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Національний технічний університет
«Дніпровська політехніка»

ЗВІТ
про виконання лабораторних робіт
з дисципліни
«Об'єктно-орієнтоване програмування»
Лабораторна робота № 4

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Фігура: восьмикутник та окружність.

Код класу CGraphicsObject:

```
using System;
using System.Collections.Generic;
using System.ComponentModel;
using System.Data;
using System.Drawing;
using System.Linq;
using System.Text;
using System.Threading.Tasks;
using System.Windows.Forms;

namespace LW_4
{
    public abstract class CGraphicsObject
    {
        protected Point point;
        protected Point[] points;
        protected Pen pen;
        protected int x;
        protected int y;
        protected int width;
        protected int height;
        protected double perimeter;

        public virtual void show(PaintEventArgs e)
        {

        }
    }
}
```

Код класу Cpoint:

```
using System;
using System.Collections.Generic;
using System.ComponentModel;
using System.Data;
using System.Drawing;
using System.Linq;
using System.Text;
using System.Threading.Tasks;
using System.Windows.Forms;

namespace LW_4
{

    public class CPoint : CGraphicsObject
    {
        public Point Point
        {
            get { return point; }
            set { point = value; }
        }

        public CPoint()
        {

        }

        public CPoint(Point p)
        {
            point = p;
```

```
        }


        ~CPoint()
        {

        }

        public override void show( PaintEventArgs e)
        {
        }
    }
}
```

Код класу Octagon:

```
using System;
using System.Collections.Generic;
using System.ComponentModel;
using System.Data;
using System.Drawing;
using System.Linq;
using System.Text;
using System.Threading.Tasks;
using System.Windows.Forms;

namespace LW_4
{
    public class Octagon : CPoint
    {
        public Point[] Points
        {
            get { return points; }
            set { points = value; }
        }

        public Pen Pen
        {
            get { return pen; }
            set { pen = value; }
        }

        public double Perimeter
        {
            get { return perimeter; }
            set { perimeter = calculateP(); }
        }


        public Octagon()
        {

        }

        public Octagon(Pen penOct, Point[] p)
        {
            pen = penOct;
            points = p;
        }

        ~Octagon()
        {

        }
```

```
        public double calculateP()
        {
            double p = 0;
            for (int i = 0; i < 8; i+=2)
            {
                p += Math.Sqrt((Math.Pow((points[i + 1].X - points[i].X), 2) +
(Math.Pow((points[i + 1].Y - points[i].Y), 2))));
            }
            return p;
        }

        public static double operator *(Octagon oct, Circle c)
        {
            double p = oct.calculateP() * c.calculateP();
            return p;
        }

        public static double operator *(Circle c, Octagon oct)
        {
            double p = oct.calculateP() * c.calculateP();
            return p;
        }

        public override void show(PaintEventArgs e)
        {
            e.Graphics.DrawPolygon(pen, points);
        }
    }
}
```

Код класу Circle:

```
using System;
using System.Collections.Generic;
using System.ComponentModel;
using System.Data;
using System.Drawing;
using System.Linq;
using System.Text;
using System.Threading.Tasks;
using System.Windows.Forms;

namespace LW_4
{

    public class Circle : CPoint
    {
        public Pen Pen
        {
            get { return pen; }
            set { pen = value; }
        }

        public int X
        {
            get { return x; }
            set { x = value; }
        }

        public int Y
        {
            get { return y; }
            set { y = value; }
        }
```

```
        public int Width
        {
            get { return width; }
            set { width = value; }
        }

        public int Height
        {
            get { return height; }
            set { height = value; }
        }

        public double Perimeter
        {
            get { return perimeter; }
            set { perimeter = calculateP(); }
        }

        public Circle()
        {

        }

        public Circle(Pen penC, int xC, int yC, int widthC, int heightC)
        {
            pen = penC;
            x = xC;
            y = yC;
            width = widthC;
            height = heightC;
        }

        ~Circle()
        {

        }

        public double calculateP()
        {
            double p = 2 * Math.PI * (width / 2);
            return p;
        }
        public static double operator *(Circle c, Octagon oct)
        {
            double p = oct.calculateP() * c.calculateP();
            return p;
        }

        public override void show(PaintEventArgs e)
        {
            e.Graphics.DrawEllipse(pen, x, y, width, height);
        }
    }
}
```

Код Form1.cs:

```
using System;
using System.Collections.Generic;
using System.ComponentModel;
using System.Data;
using System.Drawing;
using System.Linq;
using System.Text;
using System.Threading.Tasks;
using System.Windows.Forms;

namespace LW_4
{
    public partial class Form1 : Form
    {
        public Form1()
        {
            InitializeComponent();
        }

        private void Form1_Load(object sender, EventArgs e)
        {

        }

        private void pictureBoxCircle_Paint(object sender, PaintEventArgs e)
        {
            Circle circle = new Circle(new Pen(Color.Red, 2), 10, 10, 100, 100);
            circle.show(e);

        }

        private void pictureBoxOct_Paint(object sender, PaintEventArgs e)
        {
            Point[] octagonPoints = { new Point(100, 25), new Point(150, 25),  new
Point(200, 50), new Point(200, 75), new Point(150, 100),
                                      new Point(100, 100), new Point(50, 75), new Point(50,
50), new Point(100, 25) };
            Octagon octagon = new Octagon(new Pen(Color.Green, 2), octagonPoints);
            octagon.show(e);
        }

        private void perimeterButton_Click(object sender, EventArgs e)
        {
            Point[] octagonPoints = { new Point(100, 25), new Point(150, 25),  new
Point(200, 50), new Point(200, 75), new Point(150, 100),
                                      new Point(100, 100), new Point(50, 75), new Point(50,
50), new Point(100, 25) };
            Octagon octagon = new Octagon(new Pen(Color.Green, 2), octagonPoints);
            Circle circle = new Circle(new Pen(Color.Red, 2), 10, 10, 100, 100);
            double p = octagon * circle;
            pLabel.Text = "Perimeter = " + Convert.ToString(p);
        }
        private void buttonOct_Click(object sender, EventArgs e)
        {
            pictureBoxOct.Refresh();
        }

        private void buttonCircle_Click(object sender, EventArgs e)
        {
            pictureBoxCircle.Refresh();
        }
    }
}
```

Діаграма класів: