EJS Session III – Pendulum

Goals for the session:

1. Address your questions about the simulation project
2. Look at how to use EJS to create an animated GIF of a simulation
3. Create an EJS simulation of a pendulum
4. Spend some time working on your own simulation project

1. Your questions (30 minutes)

These can be questions about the rubric, questions about the physics of your simulation, questions about how to do something in EJS, or anything else.

2. Creating an animated GIF (15 minutes)

An "animated GIF" is basically a movie that can be viewed with a web browser or embedded in a Powerpoint presentation, among other things.

- To create such a movie, start by running a simulation of your choice in EJS. When the simulation is running, right-click on the simulation window and select "Capture Video"

- If you want the video to loop continuously, which is good for repeated motion, check the "Loop" box

- You can Pause the simulation at the point where you want the movie to start, and then check the "Capture" box in the Animated GIF window. Then hit Play on the simulation, and the movie will start recording as the simulation plays. You can stop the movie recording by either un-checking the "Capture" box, or hitting Pause on the simulation. Note that you can keep adding frames to your movie by checking and un-checking the "Capture" box as often as you like while the simulation plays.

- When you have collected all the frames you want for your movie, use the "Save As …" feature to save the movie as a .gif file

- Open the file in a web browser, or embed it in a Powerpoint presentation, to see the movie.

3. A simulation of a pendulum (60 minutes)

Level 1 goals (everyone should achieve these):

- Define a list of relevant variables
- Put in the relevant equations and/or constraints
- Create a View that shows a ball on a string oscillating back and forth

Level 2 goals (most of you should achieve these)

- Add features so that the User can interact with the simulation to change parameters (such as the mass of the ball, or the value of g)
- Add graphs to show angular position, angular velocity, and angular acceleration
- (add your own)

Level 3 goals (probably only a few of you will achieve these tonight):

- Add variables to do potential energy and kinetic energy
- Show bar graphs to represent the potential and kinetic energy as the ball oscillates
- (add your own)

4. Spend time working on your own simulation project (45 minutes)

The key to the project is planning. Make note of which achievements in the rubric you want to do first, which you might get to later, and which either don't match your simulation or you probably don't have time to do.

I would suggest creating a modest working simulation first, saving it early and often, and then adding additional features. Every time you start the process of adding a new feature, save the simulation and then change its name, using "save As…" so that in the end you have a sequence of working simulations that show how your simulation evolved.