Mechi Multiple Campus

(Tribhuvan University)

Bhadrapur, Jhapa

Lab Report of Mobile Programming (CACS-351)

Faculty of Humanities & Social Sciences

Tribhuvan University

Kritipur, Nepal

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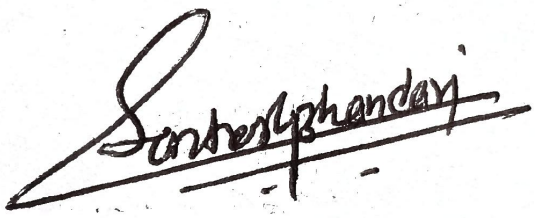

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1. Design a registration/signup form using Relative, Linear, Absolute and Constraint layout.
Should write xml file, Java file and also Manifest file.

Relative Layout

```
<RelativeLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:gravity="center"
        android:padding="20dp">
    <TextView android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_centerHorizontal="true"
            android:text="Registration form"
            android:id="@+id/title"
            android:textSize="30dp" />

    <TextView android:id="@+id/tname"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="Name"
            android:layout_below="@+id/title" />

    <EditText android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_below="@+id/tname"
            android:id="@+id/name" />

    <TextView android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_below="@+id/name"
            android:text="Address"
            android:id="@+id/taddress" />

    <EditText android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_below="@+id/taddress"
            android:id="@+id/address" />

    <TextView android:layout_width="wrap_content"
```

```
        android:layout_height="wrap_content"
        android:layout_below="@+id/address"
        android:text="Email"
        android:id="@+id/temail"/>
<EditText android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_below="@+id/temail"
        android:id="@+id/email"/>
<TextView android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/email"
        android:text="Phone"
        android:id="@+id/tphone"/>
<EditText android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_below="@+id/tphone"
        android:id="@+id/phone"
        android:inputType="number"/>
<TextView android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/phone"
        android:text="Age"
        android:id="@+id/tage"/>
<EditText android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/tage"
        android:id="@+id/age"
        android:inputType="number"/>
<TextView android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/age"
        android:text="Gender"
        android:id="@+id/tgender"/>

<RadioGroup android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/tgender"
```

```
        android:orientation="horizontal"
        android:id="@+id/gender">

    <RadioButton android:layout_width="wrap_content"
        android:height="wrap_content"
        android:text="male" />

    <RadioButton android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Female" />

</RadioGroup>

<TextView android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_below="@+id/gender"
    android:text="Hobbies"
    android:id="@+id/thobbies" />

<CheckBox android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_below="@+id/thobbies"
    android:text="Web Designing"
    android:id="@+id/hobbies1" />

<CheckBox android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_below="@+id/hobbies1"
    android:text="App Development"
    android:id="@+id/hobbies2" />

<CheckBox android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_below="@+id/hobbies2"
    android:text="AI/Machine Learning"
    android:id="@+id/hobbies3" />

<TextView android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_below="@+id/hobbies3"
    android:text="Course"
    android:id="@+id/tcourse" />
```

```
<Spinner android:layout_width="wrap_content"
         android:layout_height="wrap_content"
         android:entries="@array/courses"
         android:layout_below="@+id/tcourse"
         android:id="@+id/course" />

<Button  android:layout_width="wrap_content"
         android:layout_height="wrap_content"
         android:layout_below="@+id/course"
         android:layout_centerHorizontal="true"
         android:text="Submit" />

</Relativelayout>
```

Linearlayout

```
<Linearlayout
        android:orientation="vertical"
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:padding="20dp">
    <TextView android:layout_width="wrap_content"
              android:layout_height="wrap_content"
              android:text="Registration Form"
              android:layout_gravity="center"
              android:textSize="30dp" />
    <TextView android:layout_width="wrap_content"
              android:layout_height="wrap_content"
              android:text="Name" />
    <EditText android:layout_width="match_parent"
              android:layout_height="wrap_content" />
    <TextView android:layout_width="wrap_content"
              android:layout_height="wrap_content"
              android:text="Address" />
```

```
<EditText android:layout_width="match_parent"
          android:layout_height="wrap_content" />

<TextView android:layout_width="wrap_content" />
          android:layout_height="wrap_content"
          android:text="Email" />

<EditText android:layout_width="match_parent"
          android:layout_height="wrap_content"
          android:inputEmailType="textEmailAddress" />

<TextView android:layout_width="wrap_content"
          android:layout_height="wrap_content"
          android:text="Phone" />

<EditText android:layout_width="match_parent"
          android:layout_height="wrap_content"
          android:inputType="number" />

<TextView android:layout_width="wrap_content"
          android:layout_height="wrap_content"
          android:text="Age" />

<EditText android:layout_width="match_parent"
          android:layout_height="wrap_content"
          android:inputType="number" />

<TextView android:layout_width="wrap_content"
          android:layout_height="wrap_content"
          android:text="Gender" />

<RadioGroup android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:orientation="horizontal" />

    <RadioButton android:layout_width="wrap_content"
                 android:layout_height="wrap_content"
                 android:text="Male" />
    <RadioButton android:layout_width="wrap_content"
                 android:layout_height="wrap_content"
                 android:text="Female" />
```

```
</RadioGroup>
<TextView android:layout_width="wrap_content"
          android:layout_height="wrap_content"
          android:text="Hobbies" />
<CheckBox android:layout_width="wrap_content"
          android:text="Web Designing"
          android:layout_height="wrap_content" />
<CheckBox android:layout_width="wrap_content"
          android:layout_height="wrap_content"
          android:text="App Development" />
<CheckBox android:layout_width="wrap_content"
          android:layout_height="wrap_content"
          android:text="AI/Machine Learning" />
<TextView android:layout_width="wrap_content"
          android:layout_height="wrap_content"
          android:text="Course" />
<Spinner android:layout_width="wrap_content"
         android:layout_height="wrap_content"
         android:entries="@array/courses" />
<Button android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Submit"
        android:layout_gravity="center" />
</LinearLayout>
```

