CS101 Homework #3

CS101 Studio

Due Date: Friday, Nov 20th (Until 23:59)

Delayed Due Date: Sunday, Nov 22nd (Until 23:59)

Please read the homework description carefully and make sure that your program meets all the requirements stated. The homework is an individual task. You can discuss the problem with your friends but you should not program together. You will get an F on the entire course if your homework includes any plagiarism.

Goal:

You have received a studio cut from Jieun, and has been asked to enhance it for her new cosmetics commercial. You could use off-the-shelf program like Photoshop, but you decide to make use of your python programming skills you've mastered this semester.

Your task is to implement a Lomography effect and apply it to the picture *twice*, each with different intensities. Also you will implement contrast adjusting function.
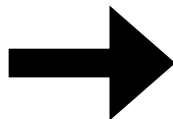
From this homework, you will:

1) Practice using function calls and parameters
2) Practice programming mathematical functions into python code
3) Learn pixel-wise operations for simple image processing
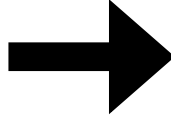
Example) Lomo Effect

(Before)   (After)

Example) Contrast Adjust with k = 75

(Before)   (After)

Requirements:

You will need to implement the following 5 Functions and write a detailed report. Details on the steps for each functions are outlined in the provided skeleton code.

Adj_contrast(10pts): Receives an image and an integer k (value between -99 and 99 inclusive), adjusts the contrast be the following formula:

$$New\ color = 128 + c * (old\ color - 128)$$

And the constant c is determined as follows:

$$c = (100 + k) / 100 \text{ if } k < 0$$

$$c = 100 / (100 - k) \text{ if } k > 0$$

Lomo (5pts): Receives a name of an image file, opens the image file, and opens the vignette file (named vignette1.jpg), calls addVignette function TWICE, once with factor of 2, once more with factor of 3, to apply the vignette effect.

AddVignette (10pts): Receives TWO images, width, height and the intensity factor. Create an empty picture, and for each pixel, calculate and insert the new pixel color by calling the getNewColorValues function. Return the new picture image.

getNewColorValues(10pts): Receives TWO pixels and the intensity factor, calculates the new color by the following equation:

$$new\ color = old\ color - (255\ \%\ old\ color)\ /\ intensity\ factor$$

Return the new color pixel.

Main (5pts): A simple command line user interface to call different functions you've implemented.

Report (10pts): should contain 1) summary of the algorithm/implementation in plain English, 2) a detailed description of what you learned, 3) a screenshot of the results, 4) and <u>what you would like to improve or add to the functionality of this program.</u>

Your source code MUST CONTAIN appropriate comments. If your source code contains only few comments or meaningless comment, you will get penalized. Some suggestions: 1) The title of the program and the author information, 2) A brief step-by-step description of algorithm at appropriate positions

Hints:

1) Reference cs1media notes file for elementary tasks
2) You probably want to use nested for-loops to access each pixel
3) Remember each pixel is a tuple of RGB values, i.e. (R,G,B), and they are all integers
4) Remember pixel values cannot exceed 255!
5) Make sure function lomo calls function addVignette, and function addVignett calls function getNewColorValues.

Submission:

You need to submit the followings:

- The program file: "HW3_yourid.py" (e.g.) HW3_20151234.py

- The homework report: "HW3_yourid.doc" or "HW3_yourid.docx" or "HW3_yourid.pdf"
(e.g.) HW3_20151234.doc, HW3_20151234.docx, HW3_20151234.pdf

You must archive the source code and the report into "HW3_yourid.zip" and submit the archived file through the webpage for homework submission. (e.g.) HW3_20151234.zip

Please zip the source code and the report into 'HW3_yourid.zip' (e.g., HW3_20151234.zip), and submit the zipped file via the CS101 homepage. If you do not following the submission policy, you will get penalty.

Delayed homework will get a 5% penalty per day from November 20 to November 22. After November 22, the server will be closed and no more submission will be accepted. Please try to submit your solution before the due date.