**Image Processing (NCTU CS, Fall 2020)**
**Programming Assignment #1 (due 10/30/2020)**

Your first task is to enhance the supplied images using techniques of contrast adjustment, noise reduction, color correction, and so on. There are 6 images supplied (5 regular photos, and one CT). They 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.

Note: For the CT image, you can only do noise reduction. No contrast or color adjustments here.
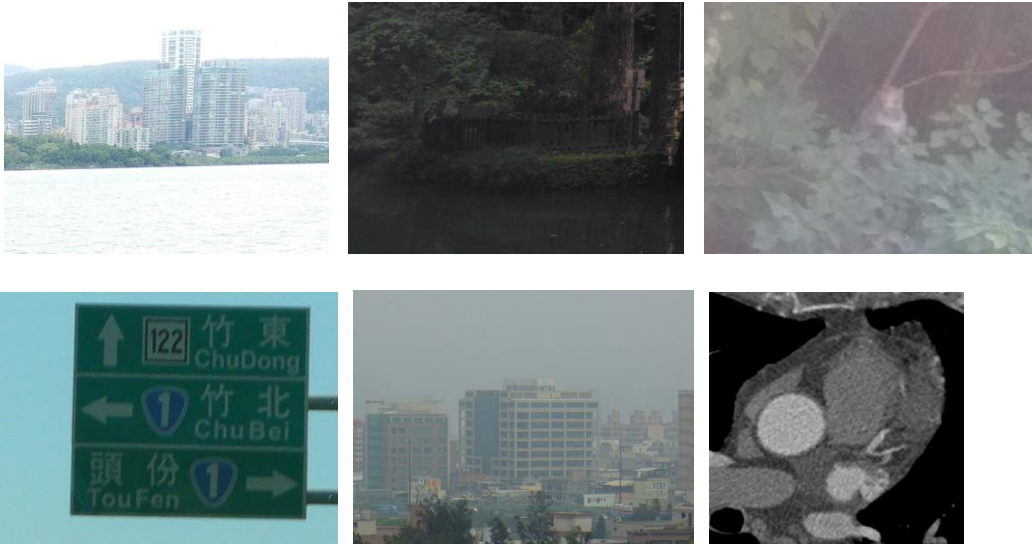


You can use either MATLAB, C/C++, or Python 3.x for the project.
Regarding the restriction on toolbox/library usage:
> You CAN use toolbox/library functions for:
> - Image reading, writing, and display.
> - Color space conversion.
> - Matrix operations not specific to images.
>
> You CAN NOT use toolbox/library functions for:
> - Image resizing.
> - Intensity transformations.
> - Histogram computation.
> - Spatial filtering. (This includes functions for doing correlation, convolution, template matching, etc.)
>
> If you're not sure about whether something can be used or not, ask the instructor.

<u>About the submission:</u>
- Submit your report (as a single PDF file) through New E3.
- Regarding the content of the report:
  1. The main text (max. 15 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.
- Do not submit files in ZIP or RAR or other compressed forms. Do not submit program codes in separate files.

<u>The grade of each project</u> 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).

Other notes:
- Late submission: 10% deduction per day, up to until the submission is closed (usually one week from the due date).

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Some notes about processing speed:
- Separable spatial filters.
- Using lookup tables for intensity transformations.
- Vectorization, if you're using MATLAB or Python.