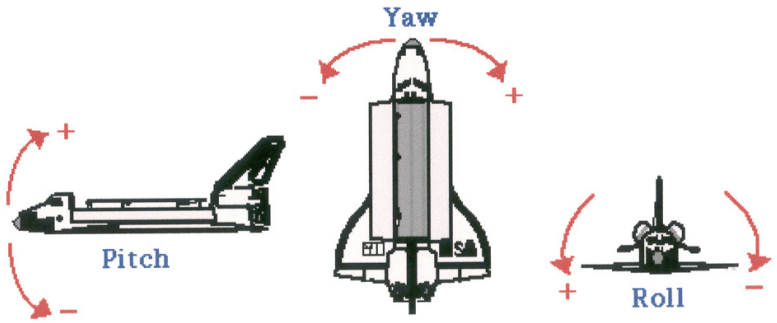
M. Stamminger, C. Weber *Erlangen,* ***Monday, 17.11.2014***

Computer Graphics - Programming Exercises

Assignment 5 [6 Points] (Camera Navigation)

In this assignment, you have to create the possibility to move around the scene using the mouse and the keyboard. The movement should be similar to the navigation of a space ship (with a reverse gear), i.e. you should be able to move forward/backward and to perform the typical flight dynamics Pitch, Yaw and Roll, which are illustrated in the following figure:



Use the following keyboard layout:

- w : move forward
- s : move backward
- a : roll left
- d : roll right

The rotations Yaw and Pitch should be performed using mouse movements in x- and y- direction respectively (while holding a mouse button down).

a) In order to realize these movements in an intuitive way, implement a class `cameraSystem` in the file `camera.h`, which simply holds a position and an orthogonal system of axes as members and which is able to perform the requested transformations on these members. The `glm` library will suit your every need, consult its documentation if you need advice on how to use it.

b) Edit the main program so that the user inputs lead to the requested effect. Use a global instance of the class `cameraSystem`, which represents the camera parameters and initialize it so that the planet system is visible at program start. The View-Matrix should be updated each time the user changes the parameters of the class so that the viewing position and direction complies with these parameters at any time. This can easily be done using the function `glm::lookAt`.

Implementation Guidelines

You already know the OpenGL keyboard event handler to react on keyboard inputs. In order to react on mouse events, there are two handlers, `glutMouseFunc` and `glutMotionFunc`. The function you provide to the first one is called each time the user pushes a button. The second one is called each time the mouse is moved while a button is pressed. Please see the online documentation of these event handlers for information about the parameters of the functions or have a look at the program skeleton in the main file `part5.cpp`, where the function heads are already written.

However, we recommend to use the skeleton only as orientation since it is very minimalistic and only contains a single lit sphere. It is sufficient to implement the functionality demanded in this assignment but we highly recommend to implement the solution based on your code from the previous assignment so that you keep the features you already implemented.

Good Luck!

Your source code will be copied from your handin directory on:
Monday, 24.11.2014 14:00 pm
all subsequent changes cannot be taken into account!