Lab 1

Date:

1. WAP to find greatest of three integers.

Code:
```java
import java.util.*;
public class New {
    public static void main(String[] args) {
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter three different values\n");
        System.out.print("Enter the first value: ");
        int a=sc.nextInt();
        System.out.print("Enter the second value: ");
        int b=sc.nextInt();
        System.out.print("Enter the third value: ");
        int c=sc.nextInt();
        if (a>=b && a>=c){
            System.out.println("The greatest value is "+a);
            }
        else if(b>=a && b>=c){
            System.out.println("The greatest value is "+b);
        }
        else{
            System.out.println("The greatest value is "+c);
        }
    }
}
```

Output:

```
Output

java -cp /tmp/1K1QOFERaJ New
Enter three different values

Enter the first value: 23
Enter the second value: 78
Enter the third value: 45
The greatest value is 78
```

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2. WAP to find factorial of a number using command line arguments

Code:

```java
import java.util.*;
public class main
{
    static int Factorial(int n)
    {
        if(n==0 || n==1)
        {
            return 1;
        }
        else
        {
            return n* Factorial(n-1);
        }
    }
    public static void main(String[] args)
    {
        //int x = Integer.parseInt(args[0]);  //for command line argument
        int x = 7;
        int ans = Factorial(x);
        System.out.print("Factorial: "+ans);
    }
}
```

Output:

```
Output

java -cp /tmp/1K1QOFERaJ main
Factorial: 5040
```

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3. WAP to find the Fibonacci series using recursive and non-recursive function.

Code:

```java
import java.util.*;

public class main
{
    static int Fibr(int n)
    {
        if(n==0 || n==1)
        {
            return n;
        }
        else
        {
            return Fibr(n - 1) + Fibr(n - 2);
        }
    }
    static void Fibnonr(int n)
    {
        int a = 0;
        int b = 1;
        for(int i = 0 ;i<n;i++)
        {
            System.out.print(a+" ");
            int c = a+b;
            a = b;
            b = c;
        }
    }
    public static void main(String[] args)
    {
```

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```java
Scanner sc =new Scanner(System.in);

System.out.print("How many terms do you want of the fibonacci sequence?: ");

int n =sc.nextInt();

System.out.println("Fibonacci series without recursion:");

Fibnonr(n);

System.out.println();

System.out.println("Fibonacci series with recursion:");

for (int i = 0; i < n; i++)

{

    System.out.print(Fibr(i) + " ");

  }

 }

}
```

Output:

Output

```
java -cp /tmp/1K1QOFERaJ Project6
How many terms do you want of the fibonacci sequence?: 5
Fibonacci series without recursion:
0 1 1 2 3
Fibonacci series with recursion:
0 1 1 2 3
```

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LAB 2

Date:

4. WAP to read a set of numbers in an array & to find the sum and average of them.

Code:

```java
import java.util.Scanner;

public class Lab2_1
{
    public static void main(String[] args)
    {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter the number of elements: ");
        int n = sc.nextInt();
        int arr[] = new int[n];
        System.out.println("Enter the elements:");
        for (int i = 0; i < n; i++)
        {
            arr[i] = sc.nextInt();
        }
        int sum = 0;
        for (int i = 0; i<n ;i++)
        {
            sum += arr[i];
        }
        float avg = (float) sum / n;
        System.out.println();
        System.out.println("Sum: " + sum);
```

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```
System.out.println("Average: " + avg);

        }

}
```

Output:

5. WAP to represent ArrayList class.

Code:

```
import java.util.ArrayList;

public class lab2_q5 {

public static void main(String[] args) {

ArrayList<String> names = new ArrayList<>();

names.add("Saumyaa");

names.add("Aaron");

names.add("Kanchan");

names.add("Yati");

names.add("Ananya");

names.add("Anam");

System.out.println("The names are: " + names);

System.out.println("The first name is: " + names.get(0));

System.out.println("The last name is: " + names.get(names.size() - 1));

names.set(1, "Kanchan");

System.out.println("The names after replacing the second name are: " + names);
```

names.remove(2);

System.out.println("The names after removing the third name are: " + names);

names.add(1, "Aaron");

System.out.println("The names after inserting a new name at index 1 are: " + names);

}

}

Output:

```
Output                                              Clear

java -cp /tmp/5AWI2VOF5L lab2_q5
The names are: [Saumyaa, Aaron, Kanchan, Yati, Ananya, Anam]
The first name is: Saumyaa
The last name is: Anam
The names after replacing the second name are: [Saumyaa, Kanchan,
    Kanchan, Yati, Ananya, Anam]The names after removing the third name
    are: [Saumyaa, Kanchan, Yati, Ananya, Anam]The names after
    inserting a new name at index 1 are: [Saumyaa, Aaron, Kanchan, Yati
    , Ananya, Anam]
```

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LAB 3

Date:

6. WAP to check whether a string is palindrome or not.

Code:

```java
import java.util.*;
public class Lab3_1
{
    static boolean Palindrome(String str)
    {
        String str1 = str.toLowerCase();
        int a = 0;
        int b = str1.length() - 1;
        while (a < b)
        {
            if (str1.charAt(a) != str1.charAt(b))
            {
                return false;
            }
            a++;
            b--;
        }
        return true;
    }
    public static void main(String[] args)
    {
        Scanner obj = new Scanner(System.in);
        System.out.print("Enter a string: ");
        String s = obj.nextLine();


        if (Palindrome(s))
```

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```
        {
            System.out.println("palindrome string");
        }
        else
        {
            System.out.println("not a palindrome");
        }
    }
}
```

Output:

```
Output

java -cp /tmp/QRi1SIkPnf Lab3_1
Enter a string: kanchan
not a palindrome
```

```
Output

java -cp /tmp/QRi1SIkPnf Lab3_1
Enter a string: wowow
palindrome string
```

7. Write a java program for sorting a given list of names in ascending order.

Code:

```java
import java.util.Scanner;

public class Lab3_2
{
    public static void main(String[] args)
    {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter the number of names to be placed in the array: ");
        int n = sc.nextInt();
        sc.nextLine();
        String arr[] = new String[n];
        System.out.println("Enter the names: ");
        for (int i = 0; i < n; i++)
        {
            arr[i] = sc.nextLine();
        }
        for (int i = 0; i < n - 1; i++)
        {
            for (int j = 0; j < n - i - 1; j++)
            {
                if (arr[j].compareTo(arr[j + 1]) > 0)
                {
                    String temp = arr[j];
                    arr[j] = arr[j + 1];
```

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```java
            arr[j + 1] = temp;

        }

    }

}

System.out.println("Sorted names:");

for (int a=0;a<n;a++)

{

    System.out.println(arr[a]);

}

}
}
```

Output:

```
  Output

java -cp /tmp/QRi1SIkPnf Lab3_2
Enter the number of names to be placed in the array: 3
Enter the names:
yati
kanchan
saumyaa
Sorted names:
kanchan
saumyaa
yati
```

LAB 4

Date:

8. Design three classes: Student, Exam and Result. The student class has data members such as roll no, name etc. Create a class Exam by inheriting the Student class. The Exam class adds data members representing the marks scored in six subjects. Derive the Result from class Exam and it has its own members such as total marks and average. Calculate the total marks and average.

Code:

```
import java.util.*;
class Student{
    int rno;
    String name;
}
class Exam extends Student{
    int
English_marks,Hindi_marks,SST_marks,Maths_marks,Science_marks,PEd_marks;
}
class Result extends Exam{
    int tmarks,avgmarks;
    void get_info(){
        Scanner sc=new Scanner(System.in);
        System.out.print("Enter name of student: ");
        name=sc.next();
        System.out.print("Enter the roll no. of student: ");
        rno=sc.nextInt();
        System.out.print("Enter English marks: ");
        English_marks=sc.nextInt();
        System.out.print("Enter Hindi marks: ");
        Hindi_marks=sc.nextInt();
```

```java
        System.out.print("Enter SST marks: ");

        SST_marks=sc.nextInt();

        System.out.print("Enter Maths marks: ");

        Maths_marks=sc.nextInt();

        System.out.print("Enter Science marks: ");

        Science_marks=sc.nextInt();

        System.out.print("Enter Physical Ed marks: ");

        PEd_marks=sc.nextInt();

        sc.close();


tmarks=English_marks+Hindi_marks+SST_marks+Maths_marks+Science_marks+PEd_marks;

        avgmarks=tmarks/6;

    }

    void tresult(){

        System.out.println("The total marks are: "+tmarks);

        System.out.println("The average marks are: "+avgmarks);

    }

}

public class Project{

public static void main(String[] args) {

    Result obj=new Result();

    obj.get_info();

    obj.tresult();

    }

}
```

Output:

```java
import java.util.*;
class Student{
    int rno;
    String name;
}
class Exam extends Student{
    int
English_marks,Hindi_marks,SST_marks,Maths_marks,Science_marks,PEd_marks;
}
class Result extends Exam{
    int tmarks,avgmarks;
    void get_info(){
        Scanner sc=new Scanner(System.in);
        System.out.print("Enter name of student: ");
        name=sc.next();
        System.out.print("Enter the roll no. of student: ");
        rno=sc.nextInt();
        System.out.print("Enter English marks: ");
        English_marks=sc.nextInt();
        System.out.print("Enter Hindi marks: ");
        Hindi_marks=sc.nextInt();
        System.out.print("Enter SST marks: ");
        SST_marks=sc.nextInt();
        System.out.print("Enter Maths marks: ");
        Maths_marks=sc.nextInt();
        System.out.print("Enter Science marks: ");
```

```java
        Science_marks=sc.nextInt();

        System.out.print("Enter Physical Ed marks: ");

        PEd_marks=sc.nextInt();

        sc.close();


tmarks=English_marks+Hindi_marks+SST_marks+Maths_marks+Science_marks+PEd_marks;

        avgmarks=tmarks/6;

    }

    void tresult(){

        System.out.println("The total marks are: "+tmarks);

        System.out.println("The average marks are: "+avgmarks);

    }

}

public class Project{

public static void main(String[] args) {

    Result obj=new Result();

    obj.get_info();

    obj.tresult();

    }

}
```

Output:

```
Enter the roll no. of student: 314
Enter English marks: 78
Enter Hindi marks: 76
Enter SST marks: 77
Enter Maths marks: 79
Enter Science marks: 76
Enter Physical Ed marks: 77
The total marks are: 463
The average marks are: 77
```

9. WAP to represent abstract class with example.

Code:

```java
abstract class A{
    int x=5;
    abstract void show();
    void set(int y){
        x=y;
    }
}
class B extends A{
    void show(){
        System.out.println("New value of x is: "+x);
    }
}
public class Project2 {
    public static void main(String[] args) {
        B obj=new B();
        System.out.println("Current value of x is: "+obj.x);
        obj.set(10);
        obj.show();
    }
}
```

Output:

```
Current value of x is: 5
New value of x is: 10
```

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10. Write a java program to create an abstract class named shape that contains two integers and an empty method named print Area(). Provide three classes named Rectangle,, Triangle and Circle such that each one of the classes extends the class shape. Each one of the class contains only the method print Area() that print the area of the given shape

Code:

```
import java.util.*;
abstract class Shape{
    int n,m;
    abstract void Area();
}
class Rectangle extends Shape{
    void get_rinfo(){
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter length of rectangle: ");
        n=sc.nextInt();
        System.out.println("Enter breadth of rectangle: ");
        m=sc.nextInt();
    }
    void Area(){
        System.out.println("The area of the rectangle is: "+n*m);
    }
}
class Triangle extends Shape{

    void get_tinfo(){
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter height of triangle: ");
        n=sc.nextInt();
        System.out.println("Enter base of triangle: ");
```

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```java
        m=sc.nextInt();
    }
    void Area(){
        System.out.println("The area of the triangle is: "+0.5*n*m);
    }
}
class Circle extends Shape{

    void get_cinfo(){
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter radius of circle: ");
        n=sc.nextInt();
    }
    void Area(){
        System.out.println("The area of the circle is: "+3.14*n*n);
    }
}
public class Project3 {
    public static void main(String[] args) {
        String c;
        Scanner sc=new Scanner(System.in);
        System.out.print("What shape?: r-rectangle, t-triangle, c-circle: ");
        c=sc.next();
        if(c.equals("r")){
            Rectangle r1=new Rectangle();
            r1.get_rinfo();
            r1.Area();
        }
        else if(c.equals("t")){
```

```
        Triangle t1= new Triangle();

        t1.get_tinfo();

        t1.Area();

    }

    else if(c.equals("c")){

        Circle c1=new Circle();

        c1.get_cinfo();

        c1.Area();

    }

    else{

        System.out.println("Invalid choice");

    }

  }

}
```

Output:

```
What shape?: r-rectangle, t-triangle, c-circle: r
Enter length of rectangle:
5
Enter breadth of rectangle:
4
The area of the rectangle is: 20

