SEng 410 — Media Applications
Spring 2008
Assignment No. 1

Note 1 **This assignment is to be done individually**

Note 2 Working with other individuals is strictly prohibited.

- Due date: Jan 10, 2008, at the beginning of the class.
- This assignment is worth 5% of your total course mark.

Objectives

To serve as an introduction to processing raster-based images, and to the issues related to color and digital media.

Your task, should you choose to accept it

1. Pretend you were just hired as a New Media Expert by the Federal Government. Your first job is to produce postcards of the National Flag of Canada. You are told that the red colour to use in the flag is well defined by the Department of Canadian Heritage.

   - Describe the formal specification of size and colours that can be used to print a Canadian flag. Provide your reference.
   - Using this specification, create an electronic version of the Canadian Flag (you don't need to add a red maple leaf to it, but it will be nice if you do). You should create a JPEG or TIFF file (8 bits).
   - Colour it with an official red. Explain the method you used to create such colour.
   - Print your flag in photographic paper (size 6x4 inches, matte or glossy). Yes, I know, the Canadian flag does not have this shape; center your flag in this size leaving whitespace above and below. You can either print it in a photo-quality printer, or take it to a lab. Write in the front of the flag your name, and in the back the printing method used (if a photo lab, write down the name of the lab; if a photo printer, maker and model and type of ink used). Submit (along the rest of your answers) the description of the method you used to print it.

   What to submit: In paper submit your answers to the questions above. Submit the postcard, and submit an electronic copy of your flag.

2. Write a C program that reads 8 bit TIFFs (using libtiff). Your program takes a single command line argument: a filename. This filename will be an 8 bit TIFF file. Your program should inspect each pixel's colour in RGB form. For each colour (Red, Green and Blue) compute a histogram of the values for that colour contained in the image (the histogram will have x-axis values from 0 to 255). Your program should output (to standard output) each of the histograms as follows:

   ```
   Red:000:<count for 000>
   Red:001:<count for 001>
   ```

```
...
Red:255:<count for 255>
Green:000:<count for 000>
Green:001:<count for 001>
...
Green:255:<count for 255>
Blue:000:<count for 000>
Blue:001:<count for 001>
...
Blue:255:<count for 255>
Average:Red:<avgRed>
Average:Green:<avgGreen>
Average:Blue:<avgBlue>
```

The last 3 values are the averages of the counts for each colour. Submit an electronic copy of your program and a makefile to build it. Submit also a paper copy of both.