**ANDROID DEVELOPMENT**

**ASSIGNMENT – 2**

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***Write a simple android program to mimic the function of a calculator, which must include some basic arithmetic operation like addition, subtraction, multiplication and division.***

**Algorithm:-**

1. Open Android Studio and create New Android Studio Project .Give Application Name ***calculator***  and leave other fields as it is, then click NEXT.
2. Select the Empty Activity and click NEXT.
3. Now we have **activity\_main.xml** in which we have to make the layout of our app
4. Select Design->Pallate->Layouts->TableLayout. And customise to make a Tablerow,Tablecol of 5 and 4 respectively i.e 5x4.
5. In each row add four button of format :-
   1. <Button
   2. android:id="@+id*/<****button id****>*" ------------> Button Id
   3. android:layout\_width="30pt"
   4. android:layout\_height="30pt"
   5. android:layout\_marginRight="1pt"
   6. android:onClick="numberEvent" ----------> Onclick Event
   7. android:layout\_weight="1"
   8. android:text=<***Button name***></Button> ------> Button Name
6. From above we have 20 button which we have to edit the {id,onClickEvent,text} field of those buttons according to our requirement and then out layout is prepared .
7. Now we have to add functionality to our app , this we will do in MainActivity.java file of our app.
8. In MainActivity.java we declare
   * 1. String op : For storing the operator selected by user.
     2. String oldNumber: For storing the previous operand.
     3. Boolean isNewOperator : For checking if new operator is selected or not, which has default value of true.
     4. EditText ed1 : For storing the input from the editText field of app.
9. Open MainActivity.java and we have to implement five onClick event namely:
   * 1. numberEvent: This event is implemented to read the number from [0-9] and store it in variable ***number.***
     2. OperatorEvent: This event is implemented to read the operator selected in the app like {+,-,\*,/,mod}.
     3. equalEvent: This event is implemented to calculate the arithemetic operation and showing the result .
     4. clearEvent: Used to clear the editText field of app.
     5. percentageEvent: Used to calculate the percentage of the number entered.
10. Implementing the numberEvent :
    1. We declare the number variable for storing the input then we the switch statement to assign the number according to id . For example if selected button 7 then our

Key will be ‘’but7’’ and we can assign the value of 7 to number.

1. Implementing the operatorEvent:
   1. Firstly we assign the newOperator Value to true and then we save the previous number in oldNumber variable .
   2. Then, we switch the id according to {+,-,\*,/} and assign the op variable the symbol of the button .
2. Implementing the equalEvent:
   1. Firstly we store the newNumber in variable newNumber
   2. Then,we switch on basis of op{operator} and do the arithemetic operation and store it in the result variable.
   3. Finally , we use setText() to print the result in the editText window.
3. Implementing the clearEvent:
   1. Simply we clear the Screen by using the setText(“0”) method.
   2. And assigning the newOperator to true;
4. Implementing the percentEvent:
   1. Simply cal the percentage and print it.
5. Finally our app is completed.

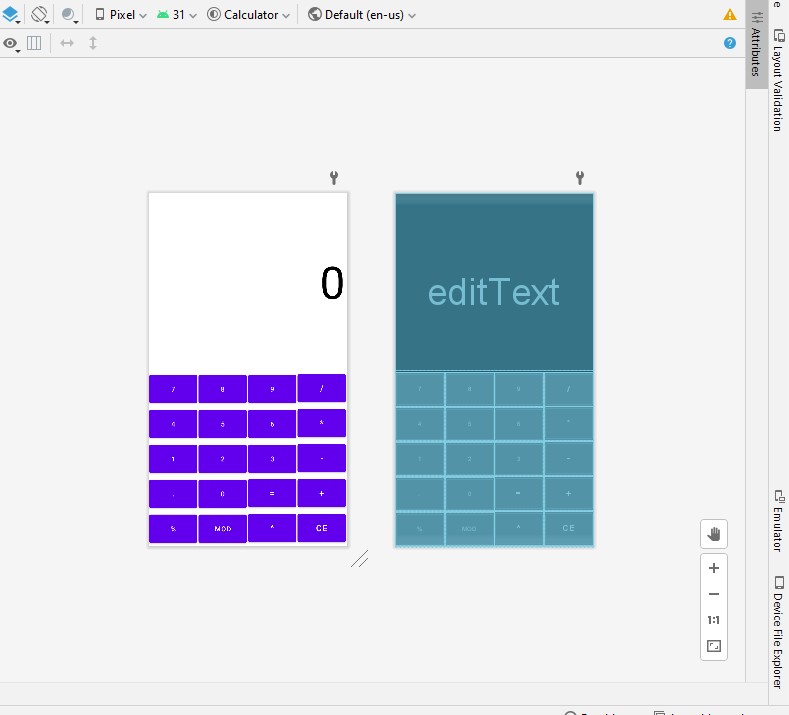
***XML FILE :***

*<?*xml version="1.0" encoding="utf-8"*?>*<LinearLayout 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">  
  
