CS5243 Assignment #3: Sky and Terrain

I. Introduction

From Assignment #1, the game engine can display 3D meshes. To make a complete outdoor environment, sky and terrain are needed.

A sky is just a 3D box that has textures assigned to it which create an illusion that you are actually in an intricate world. That is, it is just like a very big room with pictures on the walls, ceiling and floor, which contains every object in the game.

Unlike a sky, which is never in contact with other objects in the game, it is quite likely that a terrain is in contact with other objects in the game. Complicated issues, such as collision, need to be considered for a terrain. In most implementation, a terrain also consists of triangles with textures assigned to it, like 3D meshes implemented in Assignment #1. The y-coordinates of the triangles are given by a height map, which is a 2D representation of a 3D terrain with each 'color' represents a height.

II. Requirements

1. Write a SkyBox class which displays a 3D box with textures as a sky.

2. Write a Terrain class which can read the y-coordinates of the triangles of the terrain from a height map and render the terrain with any algorithm. Incorporate the view frustum culling feature implemented in Assignment #2 into the algorithm if necessary. (Hints: To create a height map, Height Map Editor, which is downloadable from http://hme.sourceforge.net/ can be used.).

III. Advanced Option (extra-credit)

1. Implement geo-morphing.

IV. Demonstration

1. To display a sky and a terrain together with the features built in previous assignments.