## MainActivity.java

```
package com.example.cgpacalculator;

import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.LinearLayout;
import android.widget.TextView;
import android.widget.Toast;

import androidx.appcompat.app.AppCompatActivity;

import java.math.BigDecimal;
import java.math.RoundingMode;
import java.util.ArrayList;

public class MainActivity extends AppCompatActivity {

    private EditText etNumberOfSemesters;
    private Button btnCalculateCgpa, btnClear, vanish;
    private LinearLayout semesterContainer;
    private TextView tvResult;
    private final ArrayList<BigDecimal> cred = new ArrayList<>();
    private final ArrayList<BigDecimal> gradd = new ArrayList<>();
    private final ArrayList<LinearLayout> semesterLayouts = new ArrayList<>();
    private DatabaseHelper dbHelper;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        etNumberOfSemesters = findViewById(R.id.et_number_of_semesters);
        Button btnGenerateSemesters = findViewById(R.id.btn_generate_semesters);
        btnCalculateCgpa = findViewById(R.id.btn_calculate_cgpa);
        btnClear = findViewById(R.id.btn_clear);
        vanish = findViewById(R.id.btn_vanish);
        semesterContainer = findViewById(R.id.semester_container);
        tvResult = findViewById(R.id.tv_result);

        dbHelper = new DatabaseHelper(this);

        btnGenerateSemesters.setOnClickListener(view -> generateSemesters());

        vanish.setOnClickListener(view -> {
```

```
            gradd.clear();
            cred.clear();
            semesterLayouts.clear();
            semesterContainer.removeAllViews();
            dbHelper.clearData(); // Clear the database
            btnClear.setVisibility(View.INVISIBLE);
            btnCalculateCgpa.setVisibility(View.INVISIBLE);
            tvResult.setText("");
            Toast.makeText(this, "All data cleared", Toast.LENGTH_SHORT).show();
        });
        btnClear.setOnClickListener(view -> {
            gradd.clear();
            cred.clear();
            semesterLayouts.clear();
            semesterContainer.removeAllViews();
            btnClear.setVisibility(View.INVISIBLE);
            tvResult.setText("");
        });

        btnCalculateCgpa.setOnClickListener(view -> {
            try {
                calculateCgpa();
            } catch (Exception e) {
                Toast.makeText(this, e.getMessage(), Toast.LENGTH_SHORT).show();
            }
        });
    }

    private void generateSemesters() {
        gradd.clear();
        cred.clear();
        String numSemestersStr = etNumberOfSemesters.getText().toString().trim();
        if (numSemestersStr.isEmpty()) {
            Toast.makeText(this, "Please enter the number of semesters",
Toast.LENGTH_SHORT).show();
            return;
        }
        int numSemesters = Integer.parseInt(numSemestersStr);
        semesterContainer.removeAllViews();
        semesterLayouts.clear();

        for (int i = 0; i < numSemesters; i++) {
            LinearLayout semesterLayout = new LinearLayout(this);
            semesterLayout.setOrientation(LinearLayout.VERTICAL);
            semesterLayout.setPadding(0, 16, 0, 16);

            TextView semesterTitle = new TextView(this);
            semesterTitle.setText("Semester " + (i + 1));
```

```
            semesterTitle.setTextSize(18);
            semesterLayout.addView(semesterTitle);

            EditText etNumberOfSubjects = new EditText(this);
            etNumberOfSubjects.setHint("Enter number of subjects");

etNumberOfSubjects.setInputType(android.text.InputType.TYPE_CLASS_NUMBER);
            semesterLayout.addView(etNumberOfSubjects);

            Button btnGenerateSubjects = new Button(this);
            btnGenerateSubjects.setText("Generate Subjects");
            semesterLayout.addView(btnGenerateSubjects);

            LinearLayout subjectContainer = new LinearLayout(this);
            subjectContainer.setOrientation(LinearLayout.VERTICAL);
            semesterLayout.addView(subjectContainer);

            int finalI = i;
            btnGenerateSubjects.setOnClickListener(view ->
generateSubjects(etNumberOfSubjects, subjectContainer, finalI));

            semesterContainer.addView(semesterLayout);
            semesterLayouts.add(semesterLayout);
        }

        btnCalculateCgpa.setVisibility(View.VISIBLE);
        btnClear.setVisibility(View.VISIBLE);
        vanish.setVisibility(View.VISIBLE);
    }

    private void generateSubjects(EditText etNumberOfSubjects, LinearLayout
subjectContainer, int semesterIndex) {
        String numSubjectsStr = etNumberOfSubjects.getText().toString().trim();
        if (numSubjectsStr.isEmpty()) {
            Toast.makeText(this, "Enter the number of subjects",
Toast.LENGTH_SHORT).show();
            return;
        }

        int numSubjects = Integer.parseInt(numSubjectsStr);
        subjectContainer.removeAllViews();

        for (int j = 0; j < numSubjects; j++) {
            LinearLayout subjectRow = new LinearLayout(this);
            subjectRow.setOrientation(LinearLayout.HORIZONTAL);

            EditText etGradePoint = new EditText(this);
            etGradePoint.setHint("Grade Point " + (j + 1));
```

```
            etGradePoint.setInputType(android.text.InputType.TYPE_CLASS_NUMBER);
            subjectRow.addView(etGradePoint);

            EditText etCredit = new EditText(this);
            etCredit.setHint("Credit " + (j + 1));
            subjectRow.addView(etCredit);

            subjectContainer.addView(subjectRow);
        }

        Button btnCalculateSgpa = new Button(this);
        btnCalculateSgpa.setText("Calculate SGPA");
        subjectContainer.addView(btnCalculateSgpa);

        btnCalculateSgpa.setOnClickListener(view -> {
            try {
                calculateSgpa(subjectContainer, semesterIndex);
            } catch (Exception e) {
                Toast.makeText(this, "Error calculating SGPA: " + e.getMessage(),
Toast.LENGTH_SHORT).show();
            }
        });
    }

    private void calculateSgpa(LinearLayout subjectContainer, int semesterIndex) {
        BigDecimal sum = BigDecimal.ZERO;
        BigDecimal totalCredits = BigDecimal.ZERO;

        for (int i = 0; i < subjectContainer.getChildCount() - 1; i++) {
            LinearLayout subjectRow = (LinearLayout) subjectContainer.getChildAt(i);
            EditText etGradePoint = (EditText) subjectRow.getChildAt(0);
            EditText etCredit = (EditText) subjectRow.getChildAt(1);

            String gradePointStr = etGradePoint.getText().toString().trim();
            String creditStr = etCredit.getText().toString().trim();

            if (!gradePointStr.isEmpty() && !creditStr.isEmpty()) {
                try {
                    BigDecimal gradePoint = new BigDecimal(gradePointStr);
                    BigDecimal credit = new BigDecimal(creditStr);

                    cred.add(credit);
                    BigDecimal tc = gradePoint.multiply(credit);
                    sum = sum.add(tc);
                    gradd.add(tc);
                    totalCredits = totalCredits.add(credit);
                } catch (NumberFormatException e) {
```

```
                Toast.makeText(this, "Invalid input. Please enter valid numbers.",
Toast.LENGTH_SHORT).show();
                return;
            }
        }
    }

    if (totalCredits.compareTo(BigDecimal.ZERO) == 0) {
        Toast.makeText(this, "Total credits cannot be zero", Toast.LENGTH_SHORT).show();
        return;
    }

    BigDecimal sgpa = sum.divide(totalCredits, 2, RoundingMode.HALF_UP);

    dbHelper.addSemester("Semester " + (semesterIndex + 1), sgpa.doubleValue(),
totalCredits.doubleValue());

    TextView sgpaTextView = new TextView(this);
    sgpaTextView.setText("SGPA for Semester " + (semesterIndex + 1) + ": " +
sgpa.toPlainString());
    sgpaTextView.setTextSize(16);

    subjectContainer.addView(sgpaTextView);
  }

  private void calculateCgpa() {
    double cgpa = dbHelper.calculateCGPA();
    tvResult.setText("CGPA: " + BigDecimal.valueOf(cgpa).setScale(2,
RoundingMode.HALF_UP).toPlainString());
  }
}
```

