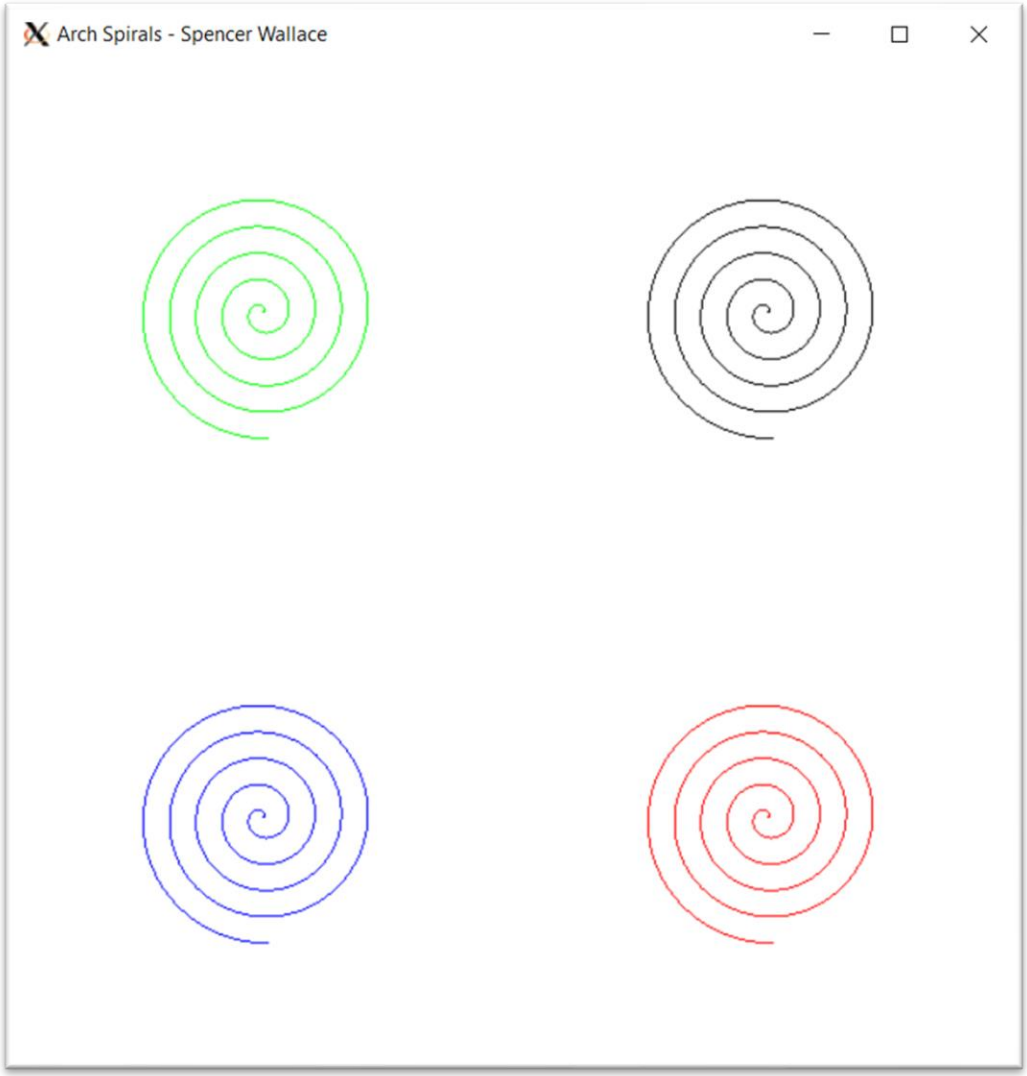
CSE 4200 Lab 5 – Spencer Wallace

Summary:

For this lab I was able to successfully display the four Archimedean spirals in their respective quadrants. I was also able to make a program which toggled between a green and red square using culling and detecting the user's mouse click. I would give myself full credit plus the 10 points extra credit, for a score of **30/20**.

Archimedean spirals (code on next page)



