5.3C - Drawing Program - Saving and Loading

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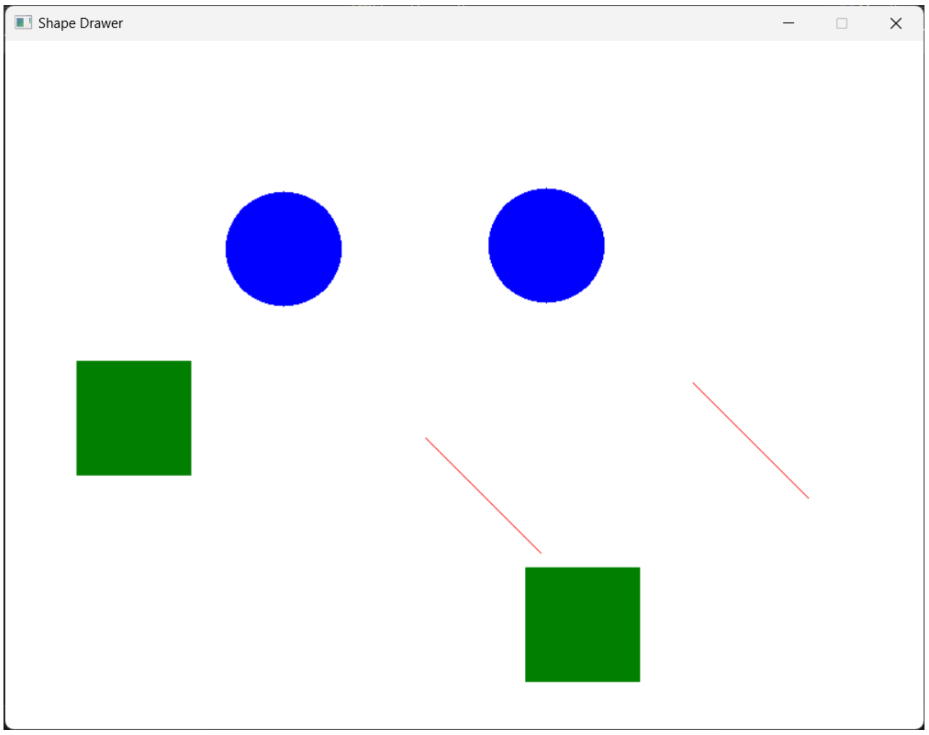
