

RVS SATYANAND
CSE-A
106118083
LAB-6

Application Apk: <https://drive.google.com/file/d/13MPwXwd-6HGCJs194ERAczY7FKsa3eh/view?usp=sharing>

Mobile Application Development Laboratory – 6

Experiment Name: Working With Shared Preferences.

Date: 22-03-2021

Aim: Design an Android application using Android Studio with the following specifications.

i) In an activity, have a menu with a list of menu items such as Help, Control, Settings, Exit. Upon clicking on the menu items, do the following.

- Help - Open help page of android using browser
- Settings - Open settings app of the mobile
- Exit - exit the application
- Control - Have options for the following:
 - Switch on/off bluetooth
 - Increase or decrease the brightness value
 - Control the mobile volume
 - Change orientation of the mobile phone

ii) Have text views and textboxes to get name, email id, mobile number from user and store it in sharedpreferences upon clicking a button. Have one more button, upon clicking, retrieve the information entered and display it on the screen.

Description of App: (The detailed working can be seen in screenshots)

1. We have an main Activity where we have a input fields(name, number, email)
2. Once the user submits the data is saved using sharedPreferences and there is one more button in main activity "Show" which once clicked will show the stored data.
3. In the Menu, we have Control, Settings , Help and Exit.
4. If Settings is clicked then the user will be redirected to the mobile setting option.
5. If Help is clicked then the user will be redirected to the Android Support Page.
6. If Control is clicked then one preference page will be shown in that page and the user has an option to turn off/on **Bluetooth**, change the **Orientation**, change the **Brightness** and to change the **Volume**.

Note: Whenever a user does something unexpected like not giving input etc then I flash a message.

Device Specifications:

Both the app run on min SDK version of 16 (so anything above API 16 - Android 4.1 - Jelly Bean would run this app which is 99.8% of devices). Currently, I have run it on Pixel API 30 for outputs. Only default libraries were used for making any app and nothing additional.

Name: Pixel_3

Resolution: 1080 X 2220

API: 30

Target: Android 11.0

hw.lcd.height: 2220

hw.accelerometer: yes

hw.device.manufacturer: Google

hw.lcd.width: 1080

hw.lcd.density: 440

hw.cpu.ncore: 6

hw.sensors.proximity: yes

hw.sensors.orientation: yes

hw.gpu.enabled: yes

Technical Concepts Learnt:

- **Ui perspective:** I learned Working with, ScrollView, TextView, Button, ConstraintLayout, background colors, **Material.io** for styling, **SlideBarPreference**, **PreferenceCategory**
- **Appln Perspective:**
 1. Working of **Shared Preferences**, **ListPreference**, **CheckBoxPreference** and **BluetoothAdapter**.

2. Working with **setOnPreferenceChangeListener** and **setRequestedOrientation**.
3. Handling exceptions using switch case and prompting errors using Toasts.
4. Checking if the valid input is provided or not.

Source Code:

AndroidManifest.xml

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    package="com.example.lab_6">

    <uses-permission android:name="android.permission.BLUETOOTH" />
    <uses-permission android:name="android.permission.BLUETOOTH_ADMIN" />
    <uses-permission android:name="android.permission.WRITE_SETTINGS"
        tools:ignore="ProtectedPermissions" />

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportRtl="true"
        android:theme="@style/Theme.Lab6">
        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

