EX 1	A User Interface using Basic Widgets: Buttons, Text Fields, Image Views, and Spinners in Android

Aim

To design a user interface using basic widgets such as buttons, text fields, image views, and spinners in Android.

Definitions

User Interface

A user interface (UI) is the point where humans interact with machines, encompassing everything a user sees, hears, or touches to control a device or software, like buttons, icons, screens, and voice commands, designed to make that interaction intuitive, efficient, and enjoyable, forming the visual and interactive layer of an application or product.

Widgets

Widgets are small, interactive app components that display timely information and offer quick actions directly on your device's home screen or desktop, providing glanceable content like weather, calendars, or news without needing to fully open the app, and they are customizable on platforms like iOS, Android, and Windows for personalization.

Buttons

In Android UI development, a **button** is an interactive user interface control (a subclass of the `TextView` class) that allows users to perform an action or make a choice with a single tap. It can contain text, an icon, or both, which communicate the action that will occur when the user interacts with it.

Text Fields

In Android UI, a **text field** is a control element that allows users to enter and edit text. In traditional Android *Views*, text fields are primarily implemented using the **`EditText`** class, while in modern **Jetpack Compose**, the `TextField` composable is used.

Image Views

An **`ImageView`** in Android UI is a widget used to **display image resources** such as bitmaps (e.g., JPEG, PNG) or drawables (e.g., icons, shapes) within an application's layout. It is a fundamental building block of the user interface, inheriting from the `View` class.

Spinners

A **Spinner** in Android UI is a widget that functions as a **drop-down list**, allowing users to select a single value from a predefined set of options.

Procedure

1. Open Android Studio IDE → select "Start a New Android Studio Project → specify the application name "UIWidgets" and company domain "com.uiwidgets" → click "next" → choose Minimum SDK "API 17:Android 4.2(Jelly Bean)" → click "Next" → choose "Blank Activity" → click "next" → specify the Activity Name "UIWidgets" → click "Finish".
2. Open UIWidgets.java under app/java/ uiwidgets.com. uiwidgets and type the following codes:

UIWidgets.java

```
package uiwidgets.com.uiwidgets;

import android.os.Bundle;
import android.view.View;
import android.widget.ArrayAdapter;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Spinner;
import android.widget.Toast;
import android.support.v7.app.AppCompatActivity;

public class UIWidgets extends AppCompatActivity {

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

      // 1. Initialize Widgets
      final EditText textField = (EditText) findViewById(R.id.myTextField);
      final Spinner spinner = (Spinner) findViewById(R.id.mySpinner);
      Button button = (Button) findViewById(R.id.myButton);

      // 2. Populate the Spinner with data
      String[] options = {"Option A", "Option B", "Option C"};
      ArrayAdapter<String> adapter = new ArrayAdapter<>(this,
            android.R.layout.simple_spinner_dropdown_item, options);
      spinner.setAdapter(adapter);

      // 3. Set Button Click Listener
      button.setOnClickListener(new View.OnClickListener() {
         @Override
         public void onClick(View v) {
            String input = textField.getText().toString();
            String selected = spinner.getSelectedItem().toString();

            Toast.makeText(UIWidgets.this,
                  "Text: " + input + "\nSelected: " + selected,
```

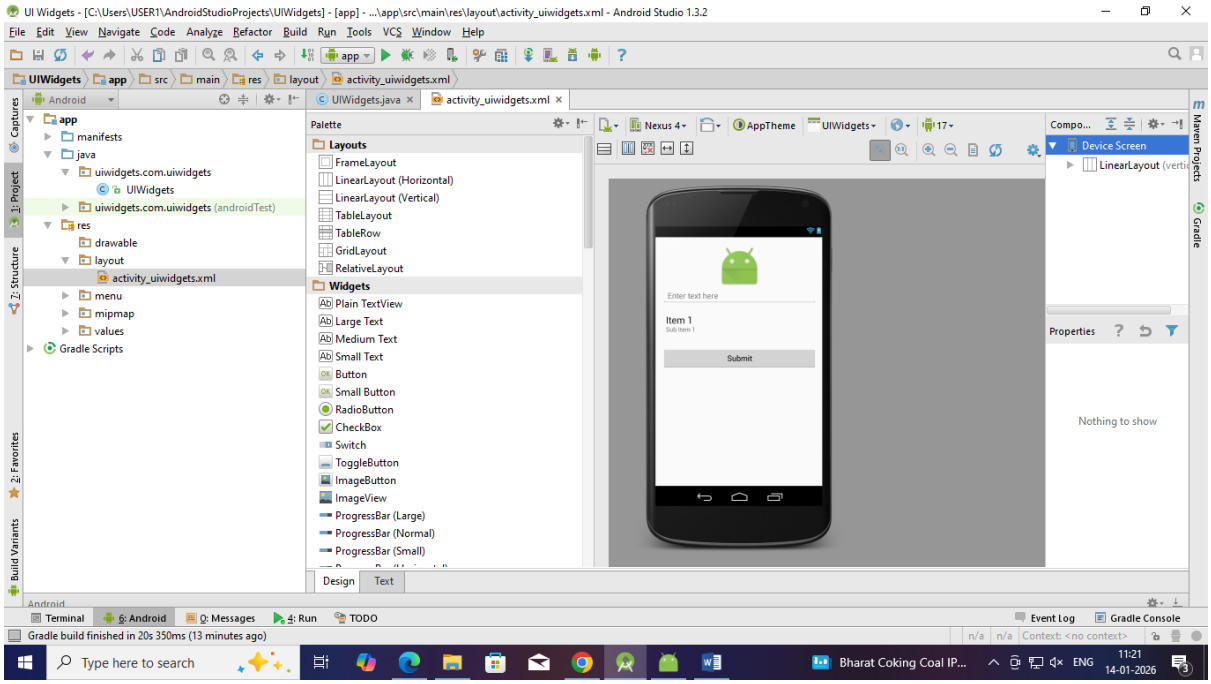
```
                Toast.LENGTH_SHORT).show();
        }
      });
  }
}
```

3. Open activity_uiwidgets.xml under app/res/layout and type the following codes:

activity_uiwidgets.xml

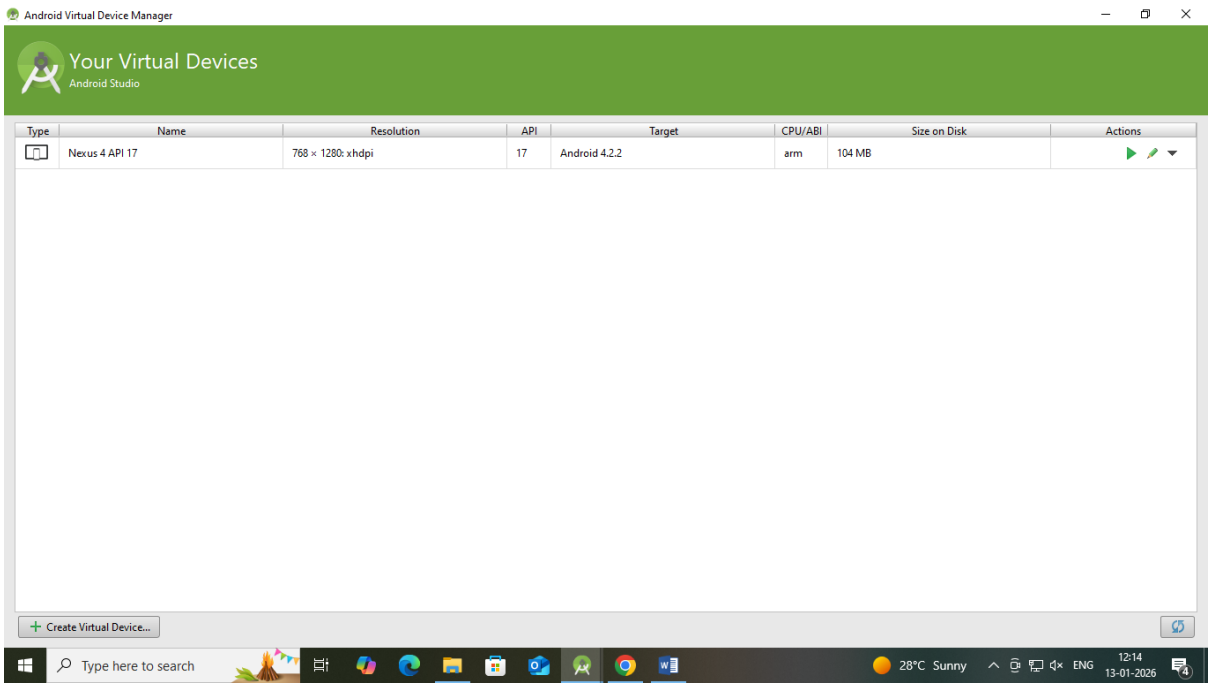
```
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
  android:layout_width="match_parent"
  android:layout_height="match_parent"
  android:orientation="vertical"
  android:padding="16dp">

  <ImageView
    android:id="@+id/myImageView"
    android:layout_width="100dp"
    android:layout_height="100dp"
    android:layout_gravity="center"
    android:src="@mipmap/ic_launcher" />

  <EditText
    android:id="@+id/myTextField"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:hint="Enter text here" />

  <Spinner
    android:id="@+id/mySpinner"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_marginTop="16dp" />

  <Button
    android:id="@+id/myButton"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_marginTop="20dp"
    android:text="Submit" />

</LinearLayout>
```

4. The design of the application will be as follows:



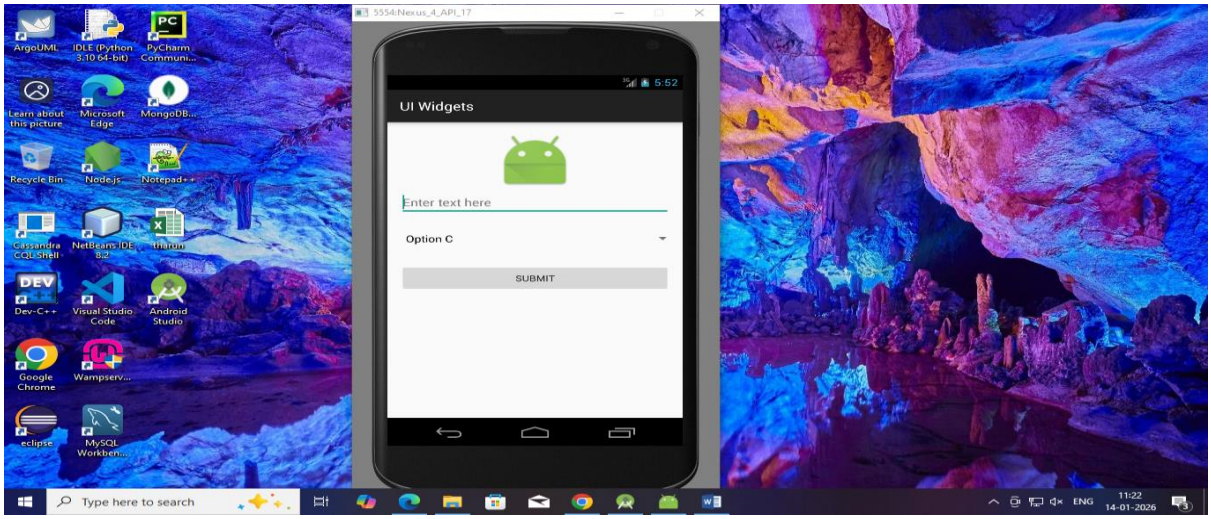
5. Go to Tools → android → AVD Manager → click "+ create a virtual device" → select "phone" from category → select "Nexus 4" from the list → click "next" → select Release name: Jelly Bean, API Level: 17, ABI: armeabi-v7a, Target: Android 4.4.2 from the list → click "next" → Choose orientation "portrait" → click "finish".

