Exercise 1 - Designing Health Insurance Form using GUI Components

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205001100

CSE-B

Aim

Generate a Health Insurance registration form to register the patient details under each group.

Patient Details - Title, Patient Name, Patient Phone Number (Mobile or Landline use Checkbox), Address, Age, DOB, Gender, Marital Status

Employer Details - Patient Employer, Employment Status (full time, parttime, unemployed, retired, student, other Checkbox)

Emergency contact Details - Name, Relationship, Address, Phone Number

Use Submit (Button) to submit the details and display the contents. Use the Reset button to clear the form. Display using Table layout.

Code

activity_main.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<ScrollView 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">

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:layout_marginLeft="16dp"
        android:layout_marginRight="16dp"
        android:layout_marginBottom="8dp"
        android:orientation="vertical"
        tools:context=".MainActivity">

        <TextView
            android:id="@+id/titleTextView"
            android:layout_width="match_parent"
```

```xml
        android:layout_height="128dp"
        android:gravity="center"
        android:text="Health Insurance Registration"
        android:textSize="32sp"
        android:textStyle="bold"
        android:typeface="serif" >

    <TextView
        android:id="@+id/title"
        android:layout_width="match_parent"
        android:layout_height="32dp"
        android:gravity="left"
        android:text="Patient Details"
        android:textSize="22sp"
        android:textStyle="bold"
        android:typeface="serif" >

    <TextView
        android:id="@+id/name"
        android:layout_width="match_parent"
        android:layout_height="26dp"
        android:layout_marginTop="16dp"
        android:gravity="left"
        android:text="Name"
        android:textSize="18sp"
        android:textStyle="bold"
        android:typeface="normal" >

    <EditText
        android:id="@+id/editName"
        android:layout_width="match_parent"
        android:layout_height="54dp"
        android:hint="Name:"
        android:inputType="text"
        android:textColor="#0000FF"
        android:typeface="sans" >

    <TextView
        android:id="@+id/number"
        android:layout_width="match_parent"
        android:layout_height="26dp"
        android:layout_marginTop="16dp"
```

```xml
        android:gravity="left"
        android:text="Number"
        android:textSize="18sp"
        android:textStyle="bold"
        android:typeface="normal" >

<RadioGroup
        android:id="@+id/radio_group_id"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="4dp">

        <RadioButton
            android:id="@+id/phone_radio_button_id"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="Phone" >

        <RadioButton
            android:id="@+id/landline_radio_button_id"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="Landline" >
/RadioGroup>

<EditText
        android:id="@+id/editNumber"
        android:layout_width="match_parent"
        android:layout_height="54dp"
        android:hint="Number:"
        android:inputType="phone" >

<TextView
        android:id="@+id/address"
        android:layout_width="match_parent"
        android:layout_height="26dp"
        android:layout_marginTop="16dp"
        android:gravity="left"
        android:text="Address"
        android:textSize="18sp"
        android:textStyle="bold"
        android:typeface="normal" >
```

```xml
<EditText
    android:id="@+id/editAddress"
    android:layout_width="match_parent"
    android:layout_height="54dp"
    android:hint="Address:"
    android:inputType="text"
    android:textColor="#0000FF"
    android:typeface="sans" >

<TextView
    android:id="@+id/age"
    android:layout_width="match_parent"
    android:layout_height="26dp"
    android:layout_marginTop="16dp"
    android:gravity="left"
    android:text="Age"
    android:textSize="18sp"
    android:textStyle="bold"
    android:typeface="normal" >

<EditText
    android:id="@+id/editAge"
    android:layout_width="match_parent"
    android:layout_height="54dp"
    android:hint="Age:"
    android:inputType="number"
    android:textColor="#0000FF"
    android:typeface="sans" >

<TextView
    android:id="@+id/dob"
    android:layout_width="match_parent"
    android:layout_height="26dp"
    android:layout_marginTop="16dp"
    android:gravity="left"
    android:text="DOB"
    android:textSize="18sp"
    android:textStyle="bold"
    android:typeface="normal" >

<DatePicker
```

```xml
        android:id="@+id/dobPicker"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:gravity="center" >

    <TextView
        android:id="@+id/gender"
        android:layout_width="match_parent"
        android:layout_height="26dp"
        android:layout_marginTop="16dp"
        android:gravity="left"
        android:text="Gender"
        android:textSize="18sp"
        android:textStyle="bold"
        android:typeface="normal" >

    <RadioGroup
        android:id="@+id/gender_group"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="4dp">

        <RadioButton
            android:id="@+id/male"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="Male" >

        <RadioButton
            android:id="@+id/female"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="Female" >
    /RadioGroup>
    <TextView
        android:id="@+id/marital_status"
        android:layout_width="match_parent"
        android:layout_height="26dp"
        android:layout_marginTop="16dp"
        android:gravity="left"
        android:text="Marital Status"
        android:textSize="18sp"
```

```
        android:textStyle="bold"
        android:typeface="normal" >

<Spinner
        android:id="@+id/marital_status_spinner"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:entries="@array/marital_status_options" >

<TextView
        android:id="@+id/employer"
        android:layout_width="match_parent"
        android:layout_height="32dp"
        android:layout_marginTop="48dp"
        android:gravity="left"
        android:text="Employer Details"
        android:textSize="22sp"
        android:textStyle="bold"
        android:typeface="serif" >

<TextView
        android:id="@+id/employer_name"
        android:layout_width="match_parent"
        android:layout_height="26dp"
        android:layout_marginTop="16dp"
        android:gravity="left"
        android:text="Employer Name"
        android:textSize="18sp"
        android:textStyle="bold"
        android:typeface="normal" >

<EditText
        android:id="@+id/editEmployerName"
        android:layout_width="match_parent"
        android:layout_height="54dp"
        android:hint="Employer Name:"
        android:inputType="text"
        android:textColor="#0000FF"
        android:typeface="sans" >

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

```xml
        android:layout_width="match_parent"
        android:layout_height="26dp"
        android:layout_marginTop="16dp"
        android:gravity="left"
        android:text="Employment Status"
        android:textSize="18sp"
        android:textStyle="bold"
        android:typeface="normal" >

<Spinner
        android:id="@+id/employment_status_spinner"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:entries="@array/employment_status_options" >

<TextView
        android:id="@+id/emergency"
        android:layout_width="match_parent"
        android:layout_height="32dp"
        android:layout_marginTop="48dp"
        android:gravity="left"
        android:text="Emergency Details"
        android:textSize="22sp"
        android:textStyle="bold"
        android:typeface="serif" >

<TextView
        android:id="@+id/emergency_name"
        android:layout_width="match_parent"
        android:layout_height="26dp"
        android:layout_marginTop="16dp"
        android:gravity="left"
        android:text="Emergency Contact Name"
        android:textSize="18sp"
        android:textStyle="bold"
        android:typeface="normal" >

<EditText
        android:id="@+id/edit_emergency_name"
        android:layout_width="match_parent"
        android:layout_height="54dp"
        android:hint="Employer Contact Name:"
```

```xml
        android:inputType="text"
        android:textColor="#0000FF"
        android:typeface="sans" >

<TextView
        android:id="@+id/emergency_relationship"
        android:layout_width="match_parent"
        android:layout_height="26dp"
        android:layout_marginTop="16dp"
        android:gravity="left"
        android:text="Relationship"
        android:textSize="18sp"
        android:textStyle="bold"
        android:typeface="normal" >

<EditText
        android:id="@+id/edit_emergency_relationship"
        android:layout_width="match_parent"
        android:layout_height="54dp"
        android:hint="Relationship:"
        android:inputType="text"
        android:textColor="#0000FF"
        android:typeface="sans" >

<TextView
        android:id="@+id/emergency_address"
        android:layout_width="match_parent"
        android:layout_height="26dp"
        android:layout_marginTop="16dp"
        android:gravity="left"
        android:text="Address"
        android:textSize="18sp"
        android:textStyle="bold"
        android:typeface="normal" >

<EditText
        android:id="@+id/edit_emergency_address"
        android:layout_width="match_parent"
        android:layout_height="54dp"
        android:hint="Address:"
        android:inputType="text"
        android:textColor="#0000FF"
```

```xml
        android:typeface="sans" >

    <TextView
        android:id="@+id/emergency_phone"
        android:layout_width="match_parent"
        android:layout_height="26dp"
        android:layout_marginTop="16dp"
        android:gravity="left"
        android:text="Phone"
        android:textSize="18sp"
        android:textStyle="bold"
        android:typeface="normal" >

    <EditText
        android:id="@+id/edit_emergency_phone"
        android:layout_width="match_parent"
        android:layout_height="54dp"
        android:hint="Phone Number:"
        android:inputType="phone"
        android:textColor="#0000FF"
        android:typeface="sans" >

    <Button
        android:id="@+id/submit"
        android:layout_width="match_parent"
        android:layout_height="64dp"
        android:layout_marginTop="32dp"
        android:backgroundTint="#4CAF50"
        android:gravity="center"
        android:hint="Register"
        android:onClick="openTableActivity" > <Button

        android:id="@+id/reset"
        android:layout_width="match_parent"
        android:layout_height="64dp"
        android:layout_marginTop="16dp"
        android:backgroundTint="#F44336"
        android:gravity="center"
        android:hint="Reset"
        android:onClick="resetFormFields" >
/LinearLayout>
```

/ScrollView>

MainActivity.java

```java
package com.example.a1;

import android.content.Intent;
import android.support.v7.app.AppCompatActivity; import
android.os.Bundle;
import android.view.View;
import android.widget.DatePicker;
import android.widget.EditText;
import android.widget.RadioButton;
import android.widget.Spinner;

import java.util.Calendar;

public class MainActivity extends AppCompatActivity {

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

    public void openTableActivity(View view) {
        Intent intent = new Intent(this, TableActivity.class);

        intent.putExtra("name", ((EditText)
findViewById(R.id.editName)).getText().toString()); if (((RadioButton)
findViewById(R.id.phone_radio_button_id)).isChecked())
                intent.putExtra("number_type", "Phone");
        else if (((RadioButton)
findViewById(R.id.phone_radio_button_id)).isChecked())
                intent.putExtra("number_type", "Landline");
        intent.putExtra("number", ((EditText)
findViewById(R.id.editNumber)).getText().toString());
        intent.putExtra("address", ((EditText)
findViewById(R.id.editAddress)).getText().toString());
        intent.putExtra("age", ((EditText)
findViewById(R.id.editAge)).getText().toString());
```

```java
DatePicker datePicker = findViewById(R.id.dobPicker);
int day = datePicker.getDayOfMonth();
int month = datePicker.getMonth();
int year = datePicker.getYear();
Calendar calendar = Calendar.getInstance();
calendar.set(year, month, day);
intent.putExtra("dob", calendar.getTime().toString());

if (((RadioButton) findViewById(R.id.male)).isChecked())
    intent.putExtra("gender", "Male");
else if (((RadioButton) findViewById(R.id.female)).isChecked())
    intent.putExtra("gender", "Female");
intent.putExtra("marital_status", ((Spinner)
findViewById(R.id.marital_status_spinner)).getSelectedItem().toString());

intent.putExtra("employer_name", ((EditText)
 findViewById(R.id.editEmployerName)).getText().toString());
intent.putExtra("employment_status", ((Spinner)
findViewById(R.id.employment_status_spinner)).getSelectedItem().toString());

intent.putExtra("emergency_name", ((EditText)
findViewById(R.id.edit_emergency_name)).getText().toString());
intent.putExtra("emergency_relationship", ((EditText)
    findViewById(R.id.edit_emergency_relationship)).getText().toString());
intent.putExtra("emergency_address", ((EditText)
    findViewById(R.id.edit_emergency_address)).getText().toString());
intent.putExtra("emergency_phone", ((EditText)
findViewById(R.id.edit_emergency_phone)).getText().toString());

startActivity(intent);
}
public void resetFormFields(View view) {
    ((EditText) findViewById(R.id.editName)).setText("");
    ((RadioButton)
findViewById(R.id.phone_radio_button_id)).setChecked(false); ((RadioButton)
findViewById(R.id.landline_radio_button_id)).setChecked(false); ((EditText)
    findViewById(R.id.editNumber)).setText("");
    ((EditText) findViewById(R.id.editAddress)).setText("");
    ((EditText) findViewById(R.id.editAge)).setText("");
    ((DatePicker) findViewById(R.id.dobPicker)).updateDate(1970, 0, 1); ((RadioButton)
    findViewById(R.id.male)).setChecked(false);
```

```java
        ((RadioButton) findViewById(R.id.female)).setChecked(false); ((Spinner)
        findViewById(R.id.marital_status_spinner)).setSelection(0);

        ((EditText) findViewById(R.id.editEmployerName)).setText(""); ((Spinner)
findViewById(R.id.employment_status_spinner)).setSelection(0);

        ((EditText) findViewById(R.id.edit_emergency_name)).setText(""); ((EditText)
findViewById(R.id.edit_emergency_relationship)).setText(""); ((EditText)
    findViewById(R.id.edit_emergency_address)).setText(""); ((EditText)
    findViewById(R.id.edit_emergency_phone)).setText(""); }
}
```

activity_table.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<TableLayout xmlns:android="http: /schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:stretchColumns="*">

    <TableRow>

        <TextView
            android:id="@+id/textView_title1"
            android:layout_width="100dp"
            android:layout_height="wrap_content"
            android:text="Patient details"
            android:textAlignment="center"
            android:textSize="48px"
            android:textStyle="bold" >
    /TableRow>

    <TableRow>

        <TextView
            android:id="@+id/textView_name"
            android:layout_width="100dp"
            android:layout_height="wrap_content"
            android:text="Name" >

        <TextView
            android:id="@+id/textView_name_value"
            android:layout_width="match_parent"
```

```xml
            android:layout_height="wrap_content" > /TableRow>

    <TableRow>

        <TextView
            android:id="@+id/textView_number"
            android:layout_width="100dp"
            android:layout_height="wrap_content"
            android:text="Number" >

        <TextView
            android:id="@+id/textView_number_value"
            android:layout_width="match_parent"
            android:layout_height="wrap_content" > /TableRow>

    <TableRow>

        <TextView
            android:id="@+id/textView_address"
            android:layout_width="100dp"
            android:layout_height="wrap_content"
            android:text="Address" >

        <TextView
            android:id="@+id/textView_address_value"
            android:layout_width="match_parent"
            android:layout_height="wrap_content" > /TableRow>

    <TableRow>

        <TextView
            android:id="@+id/textView_age"
            android:layout_width="100dp"
            android:layout_height="wrap_content"
            android:text="Age" >

        <TextView
            android:id="@+id/textView_age_value"
            android:layout_width="match_parent"
            android:layout_height="wrap_content" > /TableRow>

    <TableRow>
```

```xml
<TextView
    android:id="@+id/textView_dob"
    android:layout_width="100dp"
    android:layout_height="wrap_content"
    android:text="DOB" >

<TextView
    android:id="@+id/textView_dob_value"
    android:layout_width="match_parent"
    android:layout_height="wrap_content" > /TableRow>

<TableRow>

<TextView
    android:id="@+id/textView_gender"
    android:layout_width="100dp"
    android:layout_height="wrap_content"
    android:text="Gender" >

<TextView
    android:id="@+id/textView_gender_value"
    android:layout_width="match_parent"
    android:layout_height="wrap_content" >
/TableRow>

<TableRow>

<TextView
    android:id="@+id/textView_marital_status"
    android:layout_width="100dp"
    android:layout_height="wrap_content"
    android:text="Marital Status" >

<TextView
    android:id="@+id/textView_marital_status_value"
    android:layout_width="match_parent"
    android:layout_height="wrap_content" >
/TableRow>

<TableRow>

<TextView
```

```
            android:id="@+id/textView_title2"
            android:layout_width="100dp"
            android:layout_height="wrap_content"
            android:layout_marginTop="32px"
            android:text="Employer details"
            android:textAlignment="center"
            android:textSize="48px"
            android:textStyle="bold" >
/TableRow>

<TableRow>

    <TextView
            android:id="@+id/textView_employer_name"
            android:layout_width="100dp"
            android:layout_height="wrap_content"
            android:text="Employer Name" >

    <TextView
            android:id="@+id/textView_employer_name_value"
            android:layout_width="match_parent"
            android:layout_height="wrap_content" >
/TableRow>

<TableRow>

    <TextView
            android:id="@+id/textView_employment_status"
            android:layout_width="100dp"
            android:layout_height="wrap_content"
            android:text="Employement Status" >

    <TextView
            android:id="@+id/textView_employment_status_value"
            android:layout_width="match_parent"
            android:layout_height="wrap_content" >
/TableRow>

<TableRow>

    <TextView
            android:id="@+id/textView_title3"
```

```
            android:layout_width="100dp"
            android:layout_height="wrap_content"
            android:layout_marginTop="32px"
            android:text="Emergency details"
            android:textAlignment="center"
            android:textSize="48px"
            android:textStyle="bold" >
/TableRow>

<TableRow>

    <TextView
            android:id="@+id/textView_emergency_name"
            android:layout_width="100dp"
            android:layout_height="wrap_content"
            android:text="Emergency name" >

    <TextView
            android:id="@+id/textView_emergency_name_value"
            android:layout_width="match_parent"
            android:layout_height="wrap_content" >
/TableRow>

<TableRow>

    <TextView
            android:id="@+id/textView_emergency_relationship"
            android:layout_width="100dp"
            android:layout_height="wrap_content"
            android:text="Emergency relationship" >

    <TextView
            android:id="@+id/textView_emergency_relationship_value"
            android:layout_width="match_parent"
            android:layout_height="wrap_content" >
/TableRow>

<TableRow>

    <TextView
            android:id="@+id/textView_emergency_address"
            android:layout_width="100dp"
```

```xml
                    android:layout_height="wrap_content"
                    android:text="Emergency address" >

            <TextView
                    android:id="@+id/textView_emergency_address_value"
                    android:layout_width="match_parent"
                    android:layout_height="wrap_content" >
        /TableRow>

        <TableRow>

            <TextView
                    android:id="@+id/textView_emergency_phone"
                    android:layout_width="100dp"
                    android:layout_height="wrap_content"
                    android:text="Emergency phone" >

            <TextView
                    android:id="@+id/textView_emergency_phone_value"
                    android:layout_width="match_parent"
                    android:layout_height="wrap_content" >
        /TableRow>

/TableLayout>
```

TableActivity.java

```java
package com.example.a1;

import android.content.Intent;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.widget.TextView;

public class TableActivity extends AppCompatActivity {
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_table);

        Intent intent = getIntent();
        Bundle extras = intent.getExtras();
        if (extras = null) return;
```

```java
        ((TextView)
findViewById(R.id.textView_name_value)).setText(extras.getString("name")); ((TextView)
findViewById(R.id.textView_number_value)).setText(extras.getString("number")); ((TextView)
findViewById(R.id.textView_address_value)).setText(extras.getString("address") );
        ((TextView)
findViewById(R.id.textView_age_value)).setText(extras.getString("age")); ((TextView)
findViewById(R.id.textView_dob_value)).setText(extras.getString("dob")); ((TextView)
findViewById(R.id.textView_gender_value)).setText(extras.getString("gender")); ((TextView)
findViewById(R.id.textView_marital_status_value)).setText(extras.getString("ma rital_status"));
        ((TextView)
findViewById(R.id.textView_employer_name_value)).setText(extras.getString("emp loyer_name"));
        ((TextView)
findViewById(R.id.textView_employment_status_value)).setText(extras.getString( "employment_status"));

        ((TextView)
findViewById(R.id.textView_emergency_name_value)).setText(extras.getString("em ergency_name"));
        ((TextView)
findViewById(R.id.textView_emergency_relationship_value)).setText(extras.getSt
 ring("emergency_relationship"));
        ((TextView)
findViewById(R.id.textView_emergency_address_value)).setText(extras.getString( "emergency_address"));
        ((TextView)
findViewById(R.id.textView_emergency_phone_value)).setText(extras.getString("e mergency_phone"));

    }
}
```

strings.xml
```xml
<resources>
    <string name="app_name">A1 /string>
    <string-array name="marital_status_options">
        <item>Never Married /item>
        <item>Married /item>
        <item>Widowed /item>
        <item>Divorced /item>
        <item>Separated /item>
    /string-array>

