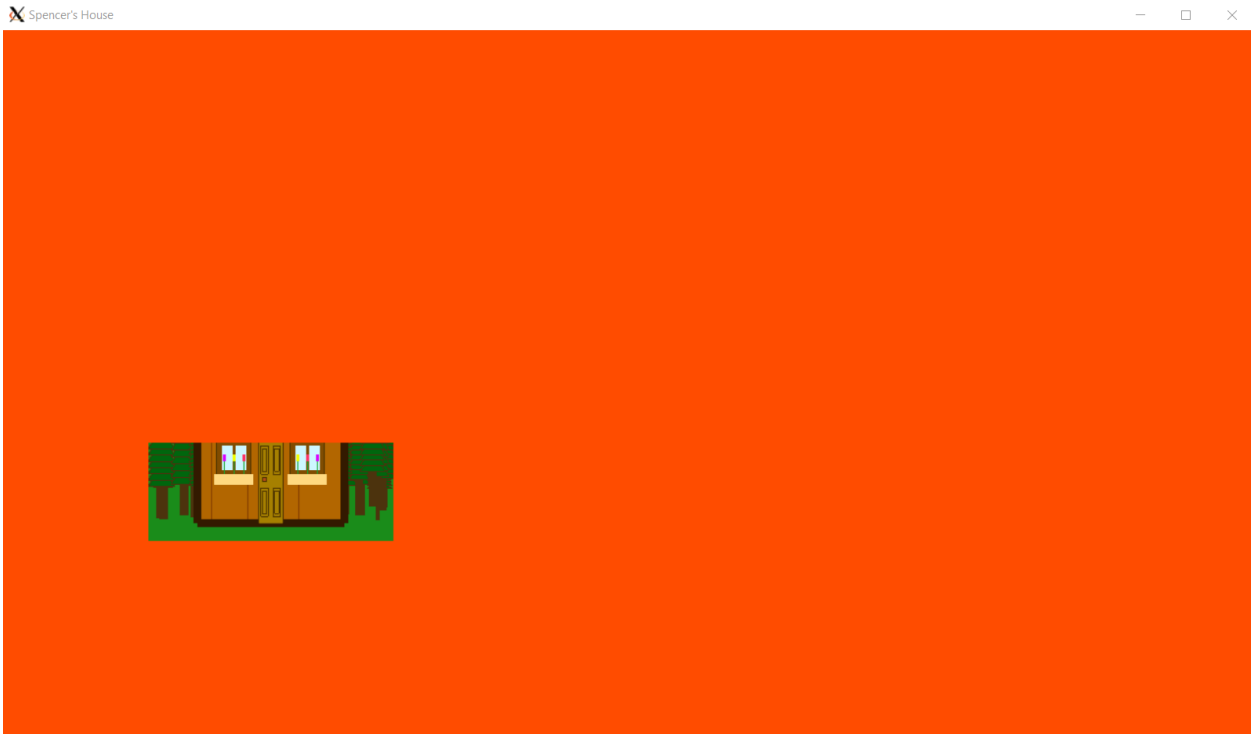
CSE 4200 Lab 2 – Spencer Wallace

Part 1) Modifying window settings



- This picture/window uses a display window that is 1280x720

- The window is set to be displayed at 100x0.

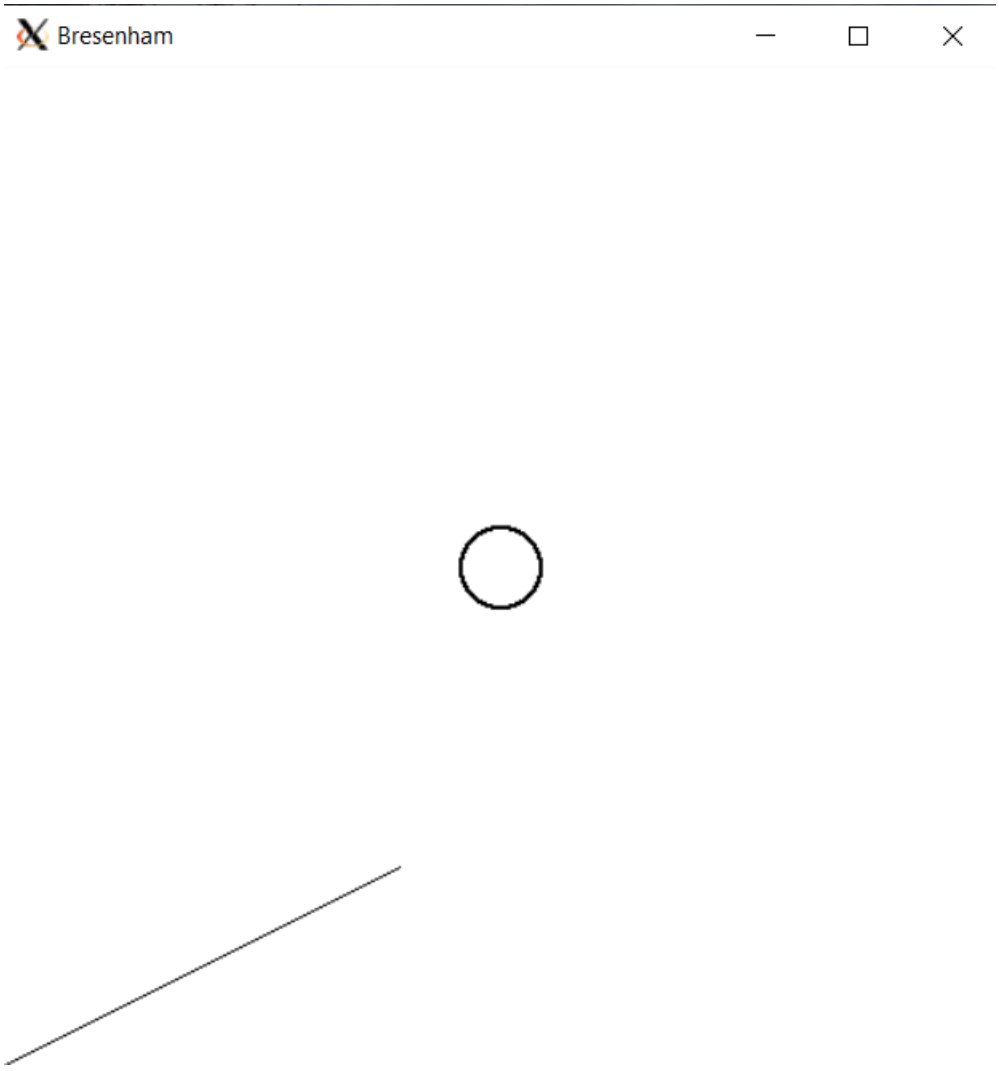
- The world settings are changed to 1280x200.

