Assignment No. 1 Write a Java program that demonstrates program structure of java.

```java
import java.util.*;
class fact
{
        public static void main(String agrs[])
        {
                int num, f, c;
                Scanner s = new Scanner(System.in);

                System.out.print("Enter a number : ");
                num = s.nextInt();
                f=1;

                for(c=1;c<=num ;c++)
                {
                        f = f *c;
                }

                System.out.println("Factorial of "+ num + " = "+f);
        }
}
```

Output:
Enter a number : 8
Factorial of 8 = 40320

Assignment No. 2 Write a Java program to demonstrate use of class and object.

```java
class Account
{
        int acc_no;
        String name;
        float amount;

        void insert(int a,String n,float amt)
        {
                acc_no=a;
                name=n;
                amount=amt;
        }

        void deposit(float amt)
        {
                amount=amount+amt;
                System.out.println(amt+"
        deposited");
        }

        void withdraw(float amt)
        {
                if(amount<amt)
                {
                        System.out.println("Insuffici
                ent Balance");
                }
                else
                {
                        amount=amount-amt;
                        System.out.println(amt+"
                withdrawn");
                }
        }

        void checkBalance()
        {
        System.out.println("Balance is: "+amount);
        }

        void display()
        {
        System.out.println(acc_no+"          "+name+"
"+amount);
        }
}

class TestAccount
{
public static void main(String[] args)
{
Account a1=new Account();
a1.insert(832345,"Ankit",1000);
a1.display();
a1.checkBalance();
a1.deposit(40000);
a1.checkBalance();
a1.withdraw(15000);
a1.checkBalance();
}
}
```

Output:
832345 Ankit 1000.0
Balance is: 1000.0
40000.0 deposited
Balance is: 41000.0
15000.0 withdrawn
Balance is: 26000.0

Assignment No. 3 Write a Java program that demonstrates all string operations.

```java
import java.io.*;
class stropr
{
        public static void main(String args[])
        {
                String s1, s2;
                DataInputStream d = new DataInputStream(System.in);
                try
                {
                        System.out.print("Enter first string  : ");
                        s1=d.readLine();
                        System.out.print("Enter second string  : ");
                        s2=d.readLine();

                        System.out.println("First String = "+s1);
                        System.out.println("Second String = "+s2);

                        //CharAt
                        System.out.println("Character at 2nd position = "+ s1.charAt(2));
                        //equals
                        System.out.println("Equals = "+ s1.equals(s2));
                        //compareTo
                        System.out.println("Comparing two strings  = "+ s1.compareTo(s2));
                        //indexOf
                        System.out.println("Index of e = "+s1.indexOf('e'));
                        //substring
                        System.out.println("Substring of s1 = "+ s1.substring(3,6));
                        //concatenation
                        System.out.println("After concatenating first and second string = " +
s1.concat(s2));
                        //replace
                        System.out.println("After replacement of e with i = "+
s1.replace('e','i'));
                        //Uppercase
                        System.out.println("Conversion of lower case to UPPERCASE =
"+s1.toUpperCase());
                        //Lowercase
                        System.out.println("Conversion of UPPERCASE to lower case =
"+s1.toLowerCase());
                        //trim
                        System.out.println("Trimming the characters = "+ s2.trim());
                        //Length
                        System.out.println("Length of first string = "+ s1.length());
                }
                catch(Exception e)
                {}
        }
}
```

Output:

Enter first string : COMPUTER
Enter second string : management
First String = COMPUTER
Second String = management
Character at 2nd position = M
Equals = false
Comparing two strings = -42
Index of e = -1
Substring of s1 = PUT
After concatenating first and second string = COMPUTERmanagement
After replacement of e with i = COMPUTER
Conversion of lower case to UPPERCASE = COMPUTER
Conversion of UPPERCASE to lower case = computer
Trimming the characters = management
Length of first string = 8