  
 <EditText  
 android:id="@+id/editText"  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="1"  
 android:ems="10"  
 android:layout\_marginBottom="1pt"  
 android:gravity="right|center"  
 android:inputType="textPersonName"  
 android:text="0"  
 android:textColor="@color/black"  
 android:textSize="40pt" />  
  
  
 <TableLayout  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content">  
  
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 android:layout\_marginBottom="1pt"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent">  
  
 <Button  
 android:id="@+id/bu7"  
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 android:onClick="numberEvent"  
 android:layout\_weight="1"  
 android:text="7"></Button>  
 <Button  
 android:id="@+id/bu8"  
 android:layout\_width="30pt"  
 android:layout\_height="30pt"  
 android:layout\_marginRight="1pt"  
 android:onClick="numberEvent"  
 android:layout\_weight="1"  
 android:text="8"></Button>  
  
 <Button  
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 android:layout\_width="30pt"  
 android:layout\_height="30pt"  
 android:onClick="numberEvent"  
 android:layout\_marginRight="1pt"  
 android:layout\_weight="1"  
 android:text="9"></Button>  
  
 <Button  
 android:id="@+id/buDivide"  
 android:layout\_width="30pt"  
 android:layout\_height="30pt"  
 android:onClick="operatorEvent"  
 android:layout\_marginRight="1pt"  
 android:layout\_weight="1"  
 android:text="/"  
 android:textSize="18sp"  
 android:textColor="@color/white"></Button>  
  
  
 </TableRow>  
  
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 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent">  
  
 <Button  
 android:id="@+id/bu4"  
 android:layout\_width="30pt"  
 android:layout\_height="30pt"  
 android:layout\_marginRight="1pt"  
 android:onClick="numberEvent"  
 android:layout\_weight="1"  
 android:text="4"></Button>  
  
 <Button  
 android:id="@+id/bu5"  
 android:layout\_width="30pt"  
 android:layout\_height="30pt"  
 android:onClick="numberEvent"  
 android:layout\_marginRight="1pt"  
 android:layout\_weight="1"  
 android:text="5"></Button>  
  
 <Button  
 android:id="@+id/bu6"  
 android:layout\_width="30pt"  
 android:layout\_height="30pt"  
 android:onClick="numberEvent"  
 android:layout\_marginRight="1pt"  
 android:layout\_weight="1"  
 android:text="6"></Button>  
  
 <Button  
 android:id="@+id/buMultiply"  
 android:layout\_width="30pt"  
 android:layout\_height="30pt"  
 android:layout\_marginRight="1pt"  
 android:onClick="operatorEvent"  
 android:layout\_weight="1"  
 android:text="\*"  
 android:textSize="18sp"  
 android:textColor="@color/white"></Button>  
  
  
 </TableRow>  
  
 <TableRow  
 android:layout\_marginBottom="1pt"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent">  
  
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 android:id="@+id/bu1"  
 android:layout\_width="30pt"  
 android:layout\_height="30pt"  
 android:onClick="numberEvent"  
 android:layout\_marginRight="1pt"  
 android:layout\_weight="1"  
 android:text="1"></Button>  
  
 <Button  
 android:id="@+id/bu2"  
 android:layout\_width="30pt"  
 android:onClick="numberEvent"  
 android:layout\_height="30pt"  
 android:layout\_marginRight="1pt"  
 android:layout\_weight="1"  
 android:text="2"></Button>  
  
 <Button  
 android:id="@+id/bu3"  
 android:layout\_width="30pt"  
 android:onClick="numberEvent"  
 android:layout\_height="30pt"  
 android:layout\_marginRight="1pt"  
 android:layout\_weight="1"  
 android:text="3"></Button>  
  
 <Button  
 android:id="@+id/buSubtract"  
 android:layout\_width="30pt"  
 android:layout\_height="30pt"  
 android:layout\_marginRight="1pt"  
 android:onClick="operatorEvent"  
 android:layout\_weight="1"  
 android:textSize="18sp"  
 android:text="-"></Button>  
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 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent">  
  
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 android:id="@+id/buDecimal"  
 android:layout\_width="30pt"  
 android:layout\_height="30pt"  
 android:onClick="numberEvent"  
 android:layout\_marginRight="1pt"  
 android:layout\_weight="1"  
 android:text="."></Button>  
  
 <Button  
 android:id="@+id/bu0"  
 android:layout\_width="30pt"  
 android:onClick="numberEvent"  
 android:layout\_height="30pt"  
 android:layout\_marginRight="1pt"  
 android:layout\_weight="1"  
 android:text="0"></Button>  
  
 <Button  
 android:id="@+id/buEqual"  
 android:layout\_width="30pt"  
 android:layout\_height="30pt"  
 android:layout\_marginRight="1pt"  
 android:layout\_weight="1"  
 android:onClick="equalEvent"  
 android:textSize="18sp"  
 android:text="="></Button>  
  
 <Button  
 android:id="@+id/buAdd"  
 android:layout\_width="30pt"  
 android:layout\_height="30pt"  
 android:layout\_marginRight="1pt"  
 android:onClick="operatorEvent"  
 android:layout\_weight="1"  
 android:text="+"  
 android:textSize="18sp"  
 android:textColor="@color/white"></Button>  
  
