



## Lab 14

### Reading and Storing App data in to SQLite Databases

#### Exercise 14.1:

Implement the following Android App activities using SQLite database to store and read records of students.

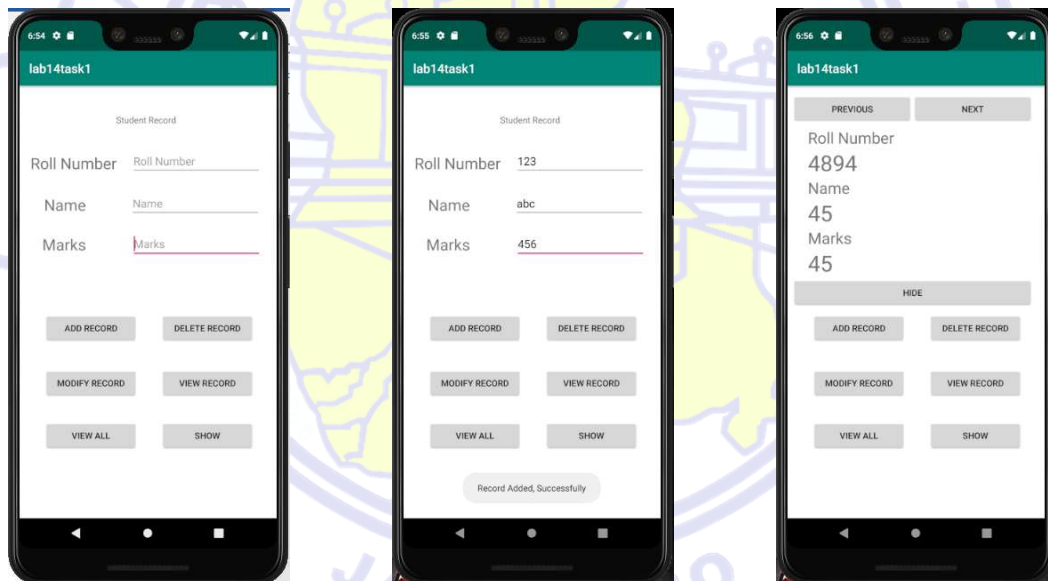
#### *Solution*

**Language:** Java

**Platform:** Android Studio

**Database:** SQLite

#### OUTPUT





## .XML Activity 1.1

```
<?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"
    android:background="#FFFFFF"
    tools:context=".MainActivity">

    <TextView
        android:id="@+id/textView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="8dp"
        android:layout_marginTop="8dp"
        android:layout_marginEnd="8dp"
        android:text="Student Record"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.491"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.056" />

    <TextView
        android:id="@+id/textView2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="8dp"
        android:layout_marginTop="8dp"
        android:layout_marginEnd="8dp"
        android:layout_marginBottom="8dp"
        android:text="Roll Number"
        android:textSize="25sp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toStartOf="@+id/etRoll"
        app:layout_constraintHorizontal_bias="0.4"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.154" />

    <EditText
        android:id="@+id/etRoll"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="8dp"
        android:layout_marginEnd="24dp"
        android:layout_marginBottom="8dp"
        android:ems="10"
        android:hint="Roll Number"
        android:inputType="textPersonName"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textView"
        app:layout_constraintVertical_bias="0.046" />

    <TextView
        android:id="@+id/textView3"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="8dp"
        android:layout_marginTop="8dp"
        android:layout_marginEnd="8dp"
        android:layout_marginBottom="8dp"
        android:text="Name"
        android:textSize="25sp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.097"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textView2"
        app:layout_constraintVertical_bias="0.05" />

    <EditText
        android:id="@+id/etName"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="8dp"
        android:layout_marginTop="8dp"
        android:layout_marginEnd="8dp"
        android:layout_marginBottom="8dp"
        android:ems="10"
        android:hint="Name"
        android:inputType="textPersonName"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.786"
        app:layout_constraintStart_toEndOf="@+id/textView3"
        app:layout_constraintTop_toBottomOf="@+id/etRoll"
        app:layout_constraintVertical_bias="0.03" />


