

CgPaint (Assignment - 01)

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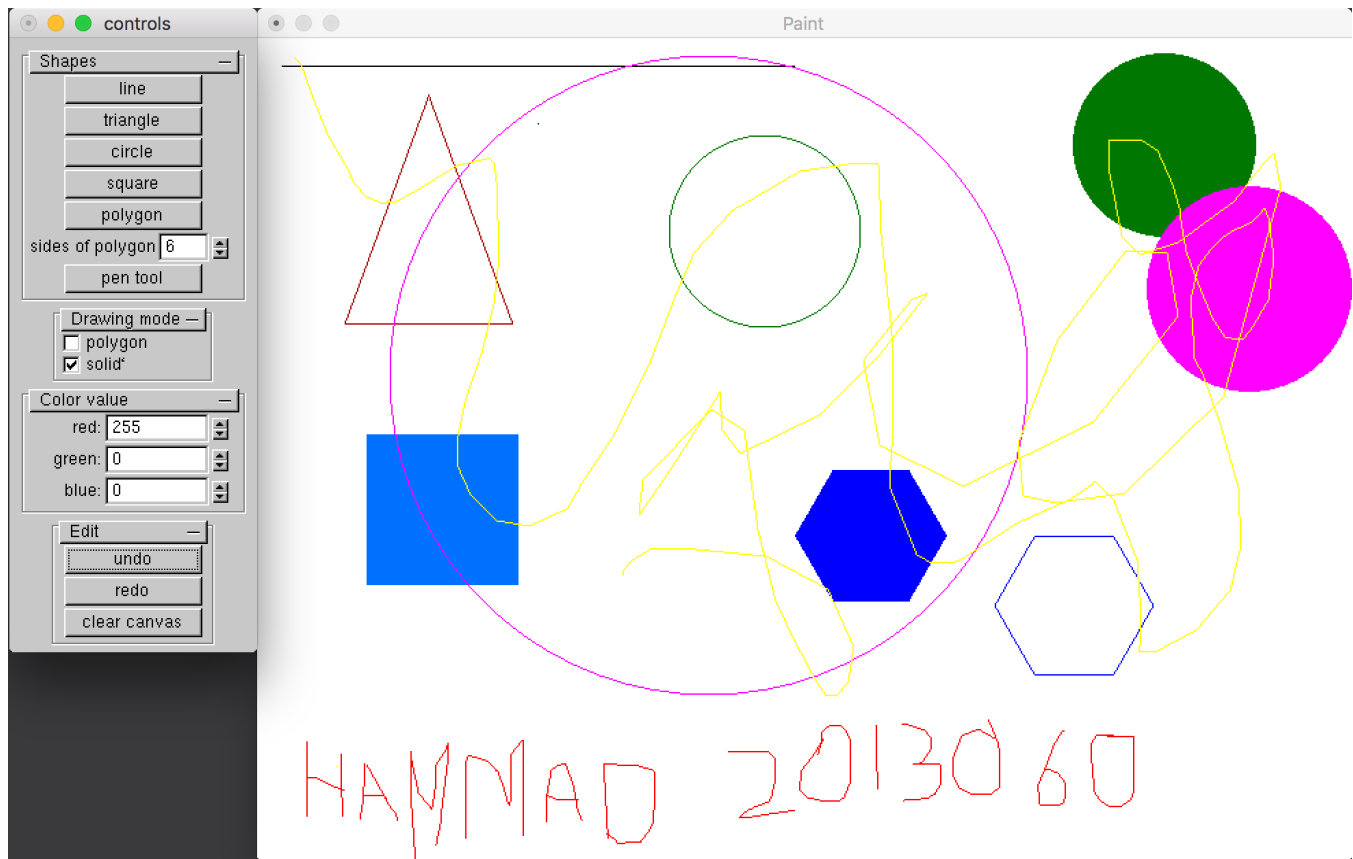


Figure 1: CgPaint Application

Abstract

Design and create an interactive 2D paint program. It should support lines, circles, polygons. Colouring should be filled and bordered.

Keywords: function, abstract class, enum, GL_LINES, GL_TRIANGLES

1 CgPaint

This is the paint application designed. It supports following features

1. Shapes
 1. Line
 2. Triangle
 3. Circle
 4. Square
 5. Polygon (upto 11 sides)
 6. Pen Tool (free hand)
2. Drawing mode
 1. polygon/border

2. solid/filled
3. Color Value
 1. Red (0-255)
 2. Green (0-255)
 3. Blue (0-255)
4. Edit options
 1. clear : clearing the canvas completely
 2. Undo
 3. Redo

2 Implementation

2.1 Shape Class

This is an abstract class from which line, triangle, circle, square classes are derived. This class provides abstract specification of *void draw()* function. Derived classes provide unique implementation of this function

2.2 Line Class

On the first and second mouse press positions are recorded and a line is drawn using those positions as vertex data. Vertex data also includes colour information supplied as argument to the constructor of line class. Line class implements *void draw()* function in which it uses **GL_LINES** enum for drawing the vertex data

2.2 Triangle Class

On the first and second mouse press positions are recorded and vertex data calculation is done using by considering displacement of cursor along x-axis and y-axis. Vertex data is populated with position data and colour information provided as argument to the constructor of triangle class. Triangle class implements *void draw()* function in which it uses **GL_TRIANGLES** enum for drawing the vertex data. Two modes for drawing are supported

1. Polygon/Border : In this mode triangle is drawn with coloured border only
2. Solid/Filled : In this mode triangle is drawn with colour filled in it.

2.3 Circle/Polygon/Square class

Circle and/or polygons are derived from the line and triangle class depending upon the current drawing mode. If the drawing mode is filled then circle/polygon is drawn as a collection of filled triangles with one vertex being the centre of circle/polygon and other two vertices lying on the circumference. If drawing mode is polygon then shape is drawn as collection of lines of points lying on the circumference (at very small distances)

2.4 Pen Tool

Positions of points browsed while left mouse button being clicked are recorded. Then collection of lines are drawn using line class as primitive.

2.4 Clear, Undo, Redo options

Clear option clears all the shapes drawn till now from the memory and erase all of them permanently note that there is no going back once this command is executed

Undo option takes the latest shape drawn and dumps it into deleted shape data structure.

Redo option takes shapes from the top of deleted shape data

structure and moves it back to current shaped data structure.

3 Compilation Instructions

- Clone the CgPaint directory to the desired location on your system.
- Open the terminal and cd into the CgPaint directory
- execute **cmake .** command
- execute **make** command
- execute **./CgPaint** command
- Paint window will pop up with a canvas and a console.

References

SHADER UTILITY CLASS (USED FOR READING SHADERS FROM A FILE AND CREATING SHADER PROGRAMS)

[HTTP://LEARNOPENGL.COM/CODE_VIEWER.PHP?TYPE=HEADER&CODE=SHADER](http://learnopengl.com/code_viewer.php?type=header&code=shader)