AbsoluteLayout

```
<AbsoluteLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:padding="20dp" />
```

```
<TextView android:layout_width="match_parent"
          android:layout_height="wrap_content"
          android:text="Registration Form"
          android:textAlignment="center"
          android:textSize="30sp" />

<TextView android:layout_width="wrap_content"
          android:layout_height="wrap_content"
          android:text="Name"
          android:layout_y="50sp" />

<EditText android:layout_width="match_parent"
          android:layout_height="wrap_content"
          android:layout_y="60sp" />

<TextView android:layout_width="wrap_content"
          android:layout_height="wrap_content"
          android:text="Address"
          android:layout_y="100sp" />

<EditText android:layout_width="wrap_content"
          android:layout_height="wrap_content"
          android:layout_y="110sp" />

<EditText android:layout_width="match_parent"
          android:layout_height="wrap_content"
          android:layout_y="160sp"
          android:inputType="textEmailAddress" />

<TextView android:layout_width="wrap_content"
          android:layout_height="wrap_content"
          android:text="Email"
          android:layout_y="150sp" />

<TextView android:layout_width="wrap_content"
          android:layout_height="wrap_content"
          android:text="Phone"
          android:layout_y="200sp" />
```

```
<EditText android:layout_width="match_parent"
          android:layout_width="wrap_content"
          android:layout_y="210sp"
          android:inputType="number"/>

<TextView android:layout_width="wrap_content"
          android:layout_height="wrap_content"
          android:text="Age"
          android:layout_y="250sp"/>

<EditText android:layout_width="match_parent"
          android:layout_height="wrap_content"
          android:inputType="number"
          android:layout_y="260sp"/>

<TextView android:layout_width="wrap_content"
          android:layout_height="wrap_content"
          android:text="Gender"
          android:layout_y="320sp"/>

<RadioGroup android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:orientation="horizontal"
            android:layout_y="340sp"
            android:layout_x="60sp"/>

    <RadioButton android:layout_width="wrap_content"
                 android:layout_height="wrap_content"
                 android:text="Male"/>

    <RadioButton android:layout_width="wrap_content"
                 android:layout_height="wrap_content"
                 android:text="female"/>

</RadioGroup>

<TextView android:layout_width="wrap_content"
          android:layout_height="wrap_content"
          android:text="
```

```
android:layout_y="360sp" />
<CheckBox android:layout_width="wrap_content"
          android:layout_height="wrap_content"
          android:text="Web Designing"
          android:layout_y="370sp" />

<CheckBox android:layout_width="wrap_content"
          android:layout_height="wrap_content"
          android:text="App Development"
          android:layout_y="390sp" />

<CheckBox android:layout_width="wrap_content"
          android:layout_height="wrap_content"
          android:text="AI/ Machine Learning"
          android:layout_y="410sp" />

<TextView android:layout_width="wrap_content"
          android:layout_height="wrap_content"
          android:text="Course"
          android:layout_y="460sp" />

<Spinner android:layout_width="wrap_content"
         android:layout_height="wrap_content"
         android:entries="@array/courses"
         android:layout_y="480sp" />

<Button android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Submit"
        android:layout_y="520sp"
        android:layout_x="152sp" />

</AbsoluteLayout>
```

Constraint Layout

```
<androidx.constraintlayout.widget.ConstraintLayout
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="20sp">

    <TextView android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Registration Form"
        android:gravity="center"
        android:id="@+id/title"
        android:textSize="30sp"/>

    <TextView android:id="@+id/tname"
        android:layout_height="wrap_content"
        android:layout_width="wrap_content"
        android:text="Name"
        app:layout_constraintTop_toBottomOf="@+id/title"/>

    <EditText android:layout_width="match_parent"
        android:layout_height="wrap_content"
        app:layout_constraintTop_toBottomOf="@+id/tname"
        android:id="@+id/name"/>

    <TextView android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Address"
        app:layout_constraintTop_toBottomOf="@+id/name"
        android:id="@+id/taddress"/>

    <EditText android:layout_width="match_parent"
        android:layout_height="wrap_content"
        app:layout_constraintTop_toBottomOf="@+id/taddress"
        android:id="@+id/address"/>
```

```
<TextView android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Gmail"
        app:layout_constraintTop_toBottomOf="@+id/address"
        android:id="@id/tmail"/>

<EditText android:layout_width="match_parent"
        android:layout_height="wrap_content"
        app:layout_constraintTop_toBottomOf="@+id/tmail"/>
        android:id="@+id/email"
        android:inputType="textEmailAddress"/>

<TextView android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        app:layout_constraintTop_toBottomOf="@+id/email"
        android:text="phone"
        android:id="@+id/tphone"/>

<EditText android:layout_width="match_parent"
        android:layout_height="wrap_content"
        app:layout_constraintTop_toBottomOf="@+id/tphone"
        android:id="@+id/phone"
        android:inputType="number"/>

<TextView android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        app:layout_constraintTop_toBottomOf="@+id/phone"
        android:text="Age"
        android:id="@id/tage"/>

<EditText android:layout_width="match_parent"
        android:layout_height="wrap_content"
        app:layout_constraintTop_toBottomOf="@id/tage"
        android:id="@+id/age"
        android:inputType="number"/>
```

```
<TextView android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        app:layout_constraintTop_toBottomOf="@+id/age"
        android:text="Gender"
        android:id="@+id/tgender"/>

<RadioGroup android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        app:layout_constraintTop_toBottomOf="@+id/tgender"
        android:orientation="horizontal"
        android:id="@+id/gender"/>

    <RadioButton android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Male"/>

    <RadioButton android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Female"/>

</RadioGroup>

<TextView android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        app:layout_constraintTop_toBottomOf="@+id/gender"
        android:text="Hobbies"/
        android:id="@+id/thobbies"/>

<CheckBox android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Web Designing"
        app:layout_constraintTop_toBottomOf="@+id/thobbies"
        android:id="@+id/hobbies1"/>

<CheckBox android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="App Development"
        app:layout_constraintTop_toBottomOf="@+id/hobbies1"
        android:id="@+id/hobbies2"/>
```

```
<CheckBox android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="AI/Machine learning"
        app:layout_constraintTop_toBottomOf="@+id/hobbies3"
        android:id="@+id/hobbies3" />

<TextView android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Course"
        app:layout_constraintTop_toBottomOf="@+id/hobbies3"
        android:id="@+id/tcourse" />

<Spinner android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:entries="@array/courses"
        app:layout_constraintTop_toBottomOf="@+id/tcourse"
        android:id="@+id/course" />

<Button android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:id="@+id/button"
        app:layout_constraintTop_toBottomOf="@+id/course"
        android:text="Submit" />

</androidx.constraintlayout.widget.ConstraintLayout>
```