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

        <activity android:name=".Controls"></activity>
    </application>

</manifest>
```

activity_main.xml

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

    <LinearLayout 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:orientation="vertical"
tools:context=".MainActivity">
```

```
<TextView
    android:id="@+id/tv_title"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:gravity="center"
    android:padding="20dp"
    android:text="Details"
    android:textColor="@color/black"
    android:textSize="30sp"
    android:textStyle="bold|italic" />
```

```
<com.google.android.material.textfield.TextInputLayout
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_marginLeft="30dp"
    android:layout_marginRight="30dp"
    android:layout_marginBottom="10dp"
    android:padding="1dp"
    android:textColor="@color/white"
    android:textSize="16sp"
    android:textStyle="bold|italic">
```

```
<com.google.android.material.textfield.TextInputEditText
    android:id="@+id/name"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:background="@color/very_light_gray"
    android:hint="Name"
    android:imeOptions="actionNext"
    android:inputType="textCapWords"
    android:lines="1"
    android:singleLine="true"
    android:textColor="@color/black"
    android:textSize="16sp"
    android:textStyle="bold|italic" />
```

```
</com.google.android.material.textfield.TextInputLayout>
```

```
<com.google.android.material.textfield.TextInputLayout
    android:layout_width="match_parent"
```

```
android:layout_height="wrap_content"
android:layout_marginLeft="30dp"
android:layout_marginRight="30dp"
android:layout_marginBottom="10dp"
android:padding="1dp"
android:textColor="@color/white"
android:textSize="16sp"
android:textStyle="bold|italic">
```

```
<com.google.android.material.textfield.TextInputEditText
    android:id="@+id/email"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:background="@color/very_light_gray"
    android:hint="Email"
    android:imeOptions="actionNext"
    android:inputType="textEmailAddress"
    android:lines="1"
    android:singleLine="true"
    android:textColor="@color/black"
    android:textSize="16sp"
    android:textStyle="bold|italic" />
```

```
</com.google.android.material.textfield.TextInputLayout>
```

```
<com.google.android.material.textfield.TextInputLayout
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_marginLeft="30dp"
    android:layout_marginRight="30dp"
    android:layout_marginBottom="10dp"
    android:padding="1dp"
    android:textColor="@color/white"
    android:textSize="16sp"
    android:textStyle="bold|italic">
```

```
<com.google.android.material.textfield.TextInputEditText
    android:id="@+id/mb"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:background="@color/very_light_gray"
    android:hint="Mobile Number"
    android:imeOptions="actionDone"
    android:inputType="numberSigned"
    android:lines="1"
    android:singleLine="true"
    android:textColor="@color/black"
```

```

        android:textSize="16sp"
        android:textStyle="bold|italic" />
</com.google.android.material.textfield.TextInputLayout>

<androidx.appcompat.widget.AppCompatButton
    android:id="@+id/submit"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_gravity="center"
    android:layout_marginTop="10dp"
    android:layout_marginBottom="20dp"
    android:background="@drawable/btn_state_green_gray"
    android:elevation="8dp"
    android:paddingStart="50dp"
    android:paddingTop="10dp"
    android:paddingEnd="50dp"
    android:paddingBottom="10dp"
    android:text="Submit"
    android:textColor="@color/white"
    android:textSize="18sp"
    android:textStyle="bold" />

<LinearLayout
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_marginLeft="30dp"
    android:layout_marginRight="30dp"
    android:orientation="vertical">

    <com.google.android.material.textview.MaterialTextView
        android:id="@+id/nameOutput"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:fontFamily="@string/fab_transformation_scrim_behavior"
        android:textFontWeight="700"
        android:textSize="20sp" />

    <com.google.android.material.textview.MaterialTextView
        android:id="@+id/emailOutput"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:fontFamily="@string/fab_transformation_scrim_behavior"
        android:textFontWeight="700"
        android:textSize="20sp" />

```

```

        <com.google.android.material.textview.MaterialTextView
            android:id="@+id/mobileNumberOutput"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:fontFamily="@string/fab_transformation_scrim_behavior"
            android:textFontWeight="700"
            android:textSize="20sp" />
    </LinearLayout>

    <androidx.appcompat.widget.AppCompatButton
        android:id="@+id/show"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_gravity="center"
        android:layout_marginTop="30dp"
        android:background="@drawable/btn_state_green_gray"
        android:paddingStart="50dp"
        android:paddingTop="10dp"
        android:paddingEnd="50dp"
        android:paddingBottom="10dp"
        android:text="Show"
        android:textColor="@color/white"
        android:textSize="18sp"
        android:textStyle="bold" />

</LinearLayout>
</ScrollView>

```

prefs.xml

```

<?xml version="1.0" encoding="utf-8"?>
<PreferenceScreen xmlns:android="http://schemas.android.com/apk/res/android">

    <PreferenceCategory android:title="Enable Bluetooth">
        <CheckBoxPreference
            android:defaultValue="false"
            android:key="BLUETOOTH"
            android:summaryOff=" Bluetooth is Off"
            android:summaryOn=" Bluetooth is On"
            android:title="BLUETOOTH" />
    </PreferenceCategory>

    <PreferenceCategory android:title="Screen Orientation">
        <ListPreference
            android:defaultValue="false"

```

```

        android:entries="@array/item_name"
        android:entryValues="@array/item_values"
        android:key="ORIENTATION"
        android:title="Orientation" />
    </PreferenceCategory>

    <PreferenceCategory android:title="BRIGHTNESS">
        <SeekBarPreference
            android:id="@+id/brightness"
            android:layout_width="300dp"
            android:layout_height="wrap_content"
            android:defaultValue="0"
            android:key="BRIGHTNESS"
            android:max="100" />
    </PreferenceCategory>

    <PreferenceCategory android:title="VOLUME">
        <SeekBarPreference
            android:id="@+id/volume"
            android:layout_width="300dp"
            android:layout_height="wrap_content"
            android:key="VOLUME"
            android:max="15"
            android:progress="50" />
    </PreferenceCategory>
</PreferenceScreen>