Assignment No. 4 Write a Java program to demonstrate use of constructor and finalize method.

```java
class Student
{
        int id;
        String name;
        int age;

        Student(int i,String n)
        {
                id = i;
                name = n;
        }

        Student(int i,String n,int a)
        {
                id = i;
                name = n;
                age=a;
        }

        void display()
        {
                System.out.println(id+" "+name+" "+age);
        }

        protected void finalize()
        {
                System.out.println("Everything is Destroyed.....");
        }
        public static void main(String args[])
        {
                Student s1 = new Student(111,"Karan");
                Student s2 = new Student(222,"Aryan",25);
                s1.display();
                s2.display();
                s1.finalize();
                s2.finalize();
        }
}
```

Output:

111 Karan 0
222 Aryan 25
Everything is Destroyed.....
Everything is Destroyed.....

Assignment No. 5 Write a Java program to demonstrate use of method overloading.

```java
import java.util.*;
class Over
{
        double r,Ac, l,b,Ar;

        void area(double p1)
        {
                r=p1;
                Ac = 3.14*r*r;
                System.out.println("Area of Circle = "+Ac);
        }

        void area(double p1, double p2)
        {
                l=p1;
                b= p2;
                Ar =l*b;;
                System.out.println("Area of Rectangle = "+Ar);
        }
}
class TestOver
{
        public static void main(String args[])
        {
                Over A = new Over();
                A.area(2.3);
                A.area(5.7,6.4);
        }
}
```

Output:

Area of Circle = 16.610599999999998
Area of Rectangle = 36.480000000000004

Assignment No. 6 Write a Java program to demonstrate use of wrapper class

Each of Java's eight primitive data types has a **class** dedicated to it. These are known as **Wrapper Classes**, because they "wrap" the primitive data type into an **object** of that class. The wrapper classes are part of the **java.lang** package, which imported by default into all java program.

Use: 1) To convert string into data type, known as parsing operation.

2) To convert simple data type into objects.

```java
class Demo3
{
  public static void main(String[] args)
  {
    byte rank = 1;
    int percentage = 95;
    float range = 11.6f;
    double limit = 10.5;

    Byte b1 = new Byte(rank);
    Integer i1 = new Integer(percentage);
    Float f1 = new Float(range);
    Double d1 = new Double(limit);

    System.out.println("Wrapper objects");
    System.out.println("Byte object g1: "+ b1);
    System.out.println("Integer object m1 "+ i1);
    System.out.println("Float object f1: "+ f1);
    System.out.println("Double object r1:"+ d1);

    System.out.println("\n");

    byte b = b1.byteValue();
    int i = i1.intValue();
    float f = f1.floatValue();
    double d = d1.doubleValue();

    System.out.println("Unwrapped values");
    System.out.println("byte value, b:"+ b);
    System.out.println("int value, i:"+ i);
    System.out.println("float value, f:"+ f);
    System.out.println("double value, d:"+ d);
  }
}
```

Output:

Wrapper objects

Byte object g1: 1
Integer object m1 95
Float object f1: 11.6
Double object r1:10.5
Unwrapped values
byte value, b:1
int value, i:95
float value, f:11.6
double value, d:10.5

Assignment No. 7 Write a Java program to demonstrate use of package.

// Name of the package must be same as the directory under which this file is saved.

```java
package myPackage;
public class MyClass
{
   public void getNames(String s)
   {
      System.out.println(s);
   }
}
```

```java
// import 'MyClass' class from 'names' myPackage
import myPackage.MyClass;
public class PrintName
{
   public static void main(String args[])
   {
      String name = "Package Demonstration is going on.";
      MyClass obj = new MyClass();

      obj.getNames(name);
   }
}
```