SignupForm.java

```
public class SignupForm extends Activity {
        protected void onCreate(Bundle b){
                super.onCreate(b);
                setContentView(R.layout.signupform);
        }
}
```

AndroidManifest.xml

```
<application ----
        ----->

    <activity android:name = ".SignupForm" android:exported="true" />

</application>
```

2. Design a Simple Calculator UI Using TableLayout.

```
<TableLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:gravity="center_horizontal"
        android:padding="20sp">
        <TableRow>
            <TextView android:layout_width="match_parent"
                android:layout_height="wrap_content"
                android:layout_span="4"
                android:background="#DDDDDD"
                android:padding="10dp"
                android:text="0"
                android:textSize="20sp" />
```

```
</TableRow>
<TableRow>
    <Button android:text="7" />
    <Button android:text="8" />
    <Button android:text="9" />
    <Button android:text="/" />
</TableRow>
<TableRow>
    <Button android:text="4" />
    <Button android:text="5" />
    <Button android:text="6" />
    <Button android:text="*" />
</TableRow>
<TableRow>
    <Button android:text="1" />
    <Button android:text="2" />
    <Button android:text="3" />
    <Button android:text="-" />
</TableRow>
<TableRow>
    <Button android:text="0" />
    <Button android:text="." />
    <Button android:text="=" />
    <Button android:text="+" />
</TableRow>
</TableLayout>
```

3. Develop an android application to Calculate Simple Interest. Your Application should contains fields to input principal, rate, time and button for event handling. Calculate and display result in a TextView.

SimpleInterest.xml

```
<LinearLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:orientation="vertical"
        android:gravity="center"
        android:padding="20dp" >
    <EditText android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Enter principal Amount"
        android:id="@+id/principal" />

    <EditText android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Enter Rate of Interest"
        android:id="@+id/rate" />

    <EditText android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Enter Time"
        android:id="@+id/time" />

    <Button android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:id="@+id/calc"
        android:text="Calculate" />

    <TextView android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:id="@+id/interest" />
</LinearLayout>
```

SimpleInterest.java

```
public class SimpleInterest extends Activity{
    protected void onCreate(Bundle b){
        super.onCreate(b);
        setContentView(R.layout.SimpleInterest);
        EditText pri=findViewById(R.id.principal);
        EditText rate=findViewById(R.id.rate);
        EditText time=findViewById(R.id.time);
        TextView interest=findViewById(R.id.interest);
        findViewById(R.id.calc).setOnClickListener(e->{
            int p=Integer.parseInt(pri.getText().toString());
            int t=Integer.parseInt(time.getText().toString());
            int r=Integer.parseInt(rate.getText().toString());
            interest.setText("Interest: "+(p*t*r/100));
        });
    }
}
```

4. Write fully functional code to illustrate key event handeling along with UI.

keyeventhandling.xml

```
<LinearLayout
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:padding="20dp"
    android:gravity="center"/>
```

```
<EditText android:layout_width="match_parent"
          android:layout_height="wrap_content"
          android:hint="Write Something"
          android:id="@+id/text"/>

<TextView android:layout_width="wrap_content"
          android:layout_height="wrap_content"
          android:id="@+id/result"/>

</LinearLayout>
```

KeyEventHandeling.java

```
public class KeyEventHandeling extends Activity{
    protected void onCreate(Bundle b){
        super.onCreate(b);
        setContentView(R.layout.keyeventhandeling);
        EditText txt = findViewById(R.id.text);
        TextView res = findViewById(R.id.result);
        txt.setOnKeyListener((view, keyPressed, event)->{
            String text = txt.getText().toString();
            res.setText("key pressed: "+text);
            return true;
        });
    }
}
```

5. Develop a Simple Calculator application with two inputs fields for inputting numbers and four Buttons for performing addition, subtraction, multiplication and division. Display the result in a TextView.

