

SWE315 : C++

Homework 7 (there was NO 6) - (Due date 07-08 : a Week!!)

Solution:

1. Please send solution to: zbaharav@cogswell.edu
2. You know the drill by now: Simply hit reply, and no zipped directories etc.. Just ascii-files or Word documents (or equivalent)
3. Please attach as well (word document preferred) screen shots of the console output, and of the images produced.
4. This is **an important homework**, as we will build upon this one to extend to base-classes, inheritance, template, and so on. Please put the time to get this one right!

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(see also [hints-and-guidelines](#) below!)

1. Create an Image class for dealing with ASCII pgm files, that will have the following variables and interfaces:
 - a. Variables:
 - i. String containing image name. E.g. "baboon_ascii.pgm".
 - ii. String containing File Format. E.g. "P2".
 - iii. String containing the comment string in the file (if any). E.g. "# Created on the 10 day of January."
 - iv. Integers for numbers of rows, columns.
 - v. Integer for the maximum gray level.
 - vi. A two-dimensional integer array to hold the image.
 - b. Interfaces:
 - i. Constructor :
 1. Empty constructor
 2. Constructor from a file name. This will populate the fields, and most importantly fill in the array values.
 - ii. Destructor, to clear memory allocated.
 - iii. setter() and getter() function for all the variables (other than the 2D array). For example:
 1. `std::string getName();`
 2. `std::string setName(std::string str);`
 3. `std::string getComment();`
 4. `std::string setComment(std::string str);`
 - iv. Two input/output functions:
 1. `bool ReadFromFile(std::string fileName);`
 2. `bool SaveToFile(std::string fileName);`
 - v. One utility program :
 `void Pixelize(int s);`

This utility program replaces ALL the pixels in an S-by-S blocks of the original with the same value. The value is the minimum value found in this S-by-S block of the original image. Here is an example of the first 3 rows (and the first part of those) of the Casablanca image, pixelized with s=3.

```
P2
# Casablncnca file
460 360
255
146 146 146 142 142 142 137 ...
146 146 146 142 142 142 137 ...
146 146 146 142 142 142 137 ...
:
```

And below you can see some examples of the results.

Make sure it all works on Casablanca_ascii.pgm and baboon_ascii.pgm images.

Screen shots of the console and images are given below.

```
C:\Users\Zachi\Dropbox\zCpp\Teach_2014\HW7_11home_image1\Debug\Ima...
Starting Image testing program.
Enter file name for input image: casablanca_ascii.pgm

*****
Reading file: casablanca_ascii.pgm
Successfully read file.
Image information:
Image name : casablanca_ascii.pgm
Comment : # Casablncnca file
<Rows, Cols> : (360 , 460 )
MaxGray : 255
Format : P2

*****
Testing file writing now.
Writing to file: testcasablanca_ascii.pgm

*****
Now processing image (Pixelize).
Saved Pixelized image to file: PixelizedImage8.pgm
Showing image

*****
Finsihed Image testing program.
Press any key to continue . . .
```

Casablanca_ascii.pgm



Pixelized with factor of 5:
PixelizedImage5.pgm



Pixelized with factor of 8:
PixelizedImage8.pgm



Hints and guidelines:

1. You should know how to create the simple class with variables and methods.
2. You will need to dynamically allocate a 2D array.
3. Remember to clear this space in the destructor.

Tuesday, 07-01-2014

4. You already wrote a program to read and write a pgm file. Use the very same principles (aka cut-and-paste) in this case.
5. Attached you will find a few images to help.
6. The console output of your program should look like the above. Don't worry about word-for-word, but at least similar enough.

=== End of Homework 7 ===