Alexandria University

Faculty of Engineering

Computer and Systems Engineering Dept. CS:

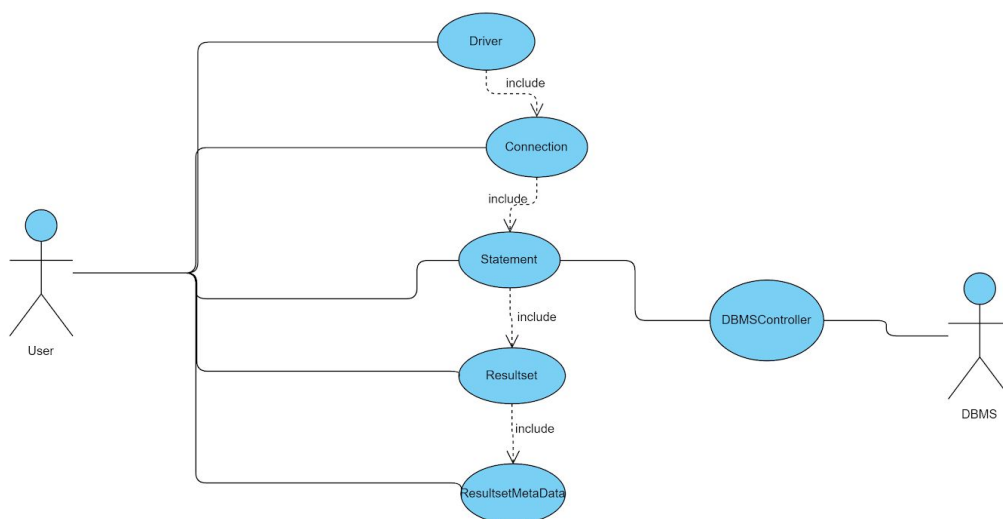*PROGRAMMING 2*

Assignment 4: JDBC API

<u>Names:</u>

