Mobile Application Development Lab Record - 2

Question 2: Demonstrate setOnClickListener() method

- AndroidManifest.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.android_lab.onclicklistener">

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/AppTheme">
        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
    </application>

</manifest>
```

- android_main.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout 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"
    android:orientation="vertical">

    <Button
        android:id="@+id/button"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Click Me" />

</LinearLayout>
```

- MainActivity.java

```java
package com.android_lab.onclicklistener;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.Toast;

public class MainActivity extends AppCompatActivity {

    private Button button;

    @Override
```

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

        button = findViewById(R.id.button);
        button.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                Toast.makeText(getApplicationContext(), "OnClickListener(): Button Clicked!",
Toast.LENGTH_LONG).show();
            }
        });
    }
}
```

Question 7: Create a Progress Bar

- AndroidManifest.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.android_lab.progress_bar">

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/AppTheme">
        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
```

```
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
    </application>

</manifest>
```

- activity_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout 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"
    android:orientation="vertical"
    android:layout_gravity="center_vertical">


    <Button
        android:id="@+id/button"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Download File" />

</LinearLayout>
```

- MainActivity.java

```java
package com.android_lab.progress_bar;

import androidx.appcompat.app.AppCompatActivity;

import android.app.ProgressDialog;
import android.os.Bundle;
import android.os.Handler;
import android.view.View;
import android.widget.Button;
import android.widget.ProgressBar;

public class MainActivity extends AppCompatActivity implements View.OnClickListener {

    private Button button;
    private Handler progressBarHandler = new Handler();
    ProgressDialog progressBar;
    int progressBarStatus = 0;

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

        button = findViewById(R.id.button);
        button.setOnClickListener(this);
    }

    @Override
    public void onClick(View view) {
        progressBar = new ProgressDialog(this);
        progressBar.setIndeterminate(false);
        progressBar.setTitle("Downloading File");
        progressBar.setProgressStyle(ProgressDialog.STYLE_HORIZONTAL);
        progressBar.setCanceledOnTouchOutside(false);
        progressBar.setCancelable(false);
```

```java
            progressBar.setMax(100);
            progressBar.setProgress(0);
            progressBar.show();

            downloadFile();
        }

        private void downloadFile() {
            // This function doesn't download a file, it just updates progress bar
            progressBarStatus = 0;

            new Thread(new Runnable() {
                @Override
                public void run() {
                    while (getProgressStatus() < 100) {
                        progressBarHandler.post(new Runnable() {
                            @Override
                            public void run() {
                                progressBar.setProgress(updateProgressStatus());
                            }
                        });

                        try {
                            Thread.sleep(100);
                        } catch (InterruptedException e) {
                            e.printStackTrace();
                        }
                    }

                    progressBar.dismiss();
                }
            }).start();
        }

        public int getProgressStatus() {
            return progressBarStatus;
```

```
        }

        public int updateProgressStatus() {
            return ++progressBarStatus;
        }
    }
```

Question 8: Demonstrate Notifications in Android. Create and show a Simple Notification and another Notification when tapped open the Dialer

- AndroidManifest.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.android_lab.notifications">

    <application
        android:name=".AppDelegate"
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/AppTheme">
        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
    </application>

</manifest>
```

- activity_main.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout 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"
    android:orientation="vertical">

    <EditText
        android:id="@+id/title"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Title" />

    <EditText
        android:id="@+id/message"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Message" />

    <Button
        android:id="@+id/show_notification"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Show Notification" />

    <EditText
        android:id="@+id/phone_no"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
```

```xml
            android:hint="Phone Number"
            android:inputType="phone" />

        <Button
            android:id="@+id/show_missed_notification"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:text="Show Missed Call Notification" />

    </LinearLayout>
```

- AppDelegate.java

```java
    package com.android_lab.notifications;

    import android.app.Application;
    import android.app.NotificationChannel;
    import android.app.NotificationManager;
    import android.os.Build;

    public class AppDelegate extends Application {

        final static String CHANNEL_ID_1 = "messages";
        final static String CHANNEL_ID_2 = "missed_calls";

