COMP201: Introduction to Computing

Programming Assingment #1

Description

In this assignment you will manipulate string and perform simple operations on images in order to better understand the basics of computer programming.

1. Write a function which takes as input a single string and prints "TRUE" if the string is a palindrome. [From wikipedia: A palindrome is a word, phrase, number, or other sequence of characters which reads the same backward as forward, such as madam or racecar. Sentence-length palindromes may be written when allowances are made for adjustments to capital letters, punctuation, and word dividers, such as "A man, a plan, a canal, Panama!", "Was it a car or a cat I saw?" or "No 'x' in Nixon".]

2. Write a function which takes as input a string representing an integer e.g. "123" and prints the sum of all the characters i.e. 1+2+3 = 6

3. Write a function which takes as input a string e.g. "hello" and prints the same string with every other character capitalized i.e. "HeLlO".

4. The next part of this assignment is about resizing an image so that we can work with it in the next question. You must first create a picture out of the image called "smile.png" [from https://goo.gl/images/wR3k5L] that we have given to you. If you try to view this image using the show(picture) function you will have trouble seeing all of it on your screen. In order to work with it you must downscale the image by removing every other pixel in the image. Images are basically large tables of pixels. The way we access the pixels is by accessing the row and column of the desired pixel. By accessing every column and row you can select the pixels that satisfy your condition (in this case: every even index).

Looking at the diagram below you can see how the original image on the left has a size of 8x8 pixels and the image on the right (smaller one) has size 4x4 where each pixel is only the even ones from the original image.
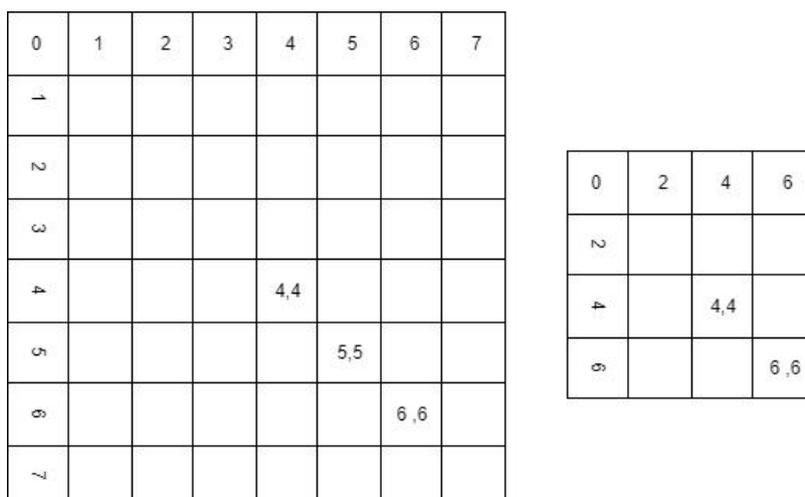
Useful functions: `makeEmptyPicture(), setColor(pixel,color), getColor(picture,pixel), getPixel(picture,column,row)`

5. For this part we will work with individual pixels of images. In this case (and generally) pixels consist of 3 values: red, green,

blue (rgb). The image will have to be modified so that it is split into 3 different vertical sections. The first section will contain pixels where all their red values are 0. The second section will contain pixels with 0 blue values and the last section will have 0 green values. The final result should look like this:

Submission (electronic submission through Moodle only)

Please create a zip file containing your Python code, a readme text file (.txt). In the readme file document the features and functionality of the application, and anything else you want the grader to know.

Evaluation Procedure

You MUST demonstrate your solution program to the lab instructor during lab hours. You must run your submitted code, demonstrate its full functionality and answer questions about the Python programming aspects of your solution. Major marking is done on the spot during demonstration. Your code will be further checked for structure, non-plagiarism, etc. However, ONLY demonstrated submissions will receive marks. Other submissions will not be marked.