Exercise 1 - Designing Health Insurance Form using GUI Components

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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 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">
```

```xml
<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"
        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"
```

```xml
            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"
            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"
```

```xml
            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" >

    <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"
```

```xml
        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
    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"
```

```xml
        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
```

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

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

```xml
        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"
        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)
```

```java
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());

    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());
```

```java
        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);
        ((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"
        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>
```

```xml
    <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>

    <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"
```

```xml
        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);
```

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

        ((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>
```
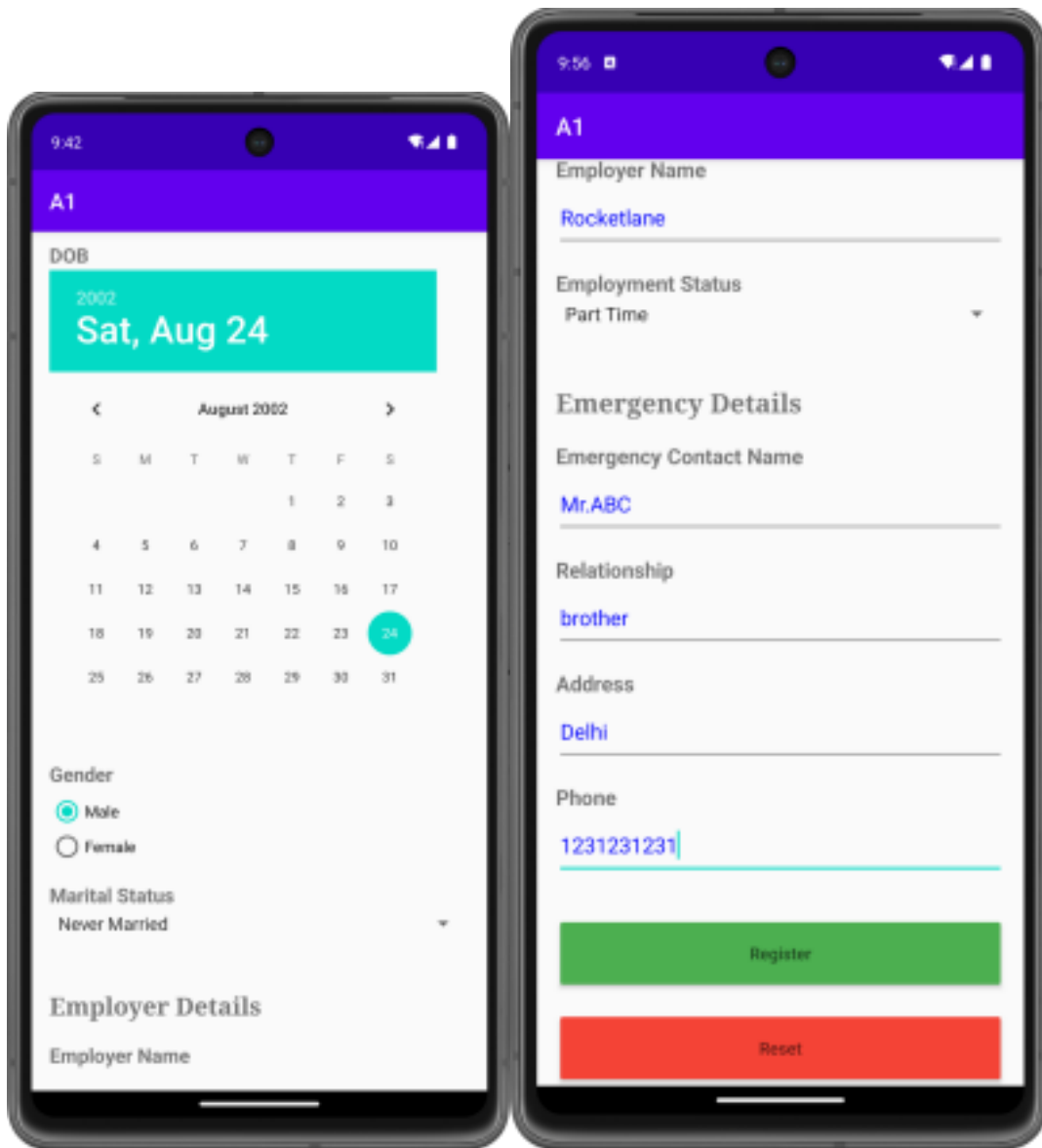
Output

Learning outcomes

Basic GUI components and layouts that are available

Passing data between activities

Exercise 2 - Keyboard application

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Aim

To implement a keyboard application using Android Studio

Code

activity_main.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);
```

```java
      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);

      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);
    }

    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));
```

```java
                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;
    }