        @Override
        public void onCreate() {
            super.onCreate();

            createNotificationChannels();
        }

        private void createNotificationChannels() {
            if(Build.VERSION.SDK_INT >= Build.VERSION_CODES.O) {
```

```java
            NotificationChannel channel_1 = new NotificationChannel(CHANNEL_ID_1,
                    "Messages",
                    NotificationManager.IMPORTANCE_HIGH
            );

            NotificationChannel channel_2 = new NotificationChannel(CHANNEL_ID_2,
                    "Missed calls",
                    NotificationManager.IMPORTANCE_HIGH
            );

            NotificationManager notificationManager = getSystemService(NotificationManager.class);
            notificationManager.createNotificationChannel(channel_1);
            notificationManager.createNotificationChannel(channel_2);
        }
    }
}
```

- MainActivity.java

```java
package com.android_lab.notifications;

import androidx.appcompat.app.AppCompatActivity;
import androidx.core.app.NotificationCompat;
import androidx.core.app.NotificationManagerCompat;

import android.app.PendingIntent;
import android.content.Intent;
import android.net.Uri;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;

public class MainActivity extends AppCompatActivity implements View.OnClickListener {
```

```java
    private EditText title, message, phone_no;
    private Button showNotification, showMissedNotification;

    private final static int notification_id = 1;

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

        title = findViewById(R.id.title);
        message = findViewById(R.id.message);
        phone_no = findViewById(R.id.phone_no);

        showNotification = findViewById(R.id.show_notification);
        showNotification.setOnClickListener(this);
        showMissedNotification = findViewById(R.id.show_missed_notification);
        showMissedNotification.setOnClickListener(this);
    }

    @Override
    public void onClick(View view) {
        NotificationManagerCompat notificationManager = NotificationManagerCompat.from(this);
        NotificationCompat.Builder notificationBuilder = new NotificationCompat.Builder(this,
AppDelegate.CHANNEL_ID_1)
                .setSmallIcon(R.drawable.ic_launcher_foreground)
                .setAutoCancel(true);

        switch (view.getId()) {
            case R.id.show_notification:
                String t = title.getText().toString();
                String m = message.getText().toString();

                notificationBuilder.setContentTitle(t)
                        .setContentText(m);
```

```
                break;

            case R.id.show_missed_notification:
                String phone = phone_no.getText().toString();

                Intent intent = new Intent(Intent.ACTION_DIAL);
                intent.setData(Uri.parse("tel:" + phone));
                PendingIntent pendingIntent = PendingIntent.getActivity(this, 0, intent, 0);

                notificationBuilder.setContentTitle("Missed Call")
                        .setContentText("You have a missed call from " + phone)
                        .setContentIntent(pendingIntent);
                break;
        }

        notificationManager.notify(notification_id, notificationBuilder.build());
    }
}
```

Question 9: Create an application to make insert, update, delete and retrieve operations on database

- AndroidManifest.xml

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.android_lab.sqlitedemo">

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/AppTheme">
```

```xml
        <activity android:name=".DetailActivity" android:parentActivityName=".MainActivity"/>
        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
    </application>

</manifest>
```

- activity_main.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout 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"
    android:orientation="vertical">

    <androidx.appcompat.widget.Toolbar
        android:id="@+id/toolbar"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:background="@color/colorPrimary"
        android:theme="@style/ToolbarTheme"
        app:titleTextColor="@android:color/white">

        <ImageButton
            android:id="@+id/add"
            android:layout_width="wrap_content"
```

```xml
                android:layout_height="match_parent"
                android:layout_gravity="right"
                android:layout_marginEnd="20dp"
                android:background="@android:color/transparent"
                android:src="@drawable/ic_add_white_24dp" />

            <ImageButton
                android:id="@+id/reload"
                android:layout_width="wrap_content"
                android:layout_height="match_parent"
                android:layout_gravity="right"
                android:layout_marginEnd="20dp"
                android:background="@android:color/transparent"
                android:src="@drawable/ic_refresh_white_24dp" />

        </androidx.appcompat.widget.Toolbar>

        <androidx.recyclerview.widget.RecyclerView
            android:id="@+id/recyclerView"
            android:layout_width="match_parent"
            android:layout_height="match_parent" />

