

MSU CSC 232, Fall 2014

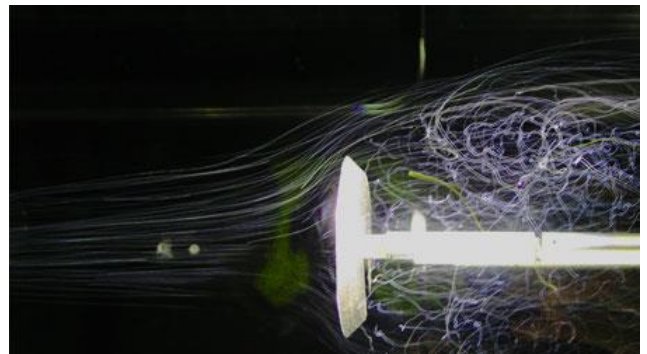
Assignment 6. Wind Tunnel Simulator

Given: (in sections, not yet complete)

Due: TBD

This assignment in its entirety, will simulate a wind tunnel. The assignment is given in small portions.

Complete each portion of the assignment and test its operation before moving on to the next portion. Perhaps you will need to back up and modify previous portions.



<http://www.rpi.edu/academics/engineering/images/programs/wind-tunnel.jpg>

Your code will produce a series of files whose filenames are in lexicographic order (e.g., “File1”, “File2”, etc.). Each file will be an image of the contents of a “wind tunnel” at a point in time. The files are stored using a simple, uncompressed format. The images are displayed with an image viewer (separate software).

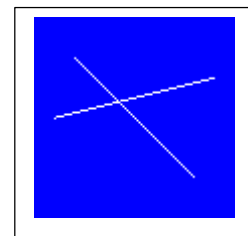
Important: The origin of many graphic displays, including the two formats we might use during this assignment (PPM format and the BMP format) have the (0,0) origin defined at the **top left** of the image. X coordinate values increase from left to right as usual, and Y coordinate values increase from top to bottom of the image. For example, if you want to draw a line from the top left corner to the center of the image, the start coordinate is (0,0) and the end coordinate is (WIDTH/2, HEIGHT/2).

Each image of the view of the wind tunnel is WIDTH pixels wide and HEIGHT pixels high. Each pixel has three integers that define its color in terms of Red, Green, and Blue.

1. Choose some colors for use in your simulation: background, smoke color, and object around which smoke travels. Select colors for graphics using an HTML color chart – find thousands with an image search on the search terms “HTML color chart.”
2. Choose and define data structure (or structures) to store the pixels of an image.
3. Initialize all pixels to background color. Display this result.
4. Write a function **drawLine ()** to draw a line in your image. *The function as described here will have major problems and will be improved later.*

Write a loop whose index is x, changing from the startX value to the endX value by a unit step of 1. Within the loop, determine the appropriate y value at each value of x.

Use the formula $y = startY + \left[\left(\frac{x - startX}{endX - startX} \right) * (endY - startY) \right]$



Test your function to draw a line from (20, 20) to (80, 80), and from (10, 50) to (90, 30). The line location and appearance should match the sample image shown (your color selection may vary).

Note that lines at different angles will have different display quality. When the output image is sufficiently enlarged, it's clear that one line has "jaggies."

(This list of tasks is not yet finished. If you can read this, then Assn6 is not complete.)

Copy your C++ program **Assn6.cpp** into your eccentric folder.

- Only those filenames will be graded. I care not that you prefer a different filename.
- If you have changed the filename, I suggest you re-open the provided filename, replace its contents with your work, then save using the original provided filename.