simplecalculator.xml

```
<LinearLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:orientation="vertical">

    <EditText android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:hint="Enter Number1"
            android:id="@+id/num1" />

    <EditText android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:hint="Enter Number2"
            android:id="@+id/num2" />

    <TableLayout android:layout_width="wrap_content"
            android:layout_height="wrap_content">

        <TableRow>

            <Button android:text="Add" android:id="@+id/add" />
            <Button android:text="sub" android:id="@+id/sub" />
            <Button android:text="Multiply" android:id="@+id/mul" />
            <Button android:text="Divide" android:id="@+id/div" />

        </TableRow>

    </TableLayout>
    <TextView android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:id="@+id/res" />

</LinearLayout>
```

SimpleCalculator.java

```
public class SimpleCalculator extends Activity {
    protected void onCreate(Bundle b) {
        super.onCreate(b);
        SetContentView(R.layout.SimpleCalculator);
        EditText num1 = findViewById(R.id.num1);
        EditText num2 = findViewById(R.id.num2);
        Button add = findViewById(R.id.add);
        Button sub = findViewById(R.id.sub);
        Button mul = findViewById(R.id.mul);
        Button div = findViewById(R.id.div);
        TextView res = findViewById(R.id.res);
        add.setOnClickListener(e -> {
            res.setText("Addition : "+((Integer.parseInt(num1.getText()
            .toString())+(Integer.parseInt(num2.getText().toString()))));
        });
        sub.setOnClickListener(e -> {
            res.setText("Subtraction : "+((Integer.parseInt(num1.getText()
            .toString()))-(Integer.parseInt(num2.getText().toString()))));
        });
        mul.setOnClickListener(e -> {
            res.setText("Multiplication : "+((Integer.parseInt(num1.getText()
            .toString()))*(Integer.parseInt(num2.getText().toString()))));
        });
        div.setOnClickListener(e -> {
            res.setText("Division : "+((Integer.parseInt(num1.getText().
            toString()))/(Integer.parseInt(num2.getText().toString()))));
        });
    }
}
```

6. Develop an android application to enter any number in EditText. Your page should also include a Button to Calculate factorial of a number only if entered number is even Otherwise check number is prime or not. Display the result in a TextView.

Calculatefactorial.xml

```
<Linearlayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:orientation="vertical">

    <EditText android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:hint="Enter a Number"
            android:id="@+id/num"/>

    <Button android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="Calculate"
            android:id="@+id/calculate"/>

    <TextView android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:id="@+id/res"/>

</Linearlayout>
```

CalculateFactorial.java

```
public class CalculateFactorial extends Activity {
    protected void onCreate(Bundle b) {
        super.onCreate(b);
        setContentView(R.layout.calculatefactorial);
        EditText num = findViewById(R.id.num);
        TextView res = findViewById(R.id.res);
```

```
findViewById(R.id.calculate).setOnClickListener(v -> {
    int n = Integer.parseInt(num.getText().toString());
    if(n%2 == 0){
        int fact = 1;
        for(int i=1; i<=n; i++){
            fact = fact * i;
        }
        res.setText("Factorial : "+fact);
    }else{
        boolean status = false;
        for(int i=2; i<=n/2; i++){
            if(n%i == 0){
                status = true;
                break;
            }
        }
        if(status){
            res.setText(n+" is not Prime Number.");
        }else{
            res.setText(n+" is Prime Number.");
        }
    }
});
}
```

7. Write android activity to illustrate different android activity life cycle Methods.

android activity lifecycle.xml

```
<Linearlayout
        android:orientation = "vertical"
        android:layout_width = "match_parent"
        android:layout_height = "match_parent"
        android:gravity = "center" >

    <TextView android:layout_width = "wrap_content"
              android:layout_height = "wrap_content"
              android:text = "Android life cycle Demo"
              android:textSize = "20dp" />

</Linear layout>
```

AndroidActivityLifecycle.java

```
public class AndroidActivityLifecycle extends Activity {
        String TAG = "LifeCycleDemo";
        protected void onCreate(Bundle b){
            super.onCreate(b);
            SetContentView(R.layout.androidactivitylifecycle);
            Log.d(TAG, "OnCreate Called:");
        }
        protected void onStart(){
            super.onStart();
            Log.d(TAG, "OnStart Called:");
        }
        protected void onResume(){
            super.onResume();
```

```
        Log.d(TAG, "onResume Called.");
    }
    protected void onPause(){
        super.onPause();
        Log.d(TAG, "onPause Called.");
    }
    protected void onStop(){
        super.onStop();
        Log.d(TAG, "onStop Called.");
    }
    protected void onRestart(){
        super.onRestart();
        Log.d(TAG, "onRestart Called.");
    }
    protected void onDestroy(){
        super.onDestroy();
        Log.d(TAG, "onDestroy Called.");
    }
}
```

8. Develop an android application to input your name, address, gender and other personal information. Pass and Display this information in another activity.

