

CPSC 526: Computer Animation Assignment 2

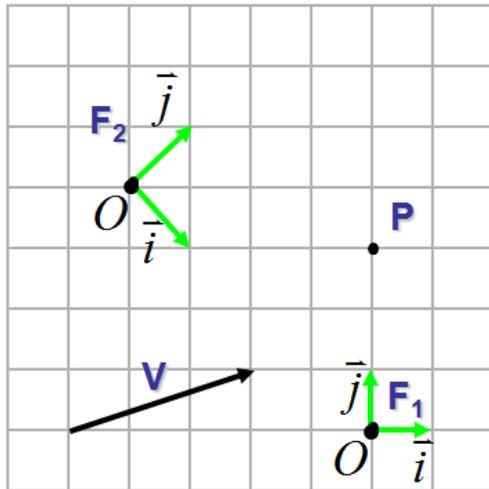
Due in class, January 21, 2014

Name: _____

Student Number: _____

Question 1	/ 6
Question 2	/ 4
Question 3	/ 6
Question 4	/ 4
TOTAL	/ 20

1. Transformation as a Change of Coordinate Frame



$$\begin{bmatrix} x \\ y \\ 1 \end{bmatrix}_1 = \begin{bmatrix} \\ \\ \end{bmatrix} \begin{bmatrix} x \\ y \\ 1 \end{bmatrix}_2$$

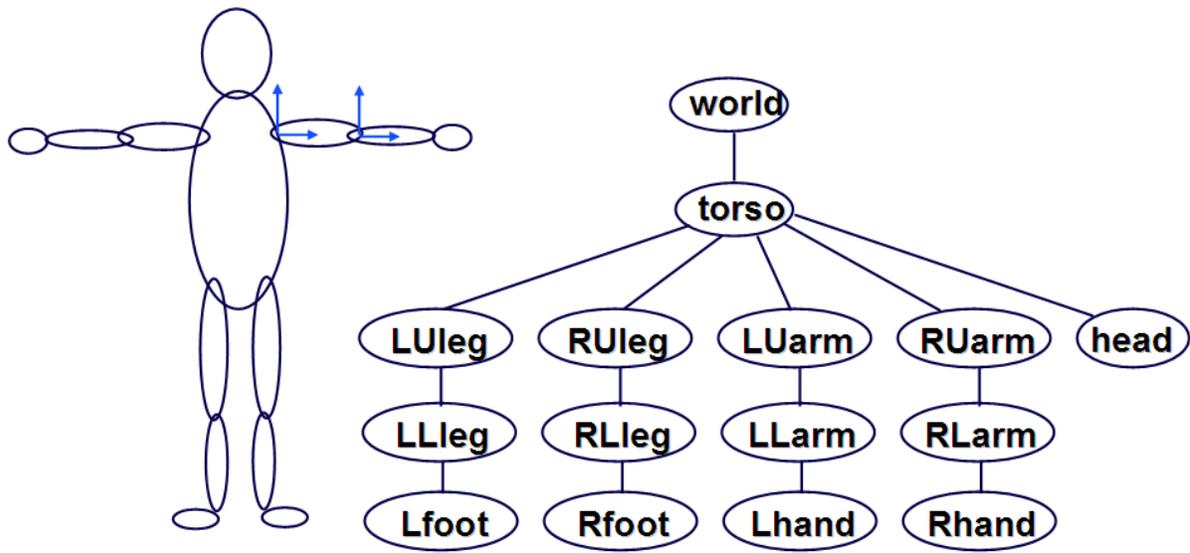
- (a) (4 points) Specify the coordinates of point P and vector V with respect to coordinate frames 1 and 2.
- (b) (2 points) Derive the 3×3 matrix transformation that takes a point expressed with respect to frame 2 and re-expresses it in terms of frame 1. Test your result on the point P .

2. (4 points) Hierarchical Scene Diagrams

Label the following scene graph with transformation matrices.

(a) Using your labels, give the compound transformation matrix that is necessary to take a point expressed in the right foot coordinate system (Rfoot) to the world coordinate system.

(b) Give the compound transformation matrix to express a point given in the right foot coordinate system (Rfoot) in terms of the left hand coordinate system (Lhand).



3. (6 points) Read the paper *Animation from observation: Motion capture and motion editing* by Michael Gleicher. You can find this using Google Scholar.

Describe why motion capture data usually needs to be edited.

Look at the website for The Capturey: (<http://www.thecapturey.com/>). Describe why or why not you think this might change how and when motion capture is used to create animation.

4. (4 points) Indicate the degrees of freedom that you might use to model the following human by identifying the major joints and annotating them with the axes, i.e., x, y, z , that they can rotate about. Sketch your own coordinate frame to give yourself a set of axes. How many total degrees of freedom does your character have, including global location and orientation? Note: there is no single correct answer.