    <string-array name="employment_status_options">
        <item>Full Time /item>
        <item>Part Time /item>
```
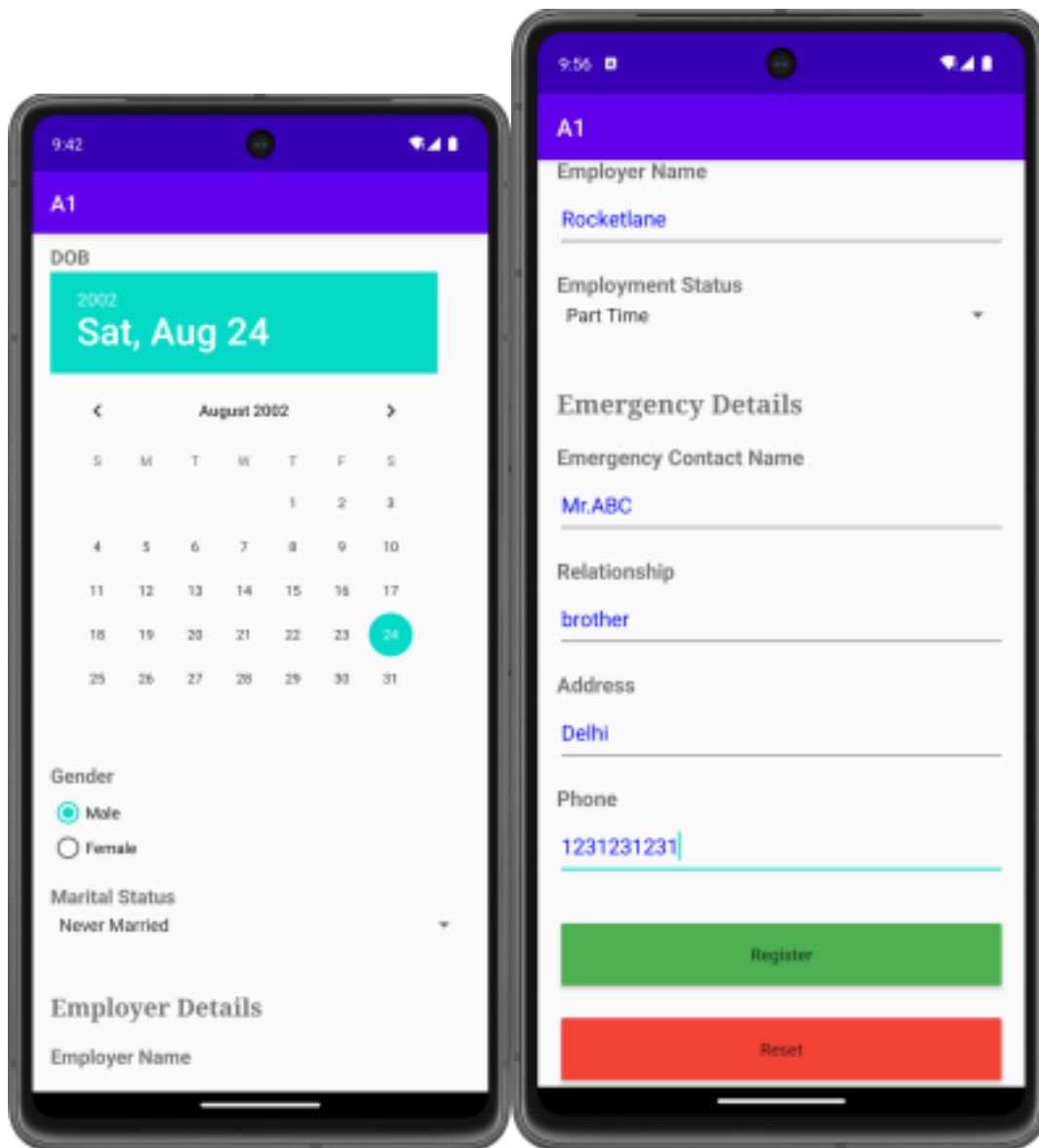
            <item>Unemployed /item>

            <item>Retired /item>

            <item>Student /item>

            <item>Other /item>

    /string-array>

    <string name="title_activity_table">All Details /string> /resources>

Output

Learning outcomes

Basic GUI components and layouts that are available

Passing data between activities

Exercise 2 - Keyboard application

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CSE-A

Aim

To implement a keyboard application using Android Studio

Code

activity_main.xml

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

  <TextView
    android:id="@+id/text_bar"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_marginLeft="6dp"
    android:layout_marginTop="24dp"
    android:layout_marginRight="6dp"
    android:hint="Enter text..."
    android:text=""
    android:textSize="24sp" />

  <GridLayout
    android:id="@+id/keyboard"
    android:layout_width="match_parent"
    android:layout_height="200dp"
    android:layout_alignParentBottom="true"
    android:background="#202020"
    android:padding="1dp" />
</RelativeLayout>
```

MainActivity.java

```java
package com.example.qwerty;

import androidx.appcompat.app.AppCompatActivity;
import androidx.core.content.res.ResourcesCompat;
import android.os.Bundle;
import android.util.DisplayMetrics;
import android.view.Gravity;
import android.widget.Button;
import android.widget.GridLayout;
import android.widget.TextView;
import android.graphics.Typeface;

public class MainActivity extends AppCompatActivity {
    private final String[][] letterKeys = {
        {"Q", "W", "E", "R", "T", "Y", "U", "I", "O", "P"},
        {"A", "S", "D", "F", "G", "H", "J", "K", "L"},
        {"↑", "Z", "X", "C", "V", "B", "N", "M", "←"},
            {"?123", ",", " ", ".", "↵"}
    };
    private final String[][] numberKeys = {
        {"1", "2", "3", "4", "5", "6", "7", "8", "9", "0"},
        {"@", "#", "₹", "_", "&", "-", "+", "(", ")", "/"},
        {"*", "\"", "'", ":", ";", "!", "?", "<", ">", "=", "←"},
            {"ABC", ",", " ", ".", "↵"}
    };
    private TextView textBar;

    private GridLayout keyboard;
    private DisplayMetrics displayMetrics;
    private Boolean isCaps = false;
    private Typeface customFont;

    private void init() {
        textBar = findViewById(R.id.text_bar);
        textBar.setText("|");
        keyboard = findViewById(R.id.keyboard);

        displayMetrics = new DisplayMetrics();
        getWindowManager().getDefaultDisplay().getMetrics(displayMetrics);

        customFont = ResourcesCompat.getFont(this, R.font.oswald);
    }
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
```

```java
        init();
        initKeyboard(letterKeys);
    }

    private void initKeyboard(String[][] keys) {
        keyboard.removeAllViews();

        int rowIndex = 0;
        for (String[] row : keys) {
            int colIndex = 0;
            int width = displayMetrics.widthPixels / (row.length + 4);

            for (String letter : row) {
                addButtonToKeyboard(letter, width, rowIndex, colIndex);
                colIndex++;
            }
            rowIndex++;
        }
    }

    private boolean isChar(String key) {
        return key.length() == 1 && Character.isLetter(key.charAt(0));
    }

    private void addButtonToKeyboard(String key, int width, int row, int col) {
        Button button = new Button(this);
        if (isChar(key)) button.setText(key.toLowerCase());
        else {
            button.setText(key);
            button.setTypeface(customFont);
            button.setWidth(0);
            button.setPadding(0, 0, 0, 0);
        }

        GridLayout.LayoutParams params = new GridLayout.LayoutParams();
        params.width = width;
        params.height = GridLayout.LayoutParams.WRAP_CONTENT;
        params.rowSpec = GridLayout.spec(row);
        params.columnSpec = GridLayout.spec(col);
        params.setGravity(Gravity.FILL);

        button.setLayoutParams(params);
        button.setClickable(true);
        setHandler(button, key);

        keyboard.addView(button);
    }
```

```java
private void setHandler(Button button, String key) {
    if (key.length() == 1 && Character.isLetter(key.charAt(0))) {
        button.setOnClickListener(view -> {
            if (isCaps) textBar.append(key.toUpperCase());
            else textBar.append(key.toLowerCase());
        });
        return;
    }

    switch (key) {
        case "↑":
            button.setOnClickListener(view -> isCaps = !isCaps);
            break;
        case "←":
            button.setOnClickListener(view -> {
                CharSequence currentText = textBar.getText();
                if(currentText.length()!=0) {
                    CharSequence newText = currentText.subSequence(0, currentText.length() - 1);
                    textBar.setText(newText);
                }
            });
            break;
        case "?123":
            button.setOnClickListener(view -> initKeyboard(numberKeys));
            break;
        case "ABC":
            button.setOnClickListener(view -> initKeyboard(letterKeys));
            break;
        case "↵":
            button.setOnClickListener(view -> textBar.append("\n"));
            break;
        default:
            button.setOnClickListener(view -> {
                CharSequence currentText = textBar.getText();
                CharSequence newText = currentText.subSequence(0, currentText.length() - 1);
                textBar.setText(newText);
                textBar.append(String.valueOf(key.charAt(0)));
                textBar.append("|");
            }
            );
            break;
    }

}
}
```
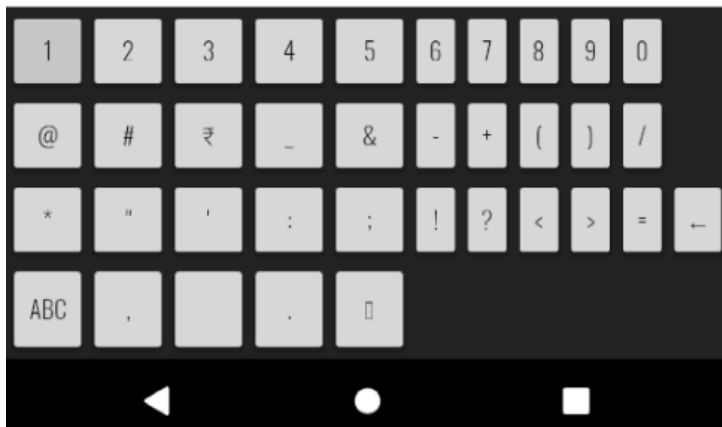
Output

Learning outcomes

Thus a keyboard was implemented using Android Studio

Exercise 3 - Application Development using basic graphicalPrimitives

T Shivcharan

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CSE-B

Aim

Design a CAR using Shape drawables with the help of relevant shapes such as Line, Circle, Rectangle and Arc.

a. Move the car forward by pressing forward button so that car moves from a predefined starting point to the predefined endpoint.

b. On pressing backward button, rotate the car to 180 degrees from the current point to the starting point.

c. Implement a Tap-to-zoom animation on any image.

d. Implement the Card flipping animation.