## DatabaseHelper.java

```
package com.example.cgpacalculator;

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

public class DatabaseHelper extends SQLiteOpenHelper {

    private static final String DATABASE_NAME = "CGPA_Calculator.db";
    private static final int DATABASE_VERSION = 1;

    // Table and Columns
    private static final String TABLE_SEMESTERS = "semesters";
    private static final String COLUMN_ID = "id";
    private static final String COLUMN_SEMESTER = "semester";
    private static final String COLUMN_GRADE = "grade";
    private static final String COLUMN_CREDITS = "credits";

    public DatabaseHelper(Context context) {
        super(context, DATABASE_NAME, null, DATABASE_VERSION);
    }

    @Override
    public void onCreate(SQLiteDatabase db) {
        String CREATE_SEMESTERS_TABLE = "CREATE TABLE " + TABLE_SEMESTERS +
" (" + COLUMN_ID + " INTEGER PRIMARY KEY AUTOINCREMENT, " +
COLUMN_SEMESTER + " TEXT, " + COLUMN_GRADE + " REAL, " + COLUMN_CREDITS
+ " REAL)";
        db.execSQL(CREATE_SEMESTERS_TABLE);
    }

    @Override
    public void onUpgrade(SQLiteDatabase db, int oldVersion, int newVersion) {
        db.execSQL("DROP TABLE IF EXISTS " + TABLE_SEMESTERS);
        onCreate(db);
    }

    // Add Semester Data
    public void addSemester(String semester, double grade, double credits) {
        SQLiteDatabase db = this.getWritableDatabase();
        String query = "INSERT INTO " + TABLE_SEMESTERS + " (" + COLUMN_SEMESTER
+ ", " + COLUMN_GRADE + ", " + COLUMN_CREDITS + ") " + "VALUES ('" + semester + "',
" + grade + ", " + credits + ")";
        db.execSQL(query);
```

```
        db.close();
    }

    public void clearData() {
        SQLiteDatabase db = this.getWritableDatabase();
        db.execSQL("DELETE FROM semesters"); // Replace "semesters" with your table
name
        db.close();
    }

    // Calculate CGPA
    public double calculateCGPA() {
        SQLiteDatabase db = this.getReadableDatabase();
        String query = "SELECT SUM(" + COLUMN_GRADE + " * " + COLUMN_CREDITS + ")
/ SUM(" + COLUMN_CREDITS + ") AS CGPA FROM " + TABLE_SEMESTERS;
        Cursor cursor = db.rawQuery(query, null);
        double cgpa = 0.0;
        if (cursor.moveToFirst()) {
            cgpa = cursor.getDouble(cursor.getColumnIndex("CGPA"));
        }
        cursor.close();
        db.close();
        return cgpa;
    }
}
```

## activity_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<ScrollView xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="16dp">

    <LinearLayout
        android:orientation="vertical"
        android:layout_width="match_parent"
        android:layout_height="wrap_content">

        <EditText
            android:id="@+id/et_number_of_semesters"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:textSize="24sp"
            android:hint="Enter number of semesters"
            android:inputType="number" />

        <Button
            android:id="@+id/btn_generate_semesters"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:text="Generate Semesters" />

        <LinearLayout
            android:id="@+id/semester_container"
            android:orientation="vertical"
            android:layout_width="match_parent"
            android:layout_height="wrap_content" />

        <Button
            android:id="@+id/btn_calculate_cgpa"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:text="Calculate CGPA"
            android:visibility="gone" />

        <Button
            android:id="@+id/btn_clear"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:text="Clear"
            android:visibility="gone" />
```

```
        <TextView
            android:id="@+id/tv_result"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:textSize="18sp"
            android:paddingTop="16dp" />

        <Button
            android:id="@+id/btn_vanish"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:text="Vanish All Data"
            android:visibility="gone"/>

    </LinearLayout>
</ScrollView>
```