    </LinearLayout>
```

- activity_detail.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout 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=".DetailActivity"
    android:orientation="vertical" >
```

```xml
<androidx.appcompat.widget.Toolbar
    android:id="@+id/toolbar"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:background="@color/colorPrimary"
    android:theme="@style/ToolbarTheme"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent"
    app:titleTextColor="@android:color/white">

    <ImageButton
        android:id="@+id/done"
        android:layout_width="wrap_content"
        android:layout_height="match_parent"
        android:layout_gravity="right"
        android:layout_marginEnd="20dp"
        android:background="@android:color/transparent"
        android:src="@drawable/button_background" />

    <ImageButton
        android:id="@+id/delete"
        android:layout_width="wrap_content"
        android:layout_height="match_parent"
        android:layout_gravity="right"
        android:layout_marginEnd="20dp"
        android:background="@android:color/transparent"
        android:src="@drawable/ic_delete_white_24dp"
        android:visibility="gone" />

</androidx.appcompat.widget.Toolbar>

<EditText
    android:id="@+id/name"
    android:layout_width="match_parent"
```

```
        android:layout_height="wrap_content"
        android:ems="10"
        android:hint="Name"
        android:inputType="textPersonName" />

    <EditText
        android:id="@+id/roll_no"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:ems="10"
        android:hint="Roll No"
        android:inputType="textPersonName" />

    <EditText
        android:id="@+id/age"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:ems="10"
        android:hint="Age"
        android:inputType="number" />

</LinearLayout>
```

- cell_layout.xml

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout 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="wrap_content"
    android:orientation="vertical">

    <TextView
```

```xml
        android:id="@+id/title"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginStart="16dp"
        android:layout_marginTop="8dp"
        android:layout_marginEnd="16dp"
        android:text="Title"
        android:textColor="@android:color/black"
        android:textSize="18sp" />

    <TextView
        android:id="@+id/subtitle"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginStart="16dp"
        android:layout_marginTop="4dp"
        android:layout_marginEnd="16dp"
        android:layout_marginBottom="8dp"
        android:text="Subtitle"
        android:textColor="@android:color/black"/>

</LinearLayout>
```

- MainActivity.java

```java
package com.android_lab.sqlitedemo;

import android.content.Intent;
import android.os.Bundle;
import android.view.View;
import android.widget.ImageButton;
import android.widget.Toast;

import androidx.appcompat.app.AppCompatActivity;
```

```java
import androidx.appcompat.widget.Toolbar;
import androidx.recyclerview.widget.DividerItemDecoration;
import androidx.recyclerview.widget.LinearLayoutManager;
import androidx.recyclerview.widget.RecyclerView;

import java.util.ArrayList;

public class MainActivity extends AppCompatActivity implements View.OnClickListener,
StudentAdapter.OnClicklistener {

    private Toolbar toolbar;
    private ImageButton add, reload;

    private RecyclerView recyclerView;
    private StudentAdapter mAdapter;
    private RecyclerView.LayoutManager layoutManager;

    private ArrayList<Student> students;
    private StudentDbHelper dbHelper;

    public static String STUDENT_ID = "MainActivity.Student";

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

        setupToolbar();
        setupRecyclerView();
    }

    @Override
    protected void onStart() {
        super.onStart();

        dbHelper = new StudentDbHelper(this);
```

```java
        reloadData();
    }

    @Override
    protected void onDestroy() {
        dbHelper.close();
        super.onDestroy();
    }

    private void setupToolbar() {
        toolbar = findViewById(R.id.toolbar);
        setSupportActionBar(toolbar);

        add = findViewById(R.id.add);
        add.setOnClickListener(this);
        reload = findViewById(R.id.reload);
        reload.setOnClickListener(this);
    }

    private void setupRecyclerView() {
        recyclerView = findViewById(R.id.recyclerView);

        recyclerView.setHasFixedSize(true);

        layoutManager = new LinearLayoutManager(this);
        recyclerView.setLayoutManager(layoutManager);

        mAdapter = new StudentAdapter(students, this);
        recyclerView.setAdapter(mAdapter);

        recyclerView.addItemDecoration(new DividerItemDecoration(recyclerView.getContext(),
DividerItemDecoration.VERTICAL));
    }

    private void reloadData() {
        students = dbHelper.getAll();
```

```java
            mAdapter.update(students);
            Toast.makeText(this, "Data Loaded", Toast.LENGTH_SHORT).show();
        }

