

CSci 350 Computing FD and FA

Due Thursday March 4th

In this assignment you will write functions to compute FD (flow directions) and FA (flow accumulation) on a grid DEM. Your FD function should take as input a grid and compute SFD or all cells in the terrain which have downslope neighbors. SFD means that FD points to the steepest downslope neighbor; if there is more than one steepest downslope neighbor pick one (at random). If all neighbors of a cell have same height or are upslope assign FD=0. Thus the SFD of a cell is a value in $\{nodata, 0, 2^0, 2^1, \dots, 2^7\}$. Your FA function should take as input an SFD grid and compute a FA grid. Assume that initially every cell in the terrain has 1 unit of water, and that every cell distributes its water (initial, as well as incoming), to the neighbor pointed to by its flow direction.

You can structure your program as you like. You can write two different programs, or you can write one program that can run both functions. Ideally the program will wait for your command and execute it:

```
lynx20:>flow
flow>flowdir in=set1.asc out=set1-dir.asc
Computing FD for set1.asc...done
flow>flowaccu in=set1-dir.asc out=set1-accu.asc
Computing FA for set1-dir.asc...done
flow>flowdir in=kaweah.asc out=kaweah-dir.asc
Computing FD for kaweah.asc...done
flow>exit
OK, bye.
lynx20:>
```

To submit, create a directory with your name that contains your code. Make a tar file of the directory and email it to me when you are ready.

The first project will integrate all the assignments into a flow computation package so it is good to think about this while deciding the structure of your FD/FA code. You can display a FD and FA grid in the same way that you display an elevation grid (Figure 1 below). You can do more elaborate visualisations, like draping the FA on top of the surface (elevation). This can be done with a nice extension your *draw-grid()* function. Think about it!

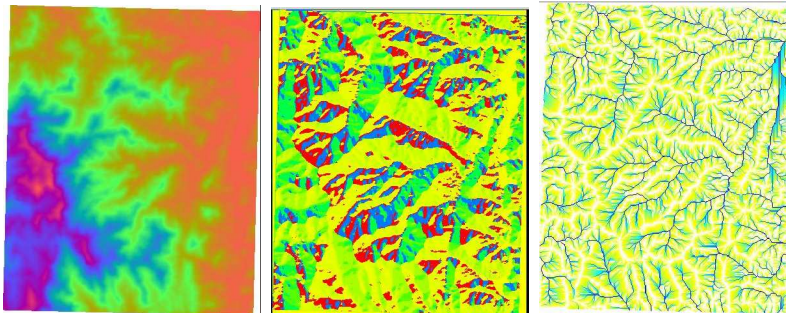


Figure 1: Elevation, SFD and FA for *set1* dataset.