# Homework #1: Warm Up

*Assigned: 07.03.2023 Due: 21.03.2023*

## 1 Objective

The purpose of this homework is to make you ready for the upcoming assignments. In the assignments, you will use Matlab/Octave with Image Processing Toolbox[1] and/or Python. But this is not a Matlab/Python programming course and you will not learn programming in Matlab/Python in the lectures, except a brief introductory tutorial. So, **it is your own responsibility to learn Matlab and/or Python programming**.

## 2 Preparation

**Task 1 - Installation**

- Obtain and install Matlab with Image Processing Toolbox on your PC. (You can use GNU Octave[2] instead of Matlab.)
- Install Python, Pillow, and scikit-image.

**Task 2 – Matlab/Python Programming**

If you are not familiar with Matlab and Python programming, try learning how to program in Matlab and Python, using online tutorials and material provided in class. You should learn at least scalar, vector, and matrix operations, basic loops, control structures, plotting, and functions.

## 3 Assignment

**Task 3 – Basic Image Processing in Matlab/Octave**

To get started with digital image processing in Matlab/Octave, watch this video. Then write a Matlab/Octave script to generate the figures in Figure 1. You will need *subplot* function. (**Hint:** You can type **"help imdata"** or **"doc imdata"** on Matlab command line to see the list of sample images provided with your Matlab Image Processing Toolbox. The image in this example is '*toysflash.png*'. You can use any other color image.) There are four images in Figure 1:

- original RGB image (top-left)
- grayscale version of the original image (top-right)
- Rotated version of the original image (bottom-left)

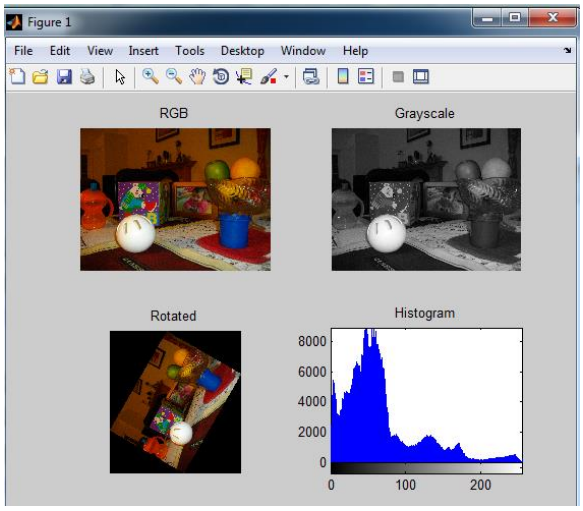


**Figure 1 – Output of Task 3.**

[1] https://www.mathworks.com/products/image.html?BB=1
[2] https://www.gnu.org/software/octave/

- histogram of the grayscale image (bottom-right)

You are also given 4 sample images here. Download those images and using Matlab ***imfinfo*** command, inspect the main properties of those images.

**Task 4 – Basic Image Processing with Python Pillow**

Watch and apply the functions in this tutorial on some input images. You should perform at least the following operations: *open, display, save, resize*, and *filter* images.

**Task 5 – Report**

Write a brief report on what you have learned, what you have obtained as output, the difficulties you have faced, etc. Write your name, surname, and student ID on your report. Also include your programming environment settings (OS, Matlab/Octave, Python, and Pillow versions etc.).

# 4 Submission

- This homework will be done individually.
- For Task 1 and Task 2, you will not submit anything.
- For Task 3 and Task 4, you will submit your source codes in separate files called **HW1_Task3.m** and **HW1_Task4.py**, respectively.
- At the top of your source files, write your name, surname, and student ID as a comment.
- Your submission directory will include the following files:
  - HW1_Task3.m
  - HW1_Task4.py
  - Image files you used
  - Report in pdf format
- Place all your files in a zip archive with name **HW1_StudentID_Surname_Name.zip** and submit through the MS Teams submission module.
- If you have further questions, you can send me an e-mail.

## 4.1 Late Submission Policy

Deadline for homework submissions is **23:59 pm** at the specified date. For each additional day, **25% cut-off** will be applied.

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