

**Lab 9 (Tuesday, February 2).** The coding portion of this lab is due before class tomorrow, and should be labeled **Lab9-LastNames.nlogo**.

**Part 1: Discussion:** Begin lab with 10 minutes of discussion about possible final programming projects. Take turns describing a project idea. For each project, be explicit about what the agents are, what decisions the agents make at each time step, what the environment is, what the spatial and temporal scales are, and what the purpose is. Ask each other questions to help refine your ideas. Projects may include agent-based games, social models, ecological models, etc. See the description on the syllabus for more details about grading. Be prepared to share a project idea at the start of class on Wednesday.

**Part 2: NetLogo Programming: Important a World:** This is the part of the lab that should be submitted.

**Step 1:** Write NetLogo code that will setup a world by importing the image heightmap.png (which can also be found in the handouts folder), and using it to set the elevation of every patch in a range from 0 to 1000 meters based on the grayscale of the corresponding point in the image (where darker colors are lower elevations and brighter colors are higher elevations.) The dimensions and number of patches of your world should be appropriate to capture the information in the image. Wrapping should be turned off.

**Step 2:** (Using agents) create rain falling on your landscape. (You should have a “rain” button with forever switch selected.) The rain should move downhill at a slow enough speed for a good animation (without using the speed slider). Follow each drop of rain as it moves across its given patch toward the neighboring patch (one of Neighbors4) of lowest elevation. A rain drop should die when it reaches a patch with no lower neighbors.

**Step 3:** Use your raindrops to determine and then visualize the different watersheds (drainages) in the map. Every patch that has no lower neighboring patch should be considered a unique watershed. Any patch on which a raindrop falls and ends up on patch P should be part of the watershed of patch P. When you visualize the watersheds, your visualization should show both watersheds and elevations.