



Homework #1

Line Drawing

Write a C++ program that implements the Midpoint line drawing algorithm. The program should read in a set of polylines as on stdin (standard input), and outputs on stdout a PPM image file containing the rasterized lines.

The input to the program consists of the following format:

```
polyline
  0.0 0.0
  1.0 0.0
  1.0 1.0
  0.0 1.0
```

```
polyline
  3.0 -3.5
  7.0 5.0
```

where the program should start at the first point and then draw lines to the next point, then the following point and so on.

The program takes in the following command line arguments:

```
draw2d [xmin] [xmax] [ymin] [ymax] [xres] [yres]
```

where:

- `xmin`, `xmax`, `ymin`, `ymax`: the range of x and y values
- `xres`, `yres`: the size of the output image

The output is a PPM image file, which has the following format:

```
P3
[xres] [yres]
[max intensity]
```

```
[r0] [g0] [b0]
[r1] [g1] [b1]
...•
```

where (r0, g0, b0) is the color of the top-left pixel, and pixels go from the top-left towards the bottom right.

For example:

```
P3
2 2
255
255 255 255
0 0 0
0 0 0
255 255 255
```

represents a 2x2 image (with 4 pixels) where the top-left pixel is white, the top-right is black, the bottom-left is black, and the bottom-right is white.

To run on a file lines.txt and view the output:

```
draw2d -1.5 1.5 -1.5 1.5 200 200 < lines.txt | display -
```

Acknowledgment

This homework is adapted from [CS 171](#) at Caltech.