Swinburne University of Technology

COS20007 Object Oriented Programming

Drawing Program - Multiple Shape Kinds

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```
using System;
using SplashKitSDK;
using DrawingProgram;

namespace DrawingMultipleShape
{
    public class Program
    {
        private enum ShapeKind
        {
            Rectangle,
            Circle,
            Line
        }

        public static void Main(string[] args)
        {
            Drawing drawing = new Drawing();
            ShapeKind kindToAdd = ShapeKind.Rectangle;
            Window window = new Window("Drawing Shape 4.1P", 800, 600);
            while(!window.CloseRequested)
            {
                SplashKit.ProcessEvents();
                SplashKit.ClearScreen();
                if (SplashKit.KeyDown(KeyCode.RKey))
                    kindToAdd = ShapeKind.Rectangle;
                if (SplashKit.KeyDown(KeyCode.CKey))
                    kindToAdd = ShapeKind.Circle;
                if (SplashKit.KeyDown(KeyCode.LKey))
                    kindToAdd = ShapeKind.Line;
                if(SplashKit.MouseClicked(MouseButton.LeftButton))
                {
                    Shape chosenShape;
                    switch(kindToAdd)
                    {
                        case(ShapeKind.Rectangle):
                            chosenShape = new MyRectangle();
                            break;
                        case (ShapeKind.Circle):
                            chosenShape = new MyCircle();
                            break;
                        case (ShapeKind.Line):
                            chosenShape = new MyLine();
                            break;
                        default:
                            chosenShape = null!;
                            break;
                    }

                    if(chosenShape != null)
                    {
                        chosenShape.X = SplashKit.MouseX();
                        chosenShape.Y = SplashKit.MouseY();
```

```
54                          drawing.AddShape(chosenShape);
55                      }
56                  }
57
58                  if(SplashKit.MouseClicked(MouseButton.RightButton))
59                  {
60                      drawing.SelectShapesAt(SplashKit.MousePosition());
61                  }
62
63                  if(SplashKit.KeyDown(KeyCode.SpaceKey))
64                  {
65                      drawing.Background = SplashKit.RandomRGBColor(255);
66                  }
67
68                  if(SplashKit.KeyDown(KeyCode.EscapeKey))
69                  {
70                      foreach(Shape s in drawing.SelectedShapes)
71                      {
72                          s.color = SplashKit.RandomRGBColor(255);
73                      }
74                  }
75
76                  if(SplashKit.KeyDown(KeyCode.DeleteKey) ||
    ↪  SplashKit.KeyDown(KeyCode.BackspaceKey))
77                  {
78                      foreach(Shape s in drawing.SelectedShapes)
79                      {
80                          drawing.RemoveShape(s);
81                      }
82                  }
83                  drawing.Draw();
84                  SplashKit.RefreshScreen();
85              }
86
87          }
88      }
89  }
```

```
using System;
using SplashKitSDK;
using System.Collections.Generic;
namespace DrawingProgram
{
    public class Drawing
    {
        private readonly List<Shape> _shapes;
        private Color _background;

        public Drawing(Color background)
        {
            _shapes = new List<Shape>();
            _background = background;
        }

        public Drawing() : this(Color.White) { }

        public List<Shape> SelectedShapes
        {
            get
            {
                List<Shape> _selectedShapes = new List<Shape>();
                foreach(Shape s in _shapes)
                {
                    if (s.Selected)
                        _selectedShapes.Add(s);
                }

                return _selectedShapes;
            }
        }

        public int ShapeCount
        {
            get
            {
                return _shapes.Count;
            }
        }

        public Color Background
        {
            get
            {
                return _background;
            }

            set
            {
                _background = value;
            }
        }
```

```
54
55          public void Draw()
56          {
57              SplashKit.ClearScreen(_background);
58              foreach(Shape s in _shapes)
59              {
60                  s.Draw();
61              }
62
63          }
64          public void SelectShapesAt(Point2D point)
65          {
66              foreach(Shape s in _shapes)
67              {
68                  s.Selected = s.IsAt(point);
69              }
70          }
71          public void AddShape(Shape s)
72          {
73              _shapes.Add(s);
74          }
75          public void RemoveShape(Shape s)
76          {
77              _shapes.Remove(s);
78          }
79      }
80  }
81
```

