Workshop-2

# Declaration

We, Steven David Pillay, Olha Hodovaniuk, Ruyuan Sun, Syed Moonis Iqbal, declare that the attached assignment is our own work in accordance with the Seneca Academic Policy. We have not copied any part of this assignment, manually or electronically, from any other source, including websites, unless specified as references. We have not distributed our work to other students.

# Task Distribution

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| --- | --- |
| **Name** | **Task(s)** |
| Steven David Pillay |  |
| Olha Hodovaniuk |  |
| Ruyuan Sun | Code and report for question 1 and 2 |
| Syed Moonis Iqbal |  |

# Questions

**Question 1.** Getting familiar with image manipulation in Python – OpenCV. Read the image "**bicycle.bmp**" from the **data** directory using the OpenCV flag **cv2.IMREAD\_UNCHANGED** and then find and print the following information about this image

**a)** find image height (number of rows)

Image height: 300

**b)** find image width (number of columns)

Image width: 453

**c)** find the image number of channels.

Number of channels: 3

**d)** find image datatype.

Image datatype: uint8

**e)** find the image number of pixels.

Number of pixels: 407700

**f)** convert the image to gray level and then save it in the **output** directory with name "**bicyclegray.jpg**"

A black bicycle with a white background

Description automatically generated

**g)** find the maximum value of the pixel values.

Maximum pixel value: 255

**h)** Calculate the mean/average of the pixel values.

Mean pixel value: 217.15924208977188

**i)** Change the image's pixel values in the following way: all pixels’ values less than the average value calculated at point (h) will be equal to 0 and all the other pixels will be equal to 1. Then, save it in the **output** directory with name "**bicycleoutA.jpg**"

![A silhouette of a bicycle

Description automatically generated]()

**j)** What type of image is generated at (i)?

The image generated at (i) is a binary image.

**Question 2.** Reducing the Number of Intensity Levels in an Image

Write a computer program capable of reducing the intensity levels in a gray image from 256 to 2 levels, in integer powers of 2. That is intensity levels: 256 defaults, 128, 64, 32, 16, 8, 4, 2. Use the image "**lena.tif**" from the **data** directory.

Note: Your code should generate the image with the required intensity and then write/save the image to the **output** directory. The name of generated images as following **lena256.jpg**, **lena128.jpg**, **lena64.jpg**, **lena32.jpg**, **lena16.png**, **lena8.png**, **lena4.png**, and **lena2.png**.

A person wearing a hat

Description automatically generated

**lena256.jpg**

**A person wearing a hat

Description automatically generated**

**lena128.jpg**

**A person wearing a hat

Description automatically generated**

**lena64.jpg**

A person wearing a hat

Description automatically generated

**lena32.jpg**

A person wearing a hat

Description automatically generated

**lena16.png**

A person wearing a hat

Description automatically generated

**lena8.png**

A person wearing a hat

Description automatically generated

**lena4.png**

A person with long hair

Description automatically generated

**lena2.png**