

Submission Guideline

Outline

- Homework file format
 - Programming language
 - RUN
 - Image I/O
- Submission requirement
 - Source Code
 - Report



Homework File Format

Programming Language

- Python
 - numpy
 - matplotlib
 - OpenCV
 - Pillow
 - Matlab
 - Image processing toolbox
 - C/C++
 - OpenCV
 - [Installation guideline](#) (apt install libopencv-lib)
 - [Using OpenCV with gcc and CMake](#)
- Only for Image I/O and plotting**

RUN

- Named RUN
 - RUN.sh for python
 - RUN.m for matlab
 - RUN.sh for c/cpp
- The file should include the following information:
 - Homework number
 - Your name
 - Your student ID #
 - Your email address

Python Example

- RUN.sh

```
# DIP Homework Assignment #1  
# Name: William Watt  
# ID #: x12345678  
# email: wwatt@csie.ntu.edu.tw  
  
python hw1.py --input lena.png --output hw1_result.png
```

- Run your code

- sh RUN.sh

- For Windows users

- WSL
 - bash in powershell

MATLAB Example

- RUN.m

```
% DIP Homework Assignment #1  
% Name: William Watt  
% ID #: x12345678  
% email: wwatt@csie.ntu.edu.tw  
hw1(input_path, output_path)
```

- Run your code

```
>>RUN
```

C/Cpp Example

- RUN
 - Please refer to [OpenCV](#) webpage.

```
# DIP Homework Assignment #1
# Name: William Watt
# ID : x12345678
# email: wwatt@csie.ntu.edu.tw
cmake
make
./hw1 input_image output_path
```

- Remember to link other libs you used
- Run your code

```
sh RUN.sh
```


Image I/O (Python example)

- read raw

```
img = np.fromfile('sample.raw', dtype = 'uint8')
```

- write raw

```
img.tofile("result.raw")
```

- write png

```
cv2.imwrite("result.png", img)
```

- read png

- grayscale image

```
img = cv2.imread("sample.png", cv2.IMREAD_GRAYSCALE) #1 channel
```

```
img = cv2.imread("sample.png") #3 channel
```

- color image

```
img = cv2.imread("sample.png") #3 channel
```

Image I/O (MATLAB raw example)

- Read raw file

```
fid=fopen(image_name, 'rb');  
pixel=fread(fid,inf, 'uchar');  
fclose(fid);
```

- Write raw file

```
fid = fopen('test.raw', 'wb');  
fwrite(fid, pixel, 'uchar');  
fclose(fid);
```

Image I/O (MATLAB jpg example)

- Grayscale image

```
function hwl(image_name, output_name)
    img = imread(image_name); % # of channel: 3
    img = rgb2gray(img); % # of channel: 1

    % do your algorithm here

    imwrite(img, output_name);
end
```

- Color image

```
function hwl(image_name, output_name)
    img = imread(image_name); % # of channel: 3

    % do your algorithm here

    imwrite(img, output_name);
end
```

Image I/O (C/Cpp raw example)

- Grayscale image

```
int main(){
    FILE *file;
    unsigned char image_data[SIZE][SIZE];
    file = fopen("sample.raw", "rb");
    fread(image_data, sizeof(unsigned char), SIZE*SIZE, file);
    fclose(file);

    // do some image processing task...

    file = fopen("result.raw", "wb");
    fwrite(image_data, sizeof(unsigned char), SIZE*SIZE, file);
    fclose(file);
    return 0;
}
```

- Color image

```
int main(){
    FILE *file;
    unsigned char image_data[3][SIZE][SIZE];
    file = fopen("sample.raw", "rb");
    fread(image_data, sizeof(unsigned char), SIZE* SIZE * 3, file);
    fclose(file);

    // do some image processing task...

    file = fopen("result.raw", "wb");
    fwrite(image_data, sizeof(unsigned char), SIZE* SIZE * 3, file);
    fclose(file);
    return 0;
}
```

Image I/O (C/Cpp jpg example)

- Grayscale image

```
#include <stdio.h>
#include <opencv2/opencv.hpp>
using namespace cv;
int main(){
    Mat img;
    img = imread("sample.jpg", IMREAD_GRAYSCALE); //1 channel
    img = imread("sample.jpg"); //3 channel

    //do some image processing task...

    imwrite("result.jpg", img);
    return 0;
}
```

- Color image

```
#include <stdio.h>
#include <opencv2/opencv.hpp>
using namespace cv;
int main(){
    Mat img;
    img = imread("sample.jpg"); //3 channel

    //do some image processing task...

    imwrite("result.jpg", img);
    return 0;
}
```

Submission Requirement

1. Source Code

+ - hw1_x12345678/

+ - RUN.sh

+ - mycode.cpp

+ - SampleImage/

+ - sample1.png

+ - sample2.png

.....


hw1_x12345678.zip



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2. Report

Every problems should contain:

- 1. Your motivation and approach (include parameters)
 - 1. Original images
 - 1. Output images
 - 1. Discussion of results
- 



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x12345678@ntu.edu.tw 請使用NTU mail

STUDENT ID
x12345678 開頭小寫

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Grading Policy

- Program 30%
 - Format 10/30
 - Execution
 - Algorithm 20/30
- Report 70%
 - motivation and approach 20/70
 - performance of results 20/70
 - discussion 30/70

Remark

- Unix-Based environment is recommended
- If you use Windows system
 - [Windows Subsystem for Linux \(WSL\)](#)
 - bash in powershell
 - Anaconda
 - CSIE workstation
 - You may need X-server to show Image
- Compress the folder by **ZIP** only
- If you have any question, feel free to post on NTUCOOL
- TA hour
 - Mon. 10:00~12:00
 - Tue. 10:00~12:00