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2. Ahmed Talaat (5)
3. Salma Ragab (32)
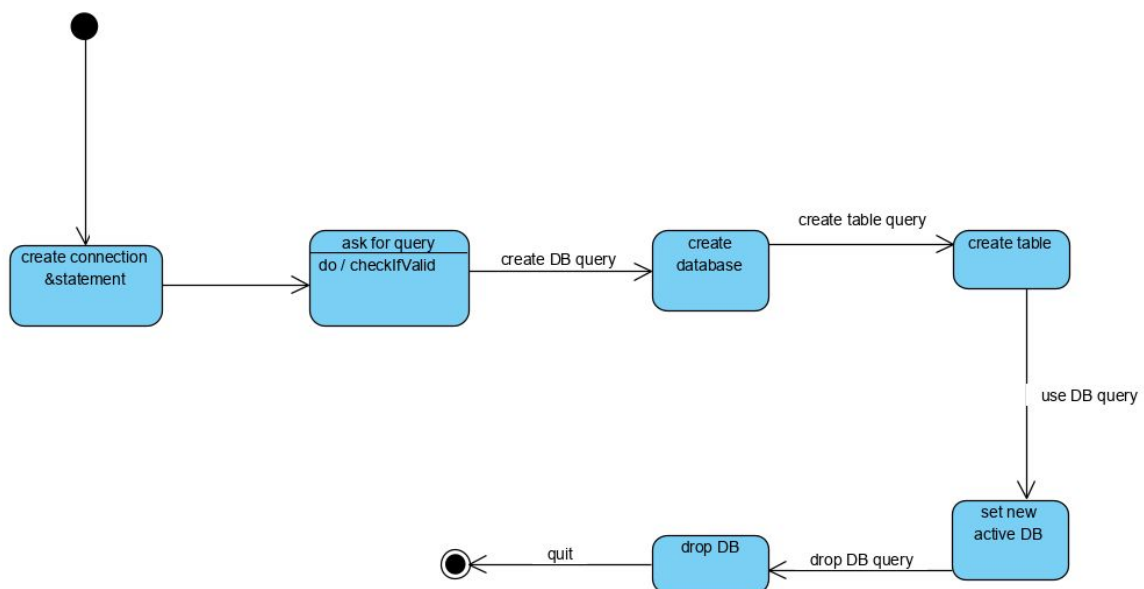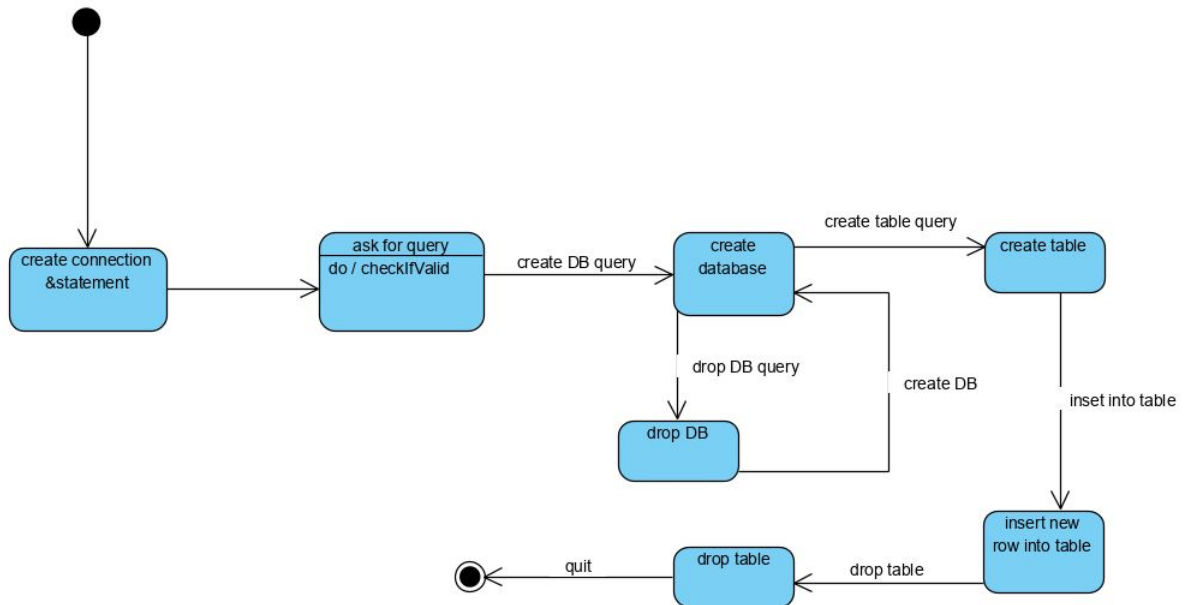4. Linh Ahmed (50)

Description :

