Q1] Write a program to implement following functions in numpy library Array, arange, len, ndim, slicing, copy, view, reshape, concatenate, split

```python
import numpy as np
# Array function
def my_array(arr_list):
    return np.array(arr_list)
# arange function
def my_arange(start, stop, step=1):
    return np.arange(start, stop, step)
# len function
def my_len(arr):
    return len(arr)
# ndim function
def my_ndim(arr):
    return arr.ndim
# slicing function
def my_slicing(arr, start=None, stop=None, step=None):
    return arr[start:stop:step]
# copy function
def my_copy(arr):
    return arr.copy()
# view function
def my_view(arr):
    return arr.view()
# reshape function
def my_reshape(arr, shape):
    if np.prod(shape) != np.prod(arr.shape):
        raise ValueError("Cannot reshape array into the specified shape")
    return arr.reshape(shape)
# concatenate function
def my_concatenate(arr1, arr2, axis=0):
```

```python
    return np.concatenate((arr1, arr2), axis=axis)
# split function
def my_split(arr, indices, axis=0):
    return np.split(arr, indices, axis=axis)
# Testing the functions
arr1 = my_array([1, 2, 3, 4, 5])
arr2 = my_array([6, 7, 8, 9, 10])
print("Array:")
print(arr1)
print("\narange:")
print(my_arange(0, 10, 2))
print("\nlen:")
print(my_len(arr1))
print("\nndim:")
print(my_ndim(arr1))
print("\nslicing:")
print(my_slicing(arr1, 1, 4, 1))
print("\ncopy:")
arr1_copy = my_copy(arr1)
print(arr1_copy)
print("\nview:")
arr1_view = my_view(arr1)
print(arr1_view)
print("\nreshape:")
arr1_reshaped = my_reshape(arr1, (1, 5))  # Corrected reshape to (1, 5)
print(arr1_reshaped)
print("\nconcatenate:")
print(my_concatenate(arr1, arr2))
print("\nsplit:")
arr_split = my_split(arr1, [2, 4])  # Split into parts of sizes [2, 3]
```

print(arr_split)

Output:

```
In [4]: runfile('D:/python/numpy_Lib.py', wdir='D:/python')
Array:
[1 2 3 4 5]

arange:
[0 2 4 6 8]

len:
5

ndim:
1

slicing:
[2 3 4]

copy:
[1 2 3 4 5]

view:
[1 2 3 4 5]

reshape:
[[1 2 3 4 5]]
```

```
reshape:
[[1 2 3 4 5]]

concatenate:
[ 1  2  3  4  5  6  7  8  9 10]

split:
[array([1, 2]), array([3, 4]), array([5])]

In [5]:
```

Q2] Write a program to implement following functions in pandas library Dataframe, dropna, fillna, replace specific values

import pandas as pd

import numpy as np

DataFrame function

def my_dataframe(data_dict):

    return pd.DataFrame(data_dict)

dropna function

3

```python
def my_dropna(df):
    return df.dropna()
# fillna function
def my_fillna(df, value):
    return df.fillna(value)
# replace function
def my_replace(df, old_value, new_value):
    return df.replace(old_value, new_value)
# Testing the functions
data = {'A': [1, 2, np.nan, 4],
        'B': [5, np.nan, 7, 8],
        'C': [9, 10, 11, 12]}
df = my_dataframe(data)
print("Original DataFrame:")
print(df)
print("\ndropna:")
print(my_dropna(df))
print("\nfillna:")
print(my_fillna(df, 0))
print("\nreplace:")
print(my_replace(df, 2, 20))
```

Output:

```
In [5]: runfile('D:/python/panda_Lib.py', wdir='D:/python')
Original DataFrame:
     A    B   C
0  1.0  5.0   9
1  2.0  NaN  10
2  NaN  7.0  11
3  4.0  8.0  12

dropna:
     A    B   C
0  1.0  5.0   9
3  4.0  8.0  12

fillna:
     A    B   C
0  1.0  5.0   9
1  2.0  0.0  10
2  0.0  7.0  11
3  4.0  8.0  12
```

```
replace:
       A     B    C
0    1.0   5.0    9
1   20.0   NaN   10
2    NaN   7.0   11
3    4.0   8.0   12

In [6]:
```

Q3] Write a program to implement following graphs in matplotlib library Line chart, bar chart, scatterplot, pie chart, histogram

import matplotlib.pyplot as plt

import numpy as np

Create sample data

x = np.arange(1, 11)

y = np.array([2, 4, 6, 8, 10, 12, 14, 16, 18, 20])

Line Chart

plt.figure(figsize=(8, 4))

plt.plot(x, y, marker='o', linestyle='-', color='b', label='Line Chart')

plt.xlabel('X-axis')

plt.ylabel('Y-axis')

plt.title('Line Chart Example')

plt.legend()

plt.grid(True)

plt.show()

