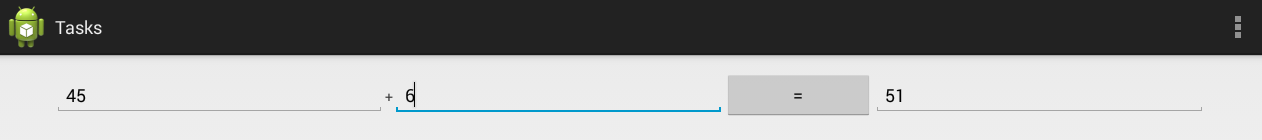
**Task#1:** Creating a bounded service which can provide the service for basic arithmetic operations like addition, subtraction, multiplication and division.



**Solution:**

**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"  
 tools:context=".MainActivity">  
  
 <LinearLayout  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent"  
 android:weightSum="10"  
 android:orientation="vertical">  
  
 <TextView  
 android:id="@+id/title\_text\_view"  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:text="Services"  
 android:textSize="40dp"  
 android:textAppearance="?android:textAppearanceLarge"  
 android:textStyle="bold"  
 android:textAlignment="center"/>  
 <TextView  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="0.5"  
 android:text="(Bound Service)"  
 android:textAlignment="center"  
 android:textSize="20dp"/>  
 <TextView  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="2"/>  
  
 <Button  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_gravity="center"  
 android:text=" Random "  
 android:layout\_weight="1"  
 android:id="@+id/btnRandom"  
 android:onClick="getRandom"/>  
  
 <TextView  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:text="Addition"  
 android:textSize="20dp"  
 android:textAppearance="?android:textAppearanceLarge"  
 android:textStyle="bold" />  
  
 <LinearLayout  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:orientation="horizontal">  
  
 <EditText  
 android:id="@+id/addnum1"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:hint="Value"  
 android:textSize="20dp" />  
 <TextView  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="+"  
 android:textSize="20dp"  
 android:textAppearance="?android:textAppearanceLarge"  
 android:textStyle="bold" />  
 <EditText  
 android:id="@+id/addnum2"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:hint="Random"  
 android:textSize="20dp" />  
 <Button  
 android:id="@+id/btnAdd"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:textAlignment="center"  
 android:layout\_gravity="center"  
 android:textSize="20dp"  
 android:text="="  
 android:onClick="getAddition"/>  
 <EditText  
 android:id="@+id/addresult"  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:hint="Output"  
 android:textSize="20dp" />  
 </LinearLayout>  
  
  
 <TextView  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:text="Subtraction"  
 android:textSize="20dp"  
 android:textAppearance="?android:textAppearanceLarge"  
 android:textStyle="bold" />  
  
 <LinearLayout  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:orientation="horizontal">  
 <EditText  
 android:id="@+id/subnum1"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:hint="Value"  
 android:textSize="20dp" />  
 <TextView  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="-"  
 android:textSize="20dp"  
 android:textAppearance="?android:textAppearanceLarge"  
 android:textStyle="bold" />  
 <EditText  
 android:id="@+id/subnum2"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:hint="Random"  
 android:textSize="20dp" />  
 <Button  
 android:id="@+id/btnSub"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:textAlignment="center"  
 android:layout\_gravity="center"  
 android:textSize="20dp"  
 android:text="="  
 android:onClick="getSubtraction"/>  
 <EditText  
 android:id="@+id/subresult"  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:hint="Output"  
 android:textSize="20dp" />  
 </LinearLayout>  
  
 <TextView  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:text="Multiplication"  
 android:textSize="20dp"  
 android:textAppearance="?android:textAppearanceLarge"  
 android:textStyle="bold" />  
  
 <LinearLayout  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:orientation="horizontal">  
  
 <EditText  
 android:id="@+id/mulnum1"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:hint="Value"  
 android:textSize="20dp" />  
 <TextView  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="\*"  
 android:textSize="20dp"  
 android:textAppearance="?android:textAppearanceLarge"  
 android:textStyle="bold" />  
 <EditText  
 android:id="@+id/mulnum2"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:hint="Random"  
 android:textSize="20dp" />  
 <Button  
 android:id="@+id/btnMul"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:textAlignment="center"  
 android:layout\_gravity="center"  
 android:textSize="20dp"  
 android:text="="  
 android:onClick="getMultiplication"/>  
 <EditText  
 android:id="@+id/mulresult"  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:hint="Output"  
 android:textSize="20dp" />  
 </LinearLayout>  
  
 <TextView  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:text="Division"  
 android:textSize="20dp"  
 android:textAppearance="?android:textAppearanceLarge"  
 android:textStyle="bold" />  
  
 <LinearLayout  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:orientation="horizontal">  
  
