Programming Test: Hills

Objective:

Convert an input TGA file representing a height field and a light direction vector into an output TGA which is a visual representation of what that height field would look like if lit by the specified light, as seen from directly above.

Imagine you are converting a set of depth measurements of the earth's surface taken by a satellite into a visual image.

A proper solution will include:

* Basic directional lighting, where the surface is lit in proportion to the angle of incidence to the light vector.   Assume there is no ambient light.

* Self Shadowing , where any point on the hill grid which is occluded from the light source by a higher point on the grid is rendered in darkness.

* Bonus: Self Shadowing algorithm in O(n^2) runtime, where the source image is nxn.

At a minimum the solution should take a height-map TGA and directional light vector as input and produce a TGA as output.   A superior solution would display output on the screen and allow the user to vary the light direction in real time.

Please include an estimate of the total time spent on the solution. Note that it is not intended for this project to require more than about ten hours to complete. If you are chasing a solution that looks to be taking much longer than that, you should think carefully. It might mean that you are going down the wrong track!

Please contact Chuck Tolman (ctolman@skydance.com) with any questions.

Good luck!