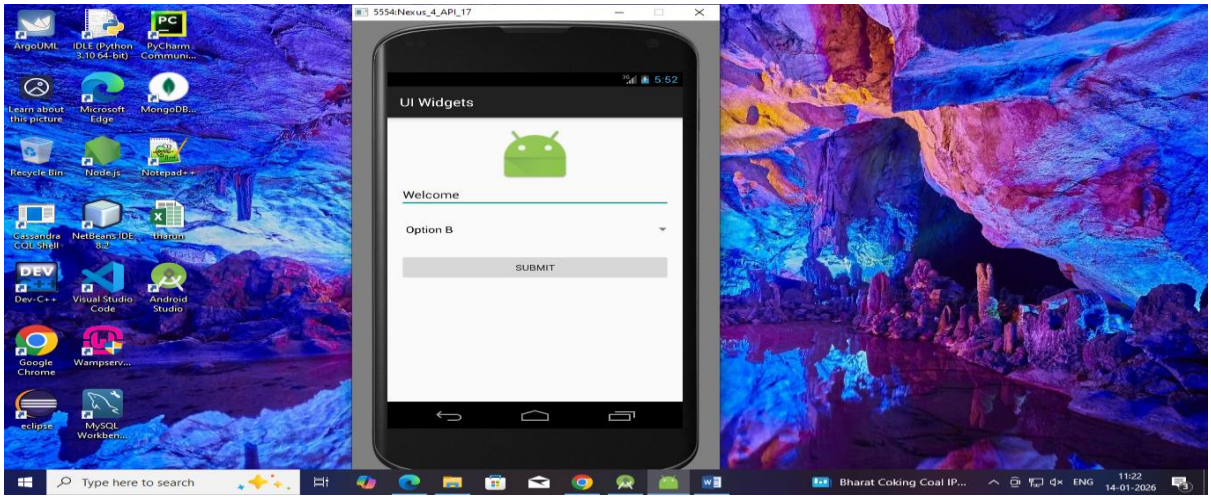
The following window will appear after configuring AVD:

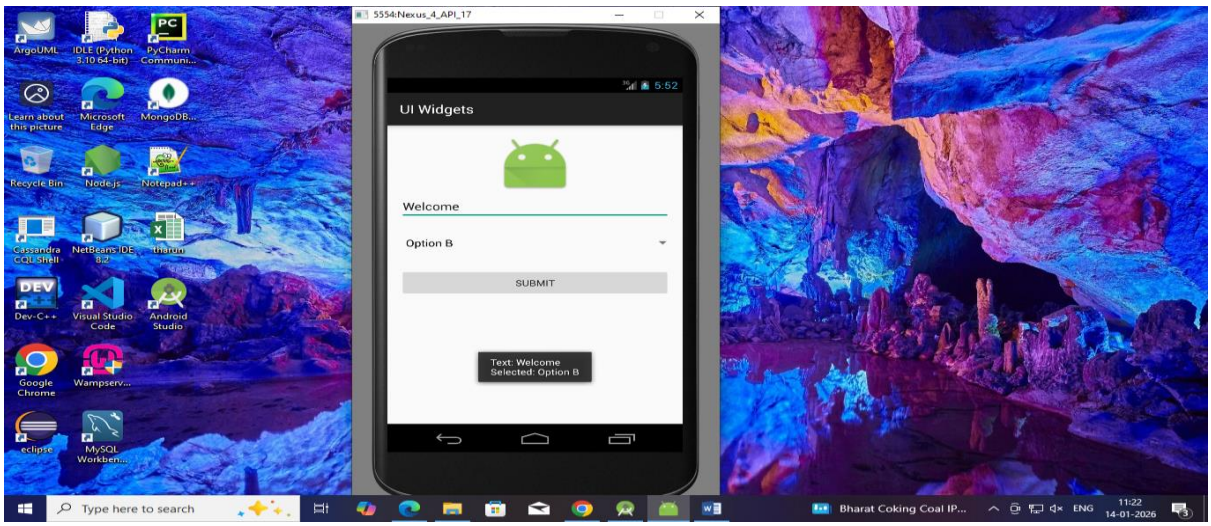


6. Click “Run app” button in the Android Studio → choose android virtual device → click “ok”.

Output







Result

Thus, a user interface using basic widgets such as buttons, text fields, image views, and spinners has been designed in Android.