CMPT 365 Project 2 Submission Guidelines (Total: 20 mark)

In this project, we have provided 3 sample input images:

parrots.tif, board.tif, lena.tif

Like Project 1, Project 2 also requires you to submit a pdf report, your code, and a demo video. Besides, you need to upload all your generated images and intermediate compression results.

What to include in the report:

In general (0.5 mark):

The project environment. You need to specify any external libraries you use and state the reasons about why you use these external libraries.

Lossless compression (8 mark):

1. Display the original image and the decompressed image from lossless compression. **Please clearly label all images**, either as an original image, or a decompressed image.
2. You should perform lossless compression on all 3 provided sample images, and 1 additional images of your choice. The decompressed image should also be saved as **TIFF** format. Therefore, you need to display at least (3+1)*2 = **8 images in total,** including the original images. (-0.5 mark for each missing set of images).
3. Save compression result to a text or binary file (-1 mark if no intermediate result is submitted).
4. [0.5 mark] Report the compression ratio, please show calculation steps.
5. [2 mark] Explain the key technique used to compress your images, please provide at least one advantage for your chosen technique, and discuss at least one of its disadvantages.
6. [2 mark] Explain the key technique used to decompress your images.

7. [1 mark] Draw a simple diagram for the processing flow (like that for JPEG in the slides).

8. [1 mark] Report the percentage of the computation times of the different modules, please explain how you measured them.

9. [1 mark] Show side-by-side image comparison between your results and results from a commercial tool (i.e., Photoshop, GIMP (free)). **Please clearly label all images**. Please report the compressed ratio/size and comment on the visual difference.*

10. [0.5 mark] Any other problem/interesting issues you have encountered. How can you improve your program in the future?

Lossy compression (9 mark):

1. Display the original image and the decompressed image from lossy compression of a compression ratio around **10**. **Please clearly label all images**, either as an original image, or a decompressed image. Please also label their compression ratios (10 in this case).

2. Display the original image and the decompressed image from lossy compression of a compression ratio around **20**. **Please clearly label all images**, either as an original image, or a decompressed image. Please also label their compression ratios (20 in this case).

3. You should perform lossy compression on all 3 provided sample images, and 1 additional images of your choice, with compression ratios around 10 and 20. The decompressed images should also be saved as **TIFF** format. Therefore, you need to display at least (3+1)*2*2 = **16 images in total**, including the original images. (-0.5 mark for each missing set of images).

4. Save both compression results (ratio 10 and 20) to two separate text or binary files (-1 mark for each missing intermediate file).

5. [0.5 mark] Report both exact compression ratios, please show calculation steps.

6. [2 mark] Explain the key technique used to compress your images, please provide at least one advantage for your chosen technique, and discuss at least one of its disadvantages.

7. [2 mark] Explain the key technique used to decompress your images.

8. [1 mark] Draw a simple diagram for the processing flow (like that for JPEG in the slides).

9. [1 mark] Compare the decompressed image with the original image, comment on any artifact, and explain why you think it happens.

10. [1 mark] Report the percentage of the computation times of the different modules, please explain how you measured them.

11. [1 mark] Show side-by-side image comparison between your results and results from a commercial tool (i.e., Photoshop, GIMP (free)). **Please clearly label all images**. Please report the compressed ratio/size and comment on the visual difference.*

12. [0.5 mark] Any other problem/interesting issues you have encountered. How can you improve your program in the future?

What to show in the demo video:

1. [0.5 mark] The compilation steps of your program with successful compiled results printed at the end.

2. [1 mark] The full process to show how you compress and decompress *one* input image using the **lossless** method. Ideally, you will show the compression encodings being saved to a file, and the decompressed result being saved to a .tif image on disk.

3. [1 mark] The full process to show how you compress and decompress *one* input image using the **lossy** method. Ideally, you will show the compression encodings being saved to a file, and the decompressed result being saved to a .tif image on disk.

Additional Note:

* To make the results comparable, you probably need to play with different parameters in the commercial tool to compress the image to similar size as the one compressed by your own program. One example is provided [here](#).

The files you shall upload to Canvas are listed below:

1. A report in .pdf format

2. A .zip file. This file should have the following structure:
   - {your-SFUID}/
     - code/
     - images/
     - compressed_files/
     - a demo video

The code/ directory should contain all your source code (**including your executable file located under directory code/, and a file named README.txt also under directory code/ which simply describes the command/method to run your executable file**).

The images/ directory should contain all your images. There should be at least 4 raw TIFF images (3 sample images and at least 1 image you provide), so totally **at least 4+4+8=16 images** you need to upload (4 raw images, 4 decompressed images from lossless, 8 decompressed images from lossy).

The compressed_files/ directory should contain 12 text or binary files with intermediate encoding results (4 files for lossless, 8 files for lossy).

The demo video should be less than 4 minutes.

In Project 2, the report and .zip file will be separately submitted on Canvas.