Code

Drawables:

car.xml

```xml
<layer-list xmlns:android="http://schemas.android.com/apk/res/android">

    <item android:drawable="@drawable/car_body" />

    <item
        android:drawable="@drawable/car_roof"
        android:gravity="top"
        />

    <item
        android:drawable="@drawable/car_window"
        android:top="10dp"
        android:left="20dp"
        android:right="50dp"
        android:bottom="20dp"
        />
    <item
        android:drawable="@drawable/car_window"
        android:top="10dp"
        android:left="75dp"
        android:right="20dp"
        android:bottom="20dp"
        />
    <item
        android:drawable="@drawable/car_wheel"
        android:gravity="left|bottom"
        android:left="5dp"
        android:bottom="0dp"
        />
```

```xml
    <item
        android:drawable="@drawable/car_wheel"
        android:gravity="right|bottom"
        android:right="5dp"
        android:bottom="0dp"
        />
</layer-list>
```

car_body.xml
```xml
<shape xmlns:android="http://schemas.android.com/apk/res/android">
    <solid android:color="#123" />
    <corners android:radius="8dp" />
    <size android:width="100dp" android:height="40dp"/>
</shape>
```

car_roof.xml
```xml
<shape xmlns:android="http://schemas.android.com/apk/res/android">
    <solid android:color="#000000" />
    <corners android:radius="2dp" />
    <size android:width="20dp" android:height="15dp" />
</shape>
```

car_wheel.xml
```xml
<shape android:shape="oval"
    xmlns:android="http://schemas.android.com/apk/res/android">
    <solid android:color="#000000" />
    <size android:width="20dp" android:height="20dp" />
    <corners android:radius="3dp" />
</shape>
```

car_window.xml
```xml
<?xml version="1.0" encoding="utf-8"?>
<shape xmlns:android="http://schemas.android.com/apk/res/android">
    <solid android:color="#333" />
    <corners android:radius="4dp" />
    <size android:width="20dp" android:height="20dp" />
</shape>
```

lane_marking.xml
```xml
<shape xmlns:android="http://schemas.android.com/apk/res/android">
    <solid android:color="#FFFFFF" />
    <size android:width="10dp" android:height="2dp" />
</shape>
```

road.xml
```xml
<layer-list xmlns:android="http://schemas.android.com/apk/res/android">
```

```
    <!-- Road Background (Gray) -->
    <item>
        <shape android:shape="rectangle">
            <solid android:color="#333" />
        </shape>
    </item>
    <item android:drawable="@drawable/lane_marking"
        android:top="10dp"
        android:right="80dp"
        android:left="10dp"
        android:bottom="10dp"/>
    <item android:drawable="@drawable/lane_marking"
        android:top="10dp"
        android:right="45dp"
        android:left="45dp"
        android:bottom="10dp"/>
    <item android:drawable="@drawable/lane_marking"
        android:top="10dp"
        android:right="10dp"
        android:left="80dp"
        android:bottom="10dp"/>
</layer-list>
```

Layout :

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">

    <ImageView
        android:id="@+id/carImageView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:src="@drawable/car"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.302"
        tools:layout_editor_absoluteX="0dp" />

    <ImageView
        android:id="@+id/roadImageView"
        android:layout_width="410dp"
```

```xml
        android:layout_height="111dp"
        android:layout_marginTop="256dp"
        android:layout_marginEnd="1dp"
        android:layout_marginBottom="364dp"
        android:src="@drawable/road"
        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" />
    <Button
        android:id="@+id/forwardButton"
        android:layout_width="117dp"
        android:layout_height="45dp"
        android:layout_marginTop="60dp"
        android:text="Forward"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/roadImageView" />
    <Button
        android:id="@+id/sunFlipId"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginBottom="108dp"
        android:text="Flip Image"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.496"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/backwardButton"
        app:layout_constraintVertical_bias="0.384" />
    <Button
        android:id="@+id/backwardButton"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="16dp"
        android:text="Backward"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/forwardButton" />
    <ImageView
        android:id="@+id/sunId"
        android:layout_width="79dp"

        android:layout_height="55dp"
        android:layout_marginTop="84dp"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
```

```
            app:srcCompat="?attr/actionModeCloseDrawable" />
    <!-- Add other UI elements here if needed -->
</androidx.constraintlayout.widget.ConstraintLayout>
```

MainActivity.java
```java
package com.example.abex3;
import androidx.appcompat.app.AppCompatActivity;
import android.animation.ObjectAnimator;
import android.os.Bundle;
import android.os.Handler;
import android.view.View;
import android.view.animation.AccelerateDecelerateInterpolator;
import android.widget.Button;
import android.widget.ImageView;
public class MainActivity extends AppCompatActivity {
    private ImageView carImageView;
    private ImageView sunImageView;
    private Button forwardButton;
    private Button backwardButton;
    private Button sunFlipButton;
    private int carXPosition = 0;
    private final int endpoint = 800;
    private final int startpoint = 0;
    boolean isClicked=false;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        carImageView = findViewById(R.id.carImageView);
        sunImageView = findViewById(R.id.sunId);
        forwardButton = findViewById(R.id.forwardButton);
        backwardButton = findViewById(R.id.backwardButton);
        sunFlipButton = findViewById(R.id.sunFlipId);
        forwardButton.setOnClickListener(new View.OnClickListener() {
            boolean isOperationInProgress = false;
            @Override

            public void onClick(View v) {
                if (!isOperationInProgress) {
                    isOperationInProgress = true;
                    backwardButton.setEnabled(false);
                    forwardButton.setEnabled(false);
                    final Handler handler = new Handler();
                    final Runnable carMovement = new Runnable() {
                        @Override
                        public void run() {
                            carXPosition += 10;
                            if (carXPosition <= endpoint) {
```

```java
                            carImageView.setX(carXPosition);
                            handler.postDelayed(this, 100); // 100
milliseconds delay
                        } else {
                            isOperationInProgress = false;
                            backwardButton.setEnabled(true);
                            forwardButton.setEnabled(true);
                        }
                    }
                };
                handler.post(carMovement);
            }
        }
    });
    backwardButton.setOnClickListener(new View.OnClickListener() {
        boolean isOperationInProgress = false;
        private boolean isCarFlipped = false;
        @Override
        public void onClick(View v) {
            if (!isOperationInProgress) {
                isOperationInProgress = true;
                backwardButton.setEnabled(false);
                forwardButton.setEnabled(false);
                flipCar();
                final Handler handler = new Handler();
                final Runnable carMovement = new Runnable() {
                    @Override
                    public void run() {
                        carXPosition -= 10;
                        if (carXPosition >= startpoint) {
                            carImageView.setX(carXPosition);
                            handler.postDelayed(this, 100); // 100
milliseconds delay
                        } else {
                            isOperationInProgress = false;
                            backwardButton.setEnabled(true);
                            forwardButton.setEnabled(true);
                            flipCar();
                        }
                    }

                };
                handler.post(carMovement);
            }
        }
        private void flipCar() {
            ObjectAnimator flipAnimator;
            if (isCarFlipped) {
```

```java
                flipAnimator = ObjectAnimator.ofFloat(carImageView,
"rotationY", 180f, 0f);
                isCarFlipped = false;
            } else {
                flipAnimator = ObjectAnimator.ofFloat(carImageView,
"rotationY", 0f, 180f);
                isCarFlipped = true;
            }
            flipAnimator.setDuration(500);
            flipAnimator.setInterpolator(new
AccelerateDecelerateInterpolator());
            flipAnimator.start();
        }
    });
    sunImageView.setOnClickListener(new View.OnClickListener(){
        @Override
        public void onClick(View v) {
            if(!isClicked){
                sunImageView.setScaleX(2);
                sunImageView.setScaleY(2);
                isClicked=true;
            }
            else{
                sunImageView.setScaleX(1);
                sunImageView.setScaleY(1);
                isClicked=false;
            }
        }
    });
    sunFlipButton.setOnClickListener(new View.OnClickListener() {
        private boolean isArrowFlipped = false;
        @Override
        public void onClick(View v) {
            ObjectAnimator flipAnimator;
            if (isArrowFlipped) {
                flipAnimator = ObjectAnimator.ofFloat(sunImageView,
"rotationY", 180f, 0f);
                isArrowFlipped = false;
            } else {
                flipAnimator = ObjectAnimator.ofFloat(sunImageView,
"rotationY", 0f, 180f);
                isArrowFlipped = true;
            }
            flipAnimator.setDuration(500);
            flipAnimator.setInterpolator(new
AccelerateDecelerateInterpolator());

            flipAnimator.start();
        }
```
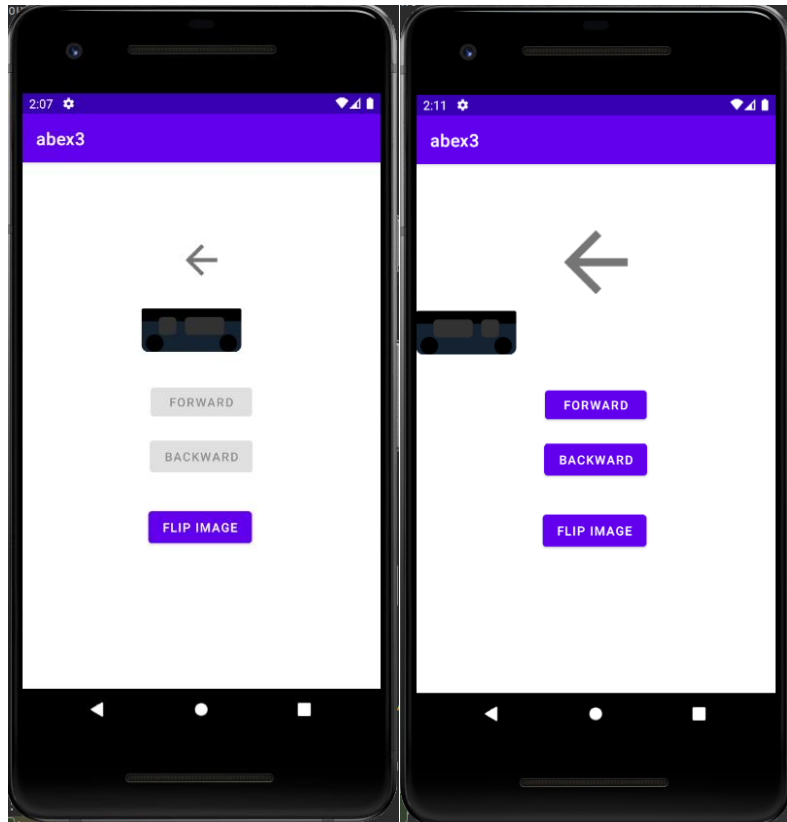
```
        });
    }
}
```

Output
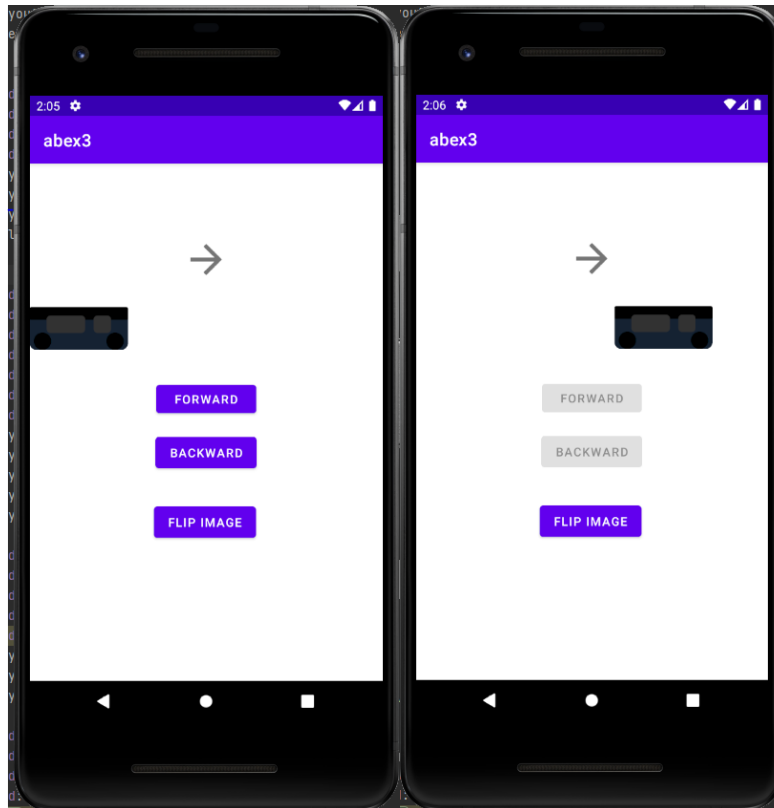
Learning outcomes

- Proficient in creating user interfaces using shape drawables and relevant shapes.
- Implemented event listeners for user interaction and learned to navigate between activities.
- Successfully added animations, improving user engagement with tap-to-zoom and card flipping features.

Ex. No. 4 Android Application Development using Database

Aim: Develop a Product information application in Android that enables toperform CRUD operations on data stored in SQLite Database.

Layout Used: Linear Layout, Table Layout

Intents: Insert, Retrieve, Retrieve All, Update, Delete and Main

Code:

MainActivity.java:

