**Junior Knights Course II Picture Homework**

**Part A: Swap Left and Right Halves**

Add a function to imageproc.c (or imageprog.py) that takes in a picture and swaps the left "half" of the picture with the right half. For example, if we were to carry out the operation on the array pictured below:

100 50 80 200 123 93

234 11 17 129 212 43

213 112 145 223 202 89

The resultant picture would be:

200 123 93 100 50 80

129 212 43 234 11 17

223 202 89 213 112 145

If the picture had an odd number of rows, you would have to decide if the left side was 1 pixel shorter than the right side of vice versa. Edit your main so that it prompts the user to enter a picture file, applies this transformation and stores the result in a file of the user's choice.

**Part B: Swap Top and Bottom Halves**

Do a similar transformation as part A, but this time split the picture horizontally and put the top half on the bottom and vice versa.

**Part C: Lighten a Picture**

Write a function that takes in a picture and a real number constant in between 0 and 1. Your function should multiply each pixel by this constant and store the nearest integer as the output pixel. Edit your main to allow the user to manipulate a picture in this manner.

**Part D: Stretch the Middle of the Picture**

Write a function that crops out the left and right 25% of input image and widens what remains by a factor of two. Accomplish the widening by repeating each pixel value twice. For example, if the input image was:

1 2 3 4 5 6 7 8 9 10 11 12

20 21 22 23 24 25 26 27 28 29 30 31

then the output image would be:

4 4 5 5 6 6 7 7 8 8 9 9

23 23 24 24 25 25 26 26 27 27 28 28

Deal with odd-sized column lengths as you see fit.

**Part E: Make Your Own Transformation**

Write your own function and try your own picture transformations!