

Mad Dancer: Lab exercises on BVH files and Forward Kinematics

I am the assistant of the Great Dancer Lady Anklesprainer, the master choreographer. Before it is possible for you to anything that is remotely useful, you will need to be trained to understand BVH files and Forward Kinematics. There are lab resources on Minerva under 'Lab Resources':

1. Readme, simple readme document.
2. Rest.bvh, Walking_1.bvh and Ballet_1.bvh, three BVH files.
3. bvh.zip, the source code to display a BVH file.

What you need to do:

1. Read the BVH file specification: <https://research.cs.wisc.edu/graphics/Courses/cs-838-1999/Jeff/BVH.html> while looking at the BVH files to understand the file structure and the meaning of each entry.
2. Read the source code which has functions implemented to read BVH files and display motions. While displaying the motion, Forward Kinematics is essentially done. Note that although it does not explicitly store the 3D positions of joints out of joint angles, it does compute them via the GL matrix stack when rendering each joint as a sphere. Pay attention to two key functions: `BVH::Load (const char * bvh_file_name)` and `RenderFigure (int frame_no, float scale)`.
3. The code itself cannot run at the moment because it uses some external libraries that are not included. So you will need to make your own GUI to display the motions of the three BVH files. You can use the source code to work with your GUI.
4. Build your own Forward Kinematics solver to compute the joint positions given joint angles.