Homework #2

1. Write a program that takes an image $f$ and
   
   • chooses $N$ intensities ranging from 0 to 1 (including 0 and 1), equally spaced;
   • computes $r \circ f$, where $r(c)$ rounds the intensity $c$ to the nearest of the $N$ chosen intensities;
   • stores $g_{r \circ f}$, performing histogram equalization, evaluated at those $N$ intensities;
   • calculates and outputs the image $g_{r \circ f} \circ r \circ f$.

   (a) Run your program on one of “books.bmp”, “clothes.bmp”, or “leaves.bmp” using $N = 4$ and turn in a print out of the original and resulting pictures. Also, find the four values $CH_f(c)$ takes.

   (b) Run your program on one of “building.bmp”, “bike.bmp”, “flower.bmp”, “dead-flowers.bmp”, “wheel.bmp”, or “gastropod.bmp” using $N = 64$ and turn in a print out of the original and resulting pictures.

2. Write a program that takes an image $f$ and
   
   • chooses $N$ intensities ranging from the min of $f$ to the max of $f$ (including these endpoints), equally spaced;
   • stores $g_f$, performing histogram equalization, evaluated at those $N$ intensities;
   • calculates the piecewise linear interpolating polynomial $p$ approximating $g_f$ using those $N$ intensities as nodes;
   • calculates and outputs the image $p \circ f$.

   (a) Run your program on one of “books.bmp”, “clothes.bmp”, or “leaves.bmp” (a different one from the one chosen in the previous problem) using $N = 4$ and turn in a print out of the original and resulting pictures.

   (b) Run your program on one of “building.bmp”, “bike.bmp”, “flower.bmp”, “dead-flowers.bmp”, “wheel.bmp”, or “gastropod.bmp” (a different one from the one chosen in the previous problem) using $N = 64$ and turn in a print out of the original and resulting pictures.