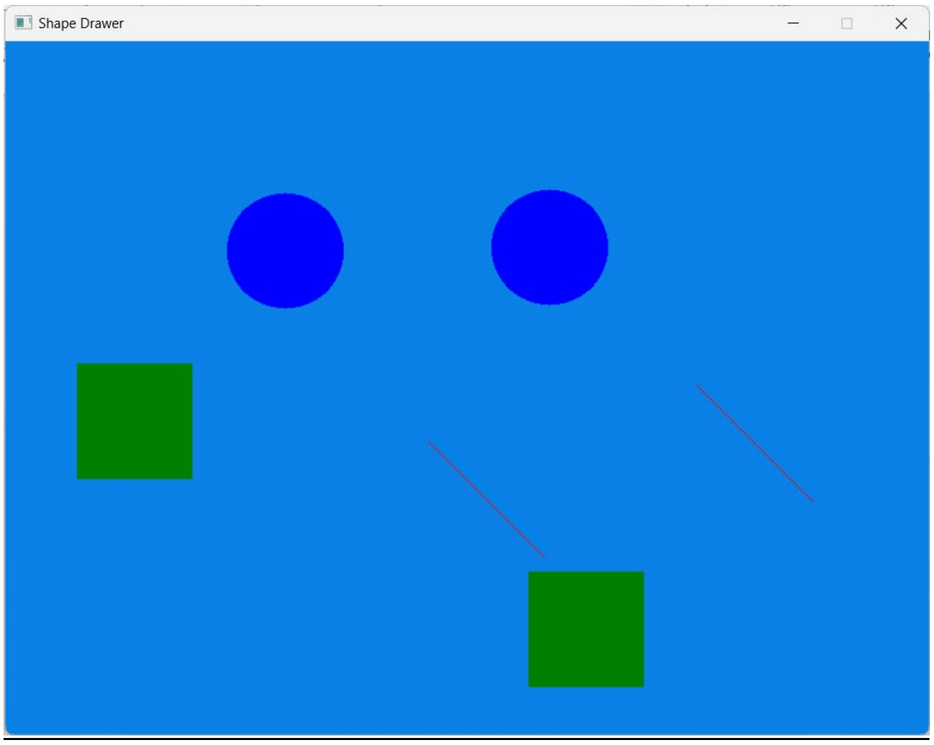
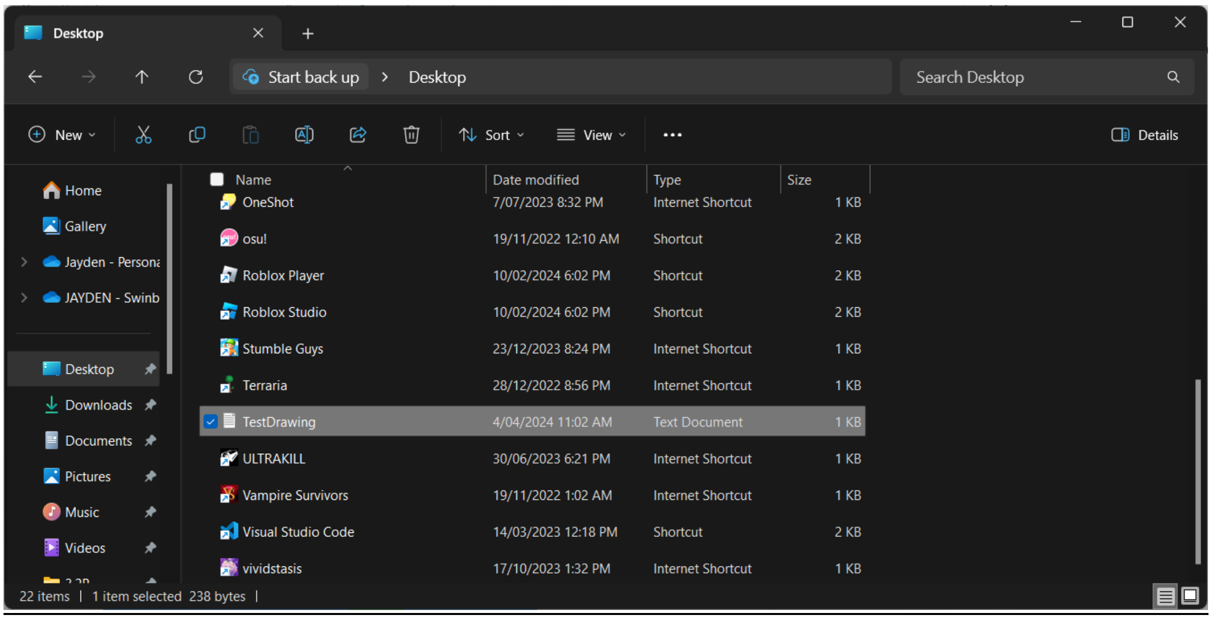
Drawing shapes:



