Assignment 2: Breakout (40 points)
Assigned 9/18/12
Due 10/4/12

Purpose:

The last of the 2D assignments, this assignment is designed to further develop your OpenGL and GLUT skills. This program will require the drawing and erasing of lines, points, polygons. In addition, an effective program will require a more developed data structure to manage the gameboard.

Breakout will provide a basic introduction to real-time graphics programming. While the last assignment was interactive, the pace of user interaction was leisurely. In this assignment, interaction must be real time to be effective.

Description:

No skeleton code this time, only this Readme-breakout.pdf file. The basics of the assignment are to develop an interactive game similar to the arcade favorite Breakout of the early 1970's.

Your program must open a GLUT window and define a user interface using GLUT menus to provide a user with access to the following functions:

- New Game - Starts a new game of breakout
- Quit - Ends the game
- Difficulty - Allows the user to choose from at least 3 levels of difficulty

If you aren't familiar with Breakout, I have included a link describing the game's history (who knew that Breakout was designed by Woz and Steve Jobs?!)
http://www.retroland.com/breakout/#.UFixOBj_Q7o
I've also included a link where you can play variants of breakout online…
http://www.tripletsandus.com/80s/80s_games/breakout.htm

The game board is a rectangle, with an open bottom edge. Along the bottom edge is a paddle that the user can move back and forth. To begin the game the user launches a ball from the paddle. Across the top are some rows of bricks with a gap at the very top. The object of the game is to clear the board of these bricks by bouncing the ball into them. Whenever a ball strikes a brick, the ball bounces off the brick and the brick disappears. The game gets its name from the strategy of bouncing the ball through a hole in the bricks to "trap" the ball in the gap at the top of the board. The ball bounces around the top of the board, breaking bricks from the top until it escapes back toward the user's paddle. A ball is lost if the user fails to hit it with the paddle and it "escapes" out the bottom of the gameboard. A typical game gives the user three tries.

There are more sophisticated variants of Breakout. For example, the user might get control of the ball speed, or have control over the paddle size. Some games give the

user more than 1 paddle, or change how the bricks affect the ball, by accelerating it or attracting it.

Deliverables

Your assignment is to submit an executable that plays the game of breakout. It must display the gameboard, including the user's paddle, the breakout bricks and the ball. The ball must be able to bounce around the playing field and when it strikes a brick, the brick must disappear.

Your **assignment2_<Your_Username>.zip** file should include an executable **breakout.exe**, the supporting source files, and a **Readme** file listing all of the other files in your submission and a short description of their purpose, together with any known bugs or other comments. Please also include an estimate of the amount of time the assignment took you to complete. Failure to include a Readme file will incur a 5 point deduction.

Milestone 1 (10 points)

Start with an app that opens the glut window and bounces a ball (in the appropriate direction) inside the interior of the window. By the way, reshape needs to work this time. You may choose to either scale the gameboard with the window while maintaining the ball's size or scale the everything with the window (ball's size is relative to gameboard size). If you get this far, you'll earn the first 10 points.

Milestone 2 (10 points)

Add the user's paddle next. It's a rectangle that the user can move along the bottom of the window. If the ball hits paddle, it should bounce off the paddle in the appropriate direction. I suggest keys to move it left and right, but some used the motion of the mouse. Either way, if your game has a paddle that the user can move back and forth and hit the ball with, you earn another 10 points.

Milestone 3 (10 points)

Add the bricks along the top. The bricks are colored rectangles, laid down in a grid or strips. Each brick should reflect the ball if struck, then disappear. If your game has bricks like these, you'll earn the next 10 points.

Milestone 4 (5 points)

Allow the user to select from at least 3 levels of difficulty. Either by varying the paddle size, ball speed, etc. Maybe make the gameboard more interesting with random obstacles appearing between the paddle and the bricks. Do this and you get another 5 points.

Milestone 5 (5 points)

These are the polish points. Make the interface work. Show a score somewhere (maybe add up the number of bricks destroyed). Maybe limit the number of balls. In short, make your game complete and you'll earn the last 5 points.

Bragging rights criteria:
What is a game without some cool music? Add sound to the game! Texture the gameboard. Make it a 3D breakout game! Unleash your inner GL Wizard!