Linnæus University

Programming for Digital Humanities
4ME501, Fall Term 2017

Assignment #4: *Image Manipulation with Python*
Deadline: December 5th, 2017, Moodle

Contact persons:
Ilir Jusufi, ilir.jusufi@lnu.se
Dan Kohen, dan.kohen@lnu.se
Marcelo Milrad, marcelo.milrad@lnu.se

Description: The purpose of this assignment is to demonstrate your understanding, knowledge and skills related to manipulating and analyzing digital images using Python. In order to complete the assignment we assume that you have watched the videos [14-17] available in the Vimeo channel and tried out and experimented with the different pieces of code shown and discussed there. You should also read chapters [8 & 9] of the book used in the course. Moreover, you will need to use and apply the previous knowledge and programming techniques you have gained in the first part of the course.

In this assignment, you are required to perform two main tasks applied to a set of given pictures we will provide you with in Moodle. These tasks are defined as follows: A) You will need to write a piece of code that will sort these images based on the average value of one of the RGB variables, B) You will need to generate a collage picture consisting of those images. More specifically, you will need to write a Python program that should perform the tasks outlined above. Below you find detailed information about how to proceed, as well as the given requirements.

1. **Acquire the images.**
   We have prepared a set of 9 images that you will need to analyze for this assignment. Please download them from Moodle course (as a single ZIP file). Please download this file and extract its content.

2. **Open and analyze each image.**
   You have to open each one of the images from those you obtained in step 1. For each one of them, you will need to calculate the average value of one of the channels (Red, Green or Blue) according to your choice. Check the video https://vimeo.com/242938917 at 15:25 to get the RGB values for specific pixel. Store the average value (R, G or B) for each one of the 9 images in a list together with the images themselves. For inspiration check https://vimeo.com/243001851 at 2:00.

3. **Sort the list of images.**
   You have to sort (order) the list generated in step 3 in ascending order (from the smallest to the largest value of the specified RGB variable). Print out this information on the screen as an output.

4. **Generate collage.**
   Generate a 3 x 3 collage with the given images according to the order requested in point 4. The outcome of this task should be stored as a collage under the name *"collage.png"*.

Expected outcomes and final results:
You are expected to generate two deliverables as described below:

Deliverable 1: A program in Python with the code you have written and created for solving the tasks above. Remember to include comments in your code where appropriate.

Deliverable 2: A short report (about 600 words, +/- 10%) in which you discuss and present the ideas and approaches on how you solved the tasks above.

Your work should be reported following the publication format available at: http://goo.gl/OtPQ5. Please upload a ZIP file named 'lastname_assig4.zip' to the corresponding Moodle folder including all the materials you have produced (source Python code (collagegenerator.py) and your report (in PDF format).

This assignment is conducted on individual basis. The deadline for submitting your assignment is by December 5th, 2017 at 23:55. Good luck!