```



## .XML Activity 1.2

```

<TextView
    android:id="@+id/textView4"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="8dp"
    android:layout_marginTop="8dp"
    android:layout_marginEnd="8dp"
    android:layout_marginBottom="8dp"
    android:text="Marks"
    android:textSize="25sp"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.089"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/textView3"
    app:layout_constraintVertical_bias="0.051" />
<EditText
    android:id="@+id/etMarks"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="8dp"
    android:layout_marginTop="8dp"
    android:layout_marginEnd="8dp"
    android:layout_marginBottom="8dp"
    android:ems="10"
    android:hint="Marks"
    android:inputType="textPersonName"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.807"
    app:layout_constraintStart_toEndOf="@+id/textView4"
    app:layout_constraintTop_toBottomOf="@+id/etName"
    app:layout_constraintVertical_bias="0.028" />
<Button
    android:id="@+id/button"
    android:layout_width="150dp"
    android:layout_height="wrap_content"
    android:layout_marginStart="40dp"
    android:layout_marginTop="364dp"
    android:onClick="onAdd"
    android:text="Add Record"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent" />
<Button
    android:id="@+id/button2"
    android:layout_width="150dp"
    android:layout_height="wrap_content"
    android:layout_marginStart="8dp"
    android:layout_marginTop="364dp"
    android:layout_marginEnd="8dp"
    android:onClick="onDelete"
    android:text="Delete Record"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.509"
    app:layout_constraintStart_toEndOf="@+id/button"
    app:layout_constraintTop_toTopOf="parent" />
<Button
    android:id="@+id/button3"
    android:layout_width="150dp"
    android:layout_height="wrap_content"
    android:layout_marginStart="40dp"
    android:layout_marginTop="40dp"
    android:onClick="onUpdate"
    android:text="Modify Record"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/button" />
<Button
    android:id="@+id/button4"
    android:layout_width="150dp"
    android:layout_height="wrap_content"
    android:layout_marginStart="8dp"
    android:layout_marginTop="40dp"
    android:layout_marginEnd="8dp"
    android:onClick="onView"
    android:text="View Record"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.509"
    app:layout_constraintStart_toEndOf="@+id/button3"
    app:layout_constraintTop_toBottomOf="@+id/button2" />

```



## .XML Activity 1.3

```

<Button
    android:id="@+id/button5"
    android:layout_width="150dp"
    android:layout_height="wrap_content"
    android:layout_marginStart="40dp"
    android:layout_marginTop="36dp"
    android:text="View All"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@+id/button3" />
<Button
    android:id="@+id/button6"
    android:layout_width="150dp"
    android:layout_height="wrap_content"
    android:layout_marginStart="8dp"
    android:layout_marginTop="36dp"
    android:layout_marginEnd="8dp"
    android:text="Show"
    app:layout_constraintHorizontal_bias="0.509"
    app:layout_constraintStart_toEndOf="@+id/button5"
    app:layout_constraintTop_toBottomOf="@+id/button4" />
<ScrollView
    android:id="@+id/sc_view"
    android:layout_width="385dp"
    android:layout_height="410dp"
    android:layout_marginStart="8dp"
    android:layout_marginTop="8dp"
    android:layout_marginEnd="8dp"
    android:layout_marginBottom="8dp"
    android:background="#FFFFFF"
    android:visibility="gone"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintHorizontal_bias="0.0"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    app:layout_constraintVertical_bias="0.0">
    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="vertical">
        <LinearLayout
            android:layout_width="match_parent"
            android:layout_height="match_parent"
            android:layout_marginTop="5dp"
            android:layout_marginBottom="5dp"
            android:orientation="horizontal">
            <Button
                android:id="@+id/button7"
                android:layout_width="0dp"
                android:layout_height="wrap_content"
                android:layout_weight="0.5"
                android:onClick="onPrevious"
                android:text="Previous" />
            <Button
                android:id="@+id/button8"
                android:layout_width="0dp"
                android:layout_height="wrap_content"
                android:layout_weight="0.5"
                android:onClick="onNext"
                android:text="Next" />
        </LinearLayout>
        <TextView
            android:id="@+id/textView5"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_marginLeft="25dp"
            android:layout_marginRight="25dp"
            android:text="Roll Number"
            android:textSize="25sp" />
        <TextView
            android:id="@+id/tvRollNoView"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_marginLeft="25dp"
            android:layout_marginRight="25dp"
            android:textSize="35sp" />
    </LinearLayout>

```



### .XML Activity 1.3

```
<TextView
    android:id="@+id/textView7"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_marginLeft="25dp"
    android:layout_marginRight="25dp"
    android:text="Name"
    android:textSize="25sp" />

<TextView
    android:id="@+id/tvNameView"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_marginLeft="25dp"
    android:layout_marginRight="25dp"
    android:textSize="35sp" />

<TextView
    android:id="@+id/textView9"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_marginLeft="25dp"
    android:layout_marginRight="25dp"
    android:text="Marks"
    android:textSize="25sp" />

<TextView
    android:id="@+id/tvMarksView"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_marginLeft="25dp"
    android:layout_marginRight="25dp"
    android:textSize="35sp" />

<Button
    android:id="@+id/button9"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:onClick="onBack"
    android:text="Hide" />
</LinearLayout>
</ScrollView>
</androidx.constraintlayout.widget.ConstraintLayout>
```



