CIS 454 Computer Graphics Fall'15

Project 2 Assigned November 2 Due November 16, 2015

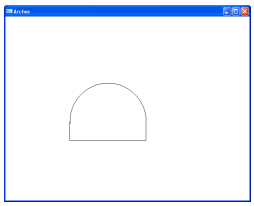
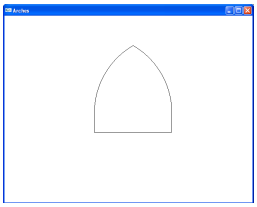
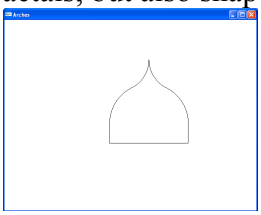
This is a team assignment. To be demonstrated upon completion.

Create a 3D landscape in OpenGL complete with height coloring, water, snow and vegetation the user can fly around using mouse controls. 70 points total

Requirements:

1. Create a fractal-generated landscape using a polygon or triangle mesh. Color the mesh using colors based on geographical height (e.g. green for low land, brown for intermediate land and white for snow peaked caps) and add a water level. The color transitions must be smooth, not jaggy. For this purpose, you must "grow" the mesh in places to correct the lack of vertices. Make sure your landscape makes space for all weather requirements (water, snow, spring and autumn layers). Your landscape must include all four seasons. In honor of Fall and New England, the Fall "layer" should have some falling leaves.

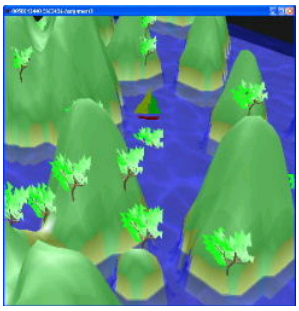
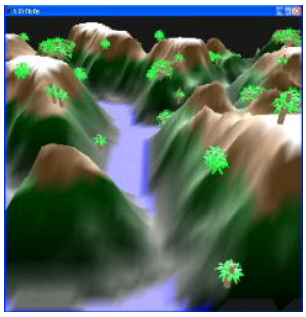
2. Create fractal vegetation for the landscape using L-Systems. Remember these will not be able to be generated during flight time as they will slow the animation sequence down considerably. To make the vegetation appear more natural, implement random branch angles and leaves. There must be appropriate vegetation at every weather or depth level (trees and/or bushes in the mountains and valleys and seaweed in the ocean. For the leaves, utilize not only fractals, but also shapes as in the figures below.

3. Allow the user to fly (**change heading**, **slide**, **pitch**, **yaw**) through your landscape using the mouse. The user should be able to **accelerate** using the left mouse button and **decelerate** using the right mouse button.

4. For extra credit deal with collision detection.

Examples of landscapes:

Grading: 1. Smooth landscape (10 points) with appropriate seasonal rendering (12 points), falling leaves (8 points); 2. Seasonal vegetation (10 points) using L-systems (6 points) and the figures below 2. (5 points); 3. Smooth flight with all camera functions (14 points). In addition, for "growing" the mesh, 5 points.