Session4 Assignment1

Task 1. Create an abstract class Figure with following properties and functions:

Properties: double dim1;

Methods: abstract void findArea();

abstract void findPerimeter();

Create three subclasses Circle, Rectangle and Triangle that extends Figure class and define both the methods.

Write a program that will find the area and perimeter of 3 Figures and print the details for all.

Solution: Below is the JAVA program (also attaching the file “Session4Prg1.java”)

```
import java.io.*;

interface Figure

{

	public void input() throws IOException;

	abstract double findArea();

	abstract double findPerimeter();

}

class Circle implements Figure

{

	double dim1;

	public void input() throws IOException

	{

	BufferedReader br = new BufferedReader(new InputStreamReader(System.in));

	 System.out.println("Enter the diameter of a Circle: ");

		dim1=Double.parseDouble(br.readLine());

	}
```

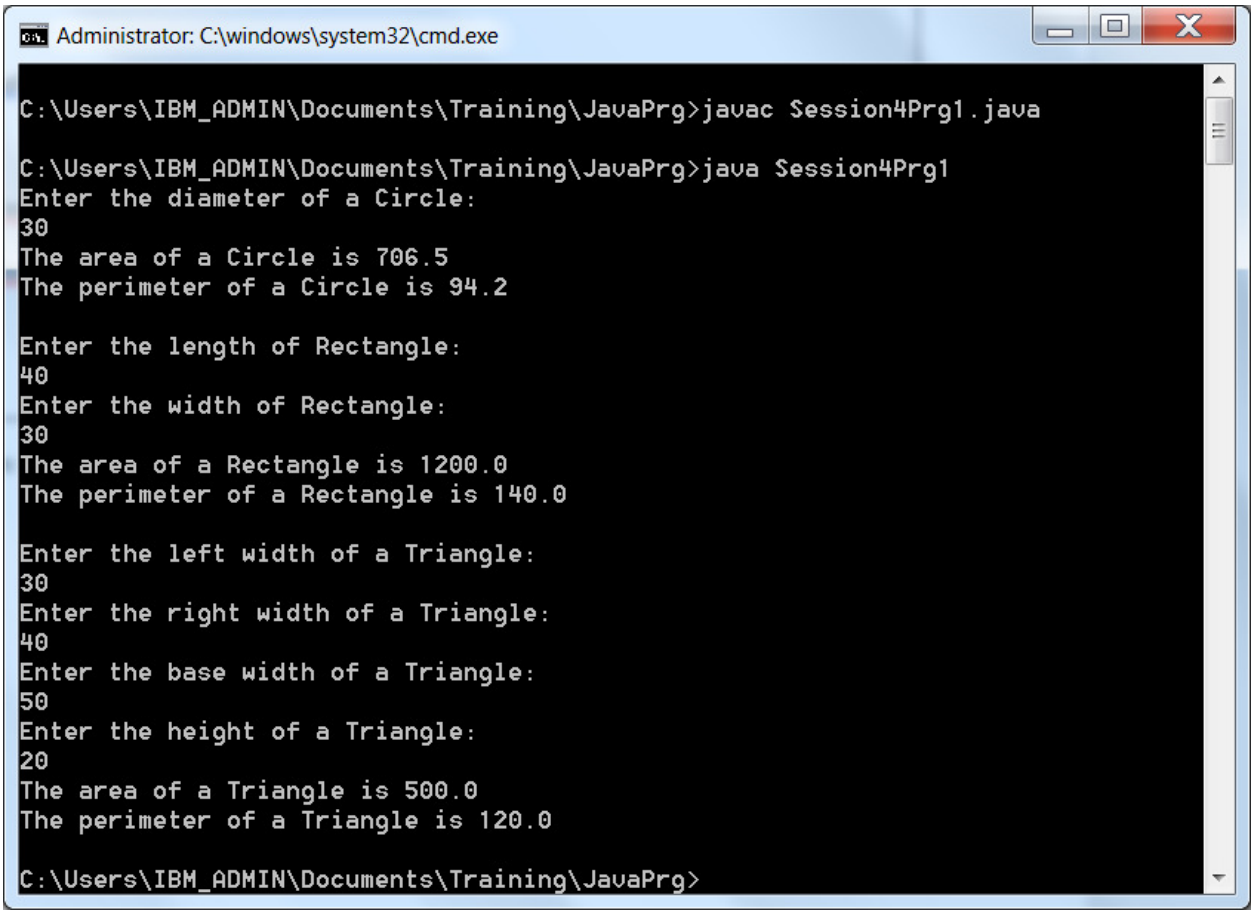
```
	public double findArea()
	{
		double findArea=3.14d*(dim1/2)*(dim1/2);
		return findArea;
	}
	public double findPerimeter()
	{
		double findPerimeter=2*3.14d*(dim1/2);
		return findPerimeter;
	}
}

class Rectangle implements Figure
{
	int length;
	int breadth;
	public void input() throws IOException
	{
	BufferedReader br = new BufferedReader(new InputStreamReader(System.in));
	 System.out.println("");
		System.out.println("Enter the length of Rectangle: ");
		length=Integer.parseInt(br.readLine());
		System.out.println("Enter the width of Rectangle: ");
		breadth=Integer.parseInt(br.readLine());
	}
```

```
	public double findArea()
	{
		double findArea=length*breadth;
		return findArea;
	}
	public double findPerimeter()
	{
		double findPerimeter=2*(length+breadth);
