CMSC 405 Week 6 Homework

1. Given a TV with a 240-Hz refresh rate, how many times will a 24 frames per second input signal be repeated in 1/24 of a second.

2. Plot time versus Amplitude for an initial Amplitude of 175, a sampling frequency (f_s) of 512 Hz, a sin wave frequency (f_o) of 4 Hz, and phase of 75 degrees. Show damping values of k=0.0 k=0.4, k=0.7 and k=0.9. Note: You can use Excel, or any other graphing package to perform the calculation and create the plot. You should include all 4 data sets on the same plot. The plot should include x and y axis labels, a title and a legend. The plot should contain at least 5 seconds of data sampled at 512 Hz (2560 points).

3. Using OpenGL and your programming environment, create a **3D unique animation of your own creation** using techniques demonstrated in this class. There are infinite possibilities for your creation. It is up to you to determine what you want to animate. However; you do need to provide at least the following features for your animation:
    1. A list of instructions displayed on screen providing what the user needs to do to start and stop animation and what options should be selected to turn on or off specific animation components. You can display these instructions in the main window or separate instruction window.
    2. You need to provide animation on at least 6 different objects or components.
    3. The animations and movements need to be "somewhat" realistic. For example animal or human animations have expected range of motion for movements.
    4. You should apply at least one physics-based animation routine. Several possibilities are listed in the readings. (e.g. projectile motion, resisted motion, friction …) For the equation you select, you should implement it in OpenGL and have at least one of your objects follow this path through your animation. (Hint: use a separate function and determine you x, y, and z positions based on that algorithm)

Deliverables: You should submit a well-organized, word document that includes the results for the first two questions of this assignment along with a screen captures of the output of running your Visual C++ code. You should submit your C++ source code for your 3D animation application. You should name your word assignment "yournamehw6.doc" (or .docx). You should name your C++ source code yournamehw6.cpp.