        @Override
        public void onClick(View view) {
            switch (view.getId()) {
                case R.id.add:
                    startActivity(new Intent(this, DetailActivity.class));
                    break;
                case R.id.reload:
                    Toast.makeText(this, "Reloading Data", Toast.LENGTH_SHORT).show();
                    reloadData();
                    break;
            }
        }

        @Override
        public void onClick(int position) {
            Intent intent = new Intent(this, DetailActivity.class);
            intent.putExtra(STUDENT_ID, students.get(position));
            startActivity(intent);
        }
    }
```

- DetailActivity.java

```java
package com.android_lab.sqlitedemo;

import android.content.Intent;
import android.os.Bundle;
import android.text.Editable;
import android.text.TextWatcher;
import android.view.View;
```

```java
import android.widget.EditText;
import android.widget.ImageButton;
import android.widget.Toast;

import androidx.appcompat.app.AppCompatActivity;
import androidx.appcompat.widget.Toolbar;

public class DetailActivity extends AppCompatActivity implements View.OnClickListener, TextWatcher {

    private Toolbar toolbar;
    private ImageButton done, delete;

    private EditText name, rollNo, age;

    private Student student;
    private StudentDbHelper dbHelper;

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

        dbHelper = new StudentDbHelper(this);

        setupToolbar();
        initializeForm();
        setupForm();
    }

    @Override
    protected void onDestroy() {
        dbHelper.close();
        super.onDestroy();
    }

    private void setupToolbar() {
```

```java
        toolbar = findViewById(R.id.toolbar);
        setSupportActionBar(toolbar);
        getSupportActionBar().setDisplayHomeAsUpEnabled(true);
        getSupportActionBar().setDisplayShowHomeEnabled(true);

        done = findViewById(R.id.done);
        done.setOnClickListener(this);
        delete = findViewById(R.id.delete);
        delete.setOnClickListener(this);
    }

    private void initializeForm() {
        name = findViewById(R.id.name);
        rollNo = findViewById(R.id.roll_no);
        age = findViewById(R.id.age);
    }

    private void setupForm() {
        Intent intent = getIntent();
        if(intent.hasExtra(MainActivity.STUDENT_ID)) {
            student = (Student) intent.getSerializableExtra(MainActivity.STUDENT_ID);

            setTitle(student.name + " Details");
            delete.setVisibility(View.VISIBLE);

            name.setText(student.name);
            rollNo.setText(student.rollNo);
            age.setText(String.valueOf(student.age));
        } else {
            student = null;

            setTitle("New Student");
            done.setEnabled(false);
        }

        name.addTextChangedListener(this);
```

```java
        rollNo.addTextChangedListener(this);
        age.addTextChangedListener(this);
    }

    private Student getUpdatedObject() {
        if(student == null)
            return new Student(
                    name.getText().toString(),
                    rollNo.getText().toString(),
                    Integer.parseInt(age.getText().toString()));

        student.name = name.getText().toString();
        student.rollNo = rollNo.getText().toString();
        student.age = Integer.parseInt(age.getText().toString());

        return student;
    }

    private void update(Student student) {
        if(this.student == null) {
            dbHelper.insert(student);
            Toast.makeText(this, "Inserted New Record", Toast.LENGTH_SHORT).show();
        } else {
            dbHelper.update(student);
            Toast.makeText(this, "Updated Record", Toast.LENGTH_SHORT).show();
        }
    }

    @Override
    public void onClick(View view) {
        switch (view.getId()) {
            case R.id.done:
                update(getUpdatedObject());
                finish();
                break;
            case R.id.delete:
```

```
                dbHelper.delete(student);
                Toast.makeText(this, "Deleted Record", Toast.LENGTH_SHORT).show();
                finish();
                break;
        }
    }

    @Override
    public void beforeTextChanged(CharSequence charSequence, int i, int i1, int i2) {}

    @Override
    public void onTextChanged(CharSequence charSequence, int i, int i1, int i2) {}