Changing background:



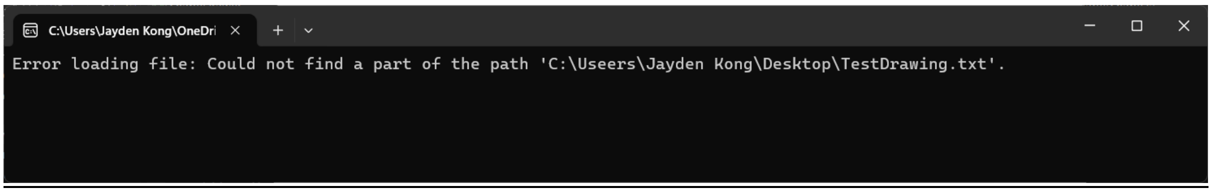
Saved file created in Desktop (file contents on later pages):



Name	Date modified	Type	Size
OneShot	7/07/2023 8:32 PM	Internet Shortcut	1 KB
osu!	19/11/2022 12:10 AM	Shortcut	2 KB
Roblox Player	10/02/2024 6:02 PM	Shortcut	2 KB
Roblox Studio	10/02/2024 6:02 PM	Shortcut	2 KB
Stumble Guys	23/12/2023 8:24 PM	Internet Shortcut	1 KB
Terraria	28/12/2022 8:56 PM	Internet Shortcut	1 KB
TestDrawing	4/04/2024 11:02 AM	Text Document	1 KB
ULTRAKILL	30/06/2023 6:21 PM	Internet Shortcut	1 KB
Vampire Survivors	19/11/2022 1:02 AM	Internet Shortcut	1 KB
Visual Studio Code	14/03/2023 12:18 PM	Shortcut	2 KB
vividstasis	17/10/2023 1:32 PM	Internet Shortcut	1 KB

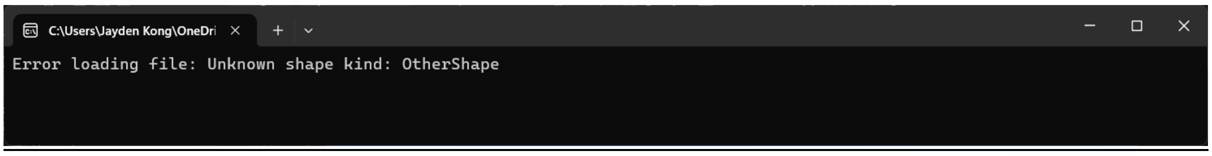
22 items | 1 item selected 238 bytes |

Exception for opening file with incorrect path:



```
Error loading file: Could not find a part of the path 'C:\Useers\Jayden Kong\Desktop\TestDrawing.txt'.
```

Exception for having an unknown shape kind in saved file:



```
Error loading file: Unknown shape kind: OtherShape
```

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;
using System.IO;
using SplashKitSDK;

namespace ShapeDrawer
{
    public static class ExtensionMethods
    {
        public static int ReadInteger(this StreamReader reader)
        {
            return Convert.ToInt32(reader.ReadLine());
        }
        public static float ReadSingle(this StreamReader reader)
        {
            return Convert.ToSingle(reader.ReadLine());
        }
        public static Color ReadColor(this StreamReader reader)
        {
            return Color.RGBColor(reader.ReadSingle(), reader.ReadSingle(), 
              reader.ReadSingle());
        }
        public static void WriteColor(this StreamWriter writer, Color clr)
        {
            writer.WriteLine("{0}\n{1}\n{2}", clr.R, clr.G, clr.B);
        }
    }
}

```

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;
using System.IO;
using SplashKitSDK;

namespace ShapeDrawer
{
    public class Drawing
    {
        private readonly List<Shape> _shapes;
        private Color _background;

        public Color Background
        {
            get
            {
                return _background;
            }
            set
            {
                _background = value;
            }
        }

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

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


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

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

        public void AddShape(Shape s)
        {
            _shapes.Add(s);
        }

        public void RemoveShape(Shape s)
        {
            _shapes.Remove(s);
        }

        public void Draw()
        {
            SplashKit.ClearScreen(_background);
            foreach (Shape s in _shapes)
            {
                s.Draw();
            }
        }

        public void SelectShapesAt(Point2D pt)
        {
            foreach (Shape s in _shapes)
            {
                s.Selected = s.IsAt(pt);
            }
        }

        public void Save(string filename)
        {
            StreamWriter writer = new StreamWriter(filename);
            try
            {
                writer.WriteColor(Background);
                writer.WriteLine(ShapeCount);

                foreach (Shape s in _shapes)
                {
                    s.SaveTo(writer);
                }
            }
            finally
            {
                writer.Close();
            }

        }

        public void Load(string filename)
        {
            StreamReader reader = new StreamReader(filename);
            try
            {
                Background = reader.ReadColor();
                int count = reader.ReadInteger();
                _shapes.Clear();

                Shape s;
                for (int i = 0; i < count; i++)
                {
                    string kind = reader.ReadLine();
                    switch (kind)
                    {
                        case "Rectangle":
                            s = new MyRectangle();
                            break;
                        case "Circle":
                            s = new MyCircle();
                            break;
                        case "Line":
                            s = new MyLine();
                            break;
                        default:
                            throw new InvalidDataException("Unknown shape kind: " + kind);
                    }

                    s.LoadFrom(reader);
                    AddShape(s);
                }
            }
            finally
            {
                reader.Close();
            }
        }
    }
```

```
}