```

MainActivity.java

```

package com.example.lab_6;

import androidx.annotation.NonNull;
import androidx.appcompat.app.AppCompatActivity;

import android.content.Context;
import android.content.Intent;
import android.content.SharedPreferences;
import android.net.Uri;
import android.os.Bundle;
import android.preference.Preference;
import android.provider.Settings;
import android.view.Menu;
import android.view.MenuItem;
import android.view.View;
import android.widget.Button;

```



```

import android.widget.EditText;
import android.widget.TextView;
import android.widget.Toast;

import java.net.URI;
import java.net.URL;

public class MainActivity extends AppCompatActivity {

    EditText name, email, mobileNumber;
    TextView nameOut, emailOut, mobileNumberOut;
    Button button, button2;
    SharedPreferences sp;

    private boolean isValidMail(String email) {
        return android.util.Patterns.EMAIL_ADDRESS.matcher(email).matches();
    }

    private boolean isValidMobile(String phone) {
        return android.util.Patterns.PHONE.matcher(phone).matches();
    }

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

        name = findViewById(R.id.name);
        email = findViewById(R.id.email);
        mobileNumber = findViewById(R.id.mb);

        nameOut = findViewById(R.id.nameOutput);
        emailOut = findViewById(R.id.emailOutput);
        mobileNumberOut = findViewById(R.id.mobileNumberOutput);

        button = findViewById(R.id.submit);
        button2 = findViewById(R.id.show);

        sp = getSharedPreferences("MyUserPrefs", Context.MODE_PRIVATE);

        button.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {

                if (name.getText().toString().trim().length() <= 2) {

```

```

        Toast.makeText(MainActivity.this, "Name Should have atleast 3 characters!",
Toast.LENGTH_LONG).show();
        return;
    }

    if (!isValidMail(email.getText().toString())) {
        Toast.makeText(MainActivity.this, "Enter Valid Email!", Toast.LENGTH_LONG).show();
        return;
    }

    if (!isValidMobile(mobileNumber.getText().toString()) || mobileNumber.getText().toString().trim().length() <= 6
|| mobileNumber.getText().toString().trim().length() > 13) {
        Toast.makeText(MainActivity.this, "Enter Valid Number of length between 7 digit to 13 digit!",
Toast.LENGTH_LONG).show();
        return;
    }

    SharedPreferences.Editor editor = sp.edit();

    editor.putString("name", name.getText().toString());
    editor.putString("email", email.getText().toString());
    editor.putString("mobileNumber", mobileNumber.getText().toString());
    editor.commit();

    Toast.makeText(MainActivity.this, "Information Saved", Toast.LENGTH_LONG).show();
}
});

button2.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {

        if (sp.getString("name", "").trim().length() <= 0) {
            Toast.makeText(MainActivity.this, "First Insert Data!", Toast.LENGTH_LONG).show();
            return;
        }
        nameOut.setText("Name: " + sp.getString("name", ""));
        emailOut.setText("Email: " + sp.getString("email", ""));
        mobileNumberOut.setText("Number: " + sp.getString("mobileNumber", ""));
    }
});
}

@Override

```

```

public boolean onCreateOptionsMenu(Menu menu) {
    getMenuInflater().inflate(R.menu.my_menu, menu);
    return super.onCreateOptionsMenu(menu);
}

@Override
public boolean onOptionsItemSelected(@NonNull MenuItem item) {
    switch (item.getItemId()) {
        case R.id.setp: {
            startActivityForResult(new Intent(android.provider.Settings.ACTION_SETTINGS), 0);
            break;
        }
        case R.id.ctrl: {
            Intent i = new Intent(this, Controls.class);
            startActivity(i);
            break;
        }
        case R.id.hlp: {
            Intent i = new Intent(Intent.ACTION_VIEW,
Uri.parse("https://support.google.com/android/?hl=en#topic=7313011"));
            startActivity(i);
            break;
        }
        case R.id.ext: {
            finish();
            System.exit(0);
            break;
        }
    }

    return super.onOptionsItemSelected(item);
}
}

```

Controls.java

```

package com.example.lab_6;

import android.bluetooth.BluetoothAdapter;
import android.content.ContentResolver;
import android.content.Context;
import android.content.SharedPreferences;
import android.content.pm.ActivityInfo;
import android.graphics.Color;
import android.media.AudioManager;