Java Database Connectivity (JDBC) is an application programming interface (API) which allows the programmer to connect and interact with databases. It provides methods to query and update data in the database through update statements like SQL's CREATE, UPDATE, DELETE and INSERT and query statements such as SELECT.
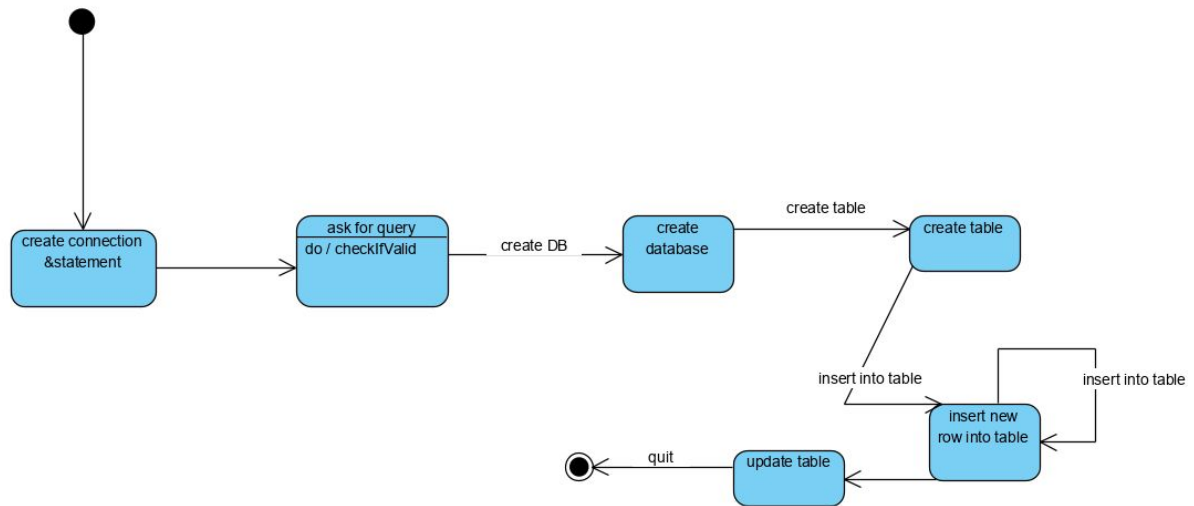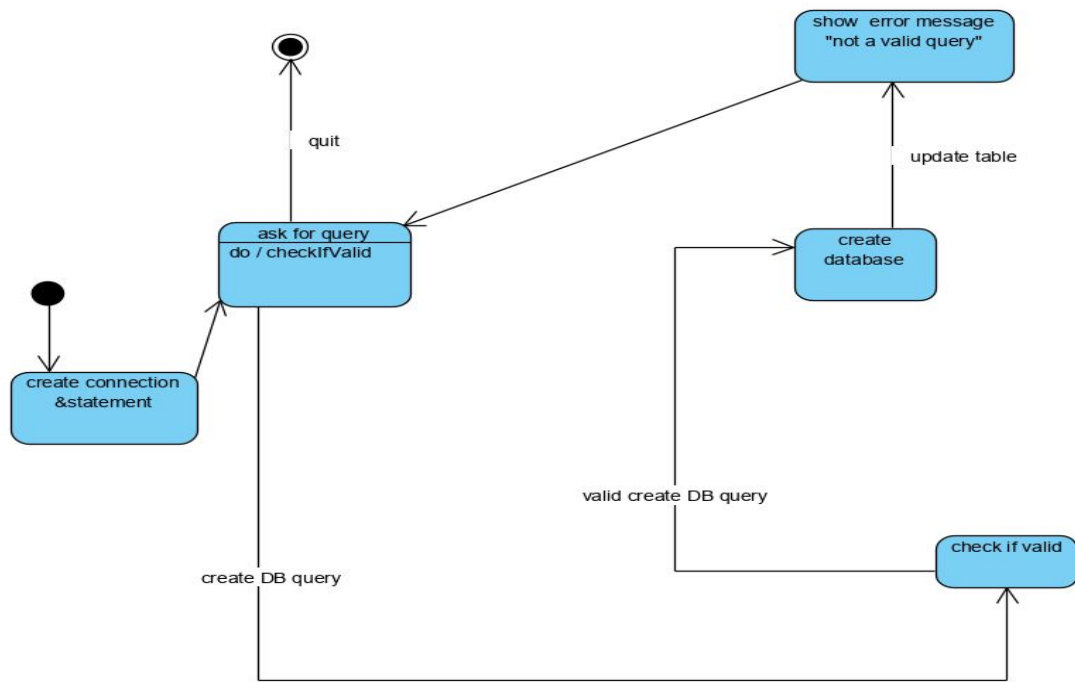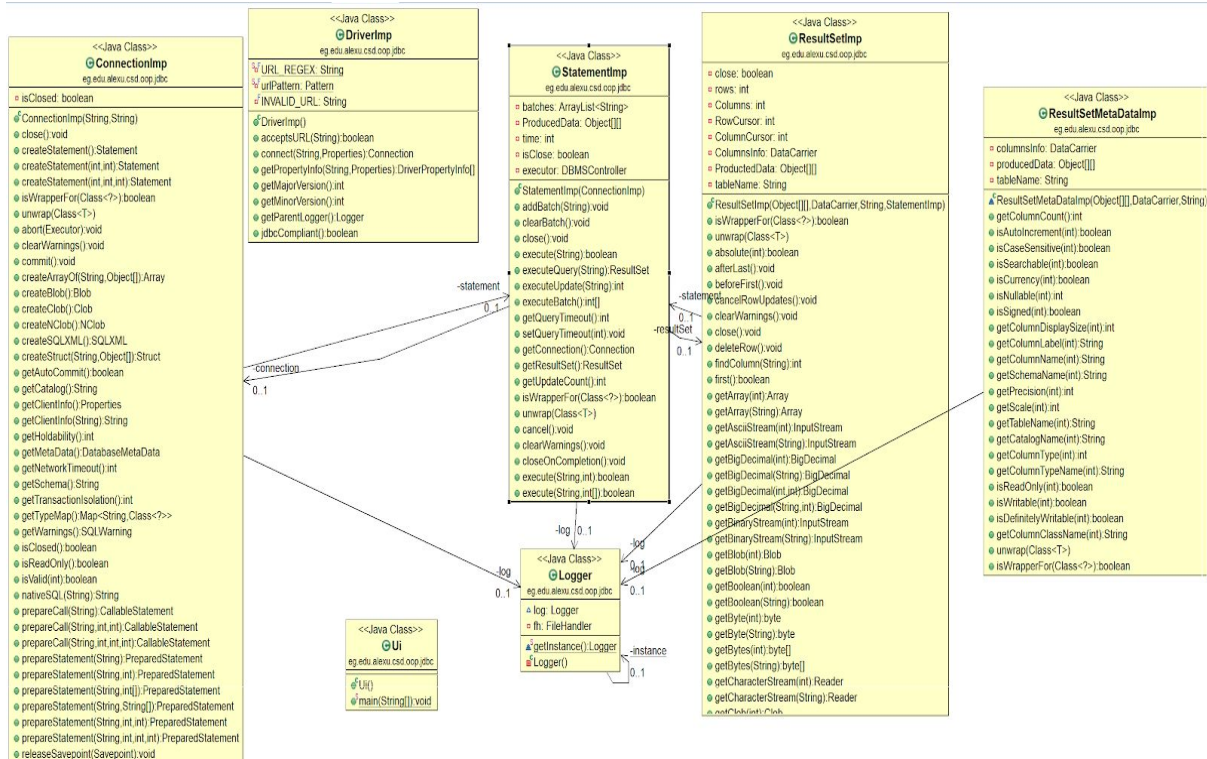
UML Diagram :

