

# CS 111 – Program Design I, Spring 2013

## Lab 7

### Posterization

Posterization is a technique that reduces the number of colors used in a picture. During lecture we did examples of posterizing a picture to 2 colors and to 4 colors.

The code to posterize is often a modification of the black & white (grayScale) code. Once the "grayAmount" has been determined for a pixel, we use that value in if statement(s) to determine which of the posterized colors that pixel will be set. The following shows that code for posterizing into 2 colors: black and white.

- If the grayAmount is in the range from 0 to 127, the color of the pixel becomes black.
- If the gray Amount is in the range from 128 to 255, the color of the pixel becomes white.

```
// determine the grayAmount from the color at the pixel
int grayAmount = (int) (red * 0.299 + green * 0.587 + blue * 0.114);

// determine the final color value of the pixel
if ( grayAmount < 128 )
{
    // set the pixel to black
    red = 0;
    green = 0;
    blue = 0;
}
else
{
    // set the pixel to white
    red = 255;
    green = 255;
    blue = 255;
}
```

To posterize to more colors we just need to use nested if statements (often called "else-if" clauses). The following posterizes to 4 colors (black, blue, green and white). In this one the ranges for the grayAmount are:

- 0 - 63 for black,
- 64 - 127 for blue,
- 128 - 191 for green, and
- 192 - 255 for white.

```
// determine the grayAmount from the color at the pixel
int grayAmount = (int) (red * 0.299 + green * 0.587 + blue * 0.114);

// determine the final color value of the pixel
if ( grayAmount < 64 )
{
    // set the pixel to black
```

```

red = 0;
green = 0;
blue = 0;
}
else if ( grayAmount < 128 )
{
    // set the pixel to blue
    red = 0;
    green = 0;
    blue = 255;
}
else if ( grayAmount < 192 )
{
    // set the pixel to green
    red = 0;
    green = 255;
    blue = 0;
}
else
{
    // set the pixel to white
    red = 255;
    green = 255;
    blue = 255;
}

```

### Lab Assignment

Due: Wednesday 3/13/2013 by 11:59 pm

For this lab assignment, you are to posterize a picture into 6 colors. We will use the "grayAmount" that was used when creating a black and white (grayscale) picture to determine which of the six color values will be used.

Since our range for the "grayAmount" can vary from 0 to 255, we need to divide that range into 6 parts to distribute the six colors evenly throughout the picture.

We will use the following shades of blue for our 6 colors. The names come from the web page at: <http://www.tayloredmktg.com/rgb/>.

grayAmount Range	0 - 42	43 - 84	85 - 127	128 - 170	171 - 212	213 - 255
<b>Color Value</b>	Midnight Blue r = 25 g = 25 b = 112	Dark Slate Blue r = 72 g = 61 b = 139	Royal Blue r = 65 g = 105 b = 225	Deep Sky Blue r = 0 g = 191 b = 255	Pale Turquoise r = 175 g = 238 b = 238	Light Cyan r = 224 g = 255 b = 255

For this lab assignment, you are to write a java program that will complete the following:

1. Prompt the user for a picture and open that picture.
2. Call a method that will posterize the picture as described above. The picture opened in step 1 is to sent as a parameter to this method.
3. Display the posterized picture.
4. You must write your programs using good programming style which includes:
  - Good variable names
  - in-line commenting
  - header block commenting for the program and each method written
    - Be sure to include the following with the header block comment for the program.
      - your name
      - day and time of your CS 101 lab section (i.e. Wednesday at 9:00)
      - A description of the project.
  - proper indentation of program statements
  - use of blank lines to separate blocks of code.

### **Submission of the Lab**

The lab must be submitted electronically to the Assignment Link for Lab 7 inside of [Blackboard](#). You will only need to submit the java source code file (the ".java" file). Please only submit source code file (the **.java** file, not the **.class**).