KOTLIN PART

1. a) Hello World Program

```
fun main() {
   println("Hello World")
}
```

---

1. b) Arithmetic Operations

```
fun main() {
   print("Enter first number: ")
   val a = readLine()!!.toInt()

   print("Enter second number: ")
   val b = readLine()!!.toInt()

   println("Addition = ${a + b}")
   println("Subtraction = ${a - b}")
   println("Multiplication = ${a * b}")
   println("Division = ${a / b}")
   println("Modulus = ${a % b}")
}
```

---

1. c) Swap Two Numbers

```
fun main() {
   print("Enter first number: ")
   var a = readLine()!!.toInt()

   print("Enter second number: ")
   var b = readLine()!!.toInt()

   val temp = a
   a = b
   b = temp

   println("After swapping: a = $a, b = $b")
}
```

---

1. d) Check Even or Odd

```
fun main() {
   print("Enter number: ")
   val num = readLine()!!.toInt()

   if (num % 2 == 0)
      println("Even Number")
   else
      println("Odd Number")
}
```

---

2. a) Find Larger Number

```
fun main() {
   print("Enter first number: ")
   val a = readLine()!!.toInt()

   print("Enter second number: ")
   val b = readLine()!!.toInt()

   if (a > b)
      println("$a is larger")
   else
      println("$b is larger")
}
```

---

2. b) Check Positive or Negative

```
fun main() {
   print("Enter number: ")
   val num = readLine()!!.toInt()

   if (num >= 0)
      println("Positive")
   else
      println("Negative")
}
```

---

2. c) Vowel or Consonant

```
fun main() {
   print("Enter character: ")
   val ch = readLine()!![0]
```

```
    if (ch in listOf('a','e','i','o','u','A','E','I','O','U'))
        println("Vowel")
    else
        println("Consonant")
}
```

---

2. d) Reverse a Number

```
fun main() {
    print("Enter number: ")
    var num = readLine()!!.toInt()
    var reverse = 0

    while (num != 0) {
        val digit = num % 10
        reverse = reverse * 10 + digit
        num /= 10
    }

    println("Reversed number = $reverse")
}
```

---

3. a) Armstrong Number

```
fun main() {
    print("Enter number: ")
    val num = readLine()!!.toInt()
    var temp = num
    var sum = 0

    while (temp != 0) {
        val digit = temp % 10
        sum += digit * digit * digit
        temp /= 10
    }

    if (sum == num)
        println("Armstrong Number")
    else
        println("Not Armstrong Number")
}
```

---

3. b) Function for Multiplication

```
fun multiply(a: Int, b: Int): Int {
   return a * b
}

fun main() {
   println("Multiplication = ${multiply(5, 3)}")
}
```

---

3. c) Student Function

```
fun studentDetails(name: String, age: Int, marks: Int): String {
   return "Name: $name, Age: $age, Marks: $marks"
}

fun main() {
   println(studentDetails("Arzan", 20, 85))
}
```

---

4. a) Implicit and Explicit Array

```
fun main() {
   val arr1 = arrayOf(1, 2, 3, 4)       // Implicit
   val arr2 = Array<Int>(4) { 0 }       // Explicit

   println(arr1.joinToString())
   println(arr2.joinToString())
}
```

---

4. b) Array of 10 Integers + Even Numbers

```
fun main() {
   val arr = arrayOf(1,2,3,4,5,6,7,8,9,10)

   println("All Elements:")
   for (i in arr)
      println(i)

   println("Even Numbers:")
   for (i in arr)
```

```
    if (i % 2 == 0)
        println(i)
}
```

---

4. c) Character Array + Vowels

```
fun main() {
   val arr = arrayOf('a','b','c','e','i','x','o','u','m','z')

   println("Vowels in array:")
   for (ch in arr)
      if (ch in listOf('a','e','i','o','u'))
         println(ch)
}
```

ANDROID STUDIO PART

PRACTICAL 5
Simple Hello World Android App

Step 1: Create New Project
Empty Activity
Language: Kotlin

MainActivity.kt

```
package com.example.helloworld

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)
   }
}
```

activity_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout
   xmlns:android="http://schemas.android.com/apk/res/android"
   android:layout_width="match_parent"
```

```
    android:layout_height="match_parent">

    <TextView
        android:id="@+id/textView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Hello World"
        android:textSize="24sp"
        android:layout_centerInParent="true"/>

</RelativeLayout>
```

PRACTICAL 6(A)

activity_main.xml (Short Version)

```
<?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="20dp">

    <EditText
        android:id="@+id/et1"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Enter Name"/>

    <Button
        android:id="@+id/btn1"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Submit"/>

    <TextView
        android:id="@+id/tv2"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Output"
        android:textSize="18sp"/>

</LinearLayout>
```

MainActivity.java (Short & Easy)

