As with all programming assignments in this course, you are expected to write your own code for this assignment, with no code obtained from classmates, websites, textbooks, or other sources. The only exceptions to this are code provided by the instructor (including code from the instructor’s CS 482 course website) and code provided at Rick Parent’s “Computer Animation” textbook website or the “OpenGL SuperBible” textbook website. All code obtained from any of these sources must be clearly labeled as such in your code documentation.

In this assignment, you will use the sinusoidal Gerstner ocean wave model presented in class to model a four-wave system. Start by procedurally generating a square wireframe grid of vertices (16×16 to begin with, but see if your system can accommodate more), with edges connecting the vertices into right triangles. Place the user at an elevated vantage point from which the entire scene may be clearly seen.

Use the Gerstner equations to apply four waveforms to this grid. Randomly generate amplitudes and frequencies so the waveforms vary with each execution of the code, but toggle each waveforms by means of a keyboard command ("1" toggles the first waveform in the 0-degree direction, "2" toggles the second waveform in the 45-degree direction, "3" toggles the third waveform in the 90-degree direction, and "4" toggles the fourth waveform in the 135-degree direction). These directions are illustrated in the figure at upper right (with a 16×16 grid). The user should be allowed to have any combination of the four waveforms active at the same time.

Additional Feature (Required for graduate students, Extra Credit for undergraduates):
Include a keyboard-based toggle (‘r’) that switches between radial and linear waveforms. When in radial mode, the waveforms will propagate outward from central locations ("1" will activate the center of the grid, “2” will activate the far left corner, “3” will activate the near left corner, and “4” will activate the right midpoint). These locations are illustrated in the figure at lower right (with a 16×16 grid).

Your complete program file is due on your Moodle dropbox by 10:30 AM on Tuesday, February 26, 2013.