Use Case :

State Diagram for 3 scenarios :

First Diagram

- (initial state) → **create connection &statement**
- **create connection &statement** → **ask for query** / do / checkIfValid
- **ask for query** / do / checkIfValid → (final state) : quit
- **ask for query** / do / checkIfValid → **check if valid** : create DB query
- **check if valid** → **create database** : valid create DB query
- **create database** → **show error message "not a valid query"** : update table
- **show error message "not a valid query"** → **ask for query**

Second Diagram

- (initial state) → **create connection &statement**
- **create connection &statement** → **ask for query** / do / checkIfValid
- **ask for query** / do / checkIfValid → **create database** : create DB
- **create database** → **create table** : create table
- **create table** → **insert new row into table** : insert into table
- **insert new row into table** → **insert new row into table** : insert into table
- **insert new row into table** → **update table**
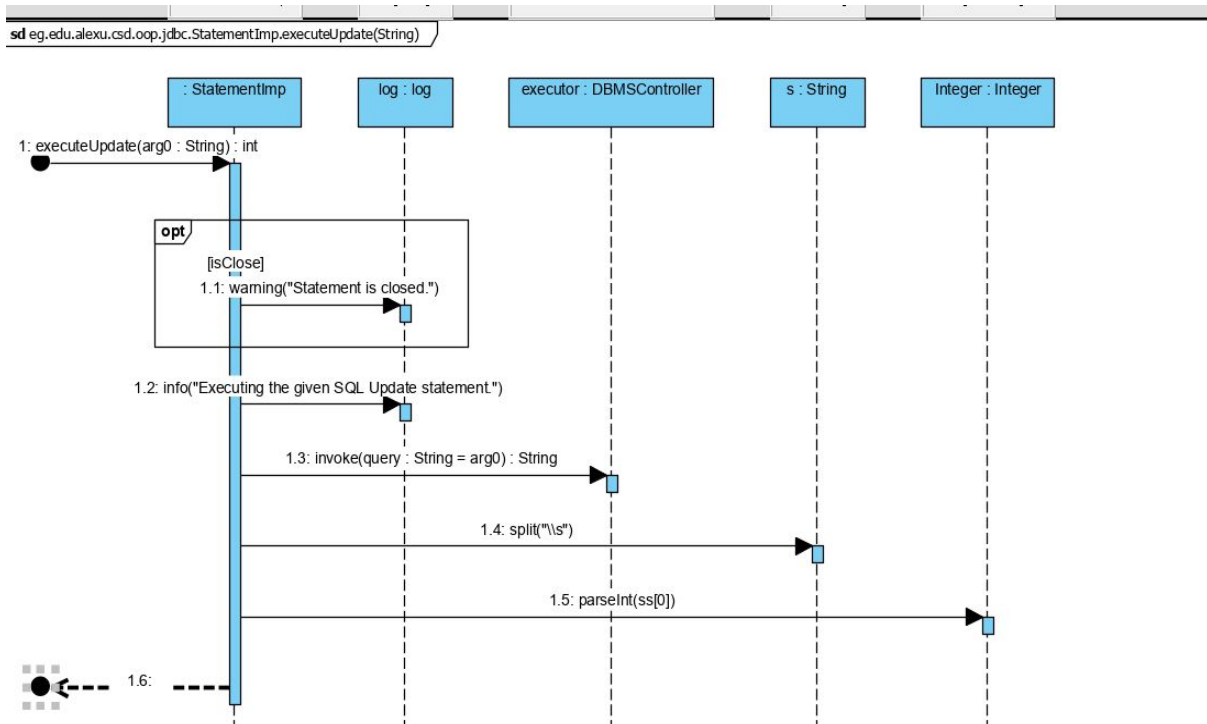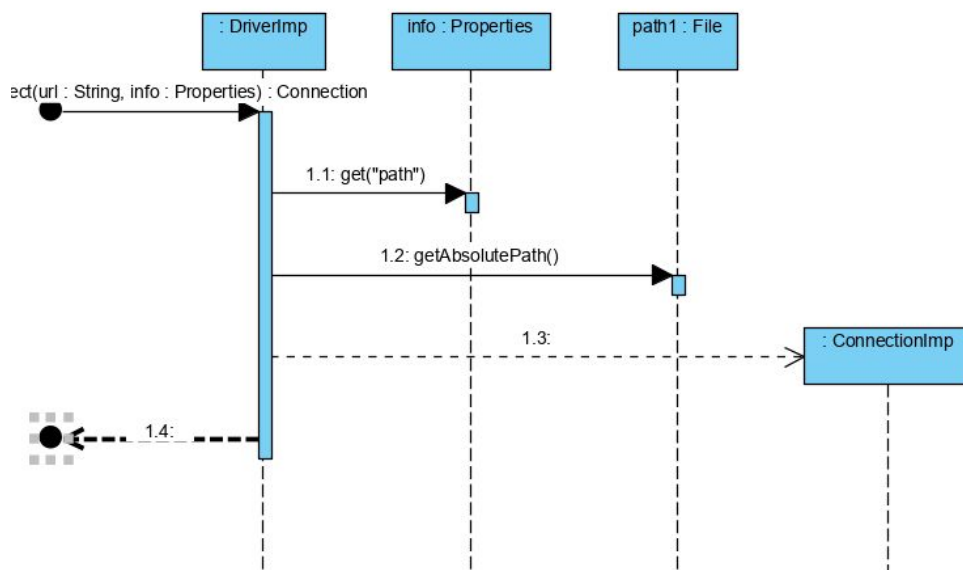- **update table** → (final state) : quit

Detailed class diagram :

Sequence Diagram :

Design Patterns:

Singleton Design Pattern :

Used in logger

Thread Pool Design Pattern :

Used in

MVC Design Pattern :

- Model

- View
  Ui
- Controller

Design decisions and Assumptions :

- ## DriverImp:

  Get the connection to database after accepting valid url and throws exception in case of not valid ones.

