives in Finland, Wireless Sensor Networks, ...	CSM	aliabour@northeastern.edu	+1 6098242524
4	4	Michel albren	Lives in Germany, Teaches Applied operations ...	CSM	Michael@northeastern.edu	+1 4015728932
5	5	Brain Mathwe	Lives in India, Wireless Sensor Networks, Interne...	CSTE	BrianMathr@northeastern.edu	+1 6078568268

Phone_logs table keeping a log of all changes:

```
SELECT * FROM phone_logs;
```

old_aid	new_aid	old_phone	new_phone	created_at
1	1	+1 6170869321	+1 6078568534	2020-07-21 16:56:46
5	5	+1 6058275244	+1 6078568268	2020-07-21 16:58:57
1	1	+1 6078568534	+1 4078967265	2020-07-21 17:02:52