  }
}
```
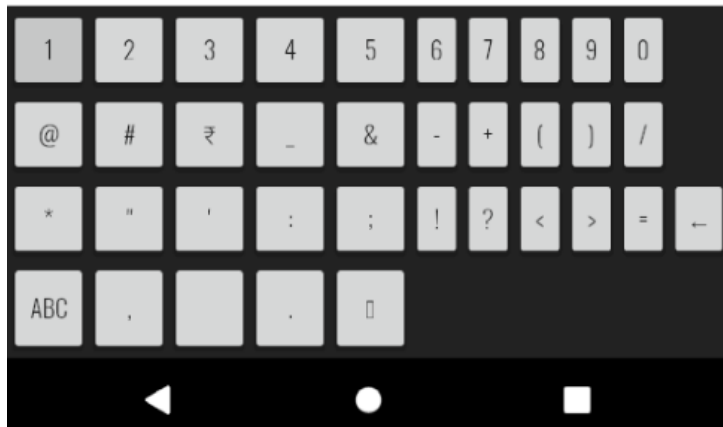
Output

11:19

qwerty

ERROR_404|

1	2	3	4	5	6	7	8	9	0
@	#	₹	_	&	-	+	(	)	/
*	"	'	:	;	!	?	<	>	=	←

ABC   ,   .   ⏎

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

car_body.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
```
<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
```
<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"
        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" />
```

```xml
    <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;
```

```java
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) {
                                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) {
                flipAnimator = ObjectAnimator.ofFloat(carImageView,
"rotationY", 180f, 0f);
                isCarFlipped = false;
            } else {
```

```java
                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();
```
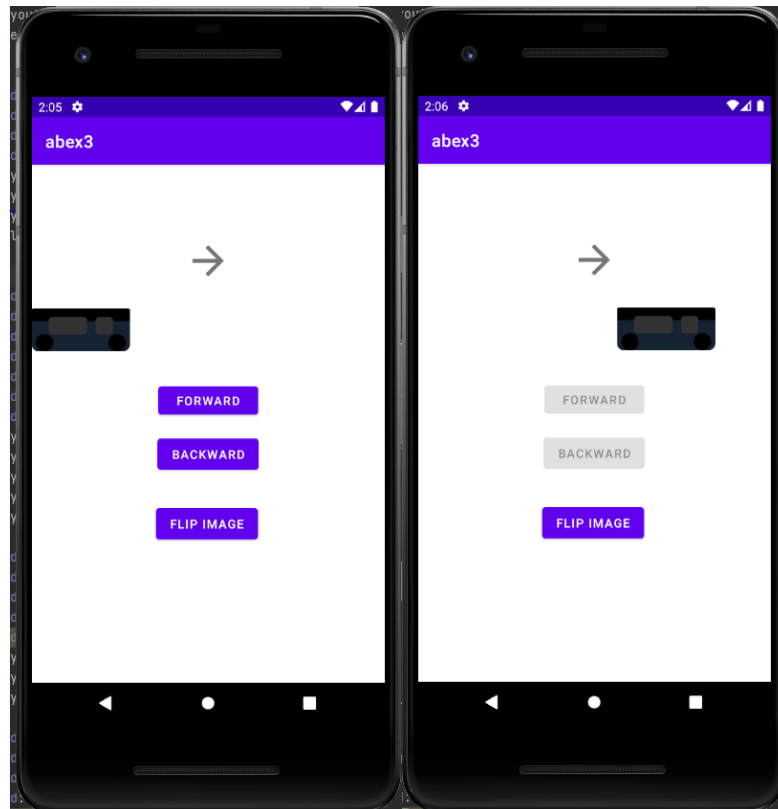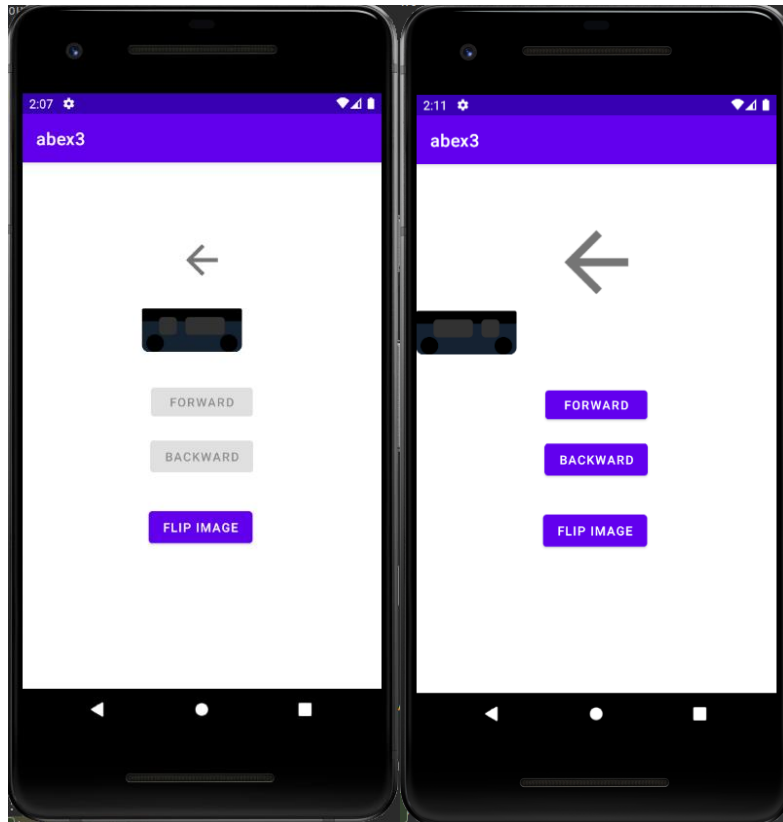
```
                    }
            });
      }
}
```

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.