parentactivity.xml

```
<LinearLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:orientation="vertical">
    <EditText android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/name"
        android:hint="Name" />
```

```
<EditText android:layout_width="match_parent"
          android:layout_height="wrap_content"
          android:id="@+id/address"
          android:hint="Address" />

<EditText android:layout_width="match_parent"
          android:layout_height="wrap_content"
          android:id="@+id/age"
          android:hint="Age"
          android:inputType="number" />

<RadioGroup android:layout_height="wrap_content"
            android:layout_width="match_parent"
            android:orientation="horizontal">

    <RadioButton android:id="@+id/male"
                 android:layout_width="wrap_content"
                 android:layout_height="wrap_content"
                 android:text="Male" />

    <RadioButton android:id="@+id/female"
                 android:layout_width="wrap_content"
                 android:layout_height="wrap_content"
                 android:text="Female" />

</RadioGroup>

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

</LinearLayout>
```

childactivity.xml

```
<LinearLayout
        android:layout_height="match_parent"
        android:layout_width="match_parent"
        android:orientation="vertical">

    <TextView android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:id="@+id/name"/>

    <TextView android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:id="@+id/address"/>

    <TextView android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:id="@+id/age"/>

    <TextView android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:id="@+id/gender"/>

</LinearLayout>
```

ParentActivity.java

```
public class ParentActivity extends Activity {
    protected void onCreate(Bundle b) {
        super.onCreate(b);
        setContentView(R.layout.parentactivity);
        EditText name = findViewById(R.id.name);
        EditText age = findViewById(R.id.age);
        EditText address = findViewById(R.id.address);
```

```
RadioGroup genderradiogroup = findViewById(R.id.gender);
findViewById(R.id.submit).setOnClickListener(e -> {
    String n = name.getText().toString();
    String a = age.getText().toString();
    String add = address.getText().toString();
    RadioButton selectedGender = findViewById(genderradiogroup.
    getCheckedRadioButtonId());
    String gender = selectedGender.getText().toString();
    Intent in = new Intent(this, ChildActivity.java);
    in.putExtra("name", n);
    in.putExtra("address", add);
    in.putExtra("age", a);
    in.putExtra("gender", gender);
    startActivity(in);
});
    }
}
```

ChildActivity.java

```
public class ChildActivity extends Activity {
    protected void onCreate(Bundle b) {
        super.onCreate(b);
        setContentView(R.layout.ChildActivity);
        TextView n = findViewById(R.id.name);
        TextView a = findViewById(R.id.age);
        TextView add = findViewById(R.id.address);
        TextView ge = findViewById(R.id.gender);
        Intent in = getIntent();
```

```
String name = in.getStringExtra("name");
String address = in.getStringExtra("address");
String age = in.getStringExtra("age");
String gender = in.getStringExtra("gender");

n.setText("Name : "+name);
add.setText("Address : "+address);
a.setText("Age : "+age);
ge.setText("Gender : "+gender);

}
}
```

9. Develop an android application which get some result/data like name, address, age etc. Back from a child activity.

parentactivity.xml

```
<LinearLayout
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical">

    <Button android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Start Child Activity" />

    <TextView android:id="@+id/result"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content" />

</LinearLayout>
```

· childactivity.xml

```
<Linearlayout
        android:layout_width = "match_parent"
        android: layout_height = "match_parent"
        android: orientation = "vertical"
        android: padding = "16dp">

    <EditText  android: id = "@+id/name"
               android: layout_width = "match_parent"
               android: layout_height = "wrap_content"
               android: hint = "Name" />

    <EditText  android:id = "@+id/address"
               android : layout_width = "match_parent"
               android: layout_height = "wrap_content"
               android: hint = "Address" />

    <EditText  android: id = "@+id/address"
               android: layout_width = "match_parent"
               android: layout_height = "wrap_content"
               android: hint = "Age"
               android: inputType = "number" />

    <Button    android: id = "@+id/SubmitButton"
               android: layout_width = "wrap_content"
               android: layout_height = "wrap_content"
               android: text = "Submit" />

</Linearlayout>
```

ParentActivity.java

```
public class ParentActivity extends Activity {
    TextView result;
    protected void onCreate(Bundle b) {
        super.onCreate(b);
        setContentView(R.layout.parentactivity);
        result=findViewById(R.id.result);
        findViewById(R.id.btn).setOnClickListener(e -> {
            Intent in = new Intent(this, ChildActivity.class);
            startActivityForResult(in, 1);
        });
    }

    protect void onActivityResult(int req, int res, Intent data) {
        if(req==1 && res==1) {
            String name = data.getStringExtra("name");
            String address = data.getStringExtra("address");
            String age = data.getStringExtra("age");

            String result= "Name : "+name+"\nAddress : "+
            address+ "\nAge : "+age;
            result.setText(result);
        }
    }
}
```

childActivity.java

```
public class ChildActivity extends Activity{
    protected void onCreate(Bundle b){
        super.onCreate(b);
        setContentView(R.layout.childactivity);
        EditText name = findViewById(R.id.name);
        EditText address = findViewById(R.id.address);
        EditText age = findViewById(R.id.age);
        findViewById(R.id.submitButton).setOnClickListener(e->{
            String n = name.getText().toString();
            String add = address.getText().toString();
            String a = age.setText().toString();
            Intent in = new Intent();
            in.putExtra("name", n);
            in.putExtra("address", add);
            in.putExtra("age", a);
            setResult(1, in);
            finish();
        });
    }
}
```

10. Develop an android application to display multiple fragments in activity using fragment manager.

fragment1.xml

```
<LinearLayout
        android:orientation="vertical"
        android:layout_width="match_parent"
        android:layout_height="wrap_content">
    <TextView android:layout_width="wrap_content"
              android:layout_height="wrap_content"
              android:text="Fragment 1" />
</LinearLayout>
```

fragment2.xml

```
<LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content">
    <TextView android:layout_width="wrap_content"
              android:layout_height="wrap_content"
              android:text="Fragment 2" />
</LinearLayout>
```

fragmentactivity.xml

```
<LinearLayout android:orientation="vertical"
        android:layout_width="match_parent"
        android:layout_height="wrap_content">
    <Button android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="Fragment 1"
            android:id="@+id/frag1" />
    <Button android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="Fragment 2"
            android:id="@+id/frag2" />
```

```
<FrameLayout android:layout_width="wrap_content"
             android:layout_height="wrap_content"
             android:id="@+id/fragment" />

</LinearLayout>
```

