Assignment: (due 4/11/2012 ( 2 weeks ))

In this lab 7 assignment we will add simple animation and physics to lab 6. Please ensure that you scale the Terrain with a reasonable [x|z]TerrainDimension.

We will be playing / animating monster spiders walking around the Terrain and will attempt to shoot them from the space craft.

The desired effect of a moving/animated spider is shown in the following youtube video:

http://www.youtube.com/watch?v=PA_e9EyzHe0&feature=related

The goal is to have multiple of these spiders running around and ultimately
a) avoid collision with each other and
b) stepping on some randomly placed hidden(invisible) landmines that will explode
c) shooting/killing a spider with a spaceship missile

(you get the idea that you can reuse many things from the lab 6 project).

You should implement the spider as a class (so we can have multiple instances) and randomly have the spider move around.
Here is a possible path that should successively get you to a solution:

1. Start with project lab 6.
2. Comment out the plane drawing since we will focus on the spiders.
3. Just comment out existing code as it will be used later on.
4. Use a flat terrain ( height is all equal ) or draw a square to make drawing faster for now.
5. Start with programming the spider as a simple cube and program the random motion. To do that you should think of a general direction of movement and a random distance the spider
should move before changing direction by a random angle. Once it changes direction it should
transition to that direction not abruptly (maybe on walking on a curve or just turning on the spot
into the right direction). The spider should not fall off the terrain boundary but should turn instead.
6. Use global variables (that can be modified) for the speed at which spiders are moving (maybe
variable speed is kind of nice).
7. Now model the spider as using spheres and cones using hierarchical drawing as it was done for
the robots. Each arm segment should have a small motion range and it seems that the arms
segment is moving in a small range. Make sure that not all arms are all moving in
synchronization (see youtube).
8. Only operate one spider at the beginning to get the motions right
10. Place random “landmines” that when a spider steps on it, both the spider and landmind blow up
with an explosion.
11. Implement collision avoidance between the spiders using outer bounding boxes or spheres.
    When two spiders collide (outer box) then they should move away from each other.
12. Implement the shooting of the spider by the plane missiles (see lab6)
13. In the dashboard replace with information regarding how many spiders were shot so far and how
    many exploded when stepping on a landmine.
14. Reactive the height map on the Terrain and make sure that the spider moves with the change in
    height.

I think finishing tasks 1-8 in the first week and 9-13 in the second week is a good breakdown. Of course
you can choose a completely different path / sequence to achieve the final game.

You should provide the following program arguments:
-m <number of hidden mines to place>       (default 10)
-n <number of initial spiders>            (default 1)

Please implement everything in one file (Spider_<YourName>.cpp) to make grading simpler and send
that file to frankeh@cims.nyu.edu.

Due to the complexity and length of the assignment, it will count double (200 points).