    @Override
    public void afterTextChanged(Editable editable) {
        done.setEnabled(
                name.getText().toString().length() > 0 &&
                rollNo.getText().toString().length() > 0 &&
                age.getText().toString().length() > 0
        );
    }
}
```

- Student.java

```
package com.android_lab.sqlitedemo;

import java.io.Serializable;

public class Student implements Serializable {
    long _ID;
    String name;
    String rollNo;
    int age;
```

```java
    public Student(String name, String rollNo, int age) {
        this.name = name;
        this.rollNo = rollNo;
        this.age = age;
    }
}
```

- StudentAdapter.java

```java
package com.android_lab.sqlitedemo;

import android.view.LayoutInflater;
import android.view.View;
import android.view.ViewGroup;
import android.widget.TextView;

import androidx.annotation.NonNull;
import androidx.recyclerview.widget.RecyclerView;

import java.util.ArrayList;

class StudentAdapter extends RecyclerView.Adapter<StudentAdapter.StudentViewHolder> {

    private ArrayList<Student> dataset;
    private String[] courses;

    private OnClicklistener mListener;

    public interface OnClicklistener {
        public void onClick(int position);
    }

    public static class StudentViewHolder extends RecyclerView.ViewHolder {
```

```java
        TextView title, subtitle;

        public StudentViewHolder(View v, final OnClicklistener mListener) {
            super(v);
            title = v.findViewById(R.id.title);
            subtitle = v.findViewById(R.id.subtitle);

            v.setOnClickListener(new View.OnClickListener() {
                @Override
                public void onClick(View view) {
                    mListener.onClick(getAdapterPosition());
                }
            });
        }
    }

    public StudentAdapter(ArrayList<Student> dataset, OnClicklistener mListener) {
        this.dataset = dataset;
        this.mListener = mListener;
    }

    @NonNull
    @Override
    public StudentViewHolder onCreateViewHolder(@NonNull ViewGroup parent, int viewType) {
        View v = LayoutInflater.from(parent.getContext())
                .inflate(R.layout.cell_layout, parent, false);

        StudentViewHolder vh = new StudentViewHolder(v, mListener);
        return vh;
    }

    @Override
    public void onBindViewHolder(@NonNull StudentViewHolder holder, int position) {
        Student student = dataset.get(position);
        holder.title.setText(student.name);
        holder.subtitle.setText(student.rollNo);
```

```java
        }

        @Override
        public int getItemCount() {
            return dataset.size();
        }

        public void update(ArrayList<Student> dataset) {
            this.dataset = dataset;
            this.notifyDataSetChanged();
        }

    }
```

- StudentContract.java

```java
package com.android_lab.sqlitedemo;

import android.provider.BaseColumns;

public class StudentContract {

    private StudentContract() {}

    public static class StudentEntry implements BaseColumns  {
        public static final String TABLE_NAME = "students";
        public static final String NAME = "name";
        public static final String ROLL_NO = "roll_no";
        public static final String AGE = "age";
    }
}
```

- StudentDbHelper.java

```java
package com.android_lab.sqlitedemo;

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 StudentDbHelper extends SQLiteOpenHelper {

    public static final int DATABASE_VERSION = 1;
    public static final String DATABASE_NAME = "StudentDB.db";

    private static final String SQL_CREATE_ENTRIES =
            "CREATE TABLE " + StudentContract.StudentEntry.TABLE_NAME + " (" +
                    StudentContract.StudentEntry._ID + " INTEGER PRIMARY KEY, " +
                    StudentContract.StudentEntry.NAME + " TEXT, " +
                    StudentContract.StudentEntry.ROLL_NO + " TEXT, " +
                    StudentContract.StudentEntry.AGE + " INTEGER)";

    private static final String SQL_DELETE_ENTRIES =
            "DROP TABLE IF EXISTS " + StudentContract.StudentEntry.TABLE_NAME;

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

    @Override
    public void onCreate(SQLiteDatabase db) {
        db.execSQL(SQL_CREATE_ENTRIES);
    }
```

