

T-637-GEDE Game Engine Architecture

Problem Set 3

Problem 1 – 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 – Ogre Input (25%)

Build a new Ogre application based on Lab 3 and Lab 4 ("Basic Tutorials on un-buffered and buffered input). Your application needs to do the following:

- a. Display a few background objects representing a simple environment
- b. Display a player avatar object
- c. The avatar object can move at a certain speed straight through the environment (this can be a fixed direction, no need to implement turning)
- d. You are able to control the speed by moving the mouse forward (increase speed) or backward (decrease speed)
- e. [BONUS] If you tap in a key sequence (e.g. "down, up, up") the avatar jumps

Problem 3 – Reference Counting (25%)

Imagine that your resource manager is about to display a new level in a game and it needs to determine what resources to unload and what resources to load. To do this it uses reference-counting. The current level is using resources ID3, ID6, ID7, ID9, ID11 and the new level will use resources ID5, ID6, ID7, ID10, ID12. Fill out a resource usage table like Table 6.2 in the textbook to demonstrate how the reference-counting occurs and what gets unloaded and loaded in the process of changing the levels.

Problem 4 – Game Loop and Object Updates (25%)

You are creating a game where a getaway car is driving at 120 km/h in the Northeast direction (north is along the negative z axis and east along the positive x axis in your world). Your game loop is running at 60 FPS. Calculate the $\langle x,y,z \rangle$ vector that you have to add to the current position of the car, each time the object is updated (given that you update it once during each pass of the game loop).