Bar Chart

categories = ['Category A', 'Category B', 'Category C', 'Category D']

values = [15, 24, 10, 30]

plt.figure(figsize=(8, 4))

plt.bar(categories, values, color='g', alpha=0.7)

plt.xlabel('Categories')

plt.ylabel('Values')

plt.title('Bar Chart Example')

```python
plt.show()
# Scatterplot
x = np.random.rand(50)
y = np.random.rand(50)
plt.figure(figsize=(8, 4))
plt.scatter(x, y, c='r', marker='o', label='Scatterplot')
plt.xlabel('X-axis')
plt.ylabel('Y-axis')
plt.title('Scatterplot Example')
plt.legend()
plt.grid(True)
plt.show()
# Pie Chart
labels = ['Category A', 'Category B', 'Category C', 'Category D']
sizes = [30, 15, 25, 20]
colors = ['gold', 'yellowgreen', 'lightcoral', 'lightskyblue']
plt.figure(figsize=(6, 6))
plt.pie(sizes, labels=labels, colors=colors, autopct='%1.1f%%', startangle=140)
plt.axis('equal')
plt.title('Pie Chart Example')
plt.show()
# Histogram
data = np.random.randn(1000)
plt.figure(figsize=(8, 4))
plt.hist(data, bins=20, color='purple', alpha=0.7)
plt.xlabel('Value')
plt.ylabel('Frequency')
plt.title('Histogram Example')
plt.show()
```
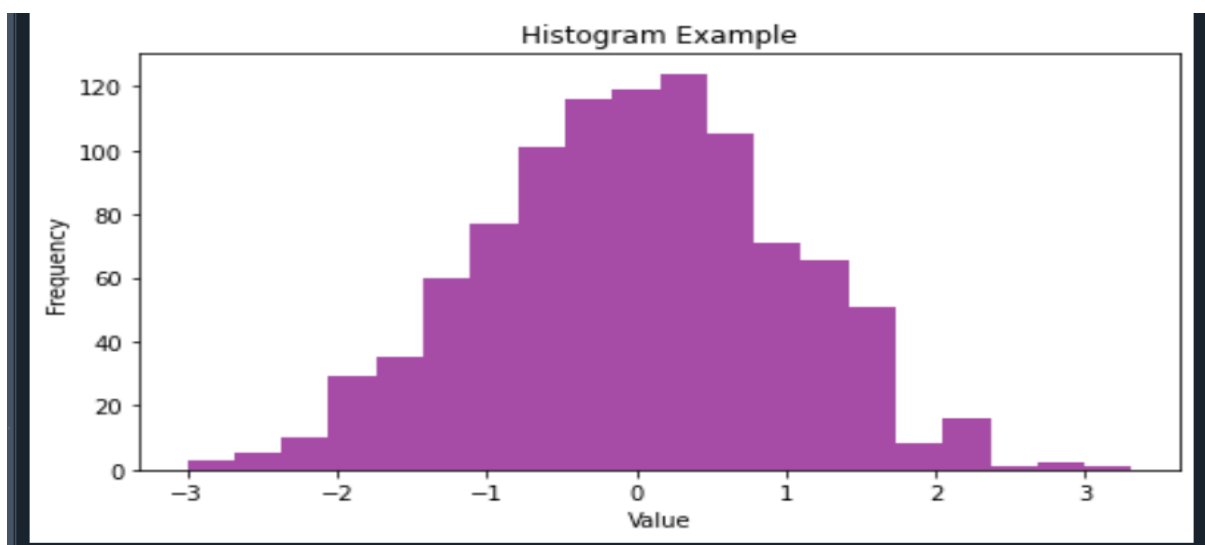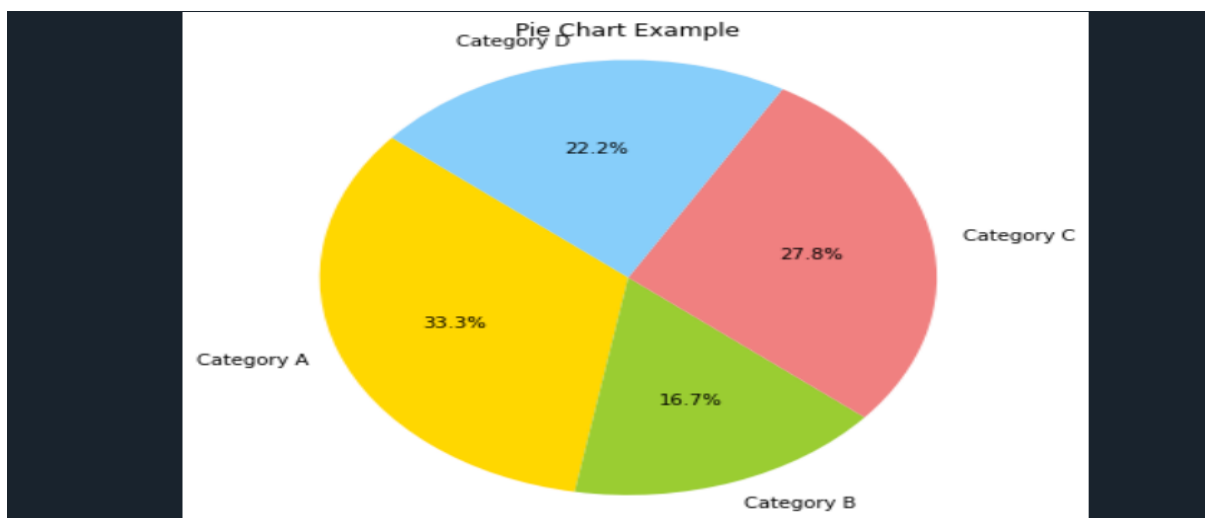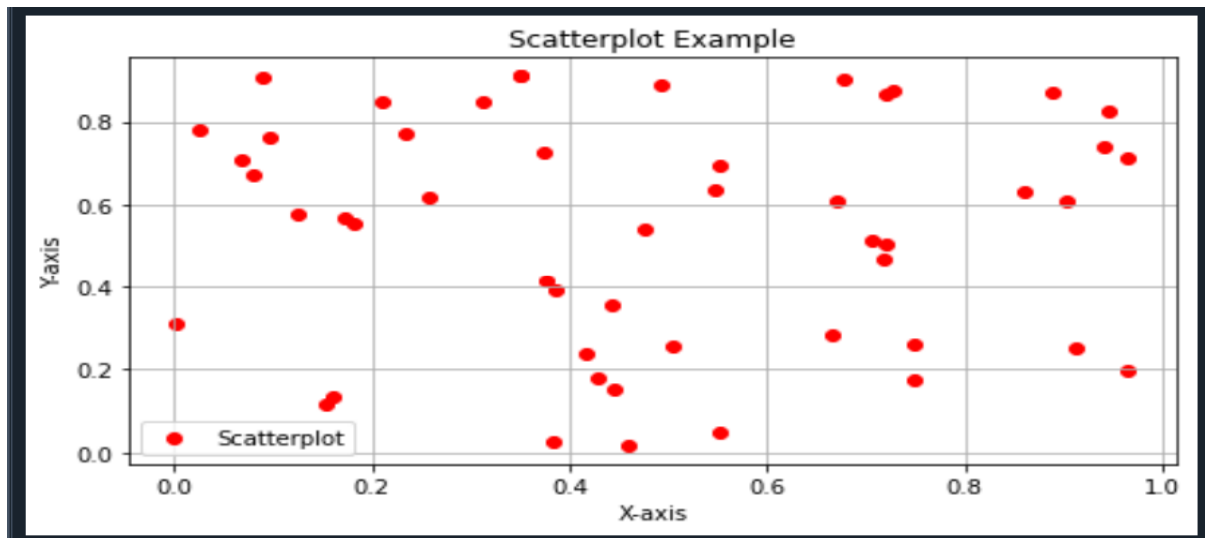
Output:

