Prof. Dr. Leif Kobbelt
Kersten Schuster, Philip Trettner

Visual Computing Institute | RWTH AACHEN UNIVERSITY

Real-time Graphics Assignment 1

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Please form groups of 2 or 3 students. You can find group members in the moodle discussion forum. Make sure to state all your matriculation numbers in the respective task in Assignment01.cc. Only one of you should upload the solution to moodle. After that, we will create groups for you.

The **only** files that you should modify and **upload**:

- Assignment01.cc

Exercise 1 Compiling and Hand In [3 Points]

Obtain the (publicly accessible) exercise framework and assignments from
`https://www.graphics.rwth-aachen.de:9000/Teaching/rtg-ws19-assignments/`.
If you do not want to use git, you can also download the code as a zip file from there.
Once the code was cloned (or downloaded), you will find build instructions in the `Readme.md`.

Points are given for code handed in via RWTHmoodle that is compiling and attempts to solve the second exercise.

Exercise 2 Main Loop [1+6 Points]

(a) Complete the `Assignment01::getGroup()` function. This function must return your group, i.e. all names and immatriculation numbers.

(b) Based on the information from `getGroup()`, the assignment chooses a variant of the Main Loop for you to implement. Your task is displayed when running the program. Note that this depends on your immatriculation numbers, so you should definitely form a proper group before starting this subtask. Complete the function `Assignment01::mainLoop()`. For your convenience, an exemplary implementation of the simplest variant (variable timestep) is given. Depending on your group, one of the following versions should be implemented:

- A variable timestep loop (both rendering and update) but with a maximum FPS. If the loop body is too fast, sleep for some time to reduce the CPU burden.
- A loop with fixed timestep updating but variable timestep rendering.
- A fixed timestep loop (both rendering and update) that drops frames if simulation time is too much out of sync. (In reality, one would not put rendering and update together in a fixed timestep. This is only intended as an exercise.)

Exercise 3 (Theory) Main Loop [0 Points]

Note that theoretical questions are not graded and should not be handed in. They are discussed in the exercise class though.

1. What is a fixed timestep main loop?
2. What is a variable timestep main loop?
3. What is a fixed update rate, variable FPS main loop?
4. What is frameskip in a fixed update rate, variable FPS main loop? Why do we need it?
5. What is a main loop with extrapolation? In what situation is it useful?
6. What is a main loop with interpolation?

Exercise 4 (Theory) Event Systems [0 Points]

Note that theoretical questions are not graded and should not be handed in. They are discussed in the exercise class though.

1. Name three types of event systems (and pros/cons)
2. Name three ways to organize message types in an event system
3. Name three ways to store the message type in a message (and pros/cons)