EECS 367 Lab:
KinEval pose parameters and HTML5 audio
Lab Takeaways

1) **KinEval Overview**

2) **KinEval Walkthrough**

How to start assignment 4
Forward Kinematics Overview

<table>
<thead>
<tr>
<th>Assignment 4: Dance Controller</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
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<tr>
<td>2</td>
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Features assigned to all sections:
- Quaternion joint rotation
- Interactive base control
- Pose setpoint controller
- Dance FSM

Features assigned to graduate sections:
- Joint limits
- Prismatic joints
- Fetch rosbridge interface
KinEval Overview

All code for assignment 4
kineval_forward_kinematics.js

For each joint, incorporate joint.axis and joint.angle within forward kinematics. (you'll then be able to control joints)
With these functions you’ll be able to create a joint’s rotation matrix about any axis-angle pair.

Define quaternion helper functions.

Joint Frame without control

Joint Frame with control

Rest of Forward Kinematics
kineval_control.js

Control applied to joint.angle(s) and robot.origin pose for you

Grad sections have stencil to enforce joint limits
Implement a Finite State Machine for setpoint dance routine

Thought Experiment
1) Why are we only asking for a P controller?
2) What would control look like with a PID controller?
3) What about a PD controller?

Implement P controller for joint control w.r.t. setpoints
Create a cool dance routine by defining a sequence of joint angle setpoints to be used by the FSM implementation.

Interactive controls:
poses for servo can be set interactively in KinEval using [0-9] keys and Shift+[0-9]

JSON.stringify(kineval.setpoints) will output the currently available servo setpoints to the console as a string
HTML5 Audio

- With two small additions to the stencil code, you can add music for your dance routine!
- The audio element offered by HTML5
  - With this, we can load a song in `home.html`
  - Then our FSM can play/pause the song along with the dance

```html
home.html

```function my_init() {
  // STENCIL: my_initate is where your robot’s controls and movement are updated over time
  function my_init() {
    // Adding music for the dance FSM
    // The song I have chosen is ‘Wave’ by Antonio Carlos Jobim
    // My dance waves, but does not necessarily coincide with the beat of the song
    song = document.createElement("audio");
    song.src = "music/Wave.mp3"
    startingPlaceholderInit(); // a quick and dirty JavaScript tutorial
  }  
``` kineval_servo_control.js

```html
kineval_servo_control.js

```function execute_setpoints() {
  // STENCIL: implement FSM to cycle through dance pose setpoints
  if (kineval.params.update_pd_dance) {
    song.pause();
    return;
  }  
```