PIC 97, Winter 2016 – Assignment 7W

Assigned 2/17/2016. Code (a single `.py` file) due 12p.m. 2/19/2016 on CCLE. Hand in a printout of this document with the self-assessment portion completed by the end of class on 2/19/2016.

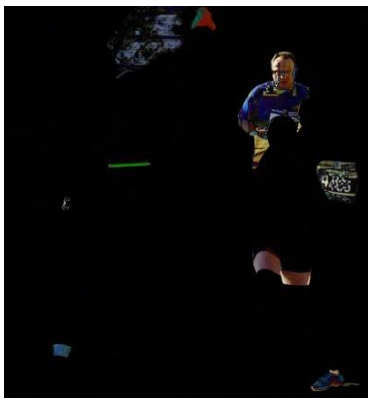
In this assignment, you will practice NumPy array manipulation by performing simple image processing operations.

Task

You saw some `matplotlib` commands in the preparation, but you may want to refer to the `matplotlib` image tutorial for loading, viewing, and saving images. All 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 (horizontal and vertical) of `a.jpg`. Use slicing to put the image back together. Show the result on the screen and save it to `c.jpg`.
2. There are 9 *differences*[1] between `g.jpg` and `h.jpg`. Use NumPy to reveal them by generating an image like `i.jpg` (below), show it on your screen, and save it to `i.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 them? You may need to perform some data type conversions and other operations to get the desired result.
3. Replace the green background of `e.jpg` with a black background. It's OK 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 `d.jpg` as shown in `f.jpg` below. Show the result on your screen and save it to your own `f.jpg`. If you don't get that far, show the minion on a black background on your screen and save *that* to `f.jpg`.

`i.jpg`



`f.jpg`

Self-Assessment

Did you generate `c.jpg` successfully (30pt)?

Did you generate `i.jpg` successfully (30pt)?

Did you generate `f.jpg` with the minion on the black background (20pt)?

Did you generate `f.jpg` with the minion in Times Square (40pt)?

[1] This hints at what you should do to find them…