PIC 16, Winter 2018 – Assignment 6F

Assigned 2/16/2018. Code (a single `.py` file) due by the end of class 2/23/2018 on CCLE. Hand in a printout of this document with the self-assessment portion completed by the end of class on 2/23/2018.

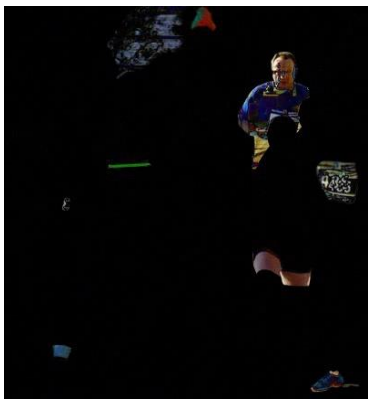
In this assignment, you will use NumPy array manipulation to perform simple image processing tasks.

Task

You saw some `matplotlib` commands in the preparation, but please refer to `matplotlib` image tutorial for loading, viewing, and saving images. (That's all you need from it.) 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 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.
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` approximately 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, just 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 with black background (20pt) or Times Square (40pt)?

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