Fragment1.java

```
public class Fragment1 extends Fragment {
    public View onCreateView(LayoutInflater li, ViewGroup vg, Bundle b) {
        return li.inflate(R.layout.fragment1, vg, false);
    }
}
```

Fragment2.java

```
public class Fragment2 extends Fragment {
    public View onCreateView(LayoutInflater li, ViewGroup vg, Bundle b) {
        return li.inflate(R.layout.fragment2, vg, false);
    }
}
```

FragmentActivity.java

```
public class FragmentActivity extends Activity {
    protected void onCreate(Bundle b) {
        super.onCreate(b);
        setContentView(R.layout.fragmentactivity);
        findViewById(R.id.frag1).setOnClickListener(e -> {
            Fragment frag = new Fragment1();
            getFragmentManager().beginTransaction().replace(R.id.fragment,
            frag).commit();
        });
        findViewById(R.id.frag2).setOnClickListener(e -> {
            Fragment frag = new Fragment2();
            getFragmentManager().beginTransaction().replace(R.id.fragment,
            frag).commit();
        });
    }
}
```

11. Develop an android application to calculate Simple Interest using Fragment.

sfragment.xml

```
<LinearLayout
        android:orientation ="vertical"
        android:layout_width="match_parent"
        android:layout_height="match_parent">
    <EditText android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/principal" />
    <EditText android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/time" />
    <EditText android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/rate" />
    <Button android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:id="@+id/calc"
        android:text="Calculate" />
    <TextView android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:id="@+id/res" />
</LinearLayout>
```

sactivity.xml

```
<LinearLayout
        android:layout_height="match_parent"
        android:layout_width="match_parent">
    <fragment android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:id="@+id/frag"
        android:name="com.lab2.SIFragment" />
</LinearLayout>
```

SIFragment.java

```
public class SIFragment extends Fragment{
    public View onCreateView(LayoutInflater li, ViewGroup vg, Bundle b){
        View view = li.Inflate(R.layout.sifragment, vg, false);
        EditText pn = view.findViewById(R.id.principal);
        EditText rate = view.findViewById(R.id.rate);
        EditText time = view.findViewById(R.id.time);
        TextView res = view.findViewById(R.id.res);
        view.findViewById(R.id.calc).setOnClickListener(e->{
            int p=Integer.parseInt(pn.getText().toString());
            int t = Integer.parseInt(time.getText().toString());
            int r = Integer.parseInt(rate.getText().toString());
            res.setText("Interest : "+(p*t*r/100));
        });
        return view;
    }
}
```

SIActivity.java

```
public class SIActivity extends Activity{
    protected void onCreate(Bundle b){
        super.onCreate(b);
        setContentView(R.layout.siactivity);
    }
}
```

12. Develop an android application to demonstrate options menu.

mainmenu.xml

```
<menu>
    <item android:title="BCA" />
    <item android:title="BBA" />
    <item android:title="BIM" />
    <item android:title="CCIT" />
</menu>
```

optionmenuactivity.xml

```
<LinearLayout
    android:layout_height="match_parent"
    android:layout_width="match_parent">
</LinearLayout>
```

OptionMenuActivity.java

```
public class OptionMenuActivity extends AppCompactActivity {
    protected void onCreate(Bundle b) {
        super.onCreate(b);
        SetContentView(R.layout.optionmenuactivity);
    }
    public boolean onCreateOptionsMenu(Menu menu) {
        getMenuInflater().inflate(R.menu.mainmenu, menu);
        return true;
    }
}
```

13. Develop an android application to demonstrate context menu.

contextmenu.xml

```
<LinearLayout
        android:layout_height="match_parent"
        android:layout_width="match_parent">

    <Button android:Layout_height="wrap_content"
        android:layout_width="wrap_content"
        android:id="@+id/extmenu"
        android:text="Context Menu"/>

</LinearLayout>
```

ContextMenu.java

```
public class ContextMenu extends AppCompactActivity{
    protected void onCreate(Bundle b){
        super.onCreate(b);
        SetContentView(R.layout.contextmenu);
        registerForContextMenu(findViewById(R.id.extmenu));
    }
    public void onCreateContextMenu(ContextMenu menu, View v, ContextMenu.context
    MenuInfo menuinfo){
        getMenuInflater().inflate(R.menu.mainmenu);
    }
}
```

14. Develop an android application to demonstrate popup menu.

popupmenu.xml

```
<LinearLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent">

    <Button android:layout_width="wrap_content"
            android:layout_width="wrap_content"
            android:text="PopUp Menu"
            android:id="@+id/popupmenu"/>

</LinearLayout>
```

PopUpMenu.java

```
public class PopUpMenu extends Activity {

    protected void onCreate(Bundle b) {
        super.onCreate(b);
        setContentView(R.layout.popupmenu);
        Button btn = findViewById(R.id.popupmenu);
        btn.setOnClickListener(e -> {

            PopupMenu menu = new PopupMenu(this, btn);
            menu.inflate(R.menu.mainmenu);
            menu.show();

        });

    }

}
```

15. Develop an android application to demonstrate alert dialog.

alertactivity.xml

```
<LinearLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent">
    <Button android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Alert Dialog"
        android:id="@+id/alertdialog"/>
</LinearLayout>
```

AlertActivity.java

```
public class AlertActivity extends Activity{
    protected void onCreate(Bundle b){
        super.onCreate(b);
        SetContentView(R.layout.alertactivity);
        findViewById(R.id.alertdialog).setOnClickListener(v->{
            AlertDialog.Builder builder=new AlertDialog.Builder(this);
            builder.setTitle("BCA Program");
            builder.setMessage("Developed By Santosh Bhandari");
            builder.setPositiveButton("ok",null);
            builder.setNegativeButton("Cancel",null);
            builder.create().show();
        });
    }
}
```

16. Develop an android application to calculate area and perimeter of a rectangle in a custom Dialog.

customdialog.xml

```
<LinearLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:orientation="vertical">
    <EditText android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android="@+id/len"/>
    <EditText android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android="@+id/bre"/>
    <Button android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/click"
        android:text="Calculate"/>
    <TextView android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:id="@+id/res"/>
</LinearLayout>
```

customactivity.xml

```
<LinearLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent">
    <Button android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Show Dialog"
        android:id="@+id/showdialog"/>
</LinearLayout>
```

CustomActivity.java

```
public class CustomActivity extends Activity{
    protected void onCreate(Bundle b){
        super.onCreate(b);
        setContentView(R.layout.customactivity);
        findViewById(R.id.showdialog).setOnClickListener(e->{
            AlertDialog.Builder builder=new AlertDialog.Builder(this);
            View view=getLayoutInflater().inflate(R.layout.customdialog,null);
            builder.setView(view);
            EditText len=(EditText)view.findViewById(R.id.len);
            EditText bre=(EditText)view.findViewById(R.id.bre);
            TextView res=view.findViewById(R.id.res);
            view.findViewById(R.id.click).setOnClickListener(z->{
                int l=Integer.parseInt(len.getText().toString());
                int bd=Integer.parseInt(bre.getText().toString());
                res.setText("Area : "+(l*bd)+"\n Perimeter : "+
                (2*(l+bd)));
            });
            builder.create().show();
        });
    }
}
```

17. Develop an android application to display any 10 programming language in ListView.

listitem.xml

```
<LinearLayout
        android:orientation="vertical"
        android:layout_width="match_parent"
        android:layout_height="wrap_parent">
    <TextView android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:id="@+id/txt"/>
</LinearLayout>
```

listactivity.xml

```
<Linearlayout
        android:orientation="vertical"
        android:layout_width="match_parent"
        android:layout_height="match_parent">
    <ListView android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:id="@+id/listview"/>
</LinearLayout>
```

ListActivity.java

```
public class ListActivity extends Activity{
    public void onCreate(Bundle b){
        super.onCreate(b);
        SetContentView(R.layout.listactivity);
        ListView list=findViewById(R.layout.listitem);
        String[] lang={"C","C++","JAVA","Python","C#","JS","PHP",
        "Swift","Rust","R"};
        ArrayAdapter<String> adapter=new ArrayAdapter<>(this,R.layout,
        listitem,R.id.txt,lang);
        list.SetAdapter(adapter);
    }
}
```

18. Develop an android application to display any 5 courses in GridView.

grditem.xml

```
<LinearLayout
        android:orientation="vertical"
        android:layout_width="match_parent"
        android:layout_height="match_parent">
    <TextView android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:id="@+id/txt"/>
</LinearLayout>
```

grdactivity.xml

```
<LinearLayout
        android:layout_width="match_parnt"
        android:layout_height="match_parnt">
    <GridView android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:id="@+id/grdlist"
        android:numColumns="3"/>
</LinearLayout>
```

GridActivity.java

```
public class GridActivity extends Activity{
    protected void onCreate(Bundle b){
        super.onCreate(b);
        setContentView(R.layout.grdactivity);
        GridView grd=findViewById(R.id.grdlist);
        String courses[]={"BCA","BBA","BIM","CSIT","BIT"};
        ArrayAdapter<String> adapter=new ArrayAdapter<>(this,R.layout.grditem,
        R.id.txt,courses);
        grd.setAdapter(adapter);
    }
}
```

19. Develop an android application to display id, name and address of 5 Students using recycler view.

recyclerItem.xml

```
<LinearLayout
        android:orientation="vertical"
        android:layout_width="match_parent"
        android:layout_height="wrap_content">

    <TextView android:layout_width="wrap_content"
              android:layout_height="wrap_content"
              android:id="@+id/id" />

    <TextView android:layout_width="wrap_content"
              android:layout_height="wrap_content"
              android:id="@+id/name" />

    <TextView android:layout_width="wrap_content"
              android:layout_height="wrap_content"
              android:id="@+id/address" />

</LinearLayout>
```

recycleractivity.xml

```
<LinearLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent">

    <RecycleView android:layout_width="wrap_content"
                 android:layout_height="wrap_content"
                 android:id="@+id/recyclerview" />

</LinearLayout>
```

RecyclerAdapter.java

```
public class RecyclerAdapter extends RecyclerView.Adapter<RecyclerAdapter.
ViewHolder>{

    Activity context;
    String [] id;
    String [] name;
    String [] address;
    public RecyclerAdapter(Activity context, String[] id, String[] name, String[] address)
            this.id = id;
            this.name = name;
            this.address = address;
    }
    public int getItemCount(){
        return id.length;

    public static class ViewHolder extends RecyclerView.ViewHolder{
        TextView tid, tname, taddress;
        public ViewHolder(View item){
            super(item);
            tid = item.findViewById(R.id.id);
            tname = item.findViewById(R.id.name);
            taddress = item.findViewById(R.id.address);
        }
    }
    public ViewHolder onCreateViewHolder(ViewGroup vg, int p){
        LayoutInflater li = LayoutInflater.from(context);
        return (new ViewHolder(li.inflate(R.layout.recycleritem, vg, false)));
    }
    public void onBindViewHolder(ViewHolder holder, int pos){
        holder.tid.setText(id[pos]);
        holder.tname.setText(name[pos]);
        holder.taddress.setText(address[pos]);
    }
}
```