```
package com.example.ex4;
import androidx.appcompat.app.AppCompatActivity;import
android.content.Intent;
import android.os.Bundle; import
android.view.View; import
android.widget.Button;
public class MainActivity extends AppCompatActivity {

    @Override

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

        final Database[] db = new Database[1]; Button create

        = findViewById(R.id.create);
```

```java
create.setOnClickListener(new View.OnClickListener() {@Override
    public void onClick(View v) {
        db[0] = new Database(MainActivity.this);
    }
});



Button insert = findViewById(R.id.insert);
insert.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        Intent intent = new Intent(MainActivity.this, Insert.class);startActivity(intent);
    }
});

Button delete = findViewById(R.id.delete); delete.setOnClickListener(new
View.OnClickListener() {
    @Override
    public void onClick(View v) {
        Intent intent = new Intent(MainActivity.this,Delete.class);startActivity(intent);
    }
});

Button retrieve = findViewById(R.id.read); retrieve.setOnClickListener(new
View.OnClickListener() {
    @Override
    public void onClick(View v) {
        Intent intent = new Intent(MainActivity.this,Retrieve.class);startActivity(intent);
    }
});
```

```java
Button retrieveAll = findViewById(R.id.read_all); retrieveAll.setOnClickListener(new
View.OnClickListener() {
    @Override
    public void onClick(View v) {
        Intent intent = new Intent(MainActivity.this,RetrieveAll.class);startActivity(intent);
    }
});


Button update = findViewById(R.id.update); update.setOnClickListener(new
View.OnClickListener() {
    @Override
    public void onClick(View v) {
        Intent intent = new Intent(MainActivity.this,Update.class);startActivity(intent);
    }
});



    }
}
```

Database.java:

```java
package com.example.ex4;

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


public class Database extends SQLiteOpenHelper {private static


    final String DB_NAME = "product";
```

```java
private static final int DB_VERSION = 3;

private static final String TABLE_NAME = "prod";private static

final String ID_COL = "id";

private static final String NAME_COL = "name"; private static

final String BRAND_COL = "brand";private static final String

DESC_COL = "desc"; private static final String PRICE_COL =

"price";

public Database(Context context) {
    super(context, DB_NAME, null, DB_VERSION);
}

@Override
public void onCreate(SQLiteDatabase db) {

    String query = "CREATE TABLE " + TABLE_NAME + " ("
            + ID_COL + " INTEGER PRIMARY KEY, "
            + NAME_COL + " TEXT,"
            + BRAND_COL + " TEXT,"
            + DESC_COL + " TEXT,"
            + PRICE_COL + " TEXT)";


    // at last we are calling a exec sql
    // method to execute above sql querydb.execSQL(query);
}


// this method is use to add new course to our sqlite database.
```

```java
public void addProduct(String id,String name,String brand, String desc,String price) {

    // on below line we are creating a variable for
    // our sqlite database and calling writable method
    // as we are writing data in our database. SQLiteDatabase db =
    this.getWritableDatabase();

    // on below line we are creating a
    // variable for content values.
    ContentValues values = new ContentValues();

    // on below line we are passing all values
    // along with its key and value pair.
    values.put(ID_COL,id); values.put(NAME_COL,
    name); values.put(BRAND_COL,brand);
    values.put(DESC_COL, desc);
    values.put(PRICE_COL, price);

    // after adding all values we are passing
    // content values to our table. db.insert(TABLE_NAME, null,
    values);

    // at last we are closing our
    // database after adding database.db.close();
}

public void deleteProduct(String id){ SQLiteDatabase db =
    this.getWritableDatabase();
    db.delete(TABLE_NAME,ID_COL+"= ?",new String[]{id});
}

public void updateProduct(String id,String price){
```

```java
        SQLiteDatabase db = this.getWritableDatabase(); ContentValues
        values = new ContentValues(); values.put(PRICE_COL, price);
        db.update(TABLE_NAME, values, ID_COL + "=?", new
String[]{String.valueOf(id)});
    }

    public Cursor retrieveAll(){
        SQLiteDatabase db = this.getReadableDatabase();
        return db.query(TABLE_NAME, null, null, null, null, null, null);
    }

    public Cursor retrieve(String id){
        SQLiteDatabase db = this.getReadableDatabase();String[] projection =
        {
                NAME_COL,
                BRAND_COL,
                DESC_COL,
                PRICE_COL
        };

        // Define the condition for retrieval (e.g., where id = ?)String selection =
        ID_COL + " = ?";
        String[] selectionArgs = { id };

        // Execute the query Cursor
        cursor = db.query(
                TABLE_NAME,         // Table name projection,
                                    // Columns to return selection,
                                    // Selection (WHERE clause)
                selectionArgs,      // Selection arguments null,
                                    // Group bynull,     // Having
                null                // Order by
        );
```

```
    // The cursor now contains the retrieved row(s)return cursor;
    }


    @Override
    public void onUpgrade(SQLiteDatabase db, int oldVersion, intnewVersion) {
        // this method is called to check if the table exists already. db.execSQL("DROP TABLE IF
        EXISTS " + TABLE_NAME);
        onCreate(db);
    }
}
```

Insert.java:

```
package com.example.ex4;

import android.content.Intent;import
android.os.Bundle; import
android.util.Log; import
android.view.View; import
android.widget.Button;import
android.widget.RadioButton;
import android.widget.RadioGroup;import
android.widget.TextView; import


androidx.appcompat.app.AppCompatActivity; public


class Insert extends AppCompatActivity {

    @Override
```

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

```java
Button backi = findViewById(R.id.backi); backi.setOnClickListener(new
View.OnClickListener() {
    @Override
    public void onClick(View v) {
        Intent intent = new Intent(Insert.this,MainActivity.class);startActivity(intent);
    }
});


Button submiti = findViewById(R.id.submiti); submiti.setOnClickListener(new
View.OnClickListener() {
    @Override
    public void onClick(View v) {
        Database db = new Database(Insert.this);

        TextView textView = findViewById(R.id.idi);String id =
        textView.getText().toString(); textView =
        findViewById(R.id.namei); String name =
        textView.getText().toString();

        RadioGroup radioGroup = findViewById(R.id.radioGroup);int
        selectedRadioButtonId =
radioGroup.getCheckedRadioButtonId(); RadioButton
        selectedRadioButton =
findViewById(selectedRadioButtonId);
        String brand = selectedRadioButton.getText().toString();Log.d("Debug",brand);

        textView = findViewById(R.id.desci);String desc
        = textView.getText().toString();
        Log.d("Debug",desc);

        textView = findViewById(R.id.pricei);String price
        =
```

```
textView.getText().toString();
```

```java
                db.addProduct(id,name,brand,desc,price);
            }
        });
    }
}
```

Retrieve:

```java
package com.example.ex4;

import android.content.Intent; import
android.database.Cursor;import
android.os.Bundle; import
android.view.View; import
android.widget.Button; import
android.widget.TextView;
import androidx.appcompat.app.AppCompatActivity;


public class Retrieve extends AppCompatActivity {

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

        Button backr = findViewById(R.id.backr);
        backr.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                Intent intent = new Intent(Retrieve.this,MainActivity.class);startActivity(intent);
            }
        });
```

```java
Button retrieve = findViewById(R.id.retrieve); retrieve.setOnClickListener(new
View.OnClickListener() {
    @Override
    public void onClick(View v) {
        TextView textView = findViewById(R.id.idr);String id =
        textView.getText().toString();

        Database db = new Database(Retrieve.this);Cursor cursor =
        db.retrieve(id);
        String name="",brand="",desc="",price="";


        if (cursor.moveToFirst()) {


            do {
                // Retrieve values from 'column1' and 'column2' as stringsint columnIndex =
                cursor.getColumnIndex("name");
                if (columnIndex != -1) {
                    name = cursor.getString(columnIndex);
                }

                columnIndex = cursor.getColumnIndex("brand");
                if(columnIndex!=-1){
                    brand=cursor.getString(columnIndex);
                }

                columnIndex =
                cursor.getColumnIndex("desc");
                if(columnIndex!=-1){
                    desc=cursor.getString(columnIndex);
                }

                columnIndex =
                cursor.getColumnIndex("price");
                if(columnIndex!=-1){
                    price=cursor.getString(columnIndex);
```

}

```
                    } while (cursor.moveToNext());
                }

                textView = findViewById(R.id.namer);
                textView.setText(name);

                textView = findViewById(R.id.brandr);
                textView.setText(brand);

                textView = findViewById(R.id.descr);
                textView.setText(desc);

                textView = findViewById(R.id.pricer);
                textView.setText(price);

            }
        });
    }
}
```

Retrieve All:

```
package com.example.ex4;

import android.content.Context; import
android.content.Intent; import
android.database.Cursor;import
android.graphics.Color; import
android.os.Bundle; import
android.util.Log;
import android.view.View; import
android.view.ViewGroup;import
android.widget.Button;
import android.widget.TableLayout;import
android.widget.TableRow;
```