Output:
Package Demonstration is going on.

```java
import java.io.*;
class student
{
        int rno;
        String name, course;

        void getStud()
        {
                DataInputStream d = new DataInputStream (System.in);

                try
                {
                        System.out.print("Enter Roll No. : ");
                        rno = Integer.parseInt(d.readLine());
                        System.out.print("Enter Name : ");
                        name = d.readLine();
                        System.out.print("Enter Course : ");
                        course = d.readLine();
                }
                catch(Exception e)
                {}
        }

        void putStud()
        {
                System.out.println("Student details are : ");
                System.out.println("Roll no . = "+ rno);
                System.out.println("Name = "+ name);
                System.out.println("Course = "+ course);
        }
}

class marks extends student
{
        int m1, m2, m3, total;

        void getMarks()
        {
                DataInputStream d = new DataInputStream (System.in);

                try
                {
                        System.out.print("Enter marks of First subject : ");
                        m1 = Integer.parseInt(d.readLine());
                        System.out.print("Enter marks of Second subject : ");
                        m2 = Integer.parseInt(d.readLine());
                        System.out.print("Enter marks of Third subject : ");
                        m3 = Integer.parseInt(d.readLine());
```

```
                    total = m1 + m2 + m3;
            }
            catch(Exception e)
            {}
        }

        void putMarks()
        {
            System.out.println("Marks details are : ");
            System.out.println("M1 = "+ m1);
            System.out.println("M2 = "+ m2);
            System.out.println("M3 = "+ m3);
            System.out.println("Total = "+ total);
        }

}

class testInh
{
        public static void main(String args[])
        {
            marks s1 = new marks();
            s1.getStud();
            s1.getMarks();

            s1.putStud();
            s1.putMarks();
        }
}
```

Output:
Enter Roll No. : 10
Enter Name : Ujjwal
Enter Course : BCA
Enter marks of First subject : 86
Enter marks of Second subject : 74
Enter marks of Third subject : 69
Student details are :
Roll no . = 10
Name = Ujjwal
Course = BCA
Marks details are :
M1 = 86
M2 = 74
M3 = 69
Total = 229

Assignment No. 9 Write a Java program to demonstrate interface.

```java
import java.util.*;
interface circle
{
        float pi=3.14f;
        void area(float rad);
        void circum(float rad);
}

class testIface implements circle
{
        public void area(float rad)
        {
                float AC;
                AC =pi*rad*rad;;
                System.out.println("Area of Circle = " + AC);
        }

        public void circum(float rad)
        {
                float Circum;
                Circum = 2*pi*rad;
                System.out.println("Circumference of Circle = " + Circum);
        }

        public static void main(String[] args)
        {
                testIface p=new testIface();
                float r;
                Scanner d = new Scanner(System.in);

                System.out.print("Enter Radius : ");
                r= d.nextFloat();
                p.area(r);
                p.circum(r);
        }
}
```

Output:
Enter Radius : 8.9
Area of Circle = 248.71938
Circumference of Circle = 55.892

```java
class outer
{
        void disp()
        {
                System.out.println("This is public method");
                inner B = new inner();
                B.show();
        }

        private class inner
        {
                void show()
                {
                        System.out.println("This is private method");
                }
        }
}

class testinner
{
        public static void main(String args[])
        {
                outer A = new outer();
                A.disp();
        }
}
```

Output:
This is public method
This is private method

Assignment No. 11 Write a Java program that demonstrates Exception (Divide by 0).

```java
import java.util.*;
class testExcep
{
        public static void main(String[] args)
        {
                int a, b, result;

                Scanner input = new Scanner(System.in);
                System.out.println("Input two integers");

                a = input.nextInt();
                b = input.nextInt();

                try
                {
                        result = a / b;
                        System.out.println("Result = " + result);
                }
                catch (Exception e)
                {
                        System.out.println("ERROR: Divide by Zero error…..");
                }
        }
}
```

Output:
First run:
Input two integers
54
0
ERROR: Divide by Zero error.....

Second run:
Input two integers
36
4
Result = 9

AWT Packages

AWT stands for Abstract Window toolkit. It is Java API for graphics programming. It consists of 12 packages of 370 classes. The java.awt and java.awt.event packages are commonly used.