```

```

import android.os.Bundle;
import android.os.PersistableBundle;
import android.preference.CheckBoxPreference;
import android.preference.ListPreference;
import android.preference.Preference;
import android.preference.PreferenceActivity;
import android.preference.PreferenceCategory;
import android.preference.PreferenceManager;
import android.util.Log;
import android.view.Window;
import android.view.WindowManager;
import android.widget.Toast;

public class Controls extends PreferenceActivity {

    @Override
    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        addPreferencesFromResource(R.xml.prefs);
        Load_setting();
    }

    public boolean setBluetooth(boolean enable) {
        BluetoothAdapter bluetoothAdapter = BluetoothAdapter.getDefaultAdapter();
        boolean isEnabled = bluetoothAdapter.isEnabled();
        if (enable && !isEnabled) {
            return bluetoothAdapter.enable();
        } else if (!enable && isEnabled) {
            return bluetoothAdapter.disable();
        }

        if (enable)
            Toast.makeText(getApplicationContext(), "Bluetooth Turned On", 1);
        else
            Toast.makeText(getApplicationContext(), "Bluetooth Turned Off", 1);

        // No need to change bluetooth state
        return true;
    }

    private void Load_setting() {

        CheckBoxPreference bluetooth_instant = (CheckBoxPreference) findPreference("BLUETOOTH");
    }

```

```

        bluetooth_instant.setOnPreferenceChangeListener(new
android.preference.Preference.OnPreferenceChangeListener() {
    @Override
    public boolean onPreferenceChange(android.preference.Preference prefs, Object obj) {
        boolean yes = (boolean) obj;
        if (yes) {
            setBluetooth(true);
        } else {
            setBluetooth(false);
        }

        return true;
    }
});

```

```

SharedPreferences sp = PreferenceManager.getDefaultSharedPreferences(this);

```

```

android.preference.Preference b = findPreference("BRIGHTNESS");
b.setOnPreferenceChangeListener((prefs, obj) -> {
    float sb = (int) obj;
    WindowManager.LayoutParams lp = getWindow().getAttributes();
    lp.screenBrightness = sb / 100.0f;
    getWindow().setAttributes(lp);
    return true;
});

```

```

android.preference.Preference vol = findPreference("VOLUME");
vol.setOnPreferenceChangeListener((prefs, obj) -> {
    int sb = (int) obj;
    AudioManager audioManager = (AudioManager)
getApplicationContext().getSystemService(Context.AUDIO_SERVICE);
    audioManager.setStreamVolume(AudioManager.STREAM_MUSIC, sb, 1);
    return true;
});

```

```

ListPreference LP = (ListPreference) findPreference("ORIENTATION");
String orien = sp.getString("ORIENTATION", "false");

```

```

if ("1".equals(orien)) {
    setRequestedOrientation(ActivityInfo.SCREEN_ORIENTATION_BEHIND);

    LP.setSummary(LP.getEntry());
} else if ("2".equals(orien)) {

```

```

        setRequestedOrientation(ActivityInfo.SCREEN_ORIENTATION_PORTRAIT);

        LP.setSummary(LP.getEntry());
    } else if ("3".equals(orien)) {
        setRequestedOrientation(ActivityInfo.SCREEN_ORIENTATION_LANDSCAPE);
        LP.setSummary(LP.getEntry());
    }

    LP.setOnPreferenceChangeListener(new android.preference.Preference.OnPreferenceChangeListener() {
        @Override
        public boolean onPreferenceChange(android.preference.Preference prefs, Object obj) {

            String items = (String) obj;
            if (prefs.getKey().equals("ORIENTATION")) {
                switch (items) {
                    case "1":
                        setRequestedOrientation(ActivityInfo.SCREEN_ORIENTATION_BEHIND);
                        break;
                    case "2":
                        setRequestedOrientation(ActivityInfo.SCREEN_ORIENTATION_PORTRAIT);
                        break;
                    case "3":
                        setRequestedOrientation(ActivityInfo.SCREEN_ORIENTATION_LANDSCAPE);
                        break;
                }

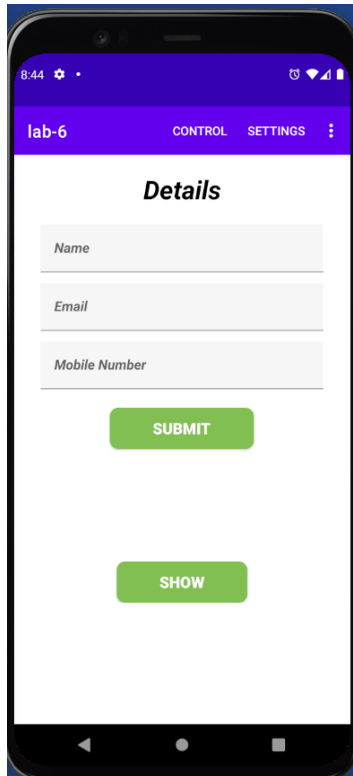
                ListPreference LPP = (ListPreference) prefs;
                LPP.setSummary(LPP.getEntries()[LPP.findIndexOfValue(items)]);

            }
            return true;
        }
    });
}

@Override
protected void onResume() {
    Load_setting();
    super.onResume();
}
}

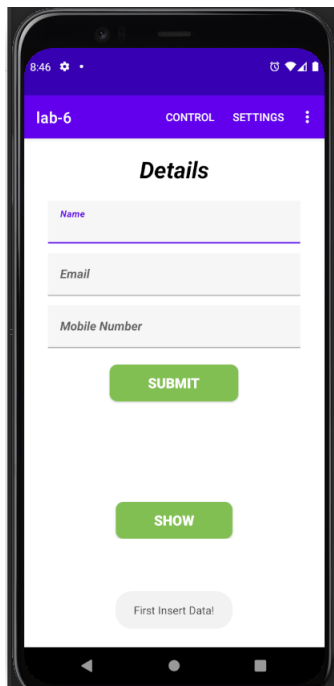
```

