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November 17, 2015

Winter Semester 2015/16

Assignment on Virtual Reality and Physically-Based Simulation - Sheet 3

Due Date 2. 12. 2015

Exercise 1 (Laggy jump'n run, *3 Credits*)

In this exercise we will test the influence of latency, to our performance in computer games. From the CGVR web site (`http://cgvr.cs.uni-bremen.de/teaching/vr_1516/index.shtml`), you can download a simple jump and run game with adjustable input delay. The goal is to complete the course from start to finish, as fast as possible and without falling down.

- Each member of your group should complete the game with at least three different delays.
- Write down the number of starts needed for the first successful run, and the time for the fastest completion. Do this for each delay (note your delay) and for each member of your group.

Exercise 2 (Practical horopter construction, *3 Credits*)

Construct the horopter using real-world building blocks or other cylindrical objects.

Place a subject (e.g., one of your group members) close to a table, such that she/he looks edge-on at the table. Make sure that the background that the subject sees behind the table is as uniform as possible (e.g., white wall). Position one block on the table. Have someone else (the experimenter) place other blocks on the table, *guided by the subject*, such that they all appear to have exactly the same depth as the first block, see to that the subject should always fixate (focus) on the first block while observing other blocks. (This usually requires some iterations, moving the new block back and forth.) The experimenter should try to help the subject such that the experimenter does not influence or bias the subject.

Capture the final setup of the blocks by a photo exactly from the top. Interpolate the block positions by a freeform curve (you can do that very approximately by hand).

Repeat the above experiment with first block at 3 different depths (note that differences in these depths should be at least 20 cm). (for instance at 10 cm, 50 cm and 100 cm)

Exercise 3 (LRU strategy, *3 Credits*)

Please assume the following sequence of colour elements passed to a sorting buffer during rendering of a scene graph: **AACDEFGHABGHCCCAGHIJABABCCCAAG** , where **A** to **J** represent different colours.

Apply the LRU strategy for a buffer size of $k = 1, 2, 3, 4$ and discuss the results with respect to number of colour changes. Which value for k is considered to be the optimal solution?