PIC 16: Homework 5 (due 5/12 at 10pm)

How should your answers be submitted?

- Download `hw5.py`. Replace `mjandr` by your name.
- Answer the questions, make sure your file runs correctly, and submit `hw5.py` to CCLE.

In this assignment, you will use NumPy array manipulation to perform image processing tasks. The images for this assignment can be found in the `.zip` file from which this document was extracted.

1. `b.jpg` was removed from the center (vertical and horizontal) of `a.jpg`.

   Use slicing to put the image back together. Save the result to `c.jpg`.

2. There are 8 *differences* between `d.jpg` and `e.jpg`. Use NumPy to reveal them by generating an image like `f.jpg` (below), and save it to `f.jpg`.

   If you are surprised by the result of your initial attempt, check the data type of your arrays. What are the minimum and maximum values? What happens when a calculation generates a result beyond these? What do you need to happen and how can you get what you want? Do some experiments with a single pixel to answer these questions and figure out what's going wrong. You will need to perform some data type conversions and other operations to get the desired result. (After refinement, my solution is one line, and it is still very readable.)

3. Replace the green background of `g.jpg` with a black background. It's okay if there is a narrow green "halo" surrounding the minion, but try to reduce it. Once you have that, try to place the minion in `h.jpg` approximately as shown in `i.jpg` below. Don't lose Tomas Haake's arm!

   Save it to your own `i.jpg`. If you don't get that far, just show the minion on a black background on your screen and save that to `i.jpg`.

`f.jpg`

`i.jpg`