```java
import android.widget.TextView;

import androidx.appcompat.app.AppCompatActivity; import
androidx.constraintlayout.widget.ConstraintLayout;import
androidx.constraintlayout.widget.ConstraintSet;

import org.w3c.dom.Text;
public class RetrieveAll extends AppCompatActivity {private TextView
    newTextView(String text){
        TextView tv = new TextView(RetrieveAll.this);

        tv.setText(text);
        tv.setPadding(4,4,4,4);
        tv.setTextSize(24);
        TableRow.LayoutParams layoutParams = new
TableRow.LayoutParams(
                TableRow.LayoutParams.WRAP_CONTENT, // Adjust width as
needed
                                        TableRow.LayoutParams.WRAP_CONTENT
                                        // Adjust height as
needed
        );


        layoutParams.rightMargin = 20;
        tv.setLayoutParams(layoutParams);

        return tv;
    }

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

        Database db = new Database(RetrieveAll.this);
```

```java
        Cursor cursor = db.retrieveAll();

        ConstraintLayout parent = findViewById(R.id.parent);

// Create layout params for the TableLayout
//        ConstraintLayout.LayoutParams tableLayoutParams = new
ConstraintLayout.LayoutParams(
//                ConstraintLayout.LayoutParams.MATCH_PARENT,
//                ConstraintLayout.LayoutParams.MATCH_PARENT
//        );
//        tableLayoutParams.startToStart =
ConstraintLayout.LayoutParams.PARENT_ID
;
//        tableLayoutParams.endToEnd =
ConstraintLayout.LayoutParams.PARENT_ID
;
//        tableLayoutParams.topToTop =
ConstraintLayout.LayoutParams.PARENT_ID
;
//        tableLayoutParams.bottomToBottom =
ConstraintLayout.LayoutParams.PARENT_ID
;

        TableLayout tl = new TableLayout(RetrieveAll.this);

        TableRow trh = new TableRow(RetrieveAll.this);TextView tv0
        = newTextView("Id"); trh.addView(tv0);

        tv0 = newTextView("Name");
        trh.addView(tv0);

        tv0 = newTextView("Brand");trh.addView(tv0);

        tv0 = newTextView("Description");
```

```
trh.addView(tv0);

tv0 = newTextView("Price");
```

```java
trh.addView(tv0);

tl.addView(trh);

String id="",name="",brand="",desc="",price="";if
(cursor.moveToFirst()) {
    do {
        // Retrieve values from 'column1' and 'column2' as stringsint columnIndex =
        cursor.getColumnIndex("id");
        if (columnIndex != -1) {
            id = cursor.getString(columnIndex);
        }

        columnIndex =
        cursor.getColumnIndex("name");
        if(columnIndex!=-1){
            name=cursor.getString(columnIndex);
        }

        columnIndex =
        cursor.getColumnIndex("brand");
        if(columnIndex!=-1){
            brand=cursor.getString(columnIndex);
        }

        columnIndex =
        cursor.getColumnIndex("desc");
        if(columnIndex!=-1){
            desc=cursor.getString(columnIndex);
        }

        columnIndex =
        cursor.getColumnIndex("price");
        if(columnIndex!=-1){
            price=cursor.getString(columnIndex);
        }
```

```
Log.d("Debug",id+" "+name+" "+brand+" "+desc+" "+price);
```

```java
        TableRow tr = new TableRow(RetrieveAll.this);


        TextView tv1 = newTextView(id); TextView tv2
        = newTextView(name);TextView tv3 =
        newTextView(brand);TextView tv4 =
        newTextView(desc);TextView tv5 =
        newTextView(price);

        tr.addView(tv1)
        ;
        tr.addView(tv2)
        ;
        tr.addView(tv3)
        ;
        tr.addView(tv4)
        ;
        tr.addView(tv5)
        ;

        tl.addView(tr);

    } while (cursor.moveToNext());
}

    parent.addView(tl);

//      app:layout_constraintEnd_toEndOf="parent"
//      app:layout_constraintStart_toStartOf="parent"
//      app:layout_constraintTop_toTopOf="parent"

    Button retrieveAll = findViewById(R.id.backra); retrieveAll.setOnClickListener(new
    View.OnClickListener() {
        @Override
        public void onClick(View v) {
            Intent intent = new Intent(RetrieveAll.this,MainActivity.class);
```

```
            startActivity(intent);
        }
    });
```

```
        }
}
```

Update:

```
package com.example.ex4;

import android.content.Intent;import
android.os.Bundle; import
android.view.View; import
android.widget.Button;import
android.widget.TextView;
import androidx.appcompat.app.AppCompatActivity;


public class Update extends AppCompatActivity {

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

        Button backu = findViewById(R.id.backu);
        backu.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                Intent intent = new Intent(Update.this,MainActivity.class);startActivity(intent);
            }
        });

        Button update = findViewById(R.id.update); update.setOnClickListener(new
        View.OnClickListener() {
```

@Override

```java
            public void onClick(View v) {
                Database db = new Database(Update.this);TextView
                textView = findViewById(R.id.idu); String id =
                textView.getText().toString(); textView =
                findViewById(R.id.priceu); String price =
                textView.getText().toString();

                db.updateProduct(id,price);
            }
        });
    }
}
```

Delete.java:

```java
package com.example.ex4;

import android.content.Intent;import
android.os.Bundle; import
android.view.View; import
android.widget.Button;import
android.widget.TextView;
import androidx.appcompat.app.AppCompatActivity;


public class Delete extends AppCompatActivity {

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

        Button backd = findViewById(R.id.backd);
        backd.setOnClickListener(new View.OnClickListener() {
```

```java
@Override
public void onClick(View v) {
```

```java
                                                    Intent intent = new
                                                    Intent(Delete.this,MainActivity.class);
                                                    startActivity(intent);
        }
    });



    Button delete = findViewById(R.id.delete); delete.setOnClickListener(new
    View.OnClickListener() {
        @Override
        public void onClick(View v) {
            Database db = new Database(Delete.this);

            TextView textView = findViewById(R.id.idd);String id =
            textView.getText().toString();

            db.deleteProduct(id);
        }
    });
  }
}
```

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:tools="http://schemas.android.com/tools"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    android:layout_width="match_parent" android:layout_height="match_parent"
    tools:context=".MainActivity">

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

```xml
<!-- Center the LinearLayout vertically -->
<LinearLayout android:id="@+id/verticalLayout"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_centerInParent="true"
    android:orientation="vertical">

    <!-- Add your UI elements within this LinearLayout -->

    <Button
        android:id="@+id/create"
        android:layout_width="177dp"
        android:layout_height="62dp"android:text="Create" />

    <Button
        android:id="@+id/insert"
        android:layout_width="177dp"
        android:layout_height="62dp"android:text="Insert" />

    <Button
        android:id="@+id/read"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Retrieve" />

    <Button
        android:id="@+id/read_all"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Retrieve All" />

    <Button
```

```xml
            android:id="@+id/update"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:text="Update" />

        <Button
            android:id="@+id/delete"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:text="Delete" />


        <!-- Add more views here as needed -->

        </LinearLayout>
    </RelativeLayout>

</androidx.constraintlayout.widget.ConstraintLayout>
```

Insert.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">

    <LinearLayout android:layout_width="409dp"
        android:layout_height="665dp"
        android:layout_marginTop="50dp"
        android:orientation="vertical"
        app:layout_constraintBottom_toBottomOf="parent"
```

```xml
        app:layout_constraintStart_toStartOf="parent"app:layout_constraintTop_toTopOf="parent">

<LinearLayout android:layout_width="match_parent"
    android:layout_height="87dp"
    android:orientation="horizontal">

    <TextView android:id="@+id/textView3"
        android:layout_width="120dp"
        android:layout_height="55dp"
        android:layout_weight="1"
        android:text="Product Id"
        android:textSize="24sp" />

    <EditText
        android:id="@+id/idi"
        android:layout_width="wrap_content"
        android:layout_height="58dp"
        android:layout_weight="1" android:ems="10"
        android:inputType="textPersonName"
        android:textSize="24sp" />
</LinearLayout>

<LinearLayout android:layout_width="match_parent"
    android:layout_height="84dp"
    android:orientation="horizontal">

    <TextView android:id="@+id/textView5"
        android:layout_width="131dp"
        android:layout_height="58dp"
```

```xml
        android:layout_weight="1"
        android:text="Product Name"
        android:textSize="24sp" />

    <EditText android:id="@+id/namei"
        android:layout_width="wrap_content"
        android:layout_height="59dp"
        android:layout_weight="1" android:ems="10"
        android:inputType="textPersonName"
        android:textSize="24sp" />
</LinearLayout>

<LinearLayout android:layout_width="match_parent"
    android:layout_height="94dp"
    android:orientation="horizontal">

    <TextView android:id="@+id/textView6"
        android:layout_width="198dp"
        android:layout_height="71dp"
        android:layout_weight="1"
        android:text="Brand"
        android:textSize="24sp" />

    <RadioGroup android:id="@+id/radioGroup"
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:layout_weight="1" >

        <RadioButton android:id="@+id/radio1"
```

```xml
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:textSize="24sp" android:text="A" />

        <RadioButton android:id="@+id/radio2"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:textSize="24sp" android:text="B" />
    </RadioGroup>

</LinearLayout>

<LinearLayout android:layout_width="match_parent"
    android:layout_height="93dp"
    android:orientation="horizontal">

    <TextView android:id="@+id/textView7"
        android:layout_width="146dp"
        android:layout_height="73dp"
        android:layout_weight="1"
        android:text="Description"
        android:textSize="24sp" />

    <EditText android:id="@+id/desci"
        android:layout_width="wrap_content"
        android:layout_height="75dp"
        android:layout_weight="1" android:ems="10"
        android:inputType="textPersonName"
```

```xml
            android:textSize="24sp" />
</LinearLayout>

<LinearLayout android:layout_width="match_parent"
    android:layout_height="96dp"
    android:orientation="horizontal">

    <TextView android:id="@+id/textView8"
        android:layout_width="114dp"
        android:layout_height="79dp"
        android:layout_weight="1"
        android:text="Price"
        android:textSize="24sp" />

    <EditText android:id="@+id/pricei"
        android:layout_width="wrap_content"
        android:layout_height="82dp"
        android:layout_weight="1" android:ems="10"
        android:inputType="textPersonName"
        android:textSize="24sp" />
</LinearLayout>

<Button
    android:id="@+id/submiti"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:text="Submit" />

<Button
    android:id="@+id/backi"
    android:layout_width="match_parent"
```

```
            android:layout_height="wrap_content"android:text="Back"
            />

    </LinearLayout>
</androidx.constraintlayout.widget.ConstraintLayout>
```

Retrieve.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">

    <LinearLayout android:id="@+id/linearLayout"
        android:layout_width="414dp"
        android:layout_height="203dp"
        android:orientation="vertical"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="1.0"
        app:layout_constraintStart_toStartOf="parent"
        tools:ignore="MissingConstraints"
        tools:layout_editor_absoluteY="-2dp">

        <LinearLayout android:layout_width="match_parent"
            android:layout_height="103dp"
            android:orientation="horizontal">