```
using System;
using SplashKitSDK;

namespace DrawingProgram
{
    public abstract class Shape
    {
        private Color _color;
        private float _x, _y;
        private bool _selected;
        private int _width, _height;

        public Shape(Color color)
        {
            _color = color;
            _x = 0;
            _y = 0;
            _width = 100;
            _height = 100;

        }

        public Shape() : this(Color.Yellow) { }

        public Color color
        {
            get
            {
                return _color;
            }
            set
            {
                _color = value;
            }
        }

        public float X
        {
            get
            {
                return _x;
            }
            set
            {
                _x = value;
            }
        }

        public float 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 bool Selected
        {
            get
            {
                return _selected;
            }
            set
            {
                _selected = value;
            }
        }

        public abstract void Draw();
        public abstract bool IsAt(Point2D pt);
        public abstract void DrawOutline();
    }
}

```

```
using System;
using SplashKitSDK;

namespace DrawingProgram
{
    public class MyRectangle : Shape
    {
        private int _width;
        private int _height;

        public MyRectangle(Color color, float x, float y, int width, int height) :
↪   base(color)
        {
            X = x;
            Y = y;
            _width = width;
            _height = height;
        }

        public MyRectangle() : this(Color.Green, 0, 0, 100, 100) { }

        public new int Width
        {
            get
            {
                return _width;
            }
            set
            {
                _width = value;
            }
        }

        public new int Height
        {
            get
            {
                return _height;
            }
            set
            {
                _height = value;
            }
        }

        public override void Draw()
        {
            if (Selected)
                DrawOutline();
            SplashKit.FillRectangle(color, X, Y, _width, _height);
        }

        public override bool IsAt(Point2D pt)
```

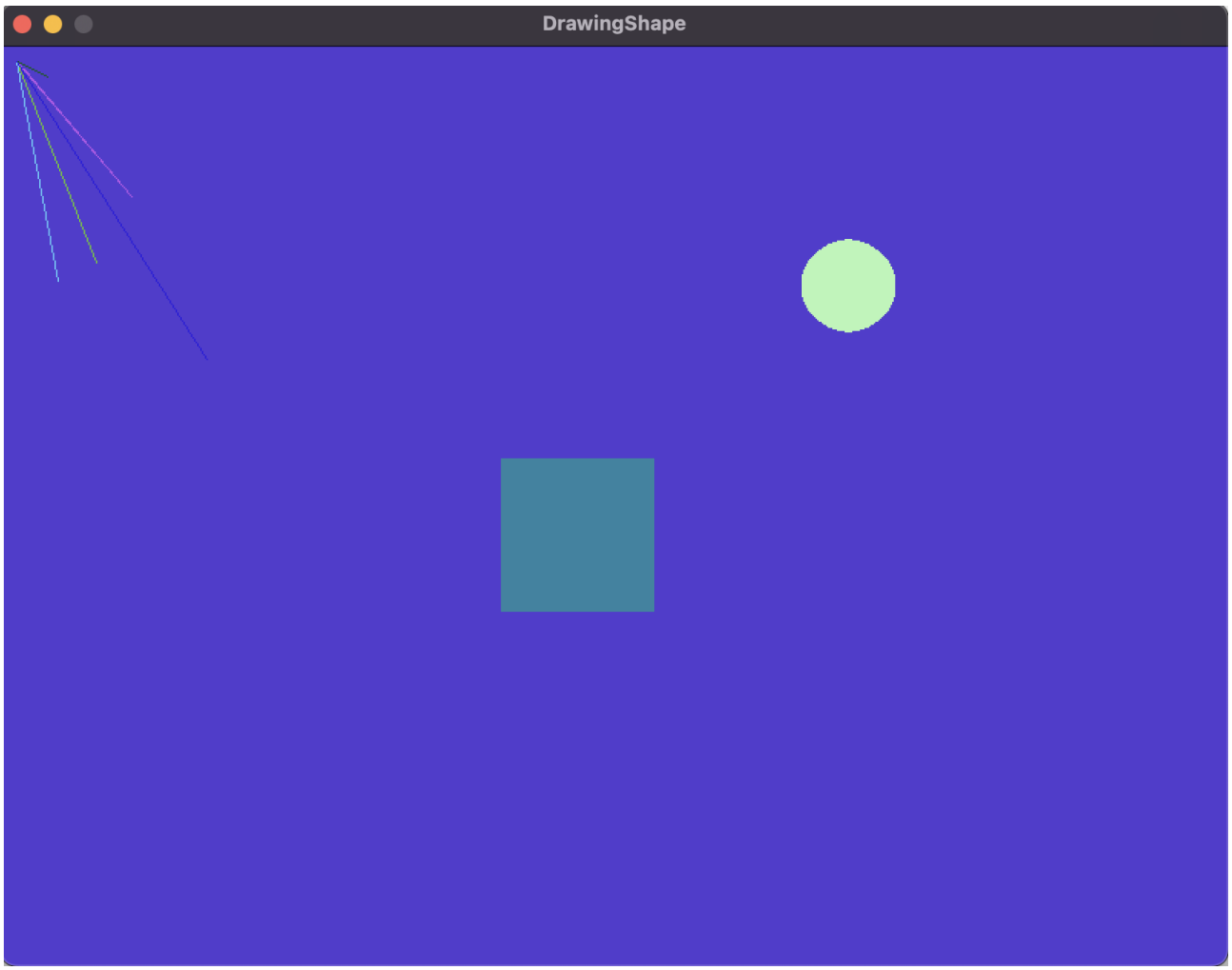
```
53          {
54              return SplashKit.PointInRectangle(pt, SplashKit.RectangleFrom(X, Y,
    ↪  _width, _height));
55          }
56
57          public override void DrawOutline()
58          {
59              SplashKit.FillRectangle(Color.Black, X - 2, Y - 2, _width + 4, _height +
    ↪  4);
60          }
61      }
62  }
63
```