 <EditText  
 android:id="@+id/divnum1"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:hint="Value"  
 android:textSize="20dp" />  
 <TextView  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="/"  
 android:textSize="20dp"  
 android:textAppearance="?android:textAppearanceLarge"  
 android:textStyle="bold" />  
 <EditText  
 android:id="@+id/divnum2"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:hint="Random"  
 android:textSize="20dp" />  
 <Button  
 android:id="@+id/btnDiv"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:textAlignment="center"  
 android:layout\_gravity="center"  
 android:textSize="20dp"  
 android:text="="  
 android:onClick="getDivision"/>  
 <EditText  
 android:id="@+id/divresult"  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:hint="Output"  
 android:textSize="20dp" />  
  
 </LinearLayout>  
 <TextView  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:text="Khizar Hayat"  
 android:textSize="20dp"  
 android:textAppearance="?android:textAppearanceLarge"  
 android:textStyle="bold"  
 android:gravity="center"  
 android:textAlignment="center"  
 android:layout\_weight="4"/>  
 </LinearLayout>  
</RelativeLayout>

**JAVA:**

**(Main)**

public class MainActivity extends AppCompatActivity {  
  
 public EditText etAdd1,etAdd2,etAdd;  
 public EditText etSub1,etSub2,etSub;  
 public EditText etMul1,etMul2,etMul;  
 public EditText etDiv1,etDiv2,etDiv;  
 public Button btnAdd, btnSub, btnMul,btnDiv;  
 MyService myService;  
 boolean isBound = false;  
  
 @Override  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
 setContentView(R.layout.activity\_main);  
  
 etAdd1= findViewById(R.id.addnum1);  
 etAdd2= findViewById(R.id.addnum2);  
 etAdd= findViewById(R.id.addresult);  
 btnAdd= findViewById(R.id.btnAdd);  
  
 etSub1= findViewById(R.id.subnum1);  
 etSub2= findViewById(R.id.subnum2);  
 etSub= findViewById(R.id.subresult);  
 btnSub= findViewById(R.id.btnSub);  
  
 etMul1= findViewById(R.id.mulnum1);  
 etMul2= findViewById(R.id.mulnum2);  
 etMul= findViewById(R.id.mulresult);  
 btnMul= findViewById(R.id.btnMul);  
  
 etDiv1= findViewById(R.id.divnum1);  
 etDiv2= findViewById(R.id.divnum2);  
 etDiv= findViewById(R.id.divresult);  
 btnMul= findViewById(R.id.btnDiv);  
  
 Intent in = new Intent(this,MyService.class);  
 bindService(in,serviceConnection, Context.BIND\_AUTO\_CREATE);  
 }  
 public void getRandom(View view){  
 etAdd2.setText(Integer.toString(myService.getRandom()));  
 etSub2.setText(Integer.toString(myService.getRandom()));  
 etMul2.setText(Integer.toString(myService.getRandom()));  
 etDiv2.setText(Integer.toString(myService.getRandom()));  
 }  
 public void getAddition(View view){  
 String str1 = etAdd1.getText().toString();  
 int num1 = Integer.parseInt(str1);  
 String str2 = etAdd2.getText().toString();  
 int num2 = Integer.parseInt(str2);  
 int add = num1 + num2;  
 etAdd.setText(Integer.toString(add));  
 }  
  
 public void getSubtraction(View view){  
 String str1 = etSub1.getText().toString();  
 int num1 = Integer.parseInt(str1);  
 String str2 = etSub2.getText().toString();  
 int num2 = Integer.parseInt(str2);  
 int sub = num1 - num2;  
 etSub.setText(Integer.toString(sub));  
 }  
 public void getMultiplication(View view){  
 String str1 = etMul1.getText().toString();  
 int num1 = Integer.parseInt(str1);  
 String str2 = etMul2.getText().toString();  
 int num2 = Integer.parseInt(str2);  
 int mul = num1 \* num2;  
 etMul.setText(Integer.toString(mul));  
 }  
 public void getDivision(View view){  
 String str1 = etDiv1.getText().toString();  
 int num1 = Integer.parseInt(str1);  
 String str2 = etDiv2.getText().toString();  
 int num2 = Integer.parseInt(str2);  
 int div = num1 / num2;  
 etDiv.setText(Integer.toString(div));  
 }  
 private ServiceConnection serviceConnection = new ServiceConnection() {  
 @Override  
 public void onServiceConnected(ComponentName name, IBinder service) {  
 MyService.LocalBinder binder = (MyService.LocalBinder) service;  
 myService = binder.getService();  
 isBound = true;  
 }  
 @Override  
 public void onServiceDisconnected(ComponentName name) {  
 isBound = false;  
 }  
 };  
}

**(MyService)**

public class MyService extends Service {  
  
 private final IBinder iBinder = new LocalBinder();  
 private final Random mGenerator = new Random();  
 public class LocalBinder extends Binder{  
 MyService getService(){  
 return MyService.this;  
 }  
 }  
 public MyService() {  
 }  
 @Override  
 public IBinder onBind(Intent intent) {  
 return iBinder;  
 }  
 public int getRandom(){  
 return mGenerator.nextInt(200);  
 }  
}

**Output:**