- The viewport uses (150, 200, 250, 100)

Code

```
#define SCREENWIDTH 1280.0

#define SCREENHEIGHT 720.0

 glutInitWindowSize(SCREENWIDTH, SCREENHEIGHT);              //set window size on screen

 glutInitWindowPosition( 100, 0 );    //set window position on screen

 glViewport(150, 200, 250, 100);

 gluOrtho2D( 0.0, SCREENWIDTH, 0.0, 200 );
```

Part 2) Bresenham



The line is drawn from 0, 0 to 200, 100 with a point size of 1 pixel. The circle is drawn with an origin in the center of the window, and a radius of 20.

Code

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


using namespace std;


/*
Try the Bresenham's Line and Circle algorithms discussed in class.
Use the line algorithm to draw a line with end points (0, 0 ) and ( 200, 100 ).
Use the circle algorithm to draw a circle with radius 20.
 */
void drawPoint(float x, float y, float size)
{
  glPointSize( size );
  glBegin(GL_POINTS);
    glVertex2i(x,y);
  glEnd();
}


//x1 and y1 are coordinates of start point, x2 and y2 are coordinates of end point
void bLine(float x1, float y1, float x2, float y2)
{
  float dx = x2 - x1;
  float dy = y2 - y1;
  float pk = 2*dy - dx;
  float x = x1; float y = y1;
  for(int k = 0; k < (int)(dx-1); ++k)
    {
      if(pk < 0)
```

```
      pk = pk + 2*dy;
    else
      {
       pk = pk + 2*dy - 2*dx;
       ++y;
      }
    ++x;
    drawPoint(x, y, 1.0);
   }

}


//r is radius, x is x-coordinate of origin, y is y-coordinate of origin
void bCircle(float r, float x, float y)
{
 float yCircle = r;
 float xCircle = 0;
 float d = (3.0/2.0) - r;
  while(xCircle<=yCircle)
   {
    drawPoint(x+xCircle,y+yCircle, 2.0);
    drawPoint(x+yCircle,y+xCircle, 2.0);          //find other points by symmetry
    drawPoint(x-xCircle,y+yCircle, 2.0);
    drawPoint(x+yCircle,y-xCircle, 2.0);
    drawPoint(x-xCircle,y-yCircle, 2.0);
    drawPoint(x-yCircle,y-xCircle, 2.0);
    drawPoint(x+xCircle,y-yCircle, 2.0);
    drawPoint(x-yCircle,y+xCircle, 2.0);
```

```
      if (d<0)
        d += (2*xCircle)+3;
      else
        {
          d += (2*(xCircle-yCircle))+5;
          yCircle -= 1;
        }
      xCircle++;
    }
}


//initialization
void init( void )
{
  glClearColor( 1.0, 1.0, 1.0, 0.0 );   //get white background color
 // glColor3f( 0.0f, 1.0f, 0.0f );      //set drawing color
  glPointSize( 1.0 );                 //specifies dot size
  glMatrixMode( GL_PROJECTION );
  glLoadIdentity();                   //replace current matrix with identity matrix
  gluOrtho2D( 0.0, 500.0, 0.0, 500.0 );
//  gluOrtho2D( 0.0, 5000.0, 0.0, 5000.0 );
}

void display( void )
{
  //  glViewport( 100, 100, 300, 300);
  glClear( GL_COLOR_BUFFER_BIT );       //clear screen
```

```
  glColor3f ( 0.0, 0.0, 0.0 );

  bLine(0,0, 200, 100);
  bCircle(20, 250, 250);

  glFlush();                    //send all output to screen
}
```

Summary

All parts completed successfully. Because all parts are, to my knowledge, fully and correctly completed - I am giving myself 20/20.