Homework 4

ASCII image

CS 5060 Intensive Programming, Fall 2012

57 points

Due: 3:59 pm October 5, 2012

Main program.

Create a program `Ppm2Ascii` that reads a ppm image and outputs the image using ASCII characters. The output image should be written to the standard output stream.

Create an `Image` class and an `AsciiImage` class. Make sure your `Ppm2Ascii` program has a method to load the ppm `Image`, and also method to convert the ppm `Image` to an `AsciiImage`. Use a `display` method in the `AsciiImage` class to display your result.

Usage:

```
java Ppm2Ascii input_file_name [options]
```

Options:

input_file_name: Input file name. The input file must be a ppm image.

-t threshold: Convert image to binary using a threshold value (convert every pixel under the threshold to black, and every other pixel to white).

Examples:

```
java Ppm2Ascii usu.ppm
    Convert usu.ppm to ASCII and display it.
java Ppm2Ascii usu.ppm -t 128
    Convert usu.ppm to ASCII and display the binary image
    obtained using the threshold.
```

PPM images.

The first line is always "`P3`" which indicates the pixel values are in ASCII format (instead of binary). After that there can be an optional comment line, which must start with a '`#`'. Next are three numbers: width, height, and maximum intensity value. After that are the RGB values for each pixel.

See Netpbm[1] format for a description of the PPM image format.

Example:

```
P3
# created by jpg2ppm
2 2 255
255 0 0
0 255 0
0 0 255
255 255 0
```

This is a 2 x 2 image with the following colors:

Figure 1: A 2 x 2 image with four different colors.

JPG to PPM conversion tool.

You can use the `jpg2ppm` Java program to convert JPG images to PPM format.

Usage:

```
java jpg2ppm input_file_name [output_file_name] [options]
```

Options:

input_file_name: Input file name. The input file must be a jpg or ppm image. If no output file is specified then the input file is displayed.

output_file_name: Optional output file. The output file is a ppm image. If no output file is specified then the input file is displayed.

-g: Convert image to gray-scale before saving or displaying.

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[1] http://en.wikipedia.org/wiki/Netpbm_format

Examples:

```
java jpg2ppm usu.jpg
    Displays usu.jpg image.
java jpg2ppm usu.ppm -g
    Displays usu.ppm image in gray-scale.
java jpg2ppm usu.jpg usu.ppm
    Convert usu.jpg to ppm and save it as usu.ppm.
java jpg2ppm usu.jpg usu.ppm -g
    Convert usu.jpg to ppm and save it in gray-scale as usu.ppm.
```

Grading:

- `Image` class: 5 points.

- `AsciiImage` class: 10 points (5 points for display method).

- `Ppm2Ascii` program: 50 points.

    - Reading program options: 5 points.

    - Loading ppm image: 10 points.

    - Converting to ASCII image: 20 points.

    - Thresholding image: 5 points.

- Sample test image: 2 points.

Submission.

Submit a `zip` file with the following files:

1. Code files `Image.java`, `AsciiImage.java` and `Ppm2Ascii.java`.

2. At least one sample image that you used to test your program.

Include your name and A number at the top of each source file. Name the `zip` file `hw04_firstName_lastName.zip`. For example, if your name is John Smith, name the file `hw04_John_Smith.zip`.