

Applications in Scientific Computing

Assignment 2: Image processing

530.390.13

Due: Friday 8 January 2016

1. Convert the binary number 1010 0011 by interpreting it as both 8-bit signed and unsigned integers.
2. Working from the code we wrote in class (i.e., use no built-in functions), write a routine for generating the “lightness” grayscale, defined by:

$$R_{i,j} = G_{i,j} = B_{i,j} = \frac{1}{2} \left[\max(R, G, B)_{i,j} + \min(R, G, B)_{i,j} \right].$$

Note that you will also need to modify the maximum and minimum functions from class. Commit this new code to your personal GitHub repository for the course; simply turn in your username and the path to the new code in the repository.

3. Imagine you must search an array for some data. You have two options: you may sort the data so that you can use “smart” searching algorithms (like our binary search), or you may simply search the data as-is (like our unsorted search). Can sorting and searching possibly be faster than searching without sorting? What are the benefits and drawbacks of option?