Exercise - Create android application to demonstrate CRUD operations using SQLite DB

Program:

activity_main.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">
    <RelativeLayout
        android:id="@+id/relativeLayout"
        android:layout_width="413dp"
        android:layout_height="450dp"
        tools:ignore="MissingConstraints"
        tools:layout_editor_absoluteX="-2dp"
        tools:layout_editor_absoluteY="105dp">

        <LinearLayout
            android:id="@+id/r1"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_alignParentTop="true"
            android:layout_marginTop="45dp"
            android:layout_marginBottom="20dp"
            android:orientation="horizontal"
            tools:ignore="MissingConstraints">

            <TextView
                android:id="@+id/name_tx"
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:layout_marginLeft="10dp"
                android:layout_marginRight="10dp"
                android:text="Enter Name"
                android:textColor="#A1887F"
                android:textSize="20sp"
                android:textStyle="bold" />

            <EditText
                android:id="@+id/et_name"
                android:layout_width="200dp"
                android:layout_height="wrap_content"
                android:autofillHints="Name"
                android:hint="eg.Pooja"
                android:inputType="text"
                android:textColorHint="#8D6E63"
                tools:ignore="TouchTargetSizeCheck" />
        </LinearLayout>

        <LinearLayout
            android:id="@+id/r2"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_below="@+id/r1"
            android:layout_marginTop="37dp"
            android:layout_marginBottom="20dp"
            android:orientation="horizontal"
            tools:ignore="MissingConstraints">

            <TextView
                android:id="@+id/rollno_tx"
```

```xml
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginLeft="10dp"
            android:layout_marginRight="10dp"
            android:text="Enter Roll Number"
            android:textColor="#A1887F"
            android:textSize="20sp"
            android:textStyle="bold" />

        <EditText
            android:id="@+id/et_rollno"
            android:layout_width="150dp"
            android:layout_height="wrap_content"
            android:hint="35"
            android:inputType="number"
            android:textColorHint="#8D6E63"
            tools:ignore="TouchTargetSizeCheck" />
    </LinearLayout>

    <Button
        android:id="@+id/addData"
        android:layout_width="160dp"
        android:layout_height="wrap_content"
        android:layout_below="@+id/r2"
        android:layout_centerHorizontal="true"
        android:text="AddData" />

    <Button
        android:id="@+id/ViewData"
        android:layout_width="160dp"
        android:layout_height="wrap_content"
        android:layout_below="@+id/addData"
        android:layout_centerHorizontal="true"
        android:layout_marginTop="0dp"
        android:text="View" />

    <Button
        android:id="@+id/updateData"
        android:layout_width="160dp"
        android:layout_height="wrap_content"
        android:layout_below="@+id/ViewData"
        android:layout_centerHorizontal="true"
        android:text="Update"
        tools:ignore="SpeakableTextPresentCheck" />

    <Button
        android:id="@+id/deleteData"
        android:layout_width="160dp"
        android:layout_height="wrap_content"
        android:layout_below="@+id/updateData"
        android:layout_centerHorizontal="true"
        android:text="Delete"
        tools:ignore="SpeakableTextPresentCheck" />
    </RelativeLayout>
</androidx.constraintlayout.widget.ConstraintLayout>\
```

activity_view_students.xml
```xml
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".ViewStudents">

    <androidx.recyclerview.widget.RecyclerView
        android:id="@+id/idRVStudents"
```

```xml
        android:layout_width="match_parent"
        android:layout_height="match_parent"/>
</RelativeLayout>
```

student_rv_item.xml
```xml
<?xml version="1.0" encoding="utf-8"?>
<androidx.cardview.widget.CardView
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:layout_margin="5dp"
    android:elevation="8dp"
    app:cardCornerRadius="4dp">

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_margin="5dp"
        android:orientation="horizontal">

        <TextView
            android:id="@+id/idStudentname"
            android:layout_width="20dp"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:padding="3dp"
            android:text="Name of Student"
            android:textColor="#FFC107" />
        <TextView android:id="@+id/idStudentnumber"
            android:layout_width="30dp"
            android:layout_height="wrap_content"
            android:padding="3dp"
            android:text="Student Number"
            android:textColor="#FFC107"
            android:textFontWeight="1" />
    </LinearLayout>
</androidx.cardview.widget.CardView>
```

MainActivity.java
```java
        package com.example.databaseapp;
        import androidx.appcompat.app.AppCompatActivity;
        import android.annotation.SuppressLint;
        import android.content.Intent;
        import android.os.Bundle;
        import android.view.View;
        import android.widget.Button;
        import android.widget.EditText;
        import android.widget.Toast;
        public class MainActivity extends AppCompatActivity {

