EXPERIMENT NUMBER: 11

AIM

Create a Graphics package that has classes and interfaces for figures Rectangle, Square and Circle. Test the package by finding the area of these figures.

ALGORITHM

PROGRAM CODE

Shapes.java

```
package org.graphics;
public interface Shapes
{
void area();
}
```

Circle.java

```
package org.graphics;
public class Circle implements Shapes
 {
  double area,r;
  public Circle(double r)
  {
  this.r=r;
  }
  public void area()
  {
   area=3.14*r*r;
   System.out.println("Area of the Circle="+area);
  }
 }
```

Rectangle.java

```
package org.graphics;
public class Rectangle implements Shapes
```

```
{
 double area,r,l,b;
 public Rectangle(double l,double b)
 {
 this.l=l;
 this.b=b;
 }
 public void area()
 {
  area=l*b;
  System.out.println("Area of the Rectangle="+area);
 }
}
```

Square.java

```
package org.graphics;
public class Square implements Shapes
{
 double area,a;
 public Square(double a)
 {
 this.a=a;

 }
 public void area()
 {
  area=a*a;
  System.out.println("Area of the Square="+area);
```

```
 } }
```

areaMain.java

```
import org.graphics.*;
import java.util.*;
public class areaMain
{
 public static void main(String[] args)
 {
 double l,b,a,r;
 Scanner sc=new Scanner(System.in);
 System.out.println("Rectangle\n_____________");
 System.out.println("Enter the length and Breadth of Rectangle:");
 l=sc.nextDouble();
 b=sc.nextDouble();
 Rectangle rec= new Rectangle(l,b);
 rec.area();
  System.out.println("Circle\n_________");
 System.out.println("Enter the Radius of the Circle:");
 r=sc.nextDouble();
 Circle c=new Circle(r);
 c.area();
  System.out.println("Square\n_________");
 System.out.println("Enter the side of the Square:");
 a=sc.nextDouble();
 Square s= new Square(a);
 s.area();
 }
 }
```

OUTPUT

```
developer@ccfl6-pc24:~/24mcas2/oops$ javac areaMain.java
developer@ccfl6-pc24:~/24mcas2/oops$ java areaMain
Rectangle
_________________
Enter the length and Breadth of Rectangle:
2
3
Area of the Rectangle=6.0
Circle
_________
Enter the Radius of the Circle:
3
Area of the Circle=28.259999999999998
Square
_________
Enter the side of the Square:
4
Area of the Square=16.0
```

EXPERIMENT NUMBER: 12

AIM

Maintain a list of Strings using ArrayList from collection framework, perform built-in operations.

ALGORITHM

PROGRAM CODE

```
import java.util.*;
public class ArrayListExp
 {
  public static void main(String args[])
  {
   ArrayList<String> list=new ArrayList<>();
   list.add("one");
   list.add("two");
   list.add("three");
   list.add("four");
   list.add("five");

   System.out.println(list);

   System.out.println("First Element:" +list.get(0));
   list.set(1,"ten");
   System.out.println("After Replacement of 2nd ELement");
   System.out.println(list);

   Collections.sort(list);
   System.out.println("Sorted List");
   System.out.println(list);
   }
   }
```

OUTPUT

```
developer@ccfl9-pc1:~/Documents$ javac ArrayListExp.java
developer@ccfl9-pc1:~/Documents$ java ArrayListExp
[one, two, three, four, five]
First Element:one
After Replacement of 2nd ELement
[one, ten, three, four, five]
Sorted List
[five, four, one, ten, three]
```

EXPERIMENT NUMBER: 13

AIM

Program to demonstrate the creation of queue object using the PriorityQueue class.

ALGORITHM

PROGRAM CODE

```
import java.util.*;
public class PqueueExp
 {
  public static void main(String args[])
  {
   Queue<String> Pqueue=new PriorityQueue<>();
   Pqueue.add("one");
   Pqueue.add("two");
   Pqueue.add("three");
   Pqueue.add("four");
   Pqueue.add("five");

   System.out.println("Given Priority Queue");
   System.out.println(Pqueue);

   Pqueue.remove("one");
   System.out.println("After Removing one:" +Pqueue);

    System.out.println("Poll Method:"+ Pqueue.poll());
   System.out.println("After Poll Method:"+Pqueue);

   System.out.println("Peek Method:"+ Pqueue.peek());
   }
   }
```

OUTPUT

```
developer@ccfl6-pc24:~/mca2024/oops$ javac PqueueExp.java
developer@ccfl6-pc24:~/mca2024/oops$ java  PqueueExp
Given Priority Queue
[five, four, three, two, one]
After Removing one:[five, four, three, two]
Poll Method:five
After Poll Method:[four, two, three]
Peek Method:four
```

EXPERIMENT NUMBER: 14

AIM

Program to demonstrate the working of Map interface by adding, changing, and removing Elements.

