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Exercise Sheet 0

Presentation during exercises in calendar week 19

Exercise 0.1 – First steps in MeshUp

In this exercise, you will explore the visualization tool MeshUp. MeshUp uses skeleton based animation and OpenGL to visualize models and 3D motions.

To start MeshUp, open a terminal window and type in

```
meshup
```

Open the example model file

```
samplemodel.lua
```

and the example animation file

```
sampleanimation.txt.
```

Both files are simple text files and can be edited using a standard text editor such as `gedit`.

Familiarize yourself with MeshUp, especially with the camera controls. What happens if you hold the different mouse buttons while moving the cursor?

Exercise 0.2 – "Hello World"

Copy the files `samplemodel.lua` and `sampleanimation.txt` in a seperate folder and edit the animation file to make the model wave with its right arm.

Hint 1: Press `F5` to load the changes directly in MeshUp.

Hint 2: `View Settings` allows activating the local coordinate systems . The X, Y and Z axis are red, green and blue respectively.

Exercise 0.3 – Animation files

You can load several animations directly from the terminal. Run

```
meshup samplemodel.lua sampleanimation.txt sampleanimation2.txt
```

to open two animation files. Do the two visualizations differ? Inspect the two files. How does an animation file without header work? Inspect your model file and make use of the RBDL lua-utils function. How are joints defined in the lua model?

Exercise 0.4 – Model changes

Edit `samplemodel.lua` in the following ways:

1. Double the size of the head
2. Display spheres in the joints. Use the file `"meshes/unit_sphere_medres.obj"` as `src` attribute. Choose a 0.15 radius and a green (0., 1., 0.) color.
3. Reduce the length of the arms and legs by a factor of 2 (Note: this means you also have to adjust the values of `joint_frame = { r = { ... } }`)

Exercise 0.5 – Create your own model

For a future exercises, we need a visualization of a double pendulum.

First, create a model mounted $1m$ above ground . The two elements should be of $0.4m$ (upper one) and $0.3m$ (lower one). The rotation axis shall be X.

Next, create an animation for this model. The first element should rotate counterclockwise once in two seconds. In the same time, the second element should rotate twice clockwise.

Notes:

- MeshUp can be downloaded from `https://github.com/ORB-HD/MeshUp` Some documentation is available there, as well.
- The skeleton semantics for the model visualization is based on Lua, a scripting language `http://www.lua.org`, which makes the model representation highly flexible.