Image Processing (NYCU CS, Fall 2022) Programming Assignment #1 (due 10/25/2022)

Your first task is to enhance the supplied images using techniques of contrast adjustment, noise reduction, color correction, and so on. You should try to choose the images used for the experiments yourself, either form the Internet or by taking your own pictures. Include some images taken in less than ideal conditions so that you can see the differences made by your image enhancement techniques. Each of you should do experiments on at least four different images. It is okay if you share images with classmates.

Note:
- You can add artificial uniform, Gaussian, or salt-and-pepper noise to your images for the purpose of testing, as is common in many literatures.
- For synthetic images or drawings, it is more difficult to do enhancements because factors that affect image qualities (illumination, noise, etc.) do not apply for such images. But you can still try to see the effects of some operations on such images.
- The images might not need the same kind of processing. As a result, you should write your processing techniques as modules so that you can try different combinations or parameters for different images. Try to do your best.

You can use either MATLAB, C/C++, or Python 3.x for the project.
Regarding the restriction on toolbox/library usage:

You CAN use toolbox/library functions for:
- Image reading, writing, and display.
- Color space conversion.
- Matrix operations not specific to images.
- Image resizing.

You CANNOT use toolbox/library functions for:
- Intensity transformations or color corrections.
- Histogram computation.
- Spatial filtering. (This includes functions for doing correlation, convolution, template matching, etc.)
- Denoising.

If you're not sure about whether something can be used or not, ask the instructor.

About the submission:
- Submit your report (as a single PDF file) through New E3.
- Regarding the content of the report:
  1. The main text (max. 10 pages, not counting the code listing) should include the following sections:
     - Introduction / Objectives
     - A review of the methods you have used (be concise)
     - A explanation of the experiments you have done, and the results.
     - Discussions: Your observations, interpretations of results, and remaining questions.
  2. The report should be typed single-spaced, with 12-point font size.
  3. Include the program code listing at the end of your report, starting from a new page as a separate section. The code listing part does not count toward the page limit.
  4. You can write your report in either English or Chinese.
- Do not submit compressed files. Do not submit program codes in separate files.
- Late submission: 10% deduction per day, up to until the submission is closed (usually one week from the due date).

The grade of each project is based on the following:
- The amount of effort you put in.
- Quality of your report (organization, clarity, completeness, depth).
- Quality of your outputs.
- Quality of your code (correctness, efficiency, clarity, documentation).