Line Chart Example

Bar Chart Example

Scatterplot Example

Pie Chart Example

Histogram Example
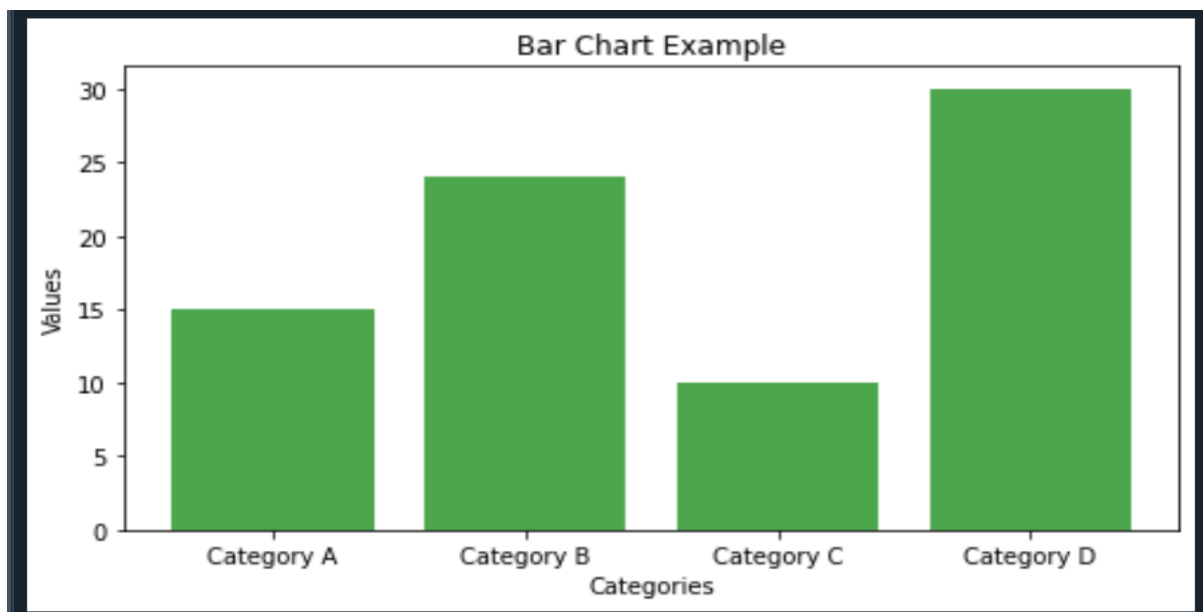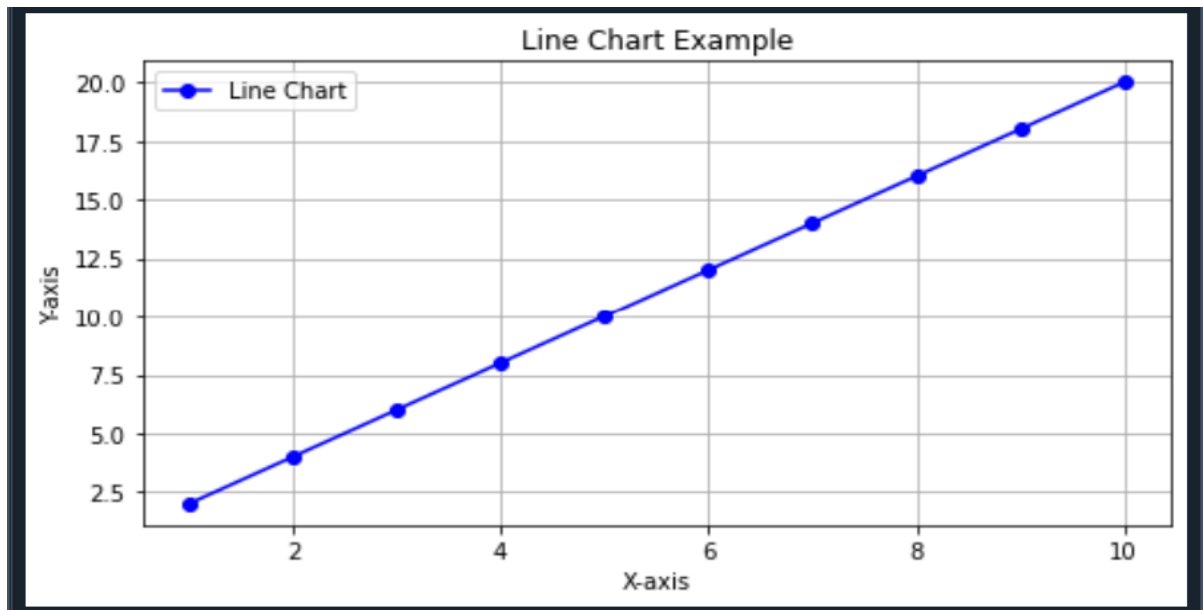
Q4] Write a program to find the correlation matrix

```python
import pandas as pd
# Sample dataset
data = {
    'A': [1, 2, 3, 4, 5],
    'B': [2, 4, 1, 6, 8],
    'C': [5, 7, 3, 8, 9],
    'D': [1, 2, 3, 2, 1]
}
# Create a DataFrame
df = pd.DataFrame(data)
# Calculate the correlation matrix
correlation_matrix = df.corr()