1. The java.awt package contains the *core* AWT graphics classes.
2. The java.awt.event package supports event handling.

Containers and Components
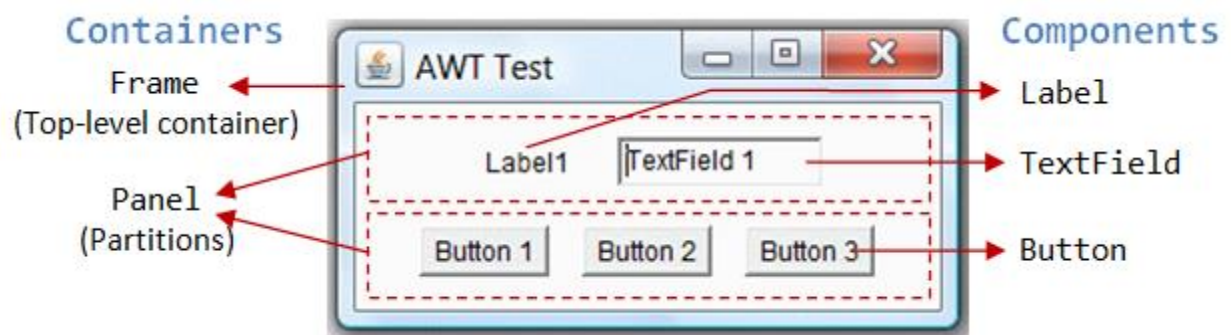
There are two types of GUI elements:

1. *Component*: Components are elementary GUI entities, such as Button, Label, and TextField.
2. *Container*: Containers, such as Frame and Panel, are used to *hold components in a specific layout* (such as FlowLayout or GridLayout). A container can also hold sub-containers.
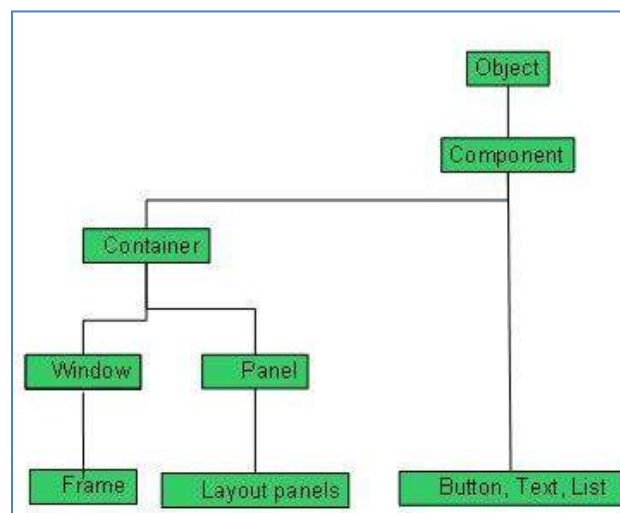
```java
import java.awt.*;
import java.awt.event.*;
class MyLoginWindow extends Frame
{
    TextField name,pass;
    Button b1,b2;
    MyLoginWindow()
    {
        setLayout(new FlowLayout());
        setLayout(null);
        Label n=new Label("Name:",Label.CENTER);
        Label p=new Label("password:",Label.CENTER);
        name=new TextField(20);
        pass=new TextField(20);
        pass.setEchoChar('*');
        b1=new Button("Submit");
        b2=new Button("Cancel");
        add(n);
        add(name);
        add(p);
        add(pass);
        add(b1);
        add(b2);
        n.setBounds(70,90,90,60);
        p.setBounds(70,130,90,60);
        name.setBounds(200,100,90,20);
        pass.setBounds(200,140,90,20);
        b1.setBounds(100,260,70,40);
        b2.setBounds(180,260,70,40);

    }
    public static void main(String args[])
    {
        MyLoginWindow ml=new MyLoginWindow();
        ml.setVisible(true);
        ml.setSize(400,400);
        ml.setTitle("my login window");
    }
}
```