		return findPerimeter;
	}
}

class Triangle implements Figure
{
	int lside, rside, base,height;
	public void input() throws IOException
	{
	BufferedReader br = new BufferedReader(new InputStreamReader(System.in));
	System.out.println("");
	System.out.println("Enter the left width of a Triangle: ");
	lside=Integer.parseInt(br.readLine());
	System.out.println("Enter the right width of a Triangle: ");
	rside=Integer.parseInt(br.readLine());
	System.out.println("Enter the base width of a Triangle: ");
```

```
        base=Integer.parseInt(br.readLine());
        System.out.println("Enter the height of a Triangle: ");
        height=Integer.parseInt(br.readLine());
        }
        public double findArea()
        {
                double findArea=(base*height)/2;
                return findArea;

        }

        public double findPerimeter()
        {
                double findPerimeter=(lside+base+rside);
                return findPerimeter;
        }
}

class Session4Prg1
{
        public static void main(String args[]) throws IOException
        {
        Figure ref;

        ref=new Circle();
```

```
        ref.input();
        System.out.println("The area of a Circle is " +ref.findArea());
        System.out.println("The perimeter of a Circle is " +ref.findPerimeter());

        ref=new Rectangle();
        ref.input();
        System.out.println("The area of a Rectangle is " +ref.findArea());
        System.out.println("The perimeter of a Rectangle is " +ref.findPerimeter());

        ref=new Triangle();
        ref.input();
        System.out.println("The area of a Triangle is " +ref.findArea());
        System.out.println("The perimeter of a Triangle is " +ref.findPerimeter());
        }
}
```