            <TextView android:id="@+id/textView"
                android:layout_width="144dp"
```

```xml
            android:layout_height="64dp"
            android:layout_weight="1" android:text="Product Id"
            android:textSize="24sp" />

        <EditText
            android:id="@+id/idr"
            android:layout_width="wrap_content"
            android:layout_height="83dp"
            android:layout_weight="1" android:ems="10"
            android:inputType="textPersonName"
            android:textSize="24sp" />
    </LinearLayout>

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

    <Button
        android:id="@+id/backr"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"android:text="Back"
        />
</LinearLayout>

<LinearLayout android:layout_marginTop="50dp"
    android:layout_width="411dp"
    android:layout_height="459dp"
    android:orientation="vertical"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintStart_toStartOf="parent"
```

```
app:layout_constraintTop_toBottomOf="@+id/linearLayout">

<LinearLayout android:layout_width="match_parent"
    android:layout_height="84dp"
    android:orientation="horizontal">

    <TextView android:id="@+id/textView5"
        android:layout_width="131dp"
        android:layout_height="58dp"
        android:layout_weight="1"
        android:text="Product Name"
        android:textSize="24sp" />

    <TextView android:id="@+id/namer"
        android:layout_width="146dp"
        android:layout_height="73dp"
        android:layout_weight="1"
        android:text=""
        android:textSize="24sp" />
</LinearLayout>

<LinearLayout android:layout_width="match_parent"
    android:layout_height="94dp"
    android:orientation="horizontal">

    <TextView android:id="@+id/textView6"
        android:layout_width="198dp"
        android:layout_height="71dp"
        android:layout_weight="1"
        android:text="Brand"
```

```xml
            android:textSize="24sp" />

        <TextView android:id="@+id/brandr"
            android:layout_width="146dp"
            android:layout_height="73dp"
            android:layout_weight="1"
            android:text=""
            android:textSize="24sp" />

    </LinearLayout>

    <LinearLayout android:layout_width="match_parent"
        android:layout_height="93dp"
        android:orientation="horizontal">

        <TextView android:id="@+id/textView0"
            android:layout_width="146dp"
            android:layout_height="73dp"
            android:layout_weight="1"
            android:text="Description"
            android:textSize="24sp" />

        <TextView android:id="@+id/descr"
            android:layout_width="146dp"
            android:layout_height="73dp"
            android:layout_weight="1"
            android:text=""
            android:textSize="24sp" />
    </LinearLayout>

    <LinearLayout
```

```
                android:layout_width="match_parent"
                android:layout_height="96dp"
                android:orientation="horizontal">

                <TextView android:id="@+id/textView8"
                    android:layout_width="114dp"
                    android:layout_height="79dp"
                    android:layout_weight="1"
                    android:text="Price"
                    android:textSize="24sp" />

                <TextView android:id="@+id/pricer"
                    android:layout_width="146dp"
                    android:layout_height="73dp"
                    android:layout_weight="1"
                    android:text=""
                    android:textSize="24sp" />
            </LinearLayout>


        </LinearLayout>
    </androidx.constraintlayout.widget.ConstraintLayout>
```

Retrieve All:

```
<?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:id="@+id/parent">
```

```
<Button
    android:id="@+id/backra" android:layout_width="match_parent"
    android:layout_height="wrap_content" android:text="Back"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintStart_toStartOf="parent" />


</androidx.constraintlayout.widget.ConstraintLayout>
```

Update.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">

    <LinearLayout android:layout_width="412dp"
        android:layout_height="352dp"
        android:orientation="vertical"
        app:layout_constraintStart_toStartOf="parent"tools:layout_editor_absoluteY="186dp"
        tools:ignore="MissingConstraints">

        <LinearLayout android:layout_width="match_parent"
            android:layout_height="107dp"
```

```xml
        android:orientation="horizontal">

    <TextView android:id="@+id/textView2"
        android:layout_width="105dp"
        android:layout_height="80dp"
        android:layout_weight="1"
        android:textSize="24sp"
        android:text="Product Id" />

    <EditText android:id="@+id/idu"
        android:layout_width="wrap_content"
        android:layout_height="match_parent"
        android:layout_weight="1" android:ems="10"
        android:inputType="textPersonName"
        android:textSize="24sp" />
</LinearLayout>

<LinearLayout android:layout_width="match_parent"
    android:layout_height="97dp"
    android:orientation="horizontal">

    <TextView android:id="@+id/textView4"
        android:layout_width="108dp"
        android:layout_height="79dp"
        android:layout_weight="1"
        android:textSize="24sp"
        android:text="Price" />

    <EditText android:id="@+id/priceu"
```

```
                android:layout_width="wrap_content"
                android:layout_height="match_parent"
                android:layout_weight="1" android:ems="10"
                android:textSize="24sp"
                android:inputType="textPersonName" />
        </LinearLayout>

        <Button
            android:id="@+id/update"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:text="Update" />

        <Button
            android:id="@+id/backu"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"android:text="Back"
            />
    </LinearLayout>
</androidx.constraintlayout.widget.ConstraintLayout>
```

Delete.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">

    <LinearLayout android:layout_width="414dp"
        android:layout_height="475dp"
```

```xml
android:orientation="vertical" app:layout_constraintEnd_toEndOf="parent"
app:layout_constraintStart_toStartOf="parent"tools:layout_editor_absoluteY="101dp"
tools:ignore="MissingConstraints">

<LinearLayout android:layout_width="match_parent"
    android:layout_height="152dp"
    android:orientation="horizontal">

    <TextView android:id="@+id/textView"
        android:layout_width="144dp"
        android:layout_height="89dp"
        android:layout_weight="1"
        android:textSize="24sp"
        android:text="Product Id" />

    <EditText android:id="@+id/idd"
        android:layout_width="wrap_content"
        android:layout_height="match_parent"
        android:layout_weight="1" android:ems="10"
        android:inputType="textPersonName"
        android:textSize="24sp" />
</LinearLayout>

<Button
    android:id="@+id/delete"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:text="Delete" />
```