```
using System;
using SplashKitSDK;

namespace DrawingProgram
{
    public class MyCircle : Shape
    {
        private int _radius;

        public MyCircle(Color color, float x, float y, int radius) : base(color)
        {
            X = x;
            Y = y;
            _radius = radius;
        }

        public MyCircle() : this(Color.Blue, 0, 0, 50)
        {
        }

        public int Radius
        {
            get
            {
                return _radius;
            }
            set
            {
                _radius = value;
            }
        }

        public override void Draw()
        {
            if(Selected)
            {
                DrawOutline();
            }
            SplashKit.FillCircle(color, X, Y, _radius);
        }

        public override bool IsAt(Point2D pt)
        {
            //c = sqrt(a^2 + b^2)
            return Math.Sqrt((pt.X - X) * (pt.X - X) + (pt.Y - Y) * (pt.Y - Y)) <
    _radius;
        }

        public override void DrawOutline()
        {
            SplashKit.FillCircle(Color.Black, X, Y, _radius + 4);
        }
    }
```

```
53 }
54
```

```
using System;
using SplashKitSDK;

namespace DrawingProgram
{
    public class MyLine : Shape
    {
        private float _endX, _endY;

        public MyLine(Color color, float startX, float startY, float endX, float
↪   endY) : base(color)
        {
            X = startX;
            Y = startY;
            _endX = endX;
            _endY = endY;
        }

        public MyLine() : this(Color.RandomRGB(255), 0, 0, 10, 10)
        {
        }

        public float EndX
        {
            get
            {
                return _endX;
            }
            set
            {
                _endX = value;
            }
        }

        public float EndY
        {
            get
            {
                return _endY;
            }
            set
            {
                _endY = value;
            }
        }



        public override void Draw()
        {
            if (Selected)
                DrawOutline();
            SplashKit.DrawLine(color, X, Y, _endX, _endY);
```

```
53          }
54
55          public override void DrawOutline()
56          {
57              SplashKit.DrawLine(color, X, Y, _endX + 5, _endY + 5);
58          }
59
60          public override bool IsAt(Point2D pt)
61          {
62              return SplashKit.PointOnLine(pt, SplashKit.LineFrom(X, Y, _endX, _endY));
63          }
64      }
65  }
66
```


DrawingShape