# Display the correlation matrix
print("Correlation Matrix:")
print(correlation_matrix)
```

Output:

```
In [7]: runfile('D:/python/pandas_lib4.py', wdir='D:/python')
Correlation Matrix:
          A          B          C          D
A  1.000000   0.773021   0.590879   0.000000
B  0.773021   1.000000   0.964275  -0.500870
C  0.590879   0.964275   1.000000  -0.570735
D  0.000000  -0.500870  -0.570735   1.000000

In [8]:
```

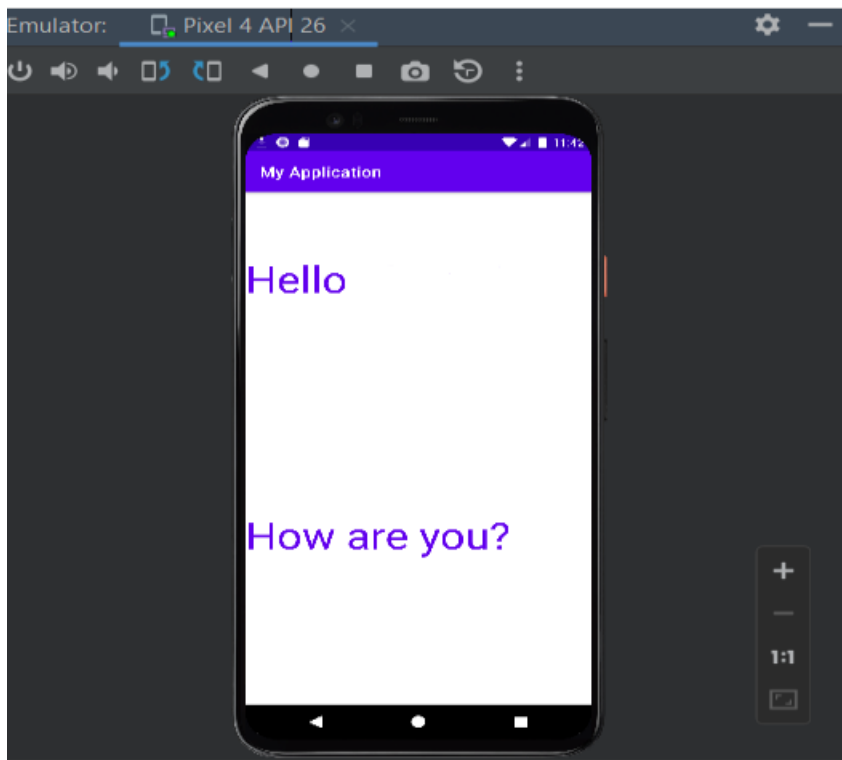Q5] Create an Android application and understand the Project and file hierarchy.

Activity_main.xml:

```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:weightSum="100">
    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Hello"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        android:textColor="@color/purple_500"
        android:textSize="50dp"
        android:layout_weight="30"
        android:gravity="center"
        />
    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="How are you?"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        android:textColor="@color/purple_500"
        android:textSize="50dp"
        android:layout_weight="70"
        android:gravity="center"
        />
</LinearLayout>
```

Mainactivity.java:

```
package com.example.myapplication
import androidx.appcompat.app.AppCompatActivity
import android.os.Bundle
class MainActivity : AppCompatActivity() {
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)
    }
}
```

Output:

Q6] Develop an Android application that uses GUI components, Font and Colors

Activity_main.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:layout_gravity="center"
    android:orientation="vertical"
    tools:context=".MainActivity"
    android:background="@color/RosyBrown"
```

```xml
>
<TextView
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_gravity="center"
    android:layout_margin="2dp"
    android:gravity="center"
    android:padding="2dp"
    android:text="Even Odd Program"
    android:textSize="40dp"
    android:textColor="@color/FireBrick" />
<TextView
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_gravity="center"
    android:layout_margin="2dp"
    android:padding="2dp"
    android:text="Even Or Odd"
    android:textSize="30dp"
    android:textColor="@color/LightGrey"
    />
<EditText
    android:id="@+id/number"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_margin="10dp"
    android:background="@color/Pink"
    android:drawablePadding="10dp"
    android:hint="Number"
    android:inputType="number"
    android:padding="20dp"
    android:textColorHint="@color/HotPink" />
<com.google.android.material.button.MaterialButton
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:hint="Submit"
    android:layout_gravity="center"
    android:backgroundTint="@color/PaleVioletRed"
    android:textColor="@color/black"
    android:textSize="30dp"
    android:id="@+id/submit"
    android:layout_margin="30dp"
    android:padding="15dp"/>
<TextView
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
```

```
        android:id="@+id/resultnum"
        android:layout_below="@id/submit"
        android:layout_margin="20dp"
        android:textSize="30dp"
        android:textColor="@color/teal_700"/>
</LinearLayout>
```
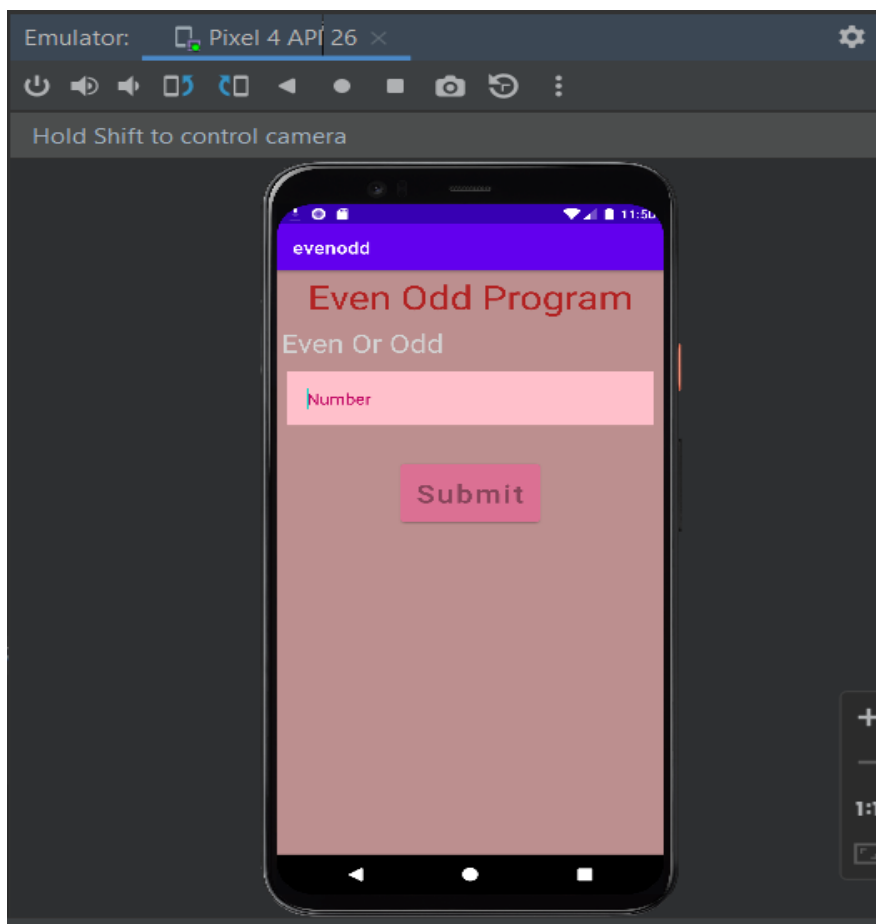
Mainactivity.java:

