LAB 8

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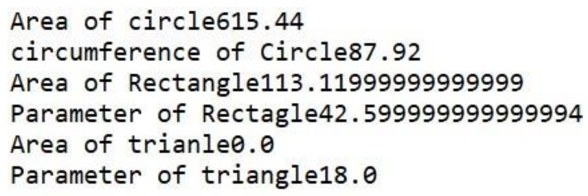
Task 1

```
abstract class Shape{ abstract double
calculateArea(); abstract double
calculateParameter();
}
class Circle extends Shape{
public double radius;
public double getRadius() {
return radius; }
public void setRadius(double radius) {
this.radius = radius;
}
public Circle(double radius) { this.radius
= radius;
} @Override double calculateArea() {
return this.radius*this.radius*3.14;
} @Override double
calculateParameter() { return
2*3.14*this.radius;
} }
class RectangleA extends Shape{
public double height, width;
public double getHeight() {
return height; }
public double getWidth() {
return width; }
public void setHeight(double height) {
this.height = height;
}
public void setWidth(double width) {
this.width = width;
}
public RectangleA(double height, double width) {
this.height = height; this.width = width;
} @Override double
calculateArea() { return
this.height*this.width;
} @Override double
calculateParameter() { return
2*(this.height+this.width);
}
}
class Triangle extends Shape{
public double height,base; public
double getHeight() { return
height;
}
public double getBase() {
return base; }
public void setHeight(double height) {
this.height = height;
}
public void setBase(double base) {
this.base = base;
}
public Triangle(double height, double base) {
this.height = height; this.base = base;
}
double calculateArea() {
return (1/2)*(this.base*this.height);
}
double calculateParameter() { return
this.base+this.base+this.base;
} }
public class task1 {
public static void main(String[] args) {

Circle obj1=new Circle(14);
System.out.println("Area of circle"+obj1.calculateArea());
System.out.println("circumference of Circle"+obj1.calculateParameter());
RectangleA obj2=new RectangleA(10.1,11.2);
System.out.println("Area of Rectangle"+obj2.calculateArea());
System.out.println("Parameter of Rectagle"+obj2.calculateParameter());
Triangle obj3=new Triangle(8,6);
System.out.println("Area of trianle"+obj3.calculateArea());
System.out.println("Parameter of triangl e"+obj3.calculateParameter());
}
}
```

Out put

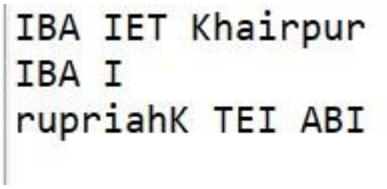


```
Area of circle615.44
circumference of Circle87.92
Area of Rectangle113.11999999999999
Parameter of Rectagle42.599999999999994
Area of trianle0.0
Parameter of triangle18.0
```

Task 2

```
interface CharSequence {
int fromEnd(int i); char
charAt(int i); int
length();
CharSequence subSequence(int start, int end); String
toString(); static int random(int max) { return max;};
} public class CharSequenceDemo implements CharSequence
{ private String s; public CharSequenceDemo(String s) {
this.s=s; } public int fromEnd(int i) { return
s.length() - 1 - i;
} public char charAt(int i)
{ return s.charAt(i);
} public int length()
{ return s.length();
} public CharSequence subSequence(int start, int end)
{ if (start < 0) {
System.out.println("Start Should be Positive");
}
if (end > s.length()) {
System.out.println("End Should be Less than Length");
}
if (start > end) {
System.out.println("Start Should be Less than end");
}
StringBuilder sub =
new StringBuilder(s.subSequence(fromEnd(end), fromEnd(start)));
CharSequence csd = new CharSequenceDemo(sub.reverse().toString());
return csd; }
public String toString() {
StringBuilder s = new StringBuilder(this.s);
return s.reverse().toString();
} private static int random(int max) { return
(int) Math.round(Math.random() * (max+1));
}
public static void main(String[] args) {
CharSequenceDemo s = new
CharSequenceDemo("IBA IET Khairpur"); for
(int i = 0; i < s.length(); i++) {
System.out.print(s.charAt(i));
}
System.out.println(""); int start =
random(s.length() - 1); int end =
random(s.length() - 1 - start) + start;
System.out.println(s.subSequence(start, end));
System.out.println(s);
}
}
```

Output

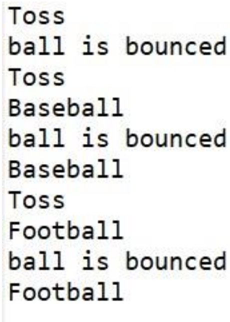


```
IBA IET Khairpur
IBA I
rupriahK TEI ABI
```

