T-637-GEDE Game Engine Architecture
Problem Set 2 – Due Friday March 1st, 2013

Problem 1 – Design and Human Interface Devices (25%)

Human interface devices (HIDs) bring game players into the heat of action; they are therefore an incredibly important piece in the whole game experience. But how do you know whether a certain HID is good for a certain game? In an attempt to understand the connection between game engine design and the wide variety of HIDs available, discuss the following two questions:

a. If you are designing a game engine for a certain genre (you can pick one you like, e.g. RPG, Sports, RTS, etc.), what range of HIDs should you support? Do certain HIDs fit that type of game better than others? Why or why not?
b. If the game world and game play is complex, how can the game engine help developers make use of a very simple HID (think of one of the simplest possible HIDs: one button)? Would this work for every game genre?

Problem 2 – Key Tapping (25%)

Your game designers have decided that a certain function in a game should be started and maintained through key tapping of a frequency no lower than 8 Hz.

a. If your input sub-system receives a second key press 121 ms after the first key press, should you register that as key tapping?
b. How should your sub-system interpret the key press interval sequence: 110 ms, 135 ms, 120 ms, 105 ms, 140 ms, 125 ms?

Problem 3 – Phong Lighting Model (25%)

If we have a point on a model surface at world coordinates (10,5,0) where the surface normal is (0,1,0), and we have a camera at world coordinates (5,8,0) facing that point, where would a point light source have to be, according to the Phong Lighting Model (see 10.1.3.2), for us to see:

a. The maximum diffuse light intensity in the point
b. The maximum specular light intensity in the point
c. The maximum ambient light intensity in the point

Problem 4 – Texture Use (25%)

Name and briefly explain 8 different kinds of information that might make sense to store and look up in a texture, using interpolated texture coordinates, when determining the color of a fragment (the area of a rasterized polygon that corresponds to one pixel on the screen).