RecyclerActivity.java

```
public class RecyclerActivity extends Activity{
    protected void onCreate(Bundle b){
        super.onCreate(b);
        setContentView(R.layout.recycleractivity);
        String[] id ={"1","2","3","4","5"};
        String[] name={"Ram","Ram","Sita","Geeta","Adi"};
        String[] address={"BTM","KTM","BRT","BDP","BTM"};
        RecyclerView view=findViewById(R.id.recyclerview);
        view.setLayoutManager(new LinearLayoutManager(this));
        RecyclerAdapter adpt=new RecyclerAdapter(this, id,
        name, address);
        view.setAdapter(adpt);
    }
}
```

20. Provided that Sqlite database name "College" with table named student with following columns (Roll as Integer, Name as Text and Address as Text). Develop an android application to connect database and Insert five Student records and Display the Information. Also write code to update and delete records.

database activity.xml

```
<Linearlayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:orientation="vertical">
    <EditText android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/roll"/>
    <EditText android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/name"/>
```

```
<EditText android:layout_width="match_parent"
          android:layout_height="wrap_content"
          android:id="@+id/address"/>

<TableLayout android:layout="wrap_content"
             android:layout_height="wrap_content">
    <TableRow>
        <Button android:id="@+id/insert" android:text="Insert"/>
        <Button android:id="@+id/update" android:text="Update"/>
        <Button android:id="@+id/delete" android:text="Delete"/>
        <Button android:id="@+id/read" android:text="Read"/>
    </TableRow>
</TableLayout>

<TextView android:layout_width="wrap_content"
          android:layout_height="wrap_content"
          android:id="@+id/result"/>

</LinearLayout>
```

DatabaseHandler.java

```
public class DatabaseHandler extends SQLiteOpenHelper{
    public DatabaseHandler(Context context){
        super(context, "College", null, 1);
    }
    public void onCreate(SQLiteDatabase db){
        db.execSQL("CREATE TABLE student(roll int, name varchar(50),
        address varchar(50));");
    }
    public void onUpgrade(SQLiteDatabase db, int oldv, int newv){
    }
```

```
public void InsertData(String roll, String name, String address){
    SQLiteDatabase db = this.getWritableDatabase();
    db.execSQL("INSERT INTO student VALUES('"+roll+"','"+
    name+"','"+address+"');");
}
public void DeleteData(String roll){
    SQLiteDatabase db = this.getWritableDatabase();
    db.execSQL("DELETE FROM student WHERE roll='"+roll+"';");
}
public void UpdateData(String roll, String name, String address){
    SQLiteDatabase db = this.getWritableDatabase();
    db.execSQL("UPDATE student SET name='"+name+"',address='"+
    address+"' WHERE roll='"+roll+"';");
}
public Cursor SelectData(){
    SQLiteDatabase db = this.getReadableDatabase();
    return (db.rawQuery("SELECT * FROM student;",null));
}
}
```

DatabaseActivity.java

```
public class DatabaseActivity extends Activity {
    public void onCreate(Bundle b){
        DatabaseHandler db = new DatabaseHandler(this);
        super.onCreate(b);
        setContentView(R.layout.databaseactivity);
        EditText roll = findViewById(R.id.roll);
        EditText name = findViewById(R.id.name);
        EditText address = findViewById(R.id.address);
        TextView res = findViewById(R.id.result");
        findViewById(R.id.insert).setOnClickListener(e->{
```

```
        String r = roll.getText().toString();
        String n = name.getText().toString();
        String a = address.getText().toString();
        db.InsertData(r,n,a);
    });
    findViewById(R.id.update).setOnClickListener(e->{
        String rollno = roll.getText().toString();
        String n = name.getText().toString();
        String a = address.getText().toString();
        db.UpdateData(rollno, n, a);
    });
    findViewById(R.id.delete).setOnClickListener(e->{
        String r = roll.getText().toString();
        db.DeleteData(r);
    });
    findViewById(R.id.read).setOnClickListner(e->{
        Cursor data = db.SelectData();
        String disp = "Roll No.\tName\tAddress\n";
        while(data.moveToNext()){
            disp += data.getInt(0) + "\t" + data.getString(1) + "\t" +
            data.getString(2) + "\n";
        }
        res.setText(disp);
    });
}
}
```

21. Write a Swift program to Calculate factorial of a number using function.

FactorialNumber.swift

```
func functionFactorial(num: Int) -> Int {
        var fact = 1;
        for i in 1...num {
            fact = fact * i;
        }
        return fact;
}
print("Enter a Number:");
var num = Int(readLine()!);
print("Factorial : ", (functionFactorial(num:num)));
```

22. Write a Swift program to Create an array and find maximal element.

```
func maxEl(array: [Int]) -> Int {
        var max = array[0];
        for el in array {
            if el > max {
                max = el;
            }
        }
}
let numbers = [23, 45, 12, 186, 24, 39, 100, 48, 68];
print("The Maximum Number in Array : ", (maxEl(array:numbers)));
```