Screenshots:
Start:



A screenshot of a mobile application interface titled "lab-6". The top navigation bar is purple with the text "lab-6", "CONTROL", and "SETTINGS". Below the navigation bar, the title "Details" is centered. There are three input fields: "Name", "Email", and "Mobile Number". Below these fields are two green buttons: "SUBMIT" and "SHOW".

If user clicks on Show before entering any data(Showing a msg to insert data):



A screenshot of the same mobile application interface as the first screenshot. The "Name" input field is highlighted with a blue border. Below the "SUBMIT" and "SHOW" buttons, a new message "First Insert Data!" is displayed in a light gray box.

If the user doesn't enter correct input then showing Toast msg to correct them:

The screenshot shows a mobile application interface with a purple header bar. The header contains the text 'lab-6' on the left, and 'CONTROL' and 'SETTINGS' on the right, followed by a three-dot menu icon. Below the header, the title 'Details' is centered. The form consists of three input fields: 'Name' with the value 'A', 'Email' with the value 'sasa', and 'Mobile Number' with the value '848'. Below the form are two green buttons: 'SUBMIT' and 'SHOW'. At the bottom, a light gray toast message is displayed: 'Name Should have atleast 3 characters!'. The status bar at the top shows the time 8:47, a settings icon, and signal/battery indicators.

8:47

lab-6 CONTROL SETTINGS

Details

Name
A

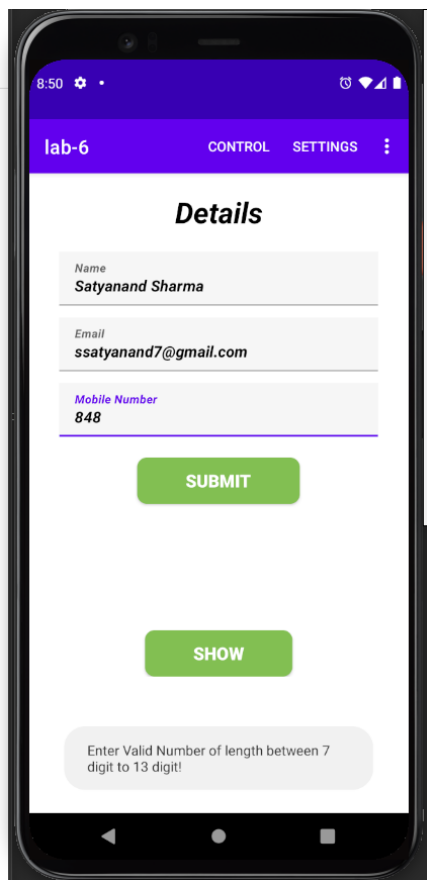
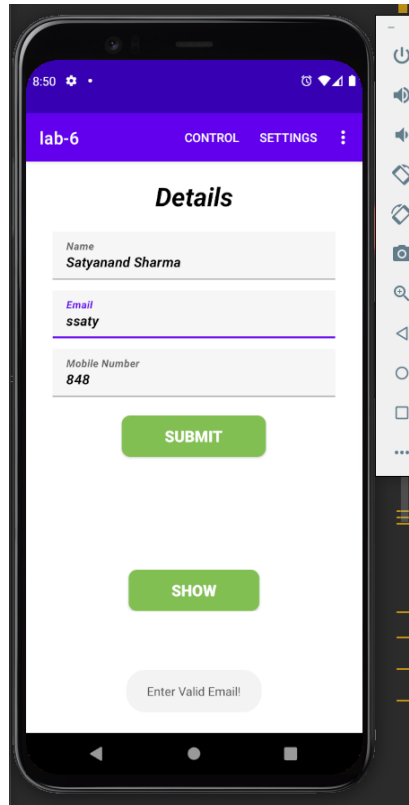
Email
sasa