Task 3

```
interface Tossable{ void
toss(); } class Ball implements
Tossable{ private String
brandname; public Ball(String
brandname) { super();
this.brandname = brandname;
} public String getBrandname() {
return brandname; } public void
bounce() { System.out.println("ball is
bounced");
} @Override public void toss() {
// TODO Auto-generated method stub
System.out.println("Toss");
} }
class Rock implements Tossable{
@Override public void toss() { //
TODO Auto-generated method stub
System.out.println("Toss");
} } class Baseball extends Ball{
public Baseball(String brandname) {
super(brandname); } public void
toss() { super.toss();
System.out.println("Baseball");
} public void bounce() {
super.bounce();
System.out.println("Baseball");
} } class Football extends Ball{
public Football(String brandname) {
super(brandname); } public void
toss() { super.toss();
System.out.println("Football");
} public void bounce()
{ super.bounce();
System.out.println("Fo
otball");
}
}
public class Task3 {
public static void main(String[] args) {
// TODO Auto-generated method stub
Ball obj1=new Ball("abc");
obj1.toss(); obj1.bounce(); Ball
obj2=new Baseball("Adidas");
obj2.toss(); obj2.bounce(); Ball
obj3=new Football("Nike");
obj3.toss(); obj3.bounce();
}
}
```

Output

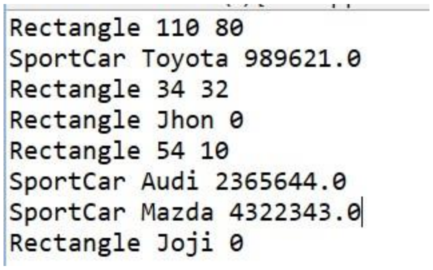


```
Toss
ball is bounced
Toss
Baseball
ball is bounced
Baseball
Toss
Football
ball is bounced
Football
```

Task 4

```
interface printable{ void print(); }
class Rectangle implements printable{
int l,w; public Rectangle(int l, int
w) { this.l = l; this.w = w; }
public void print() {
System.out.println("Rectangle "+this.l+" "+this.w);
} }
class SportCar implements printable{ String
carname; double milage; public
SportCar(String name, double milage) {
this.carname = name; this.milage = milage;
}
public void print() {
System.out.println("SportCar "+this.carname+" "+this.milage);
} }
class Manager implements printable{
String name; int age; public
Manager(String name, int age) {
this.name = name; this.age = 0; }
public void print() {
System.out.println("Rectangle "+this.name+" "+this.age);
} } public class
Task4 {
public static void main(String args[])
{
printable vec[] =  {new Rectangle(110,80), new
SportCar("Toyota", 989621), new Rectangle(34,32), new
Manager("Jhon", 40), new Rectangle(54,10), new
SportCar("Audi", 2365644), new SportCar("Mazda",
4322343), new Manager("Joji", 22)}; for(int index=0;
index<vec.length; index++)
{
vec[index].print();
}
}
}
```

Output

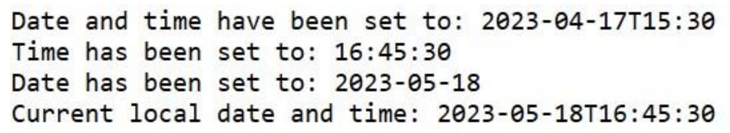


```
Rectangle 110 80
SportCar Toyota 989621.0
Rectangle 34 32
Rectangle Jhon 0
Rectangle 54 10
SportCar Audi 2365644.0
SportCar Mazda 4322343.0
Rectangle Joji 0
```

Task 5

```
import java.time.*; import java.time.LocalDateTime.*;

interface TimeServerProtocol { public void setTime(int

hour, int minute, int second); public void setDate(int

day, int month, int year);

public void setDateAndTime(int day, int month, int year, int hour, int minute, int
second); public LocalDateTime getLocalDateTime();

} class TimeServer implements TimeServerProtocol

{ private LocalDateTime localDateTime;

@Override public void setTime(int hour, int minute, int second) { localDateTime =

localDateTime.withHour(hour).withMinute(minute).withSecond(second);

System.out.println("Time has been set to: " + localDateTime.toLocalTime()); }

@Override public void setDate(int day, int month, int year) { localDateTime =

localDateTime.withDayOfMonth(day).withMonth(month).withYear(year);

System.out.println("Date has been set to: " + localDateTime.toLocalDate());

} @Override

public void setDateAndTime(int day, int month, int year, int hour, int minute, int
second) { localDateTime = LocalDateTime.of(year, month, day, hour, minute,
second); System.out.println("Date and time have been set to: " + localDateTime);

} @Override public LocalDateTime

getLocalDateTime() { return

localDateTime;

} } public class Task01b { public static

void main(String[] args) {

TimeServer timeServer = new TimeServer(); //

Example usage of each method

timeServer.setDateAndTime(17, 4, 2023, 15, 30,
0); timeServer.setTime(16, 45, 30);

timeServer.setDate(18, 5, 2023);

LocalDateTime currentDateTime = timeServer.getLocalDateTime();

System.out.println("Current local date and time: " + currentDateTime);

}

}
```

Output



```
Date and time have been set to: 2023-04-17T15:30
Time has been set to: 16:45:30
Date has been set to: 2023-05-18
Current local date and time: 2023-05-18T16:45:30
```