  
 </TableRow>  
  
 <TableRow  
 android:layout\_marginBottom="1pt"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent">  
  
 <Button  
 android:id="@+id/buPercentage"  
 android:layout\_width="30pt"  
 android:layout\_height="30pt"  
 android:onClick="percentEvent"  
 android:layout\_marginRight="1pt"  
 android:layout\_weight="1"  
 android:text="%"></Button>  
  
 <Button  
 android:id="@+id/buMod"  
 android:layout\_width="30pt"  
 android:layout\_height="30pt"  
 android:layout\_marginRight="1pt"  
 android:layout\_weight="1"  
 android:onClick="operatorEvent"  
 android:text="Mod"></Button>  
  
 <Button  
 android:id="@+id/buPower"  
 android:layout\_width="30pt"  
 android:layout\_height="30pt"  
 android:layout\_marginRight="1pt"  
 android:layout\_weight="1"  
 android:onClick="operatorEvent"  
 android:textSize="18sp"  
 android:text="^"></Button>  
  
 <Button  
 android:id="@+id/buClear"  
 android:layout\_width="30pt"  
 android:layout\_height="30pt"  
 android:layout\_marginRight="1pt"  
 android:layout\_weight="1"  
 android:onClick="clearEvent"  
 android:text="CE"  
 android:textSize="18sp"  
 android:textColor="@color/white"></Button>  
  
  
 </TableRow>  
  
  
 </TableLayout>  
  
</LinearLayout>

***MainActivity.java :-***

package com.example.calculator;  
  
import androidx.appcompat.app.AppCompatActivity;  
  
import android.os.Bundle;  
import android.view.View;  
import android.widget.EditText;  
  
public class MainActivity extends AppCompatActivity {  
  
 String op = "";  
 String oldNumber = "";  
 boolean isNewOperator = true;  
 EditText ed1;  
  
 @Override  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
 setContentView(R.layout.*activity\_main*);  
  
 ed1 = findViewById(R.id.*editText*);  
 }  
  
 public void numberEvent(View view) {  
 if(isNewOperator)  
 ed1.setText("");  
 isNewOperator = false;  
  
 String number = ed1.getText().toString();  
 switch(view.getId()){  
 case R.id.*bu0*:  
 number += "0";  
 break;  
 case R.id.*bu1*:  
 number += "1";  
 break;  
 case R.id.*bu2*:  
 number += "2";  
 break;  
 case R.id.*bu3*:  
 number += "3";  
 break;  
 case R.id.*bu4*:  
 number += "4";  
 break;  
 case R.id.*bu5*:  
 number += "5";  
 break;  
 case R.id.*bu6*:  
 number += "6";  
 break;  
 case R.id.*bu7*:  
 number += "7";  
 break;  
 case R.id.*bu8*:  
 number += "8";  
 break;  
 case R.id.*bu9*:  
 number += "9";  
 break;  
 case R.id.*buDecimal*:  
 number += ".";  
 break;  
 default:  
 throw new IllegalStateException("Unexpected value: " + view.getId());  
 }  
 ed1.setText(number);  
 }  
  
 public void operatorEvent(View view) {  
 isNewOperator = true;  
 oldNumber = ed1.getText().toString();  
 switch (view.getId()){  
 case R.id.*buAdd*: op = "+"; break;  
 case R.id.*buSubtract*: op = "-"; break;  
 case R.id.*buMultiply*: op = "\*"; break;  
 case R.id.*buDivide*: op = "/"; break;  
 case R.id.*buPower*: op = "^"; break;  
 case R.id.*buMod*: op = "%"; break;  
 }  
 }  
  
 public void equalEvent(View view) {  
 String newNumber = ed1.getText().toString();  
 double result = 0.0;  
 switch (op){  
 case "+":  
 result = Double.*parseDouble*(oldNumber) + Double.*parseDouble*(newNumber);  
 break;  
 case "-":  
 result = Double.*parseDouble*(oldNumber) - Double.*parseDouble*(newNumber);  
 break;  
 case "\*":  
 result = Double.*parseDouble*(oldNumber) \* Double.*parseDouble*(newNumber);  
 break;  
 case "/":  
 result = Double.*parseDouble*(oldNumber) / Double.*parseDouble*(newNumber);  
 break;  
 case "^":  
 result = Math.*pow*(Double.*parseDouble*(oldNumber),Double.*parseDouble*(newNumber));  
 break;  
 case "%":  
 result = Double.*parseDouble*(oldNumber) % Double.*parseDouble*(newNumber);  
 break;  
 default:  
 throw new IllegalStateException("Unexpected value: " + op);  
 }  
 ed1.setText(result + "");  
 }  
  
 public void clearEvent(View view) {  
 ed1.setText("0");  
 isNewOperator = true;  
 }  
  
 public void percentEvent(View view) {  
 double no = Double.*parseDouble*(ed1.getText().toString()) / 100;  
 ed1.setText(no+"");  
 isNewOperator = true;  
 }  
  
}

OUTPUT :-



Graphical user interface, application

Description automatically generated

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