What shape?: r-rectangle, t-triangle, c-circle: t
Enter height of triangle:
5
Enter base of triangle:
4
The area of the triangle is: 10.0
What shape?: r-rectangle, t-triangle, c-circle: c
Enter radius of circle:
5
The area of the circle is: 78.5
```

LAB 5

Date:

1. Calculate area of different figures like circle, rectangle, square, triangle using function overloading.

Code:

```java
import java.util.*;
class Test{
    static void Area(float x,float y, int ch){
        if(ch==2){
            System.out.println("Area of Rectangle: "+(x*y));
        }
        else if(ch==4){
            System.out.println("Area of Triangle: "+(0.5 * x*y));
        }
    }
    static void Area(float x,int ch){
        if(ch==1)
        {
            System.out.println("Area of Square: "+(x*x));
        }
        else if(ch==3)
        {
            System.out.println("Area of Circle: "+(3.14 * x*x));
        }
    }
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        System.out.println("1.Square\n 2.Rectangle\n 3.Circle\n 4.Triangle");
        System.out.print("Enter your choice: ");
        int ch = sc.nextInt();
        float x=0, y=0;
```

```java
if(ch == 1){
    System.out.print("Enter side: ");
    x = sc.nextFloat();
    System.out.println();
    Area(x,ch);
}
else if(ch == 2){
    System.out.print("Enter length: ");
    x = sc.nextFloat();
    System.out.println();
    System.out.print("Enter breadth: ");
    y = sc.nextFloat();
    System.out.println();
    Area(x,y,ch);
}
else if(ch == 3){
    System.out.print("Enter radius: ");
    x = sc.nextFloat();
    System.out.println();
    Area(x,ch);
}
else if(ch ==4){
    System.out.print("Enter base: ");
    x = sc.nextFloat();
    System.out.println();
    System.out.print("Enter height: ");
    y = sc.nextFloat();
    System.out.println();
    Area(x,y,ch);
}
```

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```java
        else{
            System.out.println("Invalid choice");
        }
    }
}
```

Output:

```
  Output

java -cp /tmp/HSnLgjzy66 Test
1.Square
 2.Rectangle
 3.Circle
 4.Triangle
Enter your choice: 1
Enter side: 3.4

Area of Square: 11.56
```

```
1.Square
 2.Rectangle
 3.Circle
 4.Triangle
Enter your choice: 4
Enter base: 3

Enter height: 5

Area of Triangle: 7.5
```

Lab 6

Date:

1. Write a program to implement multiple inheritance using interfaces.

Code:

```java
import java.util.*;
interface A
{
    int a=10;
    void printA();
}
interface B
{
    int b=20;
    void printB();
}
class C implements A,B
{

    public void printA()
    {
        System.out.println("Value of a: "+a);
    }
    public void printB()
    {
        System.out.println("Value of b: "+b);
    }
}
class JavaApplication22
{
```

```java
    public static void main(String[] args)

    {

        C obj = new C();

        obj.printA();

        obj.printB();

    }


}
```

Output:

```
Output

java -cp /tmp/5mgkDywLqI JavaApplication22
Value of a: 10
Value of b: 20

```

Lab 7

Date:

1. Write a program to implement exception handling.

```java
public class JavaApplication20
{
    public static void main(String[] args)
    {
        try
        {
            int arr[]={1,2,3,4};
            int y = arr[3];
            int a = 5/0;
        }
        catch(ArithmeticException e)
        {
            e.printStackTrace();
            System.out.println("Arithmetic Error (division by zero)");
        }
        catch(ArrayIndexOutOfBoundsException e)
        {
            e.printStackTrace();
            System.out.println("AOBE Error");
        }
    }
}
```

Output:

```
Output
java -cp /tmp/CREakOz33a JavaApplication20
java.lang.ArithmeticException: / by zero
    at JavaApplication20.main(JavaApplication20.java:9)
Arithmetic Error (division by zero)
```

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2. Write a program to handle your own exception

Code:

```java
class OwnExcep extends Exception
{

}

public class JavaApplication21
{
   public static void main(String[] args)
   {
      try
      {
         int age = 17;
         if(age<18)
         {
            throw new OwnExcep();
         }
      }
      catch(OwnExcep e)    //own exception
      //catch(Exception e)   //general exception
      {
            System.out.print("Age is less than 18");
      }
   }
}
```

Output:

```
Output

java -cp /tmp/CREakOz33a JavaApplication21
Age is less than 18
```

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