Output of the Program:


Administrator: C:\windows\system32\cmd.exe
C:\Users\IBM_ADMIN\Documents\Training\JavaPrg>javac Session4Prg1.java
C:\Users\IBM_ADMIN\Documents\Training\JavaPrg>java Session4Prg1
Enter the diameter of a Circle:
30
The area of a Circle is 706.5
The perimeter of a Circle is 94.2
Enter the length of Rectangle:
40
Enter the width of Rectangle:
30
The area of a Rectangle is 1200.0
The perimeter of a Rectangle is 140.0
Enter the left width of a Triangle:
30
Enter the right width of a Triangle:
40
Enter the base width of a Triangle:
50
Enter the height of a Triangle:
20
The area of a Triangle is 500.0
The perimeter of a Triangle is 120.0
C:\Users\IBM_ADMIN\Documents\Training\JavaPrg>

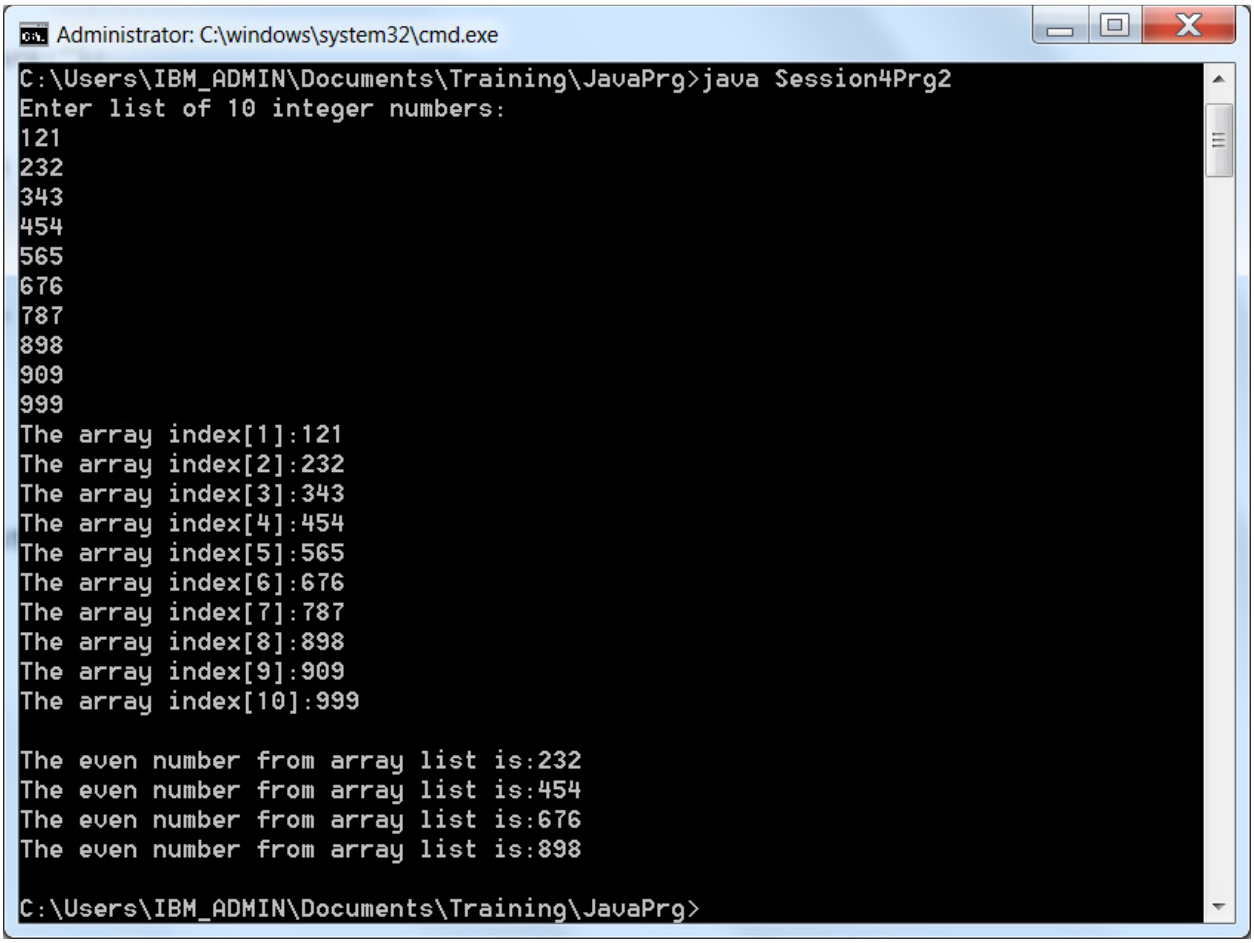
Task 2. Declare an integer array of size 10. Initialize using for loop with 1 to 10, and print all even numbers from an array.

Solution: Below is the Java program (also attaching the file “Session4Prg2.java”)

```
import java.util.Scanner;

class Session4Prg2

{

	public static void  main(String a[])

	{

		final int SIZE = 10;

		int arr[] = new int[SIZE];

		System.out.println("Enter list of 10 integer numbers:");

		Scanner sc = new Scanner(System.in);

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

		{

		arr[i] = sc.nextInt(); //it will wait for 10 inputs

		}


		// this loop will print the array

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

		{

		System.out.println("The array index[" +(i+1) +"]:"  +arr[i]);

		}


		System.out.println("");

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

		{
```

```
                if (arr[i] % 2 == 0)

                {

                System.out.println("The even number from array list is:"  +arr[i]);

                }

                }

        }

}
```

Output of the program:



Task 3. Write a program to generate a user-defined exception called NegativeAgeException if the user inputs negative value for age.

Solution: Below is the Java program (also attaching the file “Session4Prg3.java”)

```
import java.util.Scanner;

class NegativeAgeException extends Exception

{

	public NegativeAgeException(String str) {

	System.out.println(str);

	}

}


public class Session4Prg3

{

	public static void main(String[] args)

	{

		Scanner s = new Scanner(System.in);

		System.out.print("Enter the value for age: ");

		int age = s.nextInt();


		try {

			if(age < 0)

			throw new NegativeAgeException("Invalid Age!!!");

			else

			System.out.println("Valid Age");

		}

		catch (NegativeAgeException a) {
```

```
                System.out.println(a);

                }

        }

}
```

Output of the program: