Digital Image Processing
Homework Submission Guideline

In this course, you are asked to write your own codes to manipulate many images so that you have to make your source codes and output images well organized. Please read this guideline carefully and obey the instructions to avoid misunderstanding while grading.

For each assignment, both electronic version and written report are required. Please DO NOT submit output images in the electronic version but include all the resultant images in your written report.

I. IMAGE FILE FORMAT

All the images we will use throughout this course are of **.raw** format. A gray level image in **.raw** file simply saves image pixel value (of "unsigned char" type) row by row. A color image in file uses interleaved RGB format.

II. PROGRAMING LANGUAGE

You may use either Matlab or C/C++. More details are given below.

(a) Matlab

Your electronic version must include a README file with the name README. This file is very important for the grader to simulate and grade your homework. You may lose points if this file is not included or not properly prepared. The file should include the following information:

1. Homework number
2. Submission date
3. Your name
4. Your student ID #
5. Your email address
6. Description of your submitted M-files: how to invoke, how to choose the arguments and what is the file name of the output image… It is encouraged that you make the README an executable M-file. In such way, you can put all your execution commands into file. After README is invoked at MATLAB prompt, it will simply run all the M-files of your homework sequentially.

A sample README.m file:

```
% DIP Homework Assignment #1
% Month Day, Year
% Name: William Watt
% ID #: X12345678
% email: wwatt@csie.ntu.edu.tw

%#########################################################################%
% Problem 1: Noise Removal
% Implementation 1: Linear Transformation
% M-file name: linear_amp.m
% Usage: linear_amp
% Output image: linear_amp_lena.256 (or chosen by user)
% Parameters: windows size = 3
% Other parameters here
%#########################################################################%
```

```
disp('Running "linear_amp"...'); %display some useful information
figure(1) % create a new figure window
linear_amp; % invoke your M-file properly!
disp('Done, "linear_amp", output image is "linear_amp_lena.256"');

%####################################################################################%
% Problem 2: Edge Detection
…
…
%####################################################################################%
```

(b) C/C++

Your electronic version must include a README file with the name README. This file is very important for the grader to simulate and grade your homework. You may lose points if this file is not included or not properly prepared. The file should include the following information:

1. Homework number
2. Submission date
3. Your name
4. Your student ID #
5. Your email address
6. Description of your submitted source codes: the version of your operating system and compiler, how to choose the arguments and the file name of the output image…

It is recommended that you use standard ANSI functions and compile with gcc/g++ if possible. It provides maximum interoperability across the different platform. We highly recommend you to prepare the README with makefile syntax so that you can pack all your compilation and execution commands and invoke them by "make –f README". An example of README file with makefile syntax is given below.

```
# DIP Homework Assignment #1
# Month Day, Year
# Name: William Watt
# ID #: X12345678
# email: wwatt@csie.ntu.edu.tw
# compiled on WINDOWS NT with gcc

# define your compiler and linker
CC=gcc
LN=gcc
All : prob1 prob2
prob1 :
@echo "Problem 1"
@echo "compiling and linking the code"
$(CC) -c code1.c
$(CC) -c code2.c
$(LN) -o solution1 code1.o code2.o
@echo "running the program, usage: solution inputImageName outputImageName"
solution1 foo.ppm goo.ppm
prob2:
…
…
```

Note that it must be a TAB instead of several white spaces at the beginning of each command line.

If you use Visual C++ for implementation, please group your files carefully and also include a README file that briefly explains the files or subfolders. Please include only the necessary project files in your electronic version, DO NOT include any other files such as .obj files or executables.

III. SUBMISSION

To submit your homework, you may upload to CEIBA by 11:59am of the due date. For each homework assignment, two files should be uploaded including (a) Electronic version and (b) Written report.

(a) Electronic Version

All the source files including README file should be submitted. DO NOT submit intermediate files, executable files, original images or output images. The file name should be of the following format:

DIP_HW#_NAME_NTU ID_Electronic.ZIP
e.g DIP_HW1_WilliamWatt_X12345678_Electronic.zip

If you have to use Visual C++ for implementation, please include only the necessary project files in your electronic submission, DO NOT include any other files such as .obj files or executables.

(b) Written Report

You should also prepare a report for each homework problem. The following four parts should be included unless specifically specified by the problem description.

a. Your motivation and approach
b. Original images (optional)
c. Output images
d. Discussion of results

You may be asked to include some other results in the report as well.
You may also include your README file in the report as well, or a description on how to compile and run your program.

The file name should be of the following format:

DIP_HW#_NAME_NTU ID_Report.ZIP
e.g DIP_HW1_WilliamWatt_X12345678_Report.zip