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CSC372
Project 2
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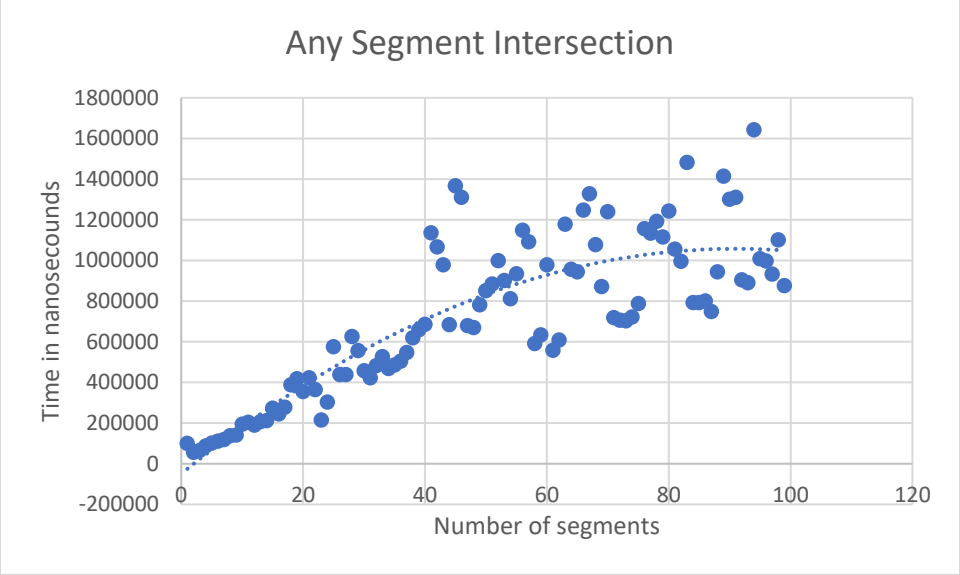

In constructing the time test I made a random number generator that fills in the x and y coordinates for two points for a number of lines(1-100), deciphers which is left, and assigns an ID. All of this, other than the random generation, also occurs in my readFile function. I generate between 1 and 100 lines each time the test number grows so does the amount of lines checked. I use chrono to time each full intersection check.

I could get most of my test cases working with a few exceptions.

Part 2:

Using crossing point number.

To solve whether or not a point is in a volume we must find if the max coordinates of the volume is greater than or equal to the coordinates of the point:
X_min <= X <= X_max and Y_min <= Y <= Y_max and Z_min <= Z <= Z_max

```
ray_cast
        count = 0
        Foreach plane in prism:
           If ray_intersects_segment(P, side)
              count = count + 1
        If is_odd(count)
           return true;
```

```
        else
            return false;
```

```
ray_intersects_segment(P, A, B)
    P = ray starting point
    A = ray end point at lowest point on y axis/z axis
    B = ray end point at highest point on y axis/ z axis
    if Py == Ay or Py == By
        Py = Py + 1
    if Py < Ay or Py > By
        return false
    else if Px >= max(Ax, Bx) //if
        return false
    else
        if Px < min(Ax, Bx)
            return true
        if Ax != Bx
            lineOne = (By - Ay)/(Bx - Ax)
        else
            lineOne = infinity
        if Ax != Px
            lineTwo = (Py - Ay)/(Px - Ax)
        else
            lineTwo = infinity
        if Az != Bz
            lineThree = (By - Ay)/(Bz - Az)
        else
            lineThree = infinity
        If Az != Pz
            lineFour = (Py - Ay)/(Pz - Az)
        else
            lineFour = infinity
        if lineTwo >= lineOne and lineFour >= lineThree
            return true
        else
            return false
```

Citation:(Ray-casting algorithm - Rosetta Code)