```java
@Override
public void onUpgrade(SQLiteDatabase db, int i, int i1) {
    db.execSQL(SQL_DELETE_ENTRIES);
    onCreate(db);
}

private ContentValues getContentValues(Student student) {
    ContentValues values = new ContentValues();
    values.put(StudentContract.StudentEntry.NAME, student.name);
    values.put(StudentContract.StudentEntry.ROLL_NO, student.rollNo);
    values.put(StudentContract.StudentEntry.AGE, student.age);
    return values;
}

public long insert(Student student) {
    SQLiteDatabase db = getWritableDatabase();

    return db.insert(StudentContract.StudentEntry.TABLE_NAME, null, getContentValues(student));
}

public ArrayList<Student> getAll() {
    SQLiteDatabase db = getReadableDatabase();

    Cursor cursor = db.query(
            StudentContract.StudentEntry.TABLE_NAME,
            null, null,null,null,null,null
    );

    ArrayList<Student> students = new ArrayList<>();

    while(cursor.moveToNext()) {
        Student student = new Student(
                cursor.getString(cursor.getColumnIndexOrThrow(StudentContract.StudentEntry.NAME)),
                cursor.getString(cursor.getColumnIndexOrThrow(StudentContract.StudentEntry.ROLL_NO)),
                cursor.getInt(cursor.getColumnIndexOrThrow(StudentContract.StudentEntry.AGE))
```

```java
                    );
                    student._ID = cursor.getLong(cursor.getColumnIndexOrThrow(StudentContract.StudentEntry._ID));
                    students.add(student);
                }
                cursor.close();

                return students;
            }

            public int update(Student student) {
                SQLiteDatabase db = getWritableDatabase();

                ContentValues values = getContentValues(student);
                String selection = StudentContract.StudentEntry._ID + " = ?";
                String selectionArgs[] = { String.valueOf(student._ID) };

                return db.update(
                        StudentContract.StudentEntry.TABLE_NAME,
                        values,
                        selection,
                        selectionArgs
                );

            }

            public int delete(long id) {
                SQLiteDatabase db = getReadableDatabase();

                String selection = StudentContract.StudentEntry._ID + " = ?";
                String selectionArgs[] = { String.valueOf(id) };

                return db.delete(
                        StudentContract.StudentEntry.TABLE_NAME,
                        selection,
                        selectionArgs
                );
```

```
        }

        public int delete(Student student) {
            return delete(student._ID);
        }
    }
```

Question 10: Develop an application to display images using gallery view and display it on screen;

- AndroidManifest.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.android_lab.gallery">

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/AppTheme">
        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
    </application>

</manifest>
```

- activity_main.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout 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"
    android:orientation="vertical">

    <ImageView
        android:id="@+id/imageView"
        android:layout_width="match_parent"
        android:layout_height="420dp" />

    <TextView
        android:id="@+id/textView"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:textAlignment="center"/>

    <Gallery
        android:id="@+id/gallery"
        android:layout_width="match_parent"
        android:layout_height="100dp"
        android:spacing="20dp" />

</LinearLayout>
```
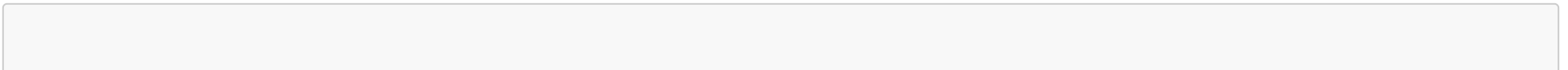
- MainActivity.java

```java
package com.android_lab.gallery;

import androidx.appcompat.app.AppCompatActivity;

import android.content.res.Resources;
import android.os.Bundle;
import android.text.Layout;
import android.view.View;
import android.view.ViewGroup;
import android.widget.AdapterView;
import android.widget.Gallery;
import android.widget.ImageView;
import android.widget.TextView;

public class MainActivity extends AppCompatActivity implements AdapterView.OnItemClickListener {

    private int dataset[] = {R.drawable.elon_musk, R.drawable.bill_gates, R.drawable.rdj,
            R.drawable.roadster, R.drawable.model_s, R.drawable.falcon_9, R.drawable.starship};

    private ImageView imageView;
    private TextView textView;
    private Gallery gallery;