```
package com.example.myapplication
import androidx.appcompat.app.AppCompatActivity
import android.os.Bundle
class MainActivity : AppCompatActivity() {
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)
    }
}
```

Output:

Q7] Develop an Android application that uses Layout Managers

Activity_main.xml:

```xml
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout
    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:padding="16dp"
    tools:context=".MainActivity">
    <TextView
        android:id="@+id/firstNumberLabel"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Enter First Number:"
        android:layout_alignParentStart="true"
        android:layout_alignParentTop="true"
        android:layout_marginEnd="8dp"/>
    <EditText
        android:id="@+id/firstNumberEditText"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_toEndOf="@+id/firstNumberLabel"
        android:layout_alignBaseline="@+id/firstNumberLabel"
        android:hint="Enter the first number"/>
    <TextView
        android:id="@+id/secondNumberLabel"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Enter Second Number:"
        android:layout_below="@+id/firstNumberLabel"
        android:layout_alignStart="@+id/firstNumberLabel"
        android:layout_marginTop="16dp"
        android:layout_marginEnd="8dp"/>
    <EditText
        android:id="@+id/secondNumberEditText"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_toEndOf="@+id/secondNumberLabel"
        android:layout_alignBaseline="@+id/secondNumberLabel"
        android:hint="Enter the second number"/>
    <Button
        android:id="@+id/multiplyButton"
        android:layout_width="wrap_content"
```

```xml
            android:layout_height="wrap_content"
            android:text="Multiply"
            android:layout_centerHorizontal="true"
            android:layout_below="@+id/secondNumberLabel"
            android:layout_marginTop="16dp"/>
    <TextView
            android:id="@+id/resultTextView"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text=""
            android:layout_centerHorizontal="true"
            android:layout_below="@+id/multiplyButton"
            android:layout_marginTop="16dp"/>
</RelativeLayout>
```
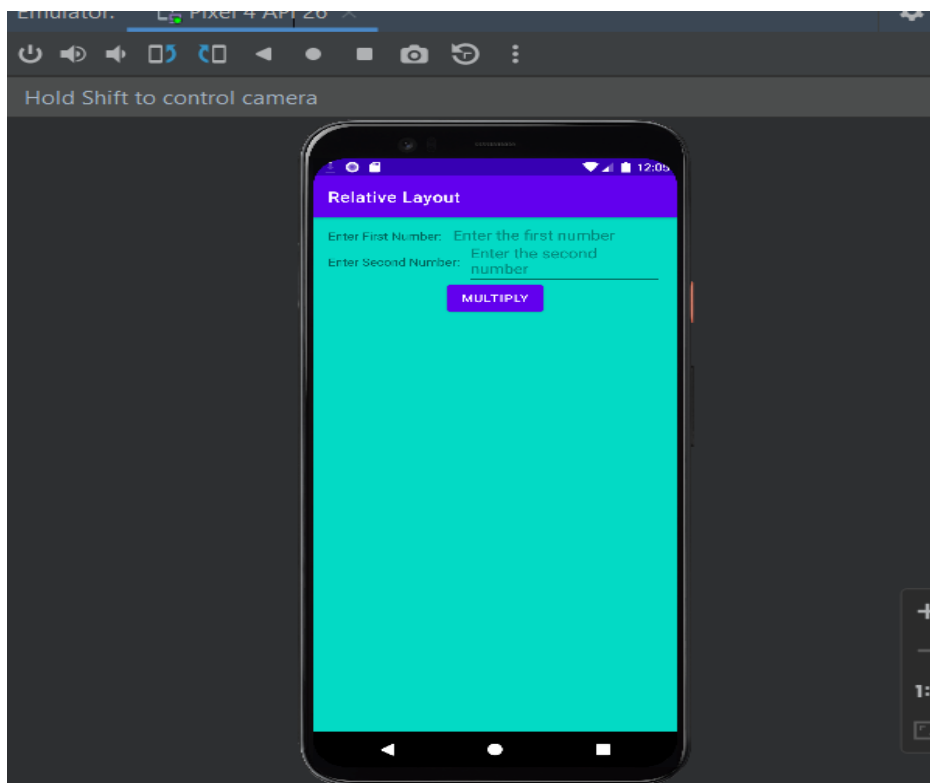
Mainactivity.java:

```kotlin
package com.example.myapplication
import androidx.appcompat.app.AppCompatActivity
import android.os.Bundle
class MainActivity : AppCompatActivity() {
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)
    }
}
```

Output:

Q8] Develop an Android application that uses Layout Managers Login Form

Activity_main.xml:

```xml
<?xml version="1.0" encoding="utf-8"?>
<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:layout_width="100dp"
        android:layout_height="100dp"
        android:src="@drawable/ic_launcher_foreground"
        android:layout_gravity="center_horizontal"
        android:layout_marginBottom="16dp"/>
    <EditText
        android:id="@+id/et_username"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Username"/>
    <EditText
        android:id="@+id/et_password"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Password"
        android:inputType="textPassword"/>
    <Button
        android:id="@+id/btn_show_toast"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Login"
        android:layout_gravity="center"/>
</LinearLayout>
```

Mainactivity.java:

```java
package com.example.loginform;

import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Toast;
import androidx.appcompat.app.AppCompatActivity;

public class MainActivity extends AppCompatActivity {
```

```java
    private EditText usernameEditText;
    private Button showToastButton;

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

        // Initialize UI elements
        usernameEditText = findViewById(R.id.et_username);
        showToastButton = findViewById(R.id.btn_show_toast);

        // Set click listener for the button
        showToastButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                // Get the entered username from the EditText
                String username = usernameEditText.getText().toString();
                String toastMessage = "Username: " + username;
                Toast.makeText(MainActivity.this, toastMessage,
Toast.LENGTH_SHORT).show();
                }
        });
    }
}
```
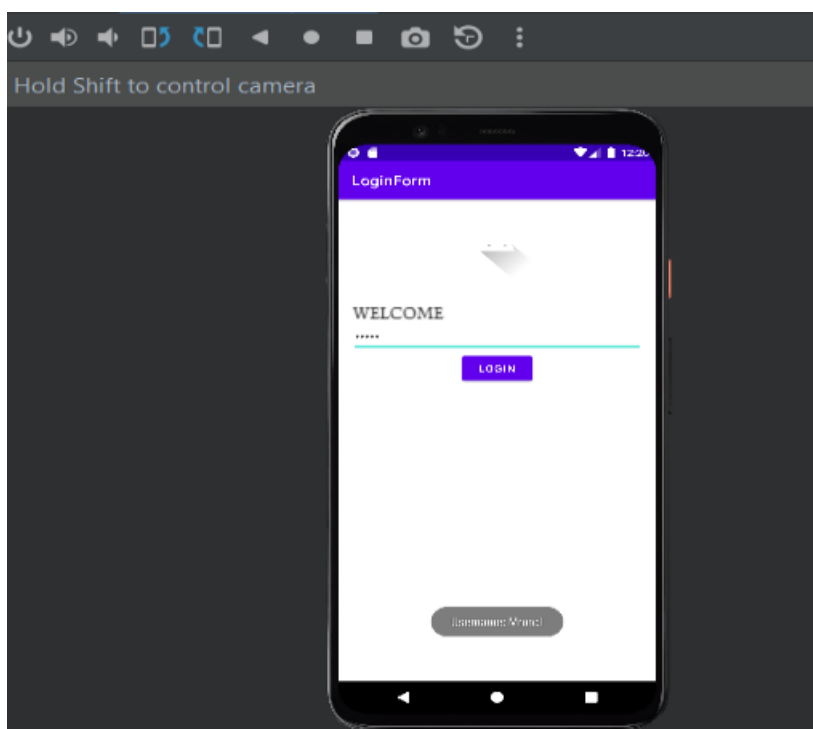
Output:

Q9] Develop an Android application that uses Layout Managers and event listeners. Registration form

Activity_main.xml:

```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:background="@drawable/registration"
    tools:context=".MainActivity"
    android:orientation="vertical">
    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/register"
        android:text="Registration Form"
        android:textSize="40dp"
        android:gravity="center"
        android:layout_margin="20dp"
        android:textColor="@color/white"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />
    <EditText
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/studentname"
        android:layout_below="@id/register"
        android:background="#30ffffff"
        android:hint="Student Name"
        android:textColorHint="@color/white"
        android:textColor="@color/white"
        android:layout_margin="10dp"
        android:padding="20dp"
        android:drawableLeft="@drawable/ic_baseline_person_24"
        android:drawablePadding="10dp"
        android:inputType="textPersonName"/>/>
    <EditText
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/studentemail"
        android:layout_below="@id/studentname"
        android:background="#30ffffff"
```

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```
    android:hint="Student Email"
    android:textColorHint="@color/white"
    android:textColor="@color/white"
    android:layout_margin="10dp"
    android:padding="20dp"
    android:drawableLeft="@drawable/ic_baseline_alternate_email_24"
    android:drawablePadding="10dp"
    android:inputType="textEmailAddress"/>/>
<EditText
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:id="@+id/number"
    android:layout_below="@id/studentemail"
    android:background="#30ffffff"
    android:hint="Mobile Number"
    android:textColorHint="@color/white"
    android:textColor="@color/white"
    android:layout_margin="10dp"
    android:padding="20dp"
    android:drawableLeft="@drawable/ic_baseline_local_phone_24"
    android:drawablePadding="10dp"
    android:inputType="text|phone"/>
<EditText
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:id="@+id/studentpassword"
    android:layout_below="@id/number"
    android:background="#30ffffff"
    android:hint="Password"
    android:textColorHint="@color/white"
    android:textColor="@color/white"
    android:layout_margin="10dp"
    android:padding="20dp"
    android:drawableLeft="@drawable/ic_baseline_info_24"
    android:drawablePadding="10dp"
    android:inputType="textPassword"/>
<EditText
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:id="@+id/repassword"
    android:layout_below="@id/studentpassword"
    android:background="#30ffffff"
    android:hint="Confirm Password"
    android:textColorHint="@color/white"
    android:textColor="@color/white"
    android:layout_margin="10dp"
```

```xml
        android:padding="20dp"
        android:drawableLeft="@drawable/ic_baseline_info_24"
        android:drawablePadding="10dp"
        android:inputType="textPassword"/>
    <com.google.android.material.button.MaterialButton
        android:id="@+id/registerbtn"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@id/repassword"
        android:layout_centerHorizontal="true"
        android:layout_margin="20dp"
        android:backgroundTint="@color/design_default_color_background"
        android:text="Register"
        android:textColor="@color/black"
        android:layout_gravity="center"/>
</LinearLayout>
```

Mainactivity.java:

```java
package com.example.registrationform;

import androidx.appcompat.app.AppCompatActivity;

import android.content.Intent;
import android.os.Bundle;
import android.text.Editable;
import android.view.View;
import android.widget.EditText;
import android.widget.Toast;

import com.google.android.material.button.MaterialButton;

public class MainActivity extends AppCompatActivity {

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

        EditText studentname= (EditText) findViewById(R.id.studentname);
        MaterialButton register= (MaterialButton) findViewById(R.id.registerbtn);
        register.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                String studentname1=studentname.getText().toString();
                Toast.makeText(MainActivity.this,"Registered Student
"+studentname1,Toast.LENGTH_SHORT).show();
```
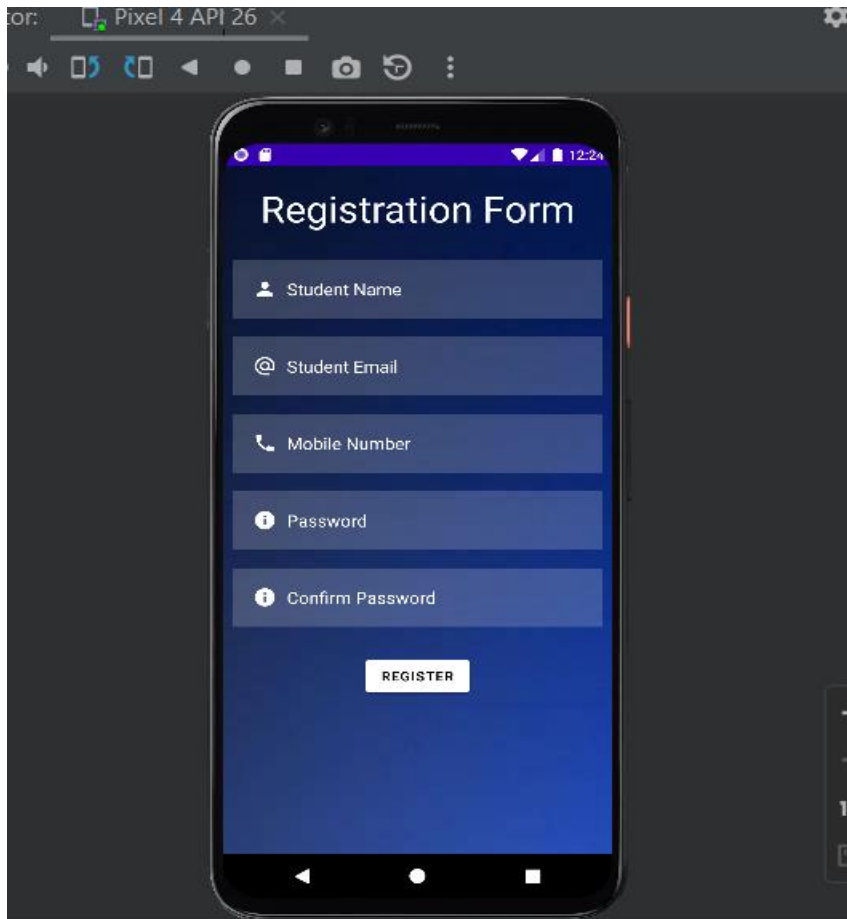
```
}
    });
  }
}
```

Output:

Q10] Develop an Android application that uses Layout Managers and event listeners.
Subscription form and Login form

Activity_main.xml:
```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">
  <EditText
    android:id="@+id/email"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:hint="Email"/>
  <EditText
```

```xml
        android:id="@+id/et_password"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Password"
        android:inputType="textPassword"/>
    <Button
        android:id="@+id/btn_subscribe"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Subscribe"/>
</LinearLayout>
```

Mainactivity.java:

```java
package com.example.subscriptionform;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Toast;
import androidx.appcompat.app.AppCompatActivity;
public class MainActivity extends AppCompatActivity {
    private EditText emailEditText;
    private EditText passwordEditText;
    private Button subscribeButton;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        emailEditText = findViewById(R.id.email);
        passwordEditText = findViewById(R.id.et_password);
        subscribeButton = findViewById(R.id.btn_subscribe);
        subscribeButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                String email = emailEditText.getText().toString();
                String password = passwordEditText.getText().toString();
                // You can add logic here to handle the subscription process
                Toast.makeText(MainActivity.this, "Subscription successful",
Toast.LENGTH_SHORT).show();
            }
        });
    }
}
```

Output: