

Assignment 5

Due 6pm Tuesday December 1

Your program should be called `pictures.c`

The goal is to write a program that will modify a ppm image. In particular, your program should read a ppm image from the standard input, modify it according to the option specified by the user on the command-line, and write the ppm image back to the standard output.

Recall that an image can be thought of as a two-dimensional array of pixels. Each pixel is an RGB color specified by three numbers in the range 0 to 255, giving the red, green and blue intensity.

A secret watermark is a hidden picture. It can be added to a picture in several ways. In this assignment we use one simple way: we manipulate the least significant bit of the red color to represent an image. In particular, if the red color is odd then this should be thought of as black, and if the red color is even then this should be thought of as white.

The operations that the user can specify are:

- M. ***Mirror***. Mirror the image so that the new image is the same right-to-left as the original was left-to-right.
- R. ***Reveal Watermark***. Expose the watermark in the user-supplied image. This is achieved by looking at the least significant red bit of each pixel, and changing the pixel to white or black accordingly.
- A. ***Add Watermark***. This is achieved by changing the least significant bit of the red color as described above. Your watermark should be exactly 100 x 100 pixels. It can be anything of your choosing but should include something identifiable with you, such as your last initial.
- S. ***Shrink the Image***. The resulting image will have half the number of rows and half the number of columns of the input image, but should look roughly the same. Each new pixel is the average of a 2x2 block of pixels from the input image.

The command-line options are specified as an upper-case letter M, R, A, S. See the website for an example file which was processed with `./a.out M < before.ppm > after.ppm`. It has a watermark, so it can be used to test your reveal watermark code.

Submit your source code `pictures.c` and any other files your program needs using
`handin.101.303 5 <files>`

You are to work independently, but can ask questions from the lecturer and lab instructors. Late submissions will be significantly penalized.