```

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Net.Security;
using System.Text;
using System.Threading.Tasks;
using SplashKitSDK;

namespace ShapeDrawer
{
    public class MyRectangle : Shape
    {
        private int _width;
        private int _height;
        public int Width
        {
            get
            {
                return _width;
            }
            set
            {
                _width = value;
            }
        }

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

        public MyRectangle() : this(Color.Green, 0.0f, 0.0f, 100, 100) { }

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

        public override void Draw()
        {
            if (base.Selected)
            {
                DrawOutline();
            }

            SplashKit.FillRectangle(base.Color, X, Y, _width, _height);
        }

        public override void DrawOutline()
        {
            SplashKit.FillRectangle(Color.Black, X - 2, Y - 2, _width + 4, _height + 4);
        }

        public override bool IsAt(Point2D pt)
        {
            return ((pt.X >= X) && (pt.X <= X + _width) && (pt.Y >= Y) && (pt.Y <= Y + _height));
        }

        public override void SaveTo(StreamWriter writer)
        {
            writer.WriteLine("Rectangle");
            base.SaveTo(writer);
            writer.WriteLine(Width);
            writer.WriteLine(Height);
        }

        public override void LoadFrom(StreamReader reader)
        {
            base.LoadFrom(reader);
            Width = reader.ReadInteger();
            Height = reader.ReadInteger();
        }
    }
}
```

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;
using SplashKitSDK;

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

        public int Radius
        {
            get
            {
                return _radius;
            }
            set
            {
                _radius = value;
            }
        }
        public MyCircle() : this(Color.Blue, 0.0f, 0.0f, 50) { }

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


        public override void Draw()
        {
            if (Selected)
            {
                DrawOutline();
            }

            SplashKit.FillCircle(base.Color, X, Y, _radius);
        }

        public override void DrawOutline()
        {
            SplashKit.FillCircle(Color.Black, X, Y, _radius + 2);
        }

        public override bool IsAt(Point2D pt)
        {
            return SplashKit.PointInCircle(pt, SplashKit.CircleAt(X, Y,
              _radius));
        }

        public override void SaveTo(StreamWriter writer)
        {
            writer.WriteLine("Circle");
            base.SaveTo(writer);
            writer.WriteLine(Radius);
        }

        public override void LoadFrom(StreamReader reader)
        {
            base.LoadFrom(reader);
            Radius = reader.ReadInteger();
        }
    }
}