Mobile Number
848

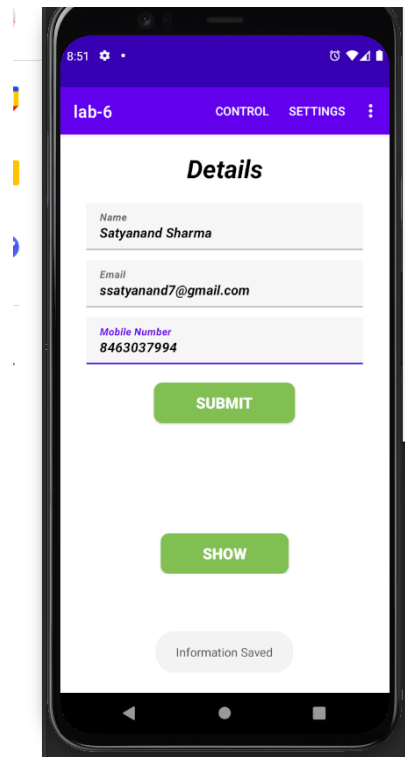
SUBMIT

SHOW

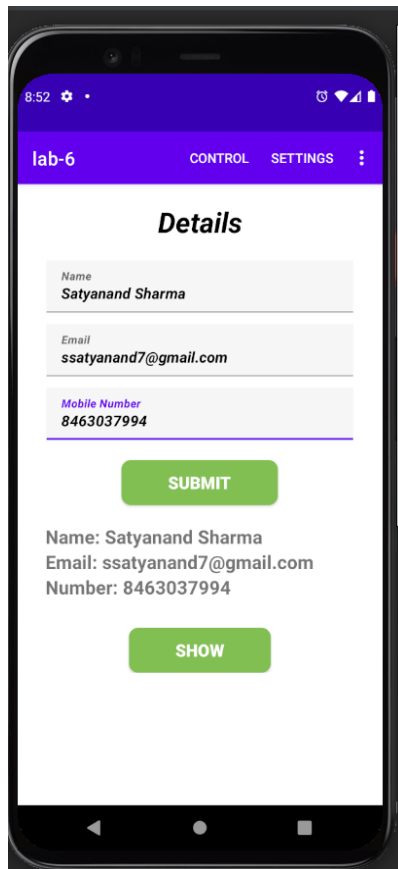
Name Should have atleast 3 characters!



After Entering Valid Data:



Now Clicking On Show:

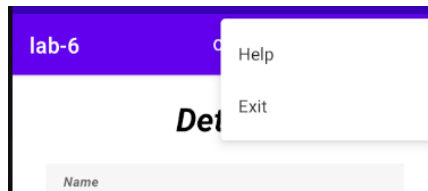


Part-1:

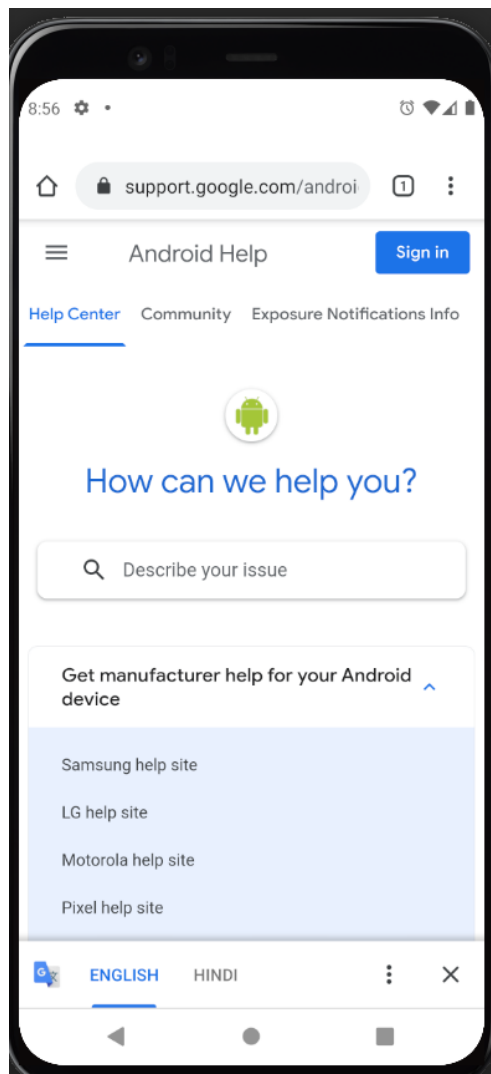
The options can be seen available in menu