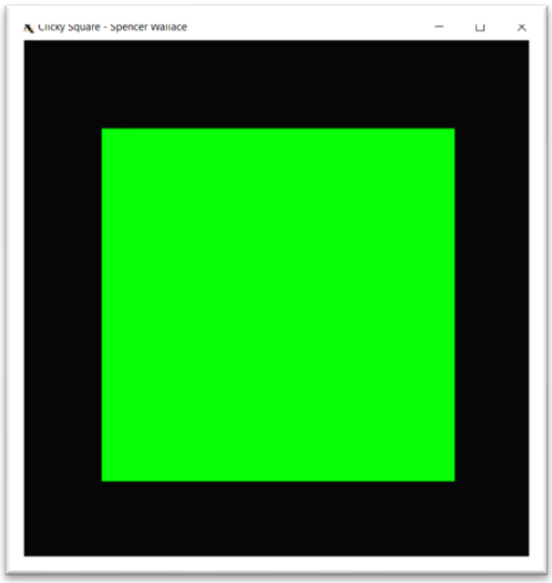
Archimedean Spiral Code

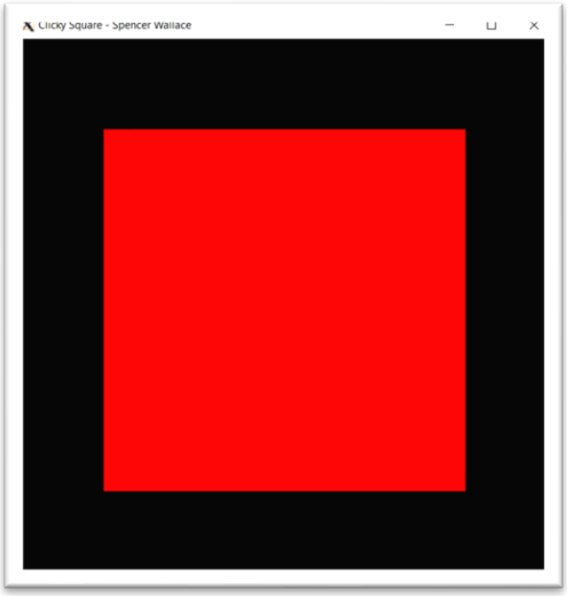
[007463307@csusb.edu@csevnc lab5]$ cat arch_spiral.cpp

```
#include "canvas.h"

Canvas cvs ( 600, 600, (char*)"Arch Spirals - Spencer Wallace" );

void spiral(float x1, float y1, int maxPoints)
{
  cvs.setWindow( -600, 600, -600, 600 );
  float angle = 0.0f;
  // Space between the spirals
  float a = 5;
  float x = 0.0, y = 0.0;
  float f = a*angle;
  cvs.moveTo(x1,y1);
  for (int i = 0; i < maxPoints; i++)
   {
    angle = 0.1 * i;
    f = a*angle;
    x = ( f * cos(angle) );
    y = ( f * sin(angle) );
    cvs.lineTo( x1+x, y1+y );
   }
}

void display(void)
{
```

```
  cvs.clearScreen();
  cvs.moveTo(0.0, 0.0); //starts at center
  cvs.turnTo ( 0.0 );   //points horizontally
  glLineWidth ( 1 );
  spiral(  300,  300, 300 );
 cvs.setColor(1,0,0);
  spiral(  300, -300, 300 );
  cvs.setColor(0,1,0);
  spiral( -300,  300, 300 );
  cvs.setColor(0,0,1);
  spiral( -300, -300, 300 );

}
```

Clicky Square





Clicky Square Code

[007463307@csusb.edu@csevnc lab5]$ cat clicky_square.cpp

```
#include <GL/glut.h>
#include <stdlib.h>
#include <cstdio>

bool FACE = true;
struct square{
    int x1;
    int x2;
    int y1;
    int y2;

    square();
```

```
        square(int x1, int x2, int y1, int y2){
        this->x1 = x1; this->x2 = x2; this->y1 = y1; this->y2 = y2;
      }
      void drawSquare(bool CCW)
      {
        glBegin( GL_POLYGON );
          glVertex2i( x1, y1 );
          (CCW) ? glVertex2i( x2, y1 ) : glVertex2i( x1, y2 );
          glVertex2i( x2, y2 );
          (CCW) ? glVertex2i( x1, y2 ) : glVertex2i( x2, y1 );
        glEnd();
      }

      bool checkClick(int x, int y)
      {
        if ( (x > x1 && x < x2 )  &&  ( y < y2 && y > y1 ) )
          return true;
        return false;
      }
};

int SQUARE_x1 = 100;
int SQUARE_x2 = 500;
int SQUARE_y1 = 100;
int SQUARE_y2 = 500;
square* SQUARE = new square(SQUARE_x1, SQUARE_x2, SQUARE_y1, SQUARE_y2);

void init(void)
{
```

```
   glClearColor (0.0, 0.0, 0.0, 0.0);
   glShadeModel (GL_FLAT);
}

void display(void)
{
 glClear (GL_COLOR_BUFFER_BIT);
   glPointSize(10.0);
   glColor3f (0.0, 1.0, 0.0);

   square* GreenSquare = new square(SQUARE_x1, SQUARE_x2, SQUARE_y1, SQUARE_y2);
   square* RedSquare = new square(SQUARE_x1, SQUARE_x2, SQUARE_y1, SQUARE_y2);

   glPolygonMode(GL_BACK, GL_FILL);
   glColor3f (1.0, 0, 0);
   RedSquare->drawSquare(false);



   glPolygonMode(GL_FRONT, GL_FILL);
   glColor3f (0, 1.0, 0);
   GreenSquare->drawSquare(true);

   glFlush ();
}

void mouseClick(int button, int state, int x, int y)
{
      if(button == GLUT_LEFT_BUTTON && state == GLUT_DOWN)
      {
```

```
            if(SQUARE->checkClick(x, y))
            {
                glEnable(GL_CULL_FACE);
                printf("mouseClick | x is : %d and y is : %d\n", x, y);
                (FACE) ? glCullFace(GL_FRONT) : glCullFace(GL_BACK);
                FACE = !FACE;
                glutPostRedisplay();
            }
        }
}

void reshape (int w, int h)
{
  glViewport (0, 0, (GLsizei) w, (GLsizei) h);
  glMatrixMode (GL_PROJECTION);
  glLoadIdentity ();
  gluOrtho2D (0.0, (GLdouble) w, 0.0, (GLdouble) h);
}

void keyboard(unsigned char key, int x, int y)
{
  switch (key) {
    case 27:
      exit(0);
      break;
  }
}

int main(int argc, char** argv)
```

```
{
  glutInit(&argc, argv);
  glutInitDisplayMode (GLUT_SINGLE | GLUT_RGB);
  glutInitWindowSize (600, 600);
  glutInitWindowPosition (100, 100);
  glutCreateWindow ( (char*)"Clicky Square - Spencer Wallace");
  init ();
  glutDisplayFunc(display);
  glutReshapeFunc(reshape);
  glutKeyboardFunc(keyboard);
  glutMouseFunc(mouseClick);
  glutMainLoop();
  return 0;
}
```