

Question 1.

In this question, you will familiarize yourself with working with images using `c_img.c` and `c_img.h`, files that were given to you as part of Project 2.

You can make an image brighter by multiplying all the pixel values by a constant larger than 1; and you can make an image darker by multiplying all the pixel values by a constant smaller than one.

The files `c_img.c/c_img.h` store red/green/blue pixel values as `uint8_t`'s – values between 0 and 255. If you are trying to make an image brighter, you may need to round the products you obtain by multiplying by a larger constant down to 255.

Download the image

<https://www.cs.toronto.edu/~guerzhoy/190/labs/cannon.jpg>

Convert the image to a bin file using https://constructor-s.github.io/esc190_bin_image/.

Write C code to create five different versions of the image at different levels of brightness.

Display the images using https://constructor-s.github.io/esc190_bin_image/.

Please write a separate C file that will compile together with `c_img.c`.

Optional: if you are interested in how one might read the images using Python, you can look at `png2bin.py` Note: you need to be able to `import` the module `Image` from `PIL`. This will work on ECF, and will work for you if you are using Anaconda. If you are not using Anaconda, you need to run the following in the terminal:

```
python3 -m pip install numpy
python3 -m pip install scipy
python3 -m pip install PIL
python3 -m pip install Pillow
```

This should work on most systems.

Question 2.

In this question, **for the very first time**, you will use ChatGPT for academic work.

Suppose you want to create a gif-file cartoon of the cannon getting brighter and brighter. The goal here is to make something that would work on your system.

I recommend breaking the problem into parts, asking ChatGPT for help on each part, and testing (although you may get lucky and get the whole thing in one go).

Here is a plan:

- Ask ChatGPT for options of how to read in a file in Python. (Hint: PIL is installed on ECF, so ask to use PIL)
- Ask ChatGPT how to make a PIL image bright or darker
- Ask ChatGPT how to save a PIL image to a file, and verify that the file is saved where it was supposed to be saved
- Ask ChatGPT to create a series of image frames that get progressively lighter
- Ask ChatGPT to create a gif file from the image frames

The goal here is to create code that you understand and that works on your system: debugging code that's created in one shot and that you don't understand can be difficult.

Question 3.

Start working on Project 2.