```

```
using SplashKitSDK;
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;

namespace ShapeDrawer
{
    public class MyLine : Shape
    {
        private float _endX;
        private float _endY;
        public float EndX
        {
            get
            {
                return _endX;
            }
            set
            {
                _endX = value;
            }
        }

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

        public MyLine() : this(Color.Red, 0.0f, 0.0f, 100.0f, 100.0f) { }

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

        public override void Draw()
        {
            if (base.Selected)
            {
                DrawOutline();
            }

            SplashKit.DrawLine(base.Color, X, Y, X + EndX, Y + EndY);
        }

        public override void DrawOutline()
        {
            SplashKit.FillCircle(Color.Black, X, Y, 2);
            SplashKit.FillCircle(Color.Black, X + EndX, Y + EndY, 2);
        }

        public override bool IsAt(Point2D pt)
        {
            return SplashKit.PointOnLine(pt, SplashKit.LineFrom(X, Y, X + 
              EndX, Y + EndY), 5);
        }

        public override void SaveTo(StreamWriter writer)
        {
            writer.WriteLine("Line");
            base.SaveTo(writer);
            writer.WriteLine(EndX);
            writer.WriteLine(EndY);
        }

        public override void LoadFrom(StreamReader reader)
        {
            base.LoadFrom(reader);
            EndX = reader.ReadInteger();
            EndY = reader.ReadInteger();
        }
    }
}
```

```
using System;
using SplashKitSDK;
namespace ShapeDrawer
{
    public class Program
    {
        private enum ShapeKind
        {
            Rectangle,
            Circle,
            Line
        }

        public static void Main()
        {
            Window window = new Window("Shape Drawer", 800, 600);
            Drawing myDrawing = new Drawing();
            ShapeKind kindToAdd = ShapeKind.Circle;

            do
            {
                SplashKit.ProcessEvents();
                SplashKit.ClearScreen();

                if (SplashKit.KeyTyped(KeyCode.SKey))
                {
                    myDrawing.Save("C:/Users/Jayden Kong/Desktop/
                  TestDrawing.txt");
                }

                if (SplashKit.KeyTyped(KeyCode.OKey))
                {
                    try
                    {
                        myDrawing.Load("C:/Users/Jayden Kong/Desktop/
                  TestDrawing.txt");
                    }
                    catch (Exception e)
                    {
                        Console.Error.WriteLine("Error loading file: {0}",
                      e.Message);
                    }
                }

                if (SplashKit.KeyTyped(KeyCode.RKey))
                {
                    kindToAdd = ShapeKind.Rectangle;
                }

                if (SplashKit.KeyTyped(KeyCode.CKey))
                {
                    kindToAdd = ShapeKind.Circle;
                }

                if (SplashKit.KeyTyped(KeyCode.LKey))
                {
                    kindToAdd = ShapeKind.Line;
                }

                if (SplashKit.MouseClicked(MouseButton.LeftButton))
                {
                    Shape newShape;

                    switch (kindToAdd)
                    {
                        case ShapeKind.Circle:
                            newShape = new MyCircle();
                            break;
                        case ShapeKind.Line:
                            newShape = new MyLine();
                            break;
                        default:
                            newShape = new MyRectangle();
                            break;
                    }

                    newShape.X = SplashKit.MouseX();
                    newShape.Y = SplashKit.MouseY();
                    myDrawing.AddShape(newShape);
                }

                if (SplashKit.KeyTyped(KeyCode.SpaceKey))
                {
                    myDrawing.Background = SplashKit.RandomColor();
                }

                if (SplashKit.MouseClicked(MouseButton.RightButton))
                {
                    myDrawing.SelectShapesAt(SplashKit.MousePosition());
                }

                if (SplashKit.KeyTyped(KeyCode.DeleteKey) ||
                  SplashKit.KeyTyped(KeyCode.BackspaceKey))
                {
                    foreach(Shape s in myDrawing.SelectedShapes)
                    {
                        myDrawing.RemoveShape(s);
                    }
                }

                myDrawing.Draw();

                SplashKit.RefreshScreen();
            } while (!window.CloseRequested);
        }
    }
}

```

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;
using SplashKitSDK;

namespace ShapeDrawer
{
    public abstract class Shape
    {
        private Color _color;
        private float _x;
        private float _y;
        private bool _selected;

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

        public float Y
        {
            get
            {
                return _y;
            }
            set
            {
                _y = value;
            }
        }

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

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

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

        public Shape(Color color)
        {
            _color = color;
            _x = 0.0f;
            _y = 0.0f;
        }

        public abstract void Draw();

        public abstract void DrawOutline();

        public abstract bool IsAt(Point2D pt);

        public virtual void SaveTo(StreamWriter writer)
        {
            writer.WriteColor(Color);
            writer.WriteLine(X);
            writer.WriteLine(Y);
        }

        public virtual void LoadFrom(StreamReader reader)
        {
            Color = reader.ReadColor();
            X = reader.ReadInteger();
            Y = reader.ReadInteger();
        }
    }
}
```