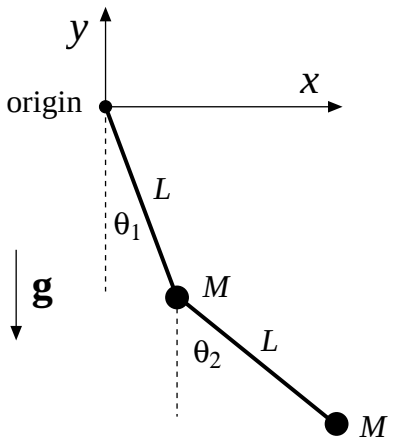
In class you worked on a Lagrange problem I supplied. Using either that problem or the following, complete the below questions.

Consider the equal-mass (M), equal-length (L), double pendulum. The pendulum consists of two pendulums with the second pendulum attached to the first. The connecting strings are massless.



1. Use geometry to calculate the positions of the two masses: $\mathbf{r}_1$ & $\mathbf{r}_2$ in terms of the generalized coordinates (for this problem θ_1 & θ_2)

2. Calculate the velocities: $\mathbf{v}_1$ and $\mathbf{v}_2$. Use the results to calculate the total kinetic energy in terms of your generalized coordinates. (Note: for this problem, the trig identity: $\cos\theta_1\cos\theta_2 + \sin\theta_1\sin\theta_2 = \cos(\theta_2 - \theta_1)$ can make the results look a bit simpler.)

3. Report the Lagrangian of the system.

4. Find the differential equation of motion for your coordinates. Often this starts to be a mess fast, so just calculate the derivatives required by Euler-Lagrange and do not attempt to solve or simplify.