- ## ConnectionImp:

  Creates statement object which should execute queries.

- ## StatementImp:

  Executes queries and get ResultSet.

- ## ResultsetImp:

  It contains selected data from current table.

- ## ResultSetMetaDataImp:

  Get information about data in ResultSet.

- ## Logger:

  writing log messages during the execution of a program to a central place. Those messages include warning messages as well as info messages so that the messages can later be retrieved and analyzed.

Snapshots :


```
Command Prompt - java -jar C:\Users\EGYPT_LAPTOP\Desktop\jar_file_A4.jar

Microsoft Windows [Version 10.0.18362.476]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\EGYPT_LAPTOP>java -jar C:\Users\EGYPT_LAPTOP\Desktop\jar_file_A4.jar
type '.help' for help
SQL >>
create database DB
Query has been executed successfully
SQL >>
create table Table1 (c1 int , c2 varchar,c3 varchar)
Query has been executed successfully
SQL >>
insert into table1 values(3,'car','plane')
1 row has been changed
SQL >>
insert into table1 values (32,'34','tree')
1 row has been changed
SQL >>
select * from table1
3 car plane
32 34 tree

SQL >>
select c1 from TaBle1
3
32

SQL >>
_
```



```
Command Prompt - java -jar C:\Users\EGYPT_LAPTOP\Desktop\jar_file_A4.jar

Microsoft Windows [Version 10.0.18362.476]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\EGYPT_LAPTOP>java -jar C:\Users\EGYPT_LAPTOP\Desktop\jar_file_A4.jar
type '.help' for help
SQL >>
create database DB2
Query has been executed successfully
SQL >>
create table t (i int ,j varchar,k int )
Query has been executed successfully
SQL >>
insert into t values(45,'gh',23)
1 row has been changed
SQL >>
insert into t values(23,'g',5)
1 row has been changed
SQL >>
insert into t values (34,'ty',5)
1 row has been changed
SQL >>
select * from t where i<33
23 g 5

SQL >>
_
```

```
Microsoft Windows [Version 10.0.18362.476]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\EGYPT_LAPTOP>java -jar C:\Users\EGYPT_LAPTOP\Desktop\jar_file_A4.jar
type '.help' for help
SQL >>
create database d
Query has been executed successfully
SQL >>
create table t2
java.sql.SQLException: Not a valid SQL query!
        at eg.edu.alexu.csd.oop.db.control.DBMSController.invoke(DBMSController.java:79)
        at eg.edu.alexu.csd.oop.jdbc.StatementImp.execute(StatementImp.java:83)
        at eg.edu.alexu.csd.oop.jdbc.Ui.main(Ui.java:39)
SQL >>
create table t2 ( a varchar,b int ,c varchar)
Query has been executed successfully
SQL >>
insert into table values ('gh',56,'g')
java.sql.SQLException: No such a table
        at eg.edu.alexu.csd.oop.db.model.DBMS.executeUpdateQuery(DBMS.java:188)
        at eg.edu.alexu.csd.oop.db.control.DBMSController.invoke(DBMSController.java:76)
        at eg.edu.alexu.csd.oop.jdbc.StatementImp.executeUpdate(StatementImp.java:131)
        at eg.edu.alexu.csd.oop.jdbc.Ui.main(Ui.java:46)
SQL >>
insert into t2 values ('gh',56,'g')
1 row has been changed
SQL >>
insert into t2 values ('rty',20,'rf')
1 row has been changed
SQL >>
select *from t2 where b<15

SQL >>
```

User Guide :

Running the application :

- It is a console application.
- In the cmd, type this command: Java -jar (path of the jar file).
- The application should run inside your cmd and you will see "SQL >> ".
- Then type any of the supported SQL queries.

Supported SQL Queries :

1. Create database
2. Create table
3. Insert into table
4. Delete from table
5. Drop database
6. Drop table
7. Select from table
8. Update table
9. Use Database (bouns).

SQL Queries References :

1. W3 Schools: https://www.w3schools.com/sql/
2. Oracle: https://docs.oracle.com/javase/tutorial/jdbc/