            EditText et_name, et_rollno;
            Button addData,updateData,deleteData, viewData;
            @Override
            protected void onCreate(Bundle savedInstanceState) {
                super.onCreate(savedInstanceState);
                setContentView(R.layout.activity_main); et_name
                        = findViewById(R.id.et_name); et_rollno=
                        findViewById(R.id.et_rollno); addData=
                        findViewById(R.id.addData); viewData=
                        findViewById(R.id.ViewData); deleteData =
                        findViewById(R.id.deleteData); updateData =
                        findViewById(R.id.updateData); Dbhandler h1 =
                        new Dbhandler(this);
                addData.setOnClickListener(v -> {
                    String stdName = et_name.getText().toString();
                    String stdRollNo = et_rollno.getText().toString(); if
```

```java
                (stdName.isEmpty() || stdRollNo.isEmpty()) {
                    Toast.makeText(MainActivity.this, "Please enter all the data
...",
                            Toast.LENGTH_SHORT).show();
                    return;
                }
                h1.addStudent(stdName, stdRollNo);
                Toast.makeText(MainActivity.this, "Student has been Added.",
                        Toast.LENGTH_SHORT).show();
                et_name.setText("");
                et_rollno.setText("");
            });
            viewData.setOnClickListener(new View.OnClickListener() {
                @Override
                public void onClick(View view) {
                    Intent i= new Intent(MainActivity.this,ViewStudents.class);
                    startActivity(i);
                }
            });
            updateData.setOnClickListener(v -> {
                String updatedName = et_name.getText().toString();
                String rollNumberToUpdate = et_rollno.getText().toString();
                h1.updateStudent(updatedName, rollNumberToUpdate);
                Toast.makeText(MainActivity.this, "Student data updated.",
                        Toast.LENGTH_SHORT).show();
            });
            deleteData.setOnClickListener(v -> {
                String rollNumberToDelete = et_rollno.getText().toString();
                String nameToDelete = et_name.getText().toString();
                h1.deleteStudent(rollNumberToDelete);
                Toast.makeText(MainActivity.this, "Student data deleted.",
                        Toast.LENGTH_SHORT).show();
            });
        }
    }
```

ViewStudents.java
```java
package com.example.databaseapp;
import android.os.Bundle;
import android.os.Handler;
import androidx.appcompat.app.AppCompatActivity;
import androidx.recyclerview.widget.LinearLayoutManager;
import androidx.recyclerview.widget.RecyclerView;
import android.view.View;
import java.util.ArrayList;
public class ViewStudents extends AppCompatActivity {
    ArrayList<StudentModal> courseModalArrayList;
    Dbhandler dbhandler;
    StudentRVAdapter courseRVAdapter;
    RecyclerView studentsRV;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_view_students);
        courseModalArrayList = new ArrayList<>();
        dbhandler = new Dbhandler(ViewStudents.this);
        courseModalArrayList= dbhandler.readStudents();
        courseRVAdapter=new
StudentRVAdapter(courseModalArrayList,ViewStudents.this);
        studentsRV = findViewById(R.id.idRVStudents);
        LinearLayoutManager linearLayoutManager = new
                LinearLayoutManager(ViewStudents.this,
                RecyclerView.VERTICAL,false);
        studentsRV.setLayoutManager(linearLayoutManager);
        studentsRV.setAdapter(courseRVAdapter);
    }
}
```
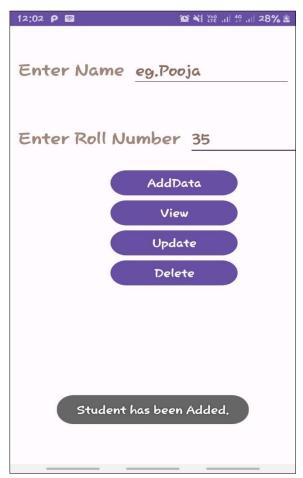
StudentModal.java

```java
package com.example.databaseapp;

public class StudentModal  {
    String
            studentName; String studentNumber;
    public String getStudentName() {
        return studentName;
    }
    public void setStudentName(String studentName) {
        this.studentName = studentName;
    }
    public String getStudentNumber() {
        return studentNumber;
    }
    public void setStudentNumber(String studentNumber) {
        this.studentNumber = studentNumber;
    }
    public StudentModal(String studentName, String studentNumber)
    {
        this.studentName= studentName;
        this.studentNumber=studentNumber;
    }
}
```

Dbhandler.java

```java
package com.example.databaseapp;
import android.content.ContentValues;
import android.content.Context;
import android.database.Cursor;
import android.database.sqlite.SQLiteDatabase;
import android.database.sqlite.SQLiteOpenHelper;
import java.util.ArrayList;
public class Dbhandler extends
        SQLiteOpenHelper{ private static final String
        dbname="my_db"; private static final int version
        =1; public Dbhandler(Context context) { super
        (context,dbname,null,version);}
    @Override
    public void onCreate(SQLiteDatabase db){
        String create = "CREATE TABLE students (_id INTEGER " +
                "PRIMARY KEY AUTOINCREMENT,"+
                "name TEXT,roll_no TEXT)";
        db.execSQL(create);
    }
    @Override public void onUpgrade(SQLiteDatabase
                                        sqLiteDatabase,int i, int i1){
        sqLiteDatabase.execSQL("Drop TABLE IF EXISTS students");
        onCreate(sqLiteDatabase);
    }
    public void addStudent(String name,String roll_no)
    {
        SQLiteDatabase db =
                this.getWritableDatabase(); ContentValues
            values=new ContentValues();
        values.put("name",name);
        values.put("roll_no",roll_no);
        db.insert("students",null,values); db.close();
    }
    public void updateStudent(String name, String roll_no) {
        SQLiteDatabase db = this.getWritableDatabase();
        ContentValues values = new ContentValues();
        values.put("name", name);
        db.update("students", values, "roll_no = ?", new
                String[]{roll_no}); db.close();
    }
```
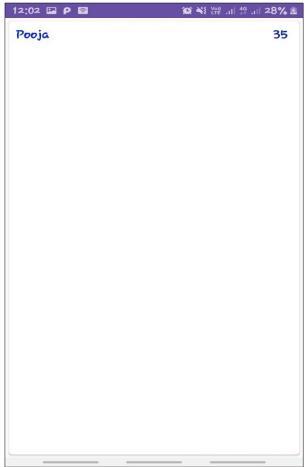
```java
        public void deleteStudent(String roll_no) {
            SQLiteDatabase db = this.getWritableDatabase();
            db.delete("students", "roll_no = ?", new String[]{roll_no});
            db.close();
        }
        public ArrayList<StudentModal> readStudents(){
            SQLiteDatabase db = this.getReadableDatabase();
            Cursor cursorStudent = db.rawQuery("SELECT name, roll_no
                    FROM STUDENTS",null);
                    ArrayList<StudentModal> studentModalArrayList = new
                            ArrayList<>();
            if(cursorStudent.moveToFirst()) {
                do {
                    studentModalArrayList.add(new

    StudentModal(cursorStudent.getString(0),cursorStudent.getString(1)));
                }while (cursorStudent.moveToNext());
            }
            cursorStudent.close();
            return studentModalArrayList;
        }
    }
```

StudentRVAdapter.java

