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Section: - 02

Problem 1: -

Define an abstract class Shape having abstract method displayShapeFeatures().

Further define two abstract classes TwoDShape and ThreeDShape, both extending the

abstract class Shape. TwoDShape has abstract methods perimeter() and area();

ThreeDShape has abstract methods surfaceArea() and volume(). Then, implement

four concrete classes Circle, Rectangle, Sphere and Box by extending suitable

abstract classes; define suitable parameterized constructors for each of the classes;

and implement suitable main() method that creates objects for each of the classes, finds

their perimeter and area or surfaceArea and volume, whichever is relevant. Finally, main() should display these values using a suitable method mentioned above through

the respective objects. (b) Write a java applet program

Soln: -

abstract class Shape {

abstract void displayShapeFeatures();

}

abstract class TwoDShape extends Shape{

abstract void displayShapeFeatures();

abstract void perimeter();

abstract void area();

}

abstract class ThreeDShape extends Shape{

abstract void displayShapeFeatures();

abstract void surfaceArea();

abstract void volume();

}

class Circle extends TwoDShape{

int radius;

Circle(int radius){

this.radius = radius;

}

@Override

void displayShapeFeatures() {

// TODO Auto-generated method stub

System.out.println("Radius of Circle: " + radius);

}

@Override

void perimeter() {

// TODO Auto-generated method stub

System.out.println("Perimeter: " + 2\*3.14\*radius);

}

@Override

void area() {

// TODO Auto-generated method stub

System.out.println("Area: " + 3.14\*radius\*radius);

}

}

class Rectangle extends TwoDShape{

int length;

int breadth;

Rectangle(int length, int breadth){

this.length = length;

this.breadth = breadth;

}

@Override

void displayShapeFeatures() {

// TODO Auto-generated method stub

System.out.println("Length and breadth " + length + " "+ breadth);

}

@Override

void perimeter() {

// TODO Auto-generated method stub

System.out.println("Perimeter: " + 2\*(length + breadth));

}

@Override

void area() {

// TODO Auto-generated method stub

System.out.println("Area: " + length\*breadth);

}

}

class Sphere extends ThreeDShape{

int radius;

Sphere(int radius){

this.radius = radius;

}

@Override

void displayShapeFeatures() {

// TODO Auto-generated method stub

System.out.println("Radius of Sphere: " + radius);

}

@Override

void surfaceArea() {

// TODO Auto-generated method stub

System.out.println("Surface Area: " + 4\*3.14\*radius\*radius);

}

@Override

void volume() {

// TODO Auto-generated method stub

System.out.println("Volume: " + (4/3)\*radius\*radius\*radius);

}

}

class Box extends ThreeDShape{

int a;

Box(int a){

this.a = a;

}

@Override

void displayShapeFeatures() {

// TODO Auto-generated method stub

System.out.println("Side of Box: " + a);

}

@Override

void surfaceArea() {

// TODO Auto-generated method stub

System.out.println("Surface Area: " + 6\*a\*a);

}

@Override

void volume() {

// TODO Auto-generated method stub

System.out.println("Volume: " + a\*a\*a);

}

public static void main(String[] args) {

Circle c = new Circle(10);

c.area();

c.perimeter();

c.displayShapeFeatures();

Rectangle r = new Rectangle(15,14);

r.area();

r.perimeter();

r.displayShapeFeatures();

Sphere s = new Sphere(20);

s.surfaceArea();

s.volume();

s.displayShapeFeatures();

Box b = new Box(25);

b.surfaceArea();

b.volume();

b.displayShapeFeatures();

}

}

Problem 2: - Write a java applet program that simulates a traffic light. The program lets the user to

click one of three light buttons: Red, Yellow, or Green. On clicking a button, an

appropriate message "Stop" or "Ready" or "Go" should appear in the space below

the buttons in the selected color. Initially there is no message shown on the display area.

Also, suitable message should be displayed on the the status bar, too.

Soln: -

import java.applet.Applet;

import java.awt.Button;

import java.awt.Label;

import java.awt.event.ActionEvent;

import java.awt.event.ActionListener;

/\* <applet code="question2" width=500 height=600></applet> \*/

public class question2 extends Applet implements ActionListener{

Label l;

Button r;

Button gr;

Button y;

public void init(){

l=new Label("");

add(l);

r=new Button("red");

r.addActionListener(this);

gr = new Button("green");

gr.addActionListener(this);

y = new Button("yellow");

y.addActionListener(this);

add(r);

add(y);

add(gr);

}

@Override

public void actionPerformed(ActionEvent e) {

if(e.getSource()==r){

l.setText("Stop");

showStatus("Chnageed to Red");

}else if(e.getSource()==y){

l.setText("Ready");

showStatus("Chnageed to Green");

}else if(e.getSource()==gr){

l.setText("Go");

showStatus("Chnageed to Yellow");

}

}

}