

CDS 301 Spring 2013
Scientific Information and Data Visualization

Homework Assignment 3

Assignment Date: February 19, 2013

Due Date: February 12, 2013

1. Lexicographic Order

Because of the regularity of a uniform grid, the sampling points in a high dimensional data domain can be stored in a 1-D array, whose index is arranged in the so called lexicographic order. Given a 2-D data domain with sampling number $N_x=100$ and $N_y=100$

- (1) If the sampling point is at $n_x=36$ and $n_y=70$, what is its lexicographic order index?
- (2) If a sampling point has a lexicographic order index of 3120, what are the ordering indices of n_x and n_y in the 2-D domain?

2. RGB color system

Look up at the RGB color cube, what are the colors of the following RGB vectors?

- (1) [1,1,1]
- (2) [1,0,0]
- (3) [0,1,1]
- (4) [0,0,0]
- (5) [0.5,0.5,0.5]

3. RGB and HSV conversion (using Listing 3.2 and Listing 3.3)

- (1) For blue color, $[R,G,B] = [0,0,1]$, calculate its corresponding $[H,S,V]$ vector values
- (2) For a color of $[H, S, V] = [1/2, 1, 1]$, calculate its corresponding $[R, G, B]$ vector values.