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

        imageView = findViewById(R.id.imageView);
        textView = findViewById(R.id.textView);

        gallery = findViewById(R.id.gallery);
        gallery.setAdapter(new MyAdapter(this, dataset));
        gallery.setOnItemClickListener(this);
    }
```

```
        @Override
        public void onItemClick(AdapterView<?> adapterView, View view, int i, long l) {
            imageView.setImageResource(dataset[i]);
            textView.setText(getResources().getResourceEntryName(dataset[i]));
        }
    }
```

- MyAdapter.java

```
package com.android_lab.gallery;

import android.content.Context;
import android.view.View;
import android.view.ViewGroup;
import android.widget.BaseAdapter;
import android.widget.Gallery;
import android.widget.ImageView;

public class MyAdapter extends BaseAdapter {

    private final Context context;
    private int dataset[];

    public MyAdapter(Context context, int dataset[]) {
        this.context = context;
        this.dataset = dataset;
    }

    @Override
    public int getCount() {
        return dataset.length;
    }
```

```
        @Override
        public Object getItem(int i) {
            return i;
        }

        @Override
        public long getItemId(int i) {
            return i;
        }

        @Override
        public View getView(int i, View view, ViewGroup viewGroup) {
            ImageView imageView = new ImageView(context);
            imageView.setImageResource(dataset[i]);
            imageView.setLayoutParams(new Gallery.LayoutParams(400, 400));
            imageView.setScaleType(ImageView.ScaleType.FIT_CENTER);
            return imageView;
        }
    }
}
```

Question 11: Demonstrate the use of shared preferences object by developing an application

- AndroidManifest.xml

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.android_lab.shared_prefs">

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
```

```xml
            android:theme="@style/AppTheme">
        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
    </application>

</manifest>
```

- activity_main.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout 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"
    android:orientation="vertical">

    <EditText
        android:id="@+id/name"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Name" />

    <EditText
        android:id="@+id/roll_no"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Roll No" />
```

```xml
    <Button
        android:id="@+id/save"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Save Preferences"
        android:onClick="save"/>

    <Button
        android:id="@+id/retrive"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Retrieve Preferences"
        android:onClick="retrieve" />

    <Button
        android:id="@+id/clear"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Clear Preferences"
        android:onClick="clear" />

</LinearLayout>
```

- MainActivity.java

```java
package com.android_lab.shared_prefs;

import androidx.appcompat.app.AppCompatActivity;

import android.content.Context;
import android.content.SharedPreferences;
import android.os.Bundle;
import android.view.View;
```

```java
import android.widget.EditText;
import android.widget.Toast;

public class MainActivity extends AppCompatActivity {

    private EditText name, rollNo;

    public static final String USER_PREF = "USER_PREF" ;
    public static final String NAME_KEY = "NAME";
    public static final String ROLLNO_KEY = "ROLLNO";

    private SharedPreferences sharedPreferences;

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

        name = findViewById(R.id.name);
        rollNo = findViewById(R.id.roll_no);

        sharedPreferences = getSharedPreferences(USER_PREF, Context.MODE_PRIVATE);
    }

    public void save(View view) {
        String n = name.getText().toString();
        String r = rollNo.getText().toString();

        SharedPreferences.Editor editor = sharedPreferences.edit();
        editor.putString(NAME_KEY, n);
        editor.putString(ROLLNO_KEY, r);
        editor.commit();

        Toast.makeText(this, "Saved Shared Preferences", Toast.LENGTH_LONG).show();
    }
```

```java
    public void retrieve(View view) {
        if(sharedPreferences.contains(NAME_KEY))
            name.setText(sharedPreferences.getString(NAME_KEY,""));

        if(sharedPreferences.contains(ROLLNO_KEY))
            rollNo.setText((sharedPreferences.getString(ROLLNO_KEY, "")));

        Toast.makeText(this, "Retrieved Shared Preferences", Toast.LENGTH_LONG).show();
    }

    public void clear(View view) {
        name.setText("");
        rollNo.setText("");

        SharedPreferences.Editor editor = sharedPreferences.edit();
        editor.clear();
        editor.commit();

        Toast.makeText(this, "Cleared Shared Preferences", Toast.LENGTH_LONG).show();
    }
}
```