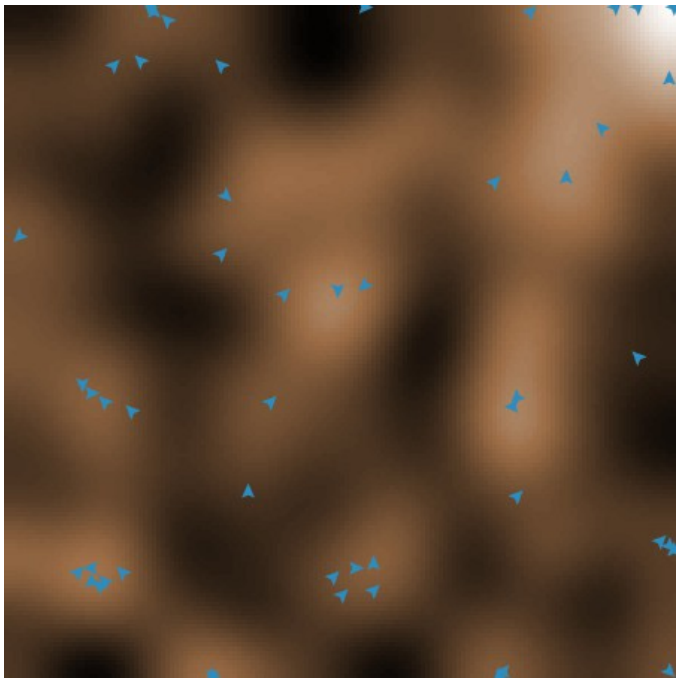
Lab 7: Hill Climbers – Part 1



There is one NetLogo video lecture that accompanies this lab assignment: "Hill Climbers – Part 1".

Assignment For Week 8:

The "Hill Climbers – Part 1" video shows and describes key portions of the code changes you will need to make to the butterfly model, to produce the first hill climbers model. However, several more changes are described in the video, without the implementation in code being shown; you are expected to complete these changes as well. **This will require significant attention to detail.** The number of points awarded for completion of the model reflects this additional effort.

After you get the Hill Climbers 1 (Climbers1) program running, you are to design and run experiments with the aim of helping you to answer question 1 and 2. Then, answer question 3 as a thought experiment.

1) The random terrain in Climbers1 is created by assigning a random elevation to each patch, uniformly distributed over the interval [0, 1); the differences between patches are then smoothed through diffusion. What's the effect on the resulting (post-diffusion) terrain if the interval for random elevations is initially set to [0, 100) – that is, if **random-float 100** is used to generate the random elevations?

2) In addition to the uniform random number generators we've been using so far, NetLogo also provides random number generators for sampling from a number of other distributions. What is the effect on the post-diffusion terrain if a normal (Gaussian) distribution (using **random-normal**) is used for the initial elevation values?

3) As you've observed, the strategy used by the butterflies to get to a hilltop isn't sufficient for finding the highest point on a terrain when the terrain has multiple hills. Without focusing on specific NetLogo commands, can you think of a strategy for the hill climbers to use, that could potentially be more effective than the butterfly strategy? Keep in mind that the hill climbers are constrained in movement, vision, and time:

   - A climber agent can only see the elevation of the patch it's standing on, and those of the neighboring patches.
   - A climber agent can move a maximum distance of 1 every tick.
   - In general, a climber agent won't have sufficient time to systematically explore every patch in the NetLogo world.
   - Climber agents aren't allowed to modify any aspect of the terrain as they explore.

   On the other hand, climber agents can be programmed to remember terrain features they've encountered. (Eventually, we'll program the climbers to share information; for now, try to come up with a strategy that has some chance of success without communication between climbers.)

Grading Rubric for Climbers part 1 [10 points total]:

[3 points]: Attached the file in Blackboard Learn with the file name: **`Climbers1.firstname.lastname.nlogo`**

Note: DO NOT copy and paste your source code into Blackboard Learn. You must ***attach*** the NetLogo source file.

*****After attaching, you MUST CLICK SUBMIT *****

[1 points]: The "info" section of your program includes your name, the date and a description of what the program does.

Note: If you start from the **`Climbers0.nlogo`** model, the Info section already contains info relevant to the Butterflies model; this will need to be changed or deleted as appropriate.

[6 points]: Design and run experiments that attempt to answer the first two questions described above. (Treat the third question as a thought experiment.) Describe your design, list the experiments you ran, report your results and state your conclusion. All this reporting must be included within the "info" tab of the **`Climbers1.firstname.lastname.nlogo`** file you submit into Blackboard Learn. Note: The points you earn for this section are NOT based at all on your conclusion. Rather, they are based on the on the following criteria:

a) Is your experimental design well-conceived? This includes number of experiments run and ranges of values tested.
b) Do the answers to "thought experiment" questions demonstrate deliberate reflection and solid reasoning?
c) Is your reporting clear, well organized, and easy to read?