ALGORITHM

PROGRAM CODE

```
import java.util.*;
public class MapExp
 {
  public static void main(String args[])
  {
   Map<String,Integer> map=new HashMap<>();
   map.put("one",1);
   map.put("two",2);
   map.put("three",3);
   map.put("four",4);
   map.put("five",5);

   System.out.println("Given Map");
   System.out.println(map);

   map.remove("one");
   System.out.println("After Removing one:" +map);
   map.replace("five",10);
   System.out.println("After changing value of five:"+map);

   }
   }
```

OUTPUT

```
developer@ccfl9-pc1:~/Documents$ javac MapExp.java
developer@ccfl9-pc1:~/Documents$ java MapExp
Given Map
{four=4, one=1, two=2, three=3, five=5}
After Removing one:{four=4, two=2, three=3, five=5}
After changing value of five:{four=4, two=2, three=3, five=10}
developer@ccfl9-pc1:~/Documents$
```

EXPERIMENT NUMBER: 15

AIM

Write a user defined exception class to authenticate the username and password.

ALGORITHM

PROGRAM CODE

```
import java.util.*;
import java.io.IOException;
class UsernameExc extends Exception
 {
  public UsernameExc(String msg)
  {
    super(msg);
   }
  }

class PasswordExc extends Exception
 {
  public PasswordExc(String msg)
  {
    super(msg);
   }
 }
 public class Login
 {
 public static void main (String []args)
  {
    Scanner sc=new Scanner(System.in);
    String uname,pword;
    System.out.println("Enter Username:");
    uname=sc.next();
    System.out.println("Enter Password:");
    pword=sc.next();
```

```
int length=uname.length();
try
{
 if(length<6)
 {
  throw new UsernameExc("Username must be greater than 6 characters");
 }
 else if(!pword.equals("yourname"))
 {
   throw new PasswordExc("Password invalid");
 }
 else
  System.out.println("Login Successful");
  }
  catch (UsernameExc u)
  {
  u.printStackTrace();
  }
  catch (PasswordExc p)
  {
  p.printStackTrace();
  }
  finally
  {
   System.out.println("This is the final statement");
   }
   }  }
```

OUTPUT

```
developer@ccfl6-pc24:~/mca2024/oops$ javac Login.java
developer@ccfl6-pc24:~/mca2024/oops$ java Login
Enter Username:
Fisat
Enter Password:
yourname
UsernameExc: Username must be greater than 6 characters
        at Login.main(Login.java:36)
This is the final statement
developer@ccfl6-pc24:~/mca2024/oops$ java Login
Enter Username:
mcadepartment
Enter Password:
yourname
Login Successful
This is the final statement
developer@ccfl6-pc24:~/mca2024/oops$
```

EXPERIMENT NUMBER: 16

AIM

Find the average of N positive integers, raising a user defined exception for each negative input.

ALGORITHM

PROGRAM CODE

```
import java.io.IOException;
import java.util.Scanner;
class MyException extends Exception
{
public MyException(String str)
{
System.out.println(str);
}
}
public class Sign
{
public static void main(String[] args) throws IOException
{
System.out.println("Enter number of input numbers :: ");
Scanner sc = new Scanner(System.in);
int n = sc.nextInt();
int k = 0, sum = 0;
Integer mynumbers[] = new Integer[n];
while (n > 0)
{
try
{
System.out.println("Enter numbers:");
int num = sc.nextInt();
if (num < 0)
throw new MyException("Number is negative");
else
```

```
{
mynumbers[k] = num;
sum = sum + num;
k++;
}
catch (MyException m)
{
System.out.println(m);
}
n--;
}
System.out.println("The average is " + sum / k);
}
}
```

OUTPUT

```
developer@ccfl6-pc24:~/mca2024/oops$ javac Sign.java
developer@ccfl6-pc24:~/mca2024/oops$ java Sign
Enter number of input numbers ::
4
Enter numbers:
-2
Number is negative
MyException
Enter numbers:
2
Enter numbers:
3
Enter numbers:
4
The average is 3
```