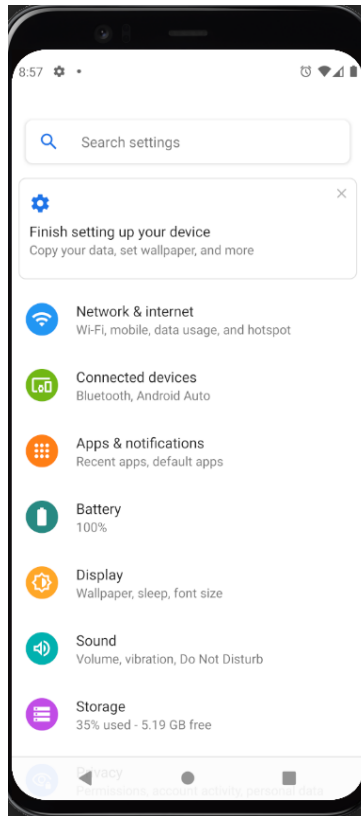
Remaining Options Can be seen after clicking 3 dots.



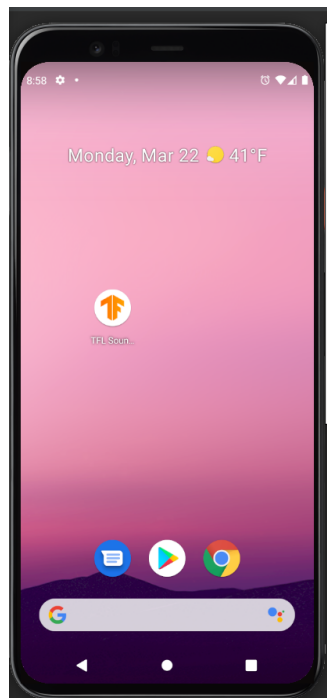
On Clicking On Help (Will be redirected to Android Support Page):



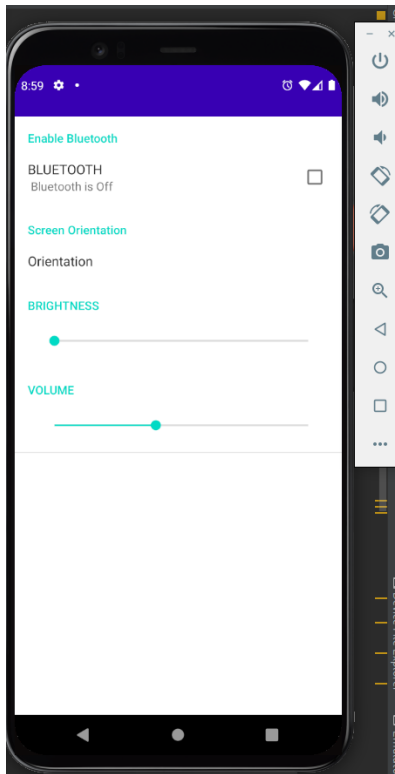
On Clicking Setting (Will be redirected to mobile settings):



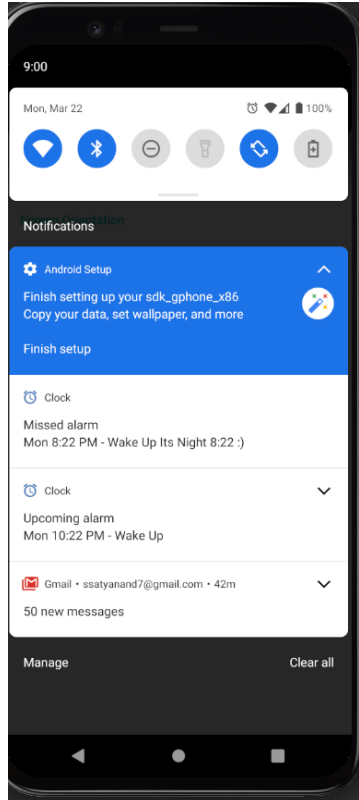
On Clicking Exit (Will Close the application):



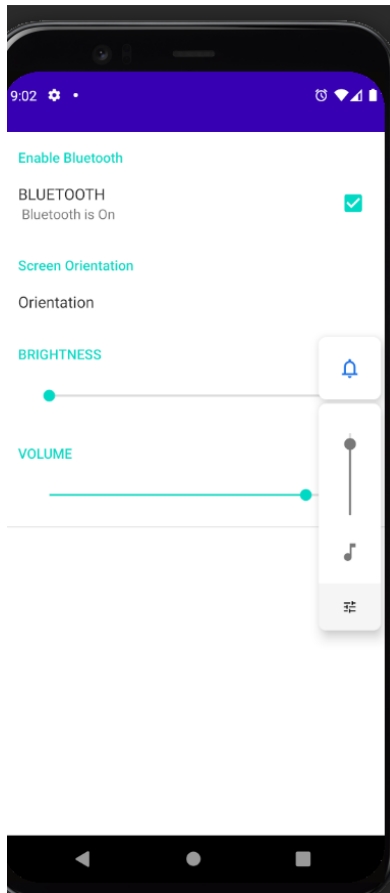
On Clicking Control:



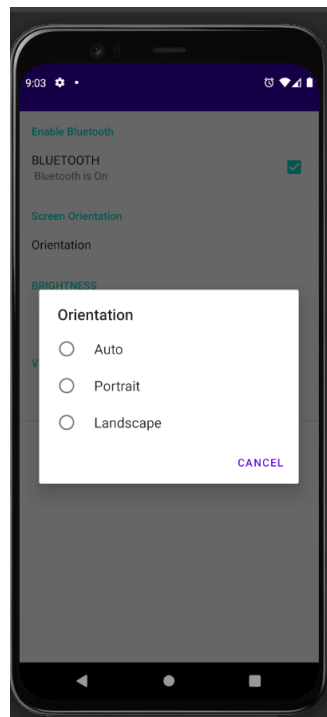
After Clicking Bluetooth Option (It turns On):



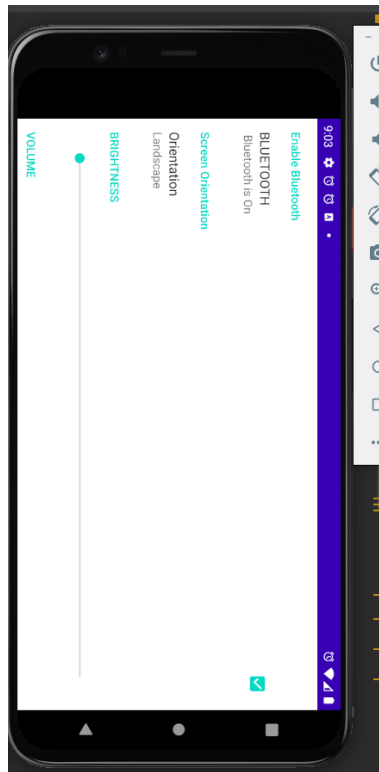
On Changing the Volume Bar:



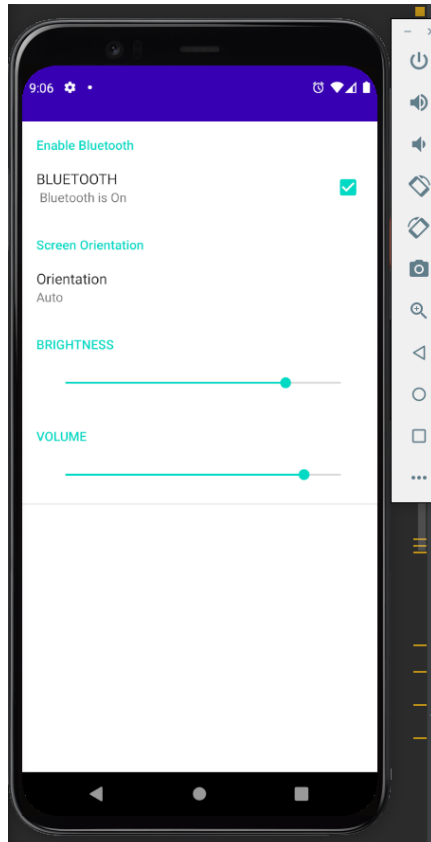
On Clicking Orientation:



On clicking Landscape mode the orientation changes:



On increasing screen brightness (It brightens):



Outcomes: The app was developed, and the saved data from the Shared Preference were displayed on the screen. The Control Preference helps in increasing the ease of user interaction(as it provides multiple options to change such as bluetooth, brightness, volume).

Practical Applications:

1. Can design a music app which can turn on bluetooth to connect to music devices.
2. Can develop an application which senses how loud a music is, so if the music is too loud then it can reduce the volume for the user and can raise it if needed.