```java
package com.example.databaseapp;
import android.content.Context;
import android.view.LayoutInflater;
import android.view.View;
import android.view.ViewGroup;
import android.widget.TextView;
import androidx.recyclerview.widget.RecyclerView;
import androidx.annotation.NonNull;
import java.util.ArrayList;
public class StudentRVAdapter extends RecyclerView.Adapter<StudentRVAdapter.ViewHolder>
{
    ArrayList<StudentModal> studentModalArrayList; Context context; public
    StudentRVAdapter(ArrayList<StudentModal> studentModalArrayList, Context
                    context){
        this.studentModalArrayList = studentModalArrayList;
        this.context = context;
    }
    @NonNull @Override public ViewHolder onCreateViewHolder (@NonNull
                                                    ViewGroup parent, int
viewType){
        View view =
            LayoutInflater.from(parent.getContext()).inflate(R.layout.student_rv_item,
parent, false);
        return new ViewHolder(view);
    }
    public class ViewHolder extends RecyclerView.ViewHolder {
        TextView studentNameTV, studentNumTV; public
        ViewHolder(@NonNull View itemView) { super(itemView);
            studentNameTV = itemView.findViewById(R.id.idStudentname);
            studentNumTV = itemView.findViewById(R.id.idStudentnumber);
        }
    }
    @Override
    public void onBindViewHolder(@NonNull ViewHolder holder, int position) {
        StudentModal modal = studentModalArrayList.get(position);
        holder.studentNameTV.setText(modal.getStudentName());
        holder.studentNumTV.setText(modal.getStudentNumber());
    }
    @Override public int
    getItemCount() {
        return studentModalArrayList.size();
    }
}
```
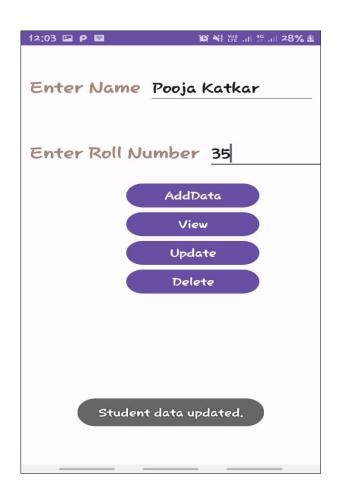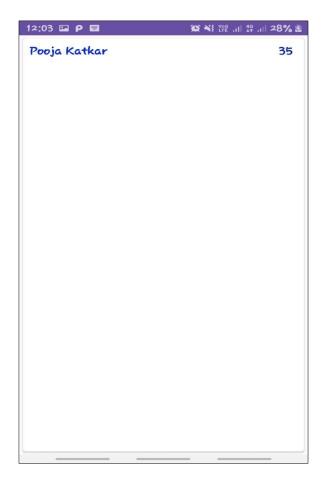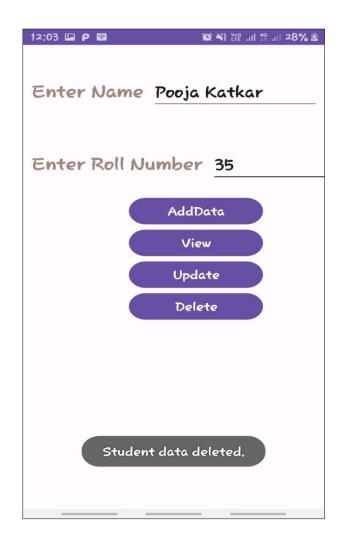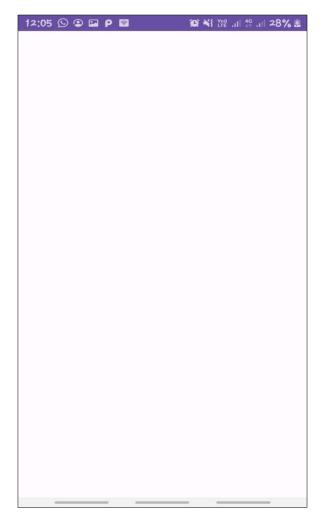
Output:

Enter Name Pooja Katkar

Enter Roll Number 35

AddData

View

Update

Delete

Student data updated.

Pooja Katkar   35

Enter Name Pooja Katkar

Enter Roll Number 35

AddData

View

Update

Delete

Student data deleted.

Pooja Katkar   35

Output:-

Enter Name Abhishek Joshi

Enter Roll Number 31

AddData

View

Update

Delete

Student data updated.

Abhishek Joshi 31

Enter Name Abhishek Joshi

Enter Roll Number 31

AddData

View

Update

Delete

Student data deleted.

Abhishek Joshi 31

Output:-

Screen 1:

Enter Name   Sourabh Apte

Enter Roll Number   01

AddData

View

Update

Delete

Student data updated.

Screen 2:

Sourabh Apte   01

Screen 3:

Enter Name   Sourabh Apte

Enter Roll Number   01

AddData

View

Update

Delete

Student data deleted.

Screen 4:

Sourabh Apte   01

Output:-

Enter Name Sumit Chandale

Enter Roll Number 12

AddData

View

Update

Delete

Student data updated.

Sumit Chandale   12

Enter Name Sumit Chandale

Enter Roll Number 12

AddData

View

Update

Delete

Student data deleted.

Sumit Chandale   12