# CPS511 Assignment 3 (Option B) Readme

## How to Compile:

This Assignment was compiled and linked using Visual Studio 2013 Professional. The solution file is *“Assignment 3.sln”*. I used freeglut as the glut library. Freeglut files are included in *“./Dependencies/freeglut/”* folder.

To set up the solution in Visual Studio, I took the following steps:

1. In the **Solution Explorer** window, changed **Assignment 1->Properties->Configuration** to *“All Configurations”*. The platform is *“Win32”*.
2. Under **Assignment 1 -> Properties -> Linker -> General**, added *“Dependencies\freeglut;”* to **Additional Library Directories**.
3. Under **Assignment 1 -> Properties -> Linker -> Input**, added *“opengl32.lib;freeglut.lib;”* to **Additional Dependencies**.

To compile and run the solution, I took the following steps:

1. Run **Start Debugging (F5)** or **Build Solution (F7)** once; a system error message will pop-up saying   
   *“The program can’t start because freeglut.dll is missing from your computer. Try reinstalling the program to fix this problem.”*   
   This creates a **Debug** folder (or **Release** folder) under the project solution folder.
2. Paste a copy of ***freeglut.dll*** into the **Debug** folder (or **Release** folder) and rerun the debugger (or build the solution).

## Parameters and Implementation details:

### File “CityBuilder.cpp”:

* A fixed size array is used to hold the room objects. The array is declared in line 74 as “*ComplexObj \*cobj[12];”* – a total of 12 objects (4 per room).
* In line 79, for room objects, the translation delta (for x-, y-, z-direction) is set to 0.2 units; the rotation angle delta is set to 5.0 degrees.

## Features Implemented:

* All (thick) walls, (thick) doors, floor, room objects, and avatar are texture mapped
* Each wall and door have collision detection implemented when interacting with the avatar
* Avatar can be steered (forward, backward, turn left/right) using arrow keys   
  To steer Avatar, first switch to NAVIGATE mode, then use arrow keys to steer  
  “n” – toggles between NAVIGATE mode and world view  
  Avatar can also turn its head (up/down, left/right)  
  “m” – toggles head turning; when head turn is on, use arrow keys to turn. Pressing “M” again resets head position and allows avatar to navigate - avatar cannot navigate when head is turned. (NOTE: Head turning is only possible when in NAVIGATE mode)
* Avatar can be allowed to penetrate other objects in the rooms  
  “b” – toggles avatar and room object collision detection
* Animating doors - Both doors open/close with toggle keys  
  “1” opens/closes door 1 (entrance to main/large room)  
  “2” opens/closes door 2 (entrance between 2 small rooms)
* There are 4 different types of objects in each room – shield, table, vase, and picture frame. All are texture-mapped
* World view (press “N” to toggle) can change viewpoint and zoom in/out  
  Hold left mouse key down and up/down movement controls the elevation of the camera, right/left movement controls the azimuth/longitude   
  Scroll forward to zoom in, backward to zoom out
* Room objects (furniture) can be selected/deselected/multi-selected. They can then be translated, rotated and raised. Initially, no objects are selected.   
  “c” activates select mode – use left/right arrow keys to cycle between objects to select  
  “+” activates multi-select mode – use left/right arrow keys to cycle between objects to select  
  “-“ deselects all selected objects  
  “t” activates translate mode – object(s) selected can be translated using all 4 arrow keys  
  “r” activates rotate mode – object(s) selected can be rotate using left/right arrow keys  
  “h” activates raise mode – object(s) selected can be raised using up/down arrow keys
* “q” (quits application)