## MainActivity.java 1.1

```
package com.example.lab14task1;

import androidx.appcompat.app.AppCompatActivity;

import android.content.ContentValues;
import android.content.Intent;
import android.database.Cursor;
import android.database.sqlite.SQLiteDatabase;
import android.os.Bundle;
import android.text.TextUtils;
import android.view.View;
import android.widget.EditText;
import android.widget.ScrollView;
import android.widget.TextView;
import android.widget.Toast;

import org.w3c.dom.Text;

import static android.os.Build.ID;

public class MainActivity extends AppCompatActivity {
    EditText etRollNo, etName, etMarks;
    ScrollView sc_View;
    TextView tvRollNumberView, tvNameView, tvMarksView;

    DBHelper helper;
    SQLiteDatabase db;
    Cursor c;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        helper = new DBHelper(this);

        etRollNo = (EditText) findViewById(R.id.etRoll);
        etName = (EditText) findViewById(R.id.etName);
        etMarks = (EditText) findViewById(R.id.etMarks);
        sc_View = (ScrollView) findViewById(R.id.sc_view);
        tvRollNumberView = (TextView) findViewById(R.id.tvRollNoView);
        tvNameView = (TextView) findViewById(R.id.tvNameView);
        tvMarksView = (TextView) findViewById(R.id.tvMarksView);

    }

    public void onAdd(View v){
        String strRollNumber = etRollNo.getText().toString();
        String strName = etName.getText().toString();
        String strMarks = etMarks.getText().toString();

        if(TextUtils.isEmpty(strRollNumber) || TextUtils.isEmpty(strName) || TextUtils.isEmpty(strMarks) ) {
            etRollNo.setError("Write Roll Number in Integers");
            etName.setError("Write your name correctly");
            etMarks.setError("Enter your marks correctly in Integers");

            return;
        }

        db = helper.getWritableDatabase();

        ContentValues values = new ContentValues();
        values.put("rollNumber", Integer.parseInt(etRollNo.getText().toString()));
        values.put("name", (etName.getText().toString()));
        values.put("marks", Integer.parseInt(etMarks.getText().toString()));

        db.insert("lab14task", null, values);
        Toast.makeText(this, "Record Added, Successfully", Toast.LENGTH_SHORT).show();

    }

    public void onUpdate(View v){

        if(TextUtils.isEmpty(etRollNo.getText().toString()) || TextUtils.isEmpty(etName.getText().toString()) ||
        TextUtils.isEmpty(etMarks.getText().toString()) ) {
            etRollNo.setError("Write Roll Number in Integers");
            etName.setError("Write your name correctly");
            etMarks.setError("Enter your marks correctly in Integers");

            return;
        }

        ContentValues cv = new ContentValues();
        cv.put("rollNumber", etRollNo.getText().toString());
        cv.put("name", etName.getText().toString());
        cv.put("marks", etMarks.getText().toString());
        String where = "rollNumber = " + etRollNo.getText().toString();
        String whereArgs[] = null;
        SQLiteDatabase db = helper.getWritableDatabase();
        db.update("lab14task", cv, where, whereArgs);
        Toast.makeText(this, "Data Updated, successfully", Toast.LENGTH_SHORT).show();

    }
}
```



## MainActivity.java 1.2

```
public void onDelete(View v){
    db= helper.getWritableDatabase();
    ContentValues cv = new ContentValues();
    cv.put("rollNumber", etRollNo.getText().toString());
    String where = "rollNumber = " + etRollNo.getText().toString();
    db.delete("lab14task", where, null);

    Toast.makeText(this, "Data Deleted, successfully", Toast.LENGTH_SHORT).show();
}

public void onView(View v){
    sc_View.setVisibility(View.VISIBLE);

    db = helper.getReadableDatabase();

    c = db.rawQuery("SELECT rollNumber, name, marks FROM lab14task",null);
    if(c == null){
        Toast.makeText(this, "Empty", Toast.LENGTH_SHORT).show();
    }else if(c.moveToFirst()){
        tvRollNumberView.setText(c.getString(0));
        tvNameView.setText(c.getString(1));
        tvNameView.setText(c.getString(2));
    }
}

public void onNext(View v){
    if(c == null){
        Toast.makeText(this, "Empty", Toast.LENGTH_SHORT).show();
    }else if(c.moveToNext()){
        tvRollNumberView.setText(c.getString(0));
        tvNameView.setText(c.getString(1));
        tvMarksView.setText(c.getString(2));
    }
}

public void onPrevious(View v){
    if(c.moveToPrevious()){
        tvRollNumberView.setText(c.getString(0));
        tvNameView.setText(c.getString(1));
        tvMarksView.setText(c.getString(2));
    }
}

public void onBack(View v){
    sc_View.setVisibility(View.GONE);
}
}
```



## DBHelper.java 1.1

```
package com.example.lab14task1;

import android.content.Context;
import android.database.sqlite.SQLiteDatabase;
import android.database.sqlite.SQLiteOpenHelper;

public class DBHelper extends SQLiteOpenHelper {
    private static String DBNAME = "StudentsDB.db";
    private static int DB_VERSION = 1;

    public DBHelper(Context context){
        super(context, DBNAME, null, DB_VERSION);
    }
    @Override
    public void onCreate(SQLiteDatabase db) {
        db.execSQL("CREATE TABLE lab14task(_id INTEGER PRIMARY KEY AUTOINCREMENT,
rollNumber INTEGER, name TEXT, marks INTEGER)");
    }
    @Override
    public void onUpgrade(SQLiteDatabase db, int oldVersion, int newVersion)
    {
        db.execSQL("DROP TABLE IF EXISTS lab14task");
        onCreate(db);
    }
}
```