```xml
    <Button
        android:id="@+id/backd"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"android:text="Back"
        />
    </LinearLayout>
 </androidx.constraintlayout.widget.ConstraintLayout>
```

Output:
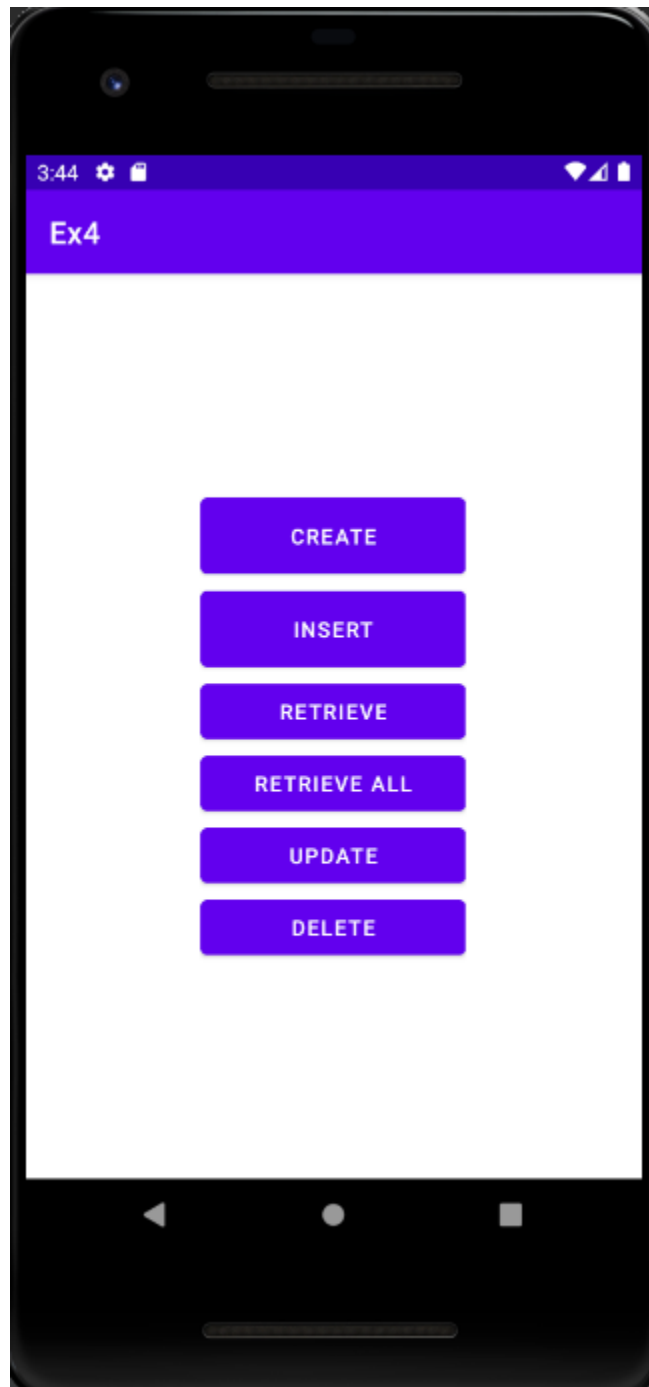
Ex4

CREATE

INSERT

RETRIEVE

RETRIEVE ALL

UPDATE

DELETE

Ex4

Id	Name	Brand	Description	Price
1	qwer	A	nice	1234
2	asdf	B	awesome	5678
4	zxcv	A	cool	4567

BACK

Ex4

Product Id 4

_____

Price 2345

_____

UPDATE

BACK

Product Id   1

DELETE

BACK
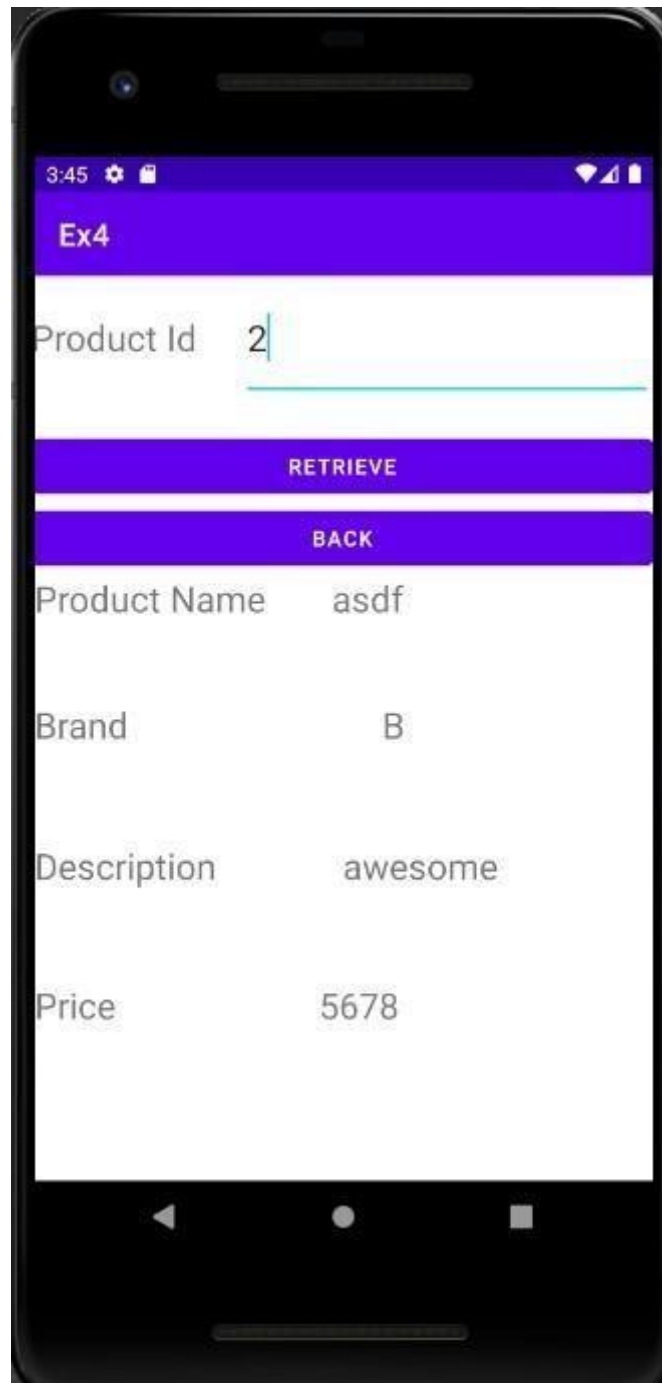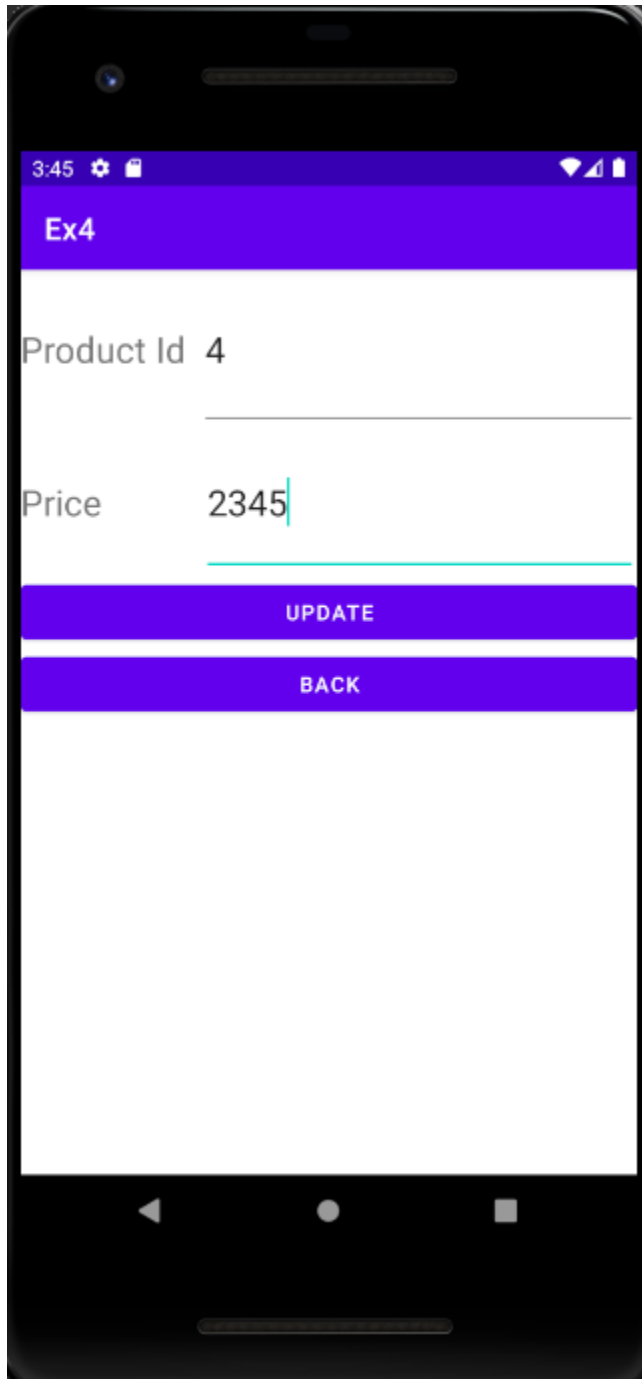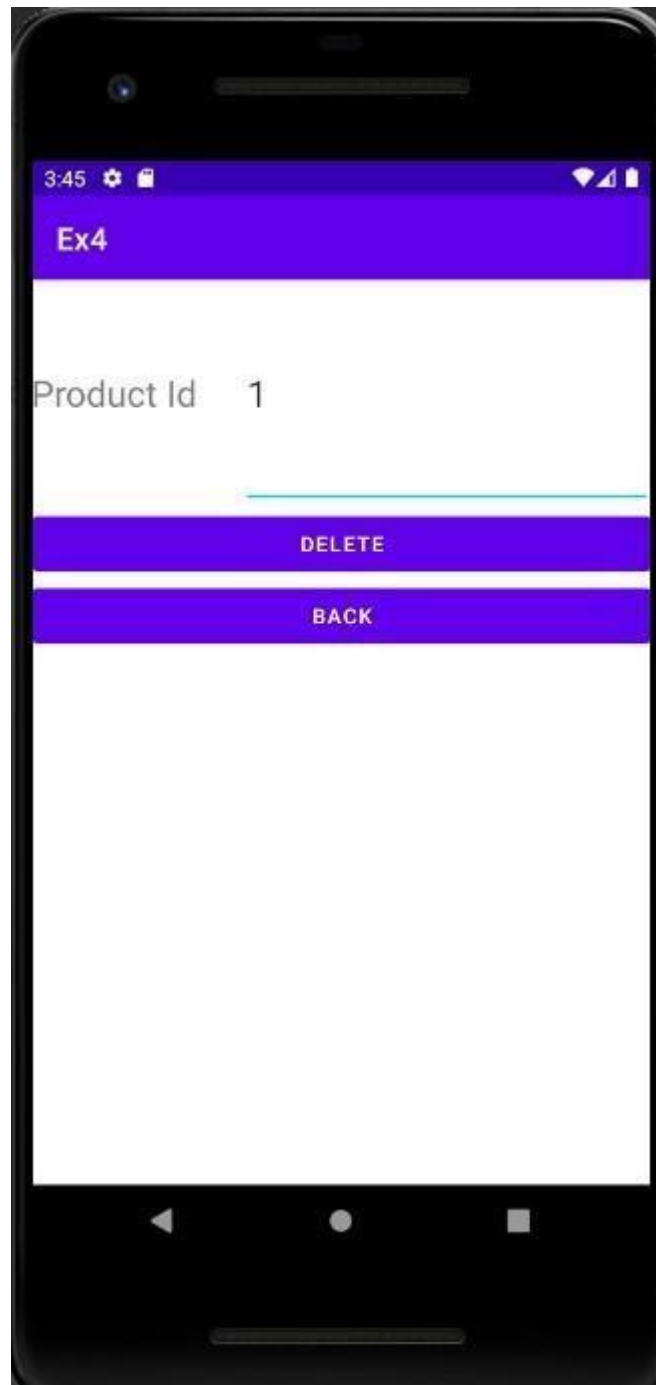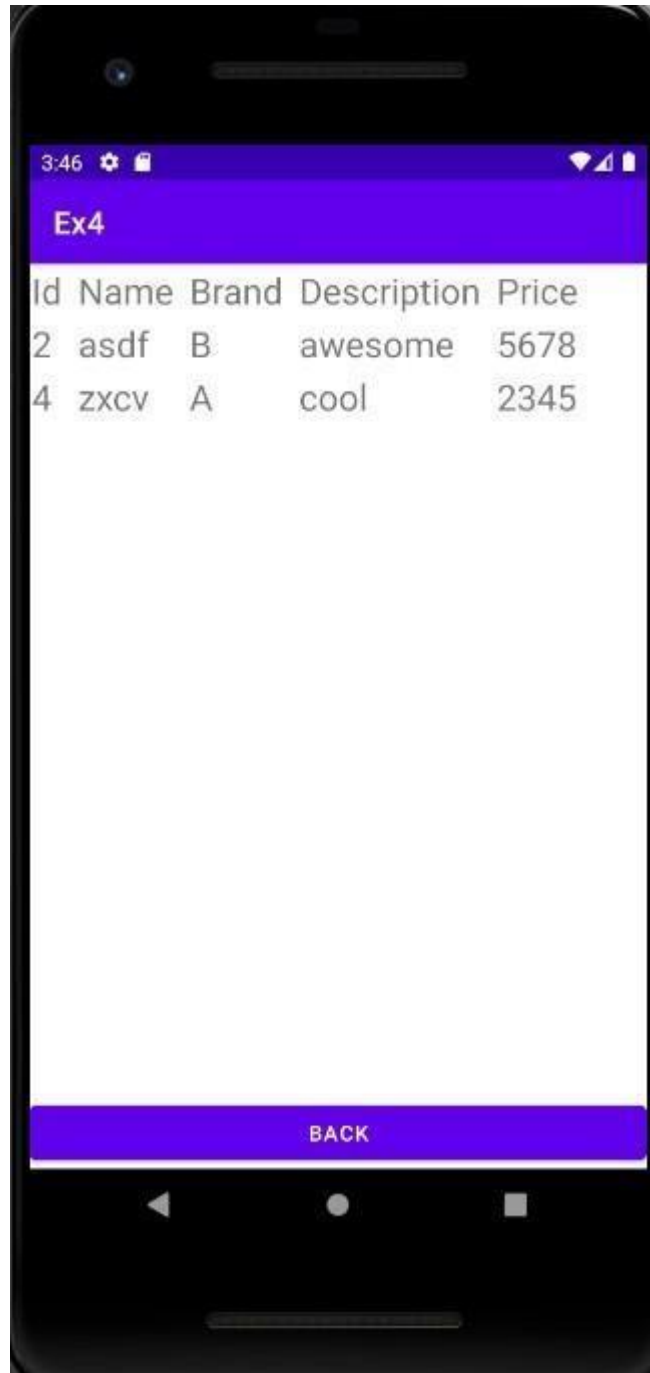
Best Practices:

- Used apt names for xml and java files.
- Set padding and margins for dynamically added elements

Learning Outcomes:

- Learnt to integrate sqlite3 in android studio
- Learnt to do CRUD operations