```
package com.ShaikhArzan5023;

import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.widget.*;

public class MainActivity extends AppCompatActivity {

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

      EditText et = findViewById(R.id.et1);
      Button btn = findViewById(R.id.btn1);
      TextView tv = findViewById(R.id.tv2);

      btn.setOnClickListener(v ->
         tv.setText("Your name is " + et.getText().toString())
      );
   }
}
```

PRACTICAL 6(b)
Activity Life Cycle (Android Studio)

MainActivity.kt

```
package com.example.lifecycle

import androidx.appcompat.app.AppCompatActivity
import android.os.Bundle
import android.widget.Toast

class MainActivity : AppCompatActivity() {

   override fun onCreate(savedInstanceState: Bundle?) {
      super.onCreate(savedInstanceState)
      setContentView(R.layout.activity_main)
      Toast.makeText(this, "onCreate", Toast.LENGTH_SHORT).show()
   }
```

```
    override fun onStart() {
        super.onStart()
        Toast.makeText(this, "onStart", Toast.LENGTH_SHORT).show()
    }

    override fun onResume() {
        super.onResume()
        Toast.makeText(this, "onResume", Toast.LENGTH_SHORT).show()
    }

    override fun onPause() {
        super.onPause()
        Toast.makeText(this, "onPause", Toast.LENGTH_SHORT).show()
    }

    override fun onStop() {
        super.onStop()
        Toast.makeText(this, "onStop", Toast.LENGTH_SHORT).show()
    }

    override fun onDestroy() {
        super.onDestroy()
        Toast.makeText(this, "onDestroy", Toast.LENGTH_SHORT).show()
    }
}
```

PRACTICAL 7

Login Form App

activity_main.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="20dp">

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

```
    <EditText
        android:id="@+id/etPassword"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Password"
        android:inputType="textPassword"/>

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

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

</LinearLayout>
```

MainActivity.kt

```
package com.example.loginapp

import androidx.appcompat.app.AppCompatActivity
import android.os.Bundle
import android.widget.*
import android.widget.Toast

class MainActivity : AppCompatActivity() {

    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)

        val etUsername = findViewById<EditText>(R.id.etUsername)
        val etPassword = findViewById<EditText>(R.id.etPassword)
        val btnSubmit = findViewById<Button>(R.id.btnSubmit)
        val btnReset = findViewById<Button>(R.id.btnReset)

        btnSubmit.setOnClickListener {
            val user = etUsername.text.toString()
            val pass = etPassword.text.toString()
```

```
        if (user == "admin" && pass == "1234") {
            Toast.makeText(this, "Correct username and password",
Toast.LENGTH_SHORT).show()
        } else {
            Toast.makeText(this, "Incorrect username/password",
Toast.LENGTH_SHORT).show()
        }
    }

    btnReset.setOnClickListener {
        etUsername.text.clear()
        etPassword.text.clear()
    }
  }
}
```

PRACTICAL 8(a)
Random Number Generator

activity_main.xml

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

  <TextView
    android:id="@+id/tvNumber"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:textSize="24sp"/>

  <Button
    android:id="@+id/btnGenerate"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Generate"/>
</LinearLayout>
```

MainActivity.kt

```
package com.example.randomnumber

import androidx.appcompat.app.AppCompatActivity
import android.os.Bundle
import android.widget.Button
import android.widget.TextView

class MainActivity : AppCompatActivity() {

    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)

        val tvNumber = findViewById<TextView>(R.id.tvNumber)
        val btnGenerate = findViewById<Button>(R.id.btnGenerate)

        btnGenerate.setOnClickListener {
            val randomNumber = (1..100).random()
            tvNumber.text = randomNumber.toString()
        }
    }
}
```

PRACTICAL 8(b)
Simple Calculator (Basic Version)

activity_main.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="20dp">

    <EditText
        android:id="@+id/etNum1"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="First Number"
        android:inputType="number"/>

    <EditText
        android:id="@+id/etNum2"
```

```
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:hint="Second Number"
        android:inputType="number"/>

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

    <TextView
        android:id="@+id/tvResult"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:textSize="20sp"/>
</LinearLayout>
```

MainActivity.kt

```
package com.example.calculator

import androidx.appcompat.app.AppCompatActivity
import android.os.Bundle
import android.widget.*

class MainActivity : AppCompatActivity() {

    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)

        val etNum1 = findViewById<EditText>(R.id.etNum1)
        val etNum2 = findViewById<EditText>(R.id.etNum2)
        val btnAdd = findViewById<Button>(R.id.btnAdd)
        val tvResult = findViewById<TextView>(R.id.tvResult)

        btnAdd.setOnClickListener {
            val n1 = etNum1.text.toString().toInt()
            val n2 = etNum2.text.toString().toInt()
            tvResult.text = "Result = ${n1 + n2}"
        }
    }
}
```