Write a C++ program that simulates the motion of a double spring system.

As input, the program should take
- The initial position of the mass
- The initial velocity of the mass
- The spring constant of the two springs (assumed to be identical)
- The mass
- The natural length of the two springs (assumed to be identical)
- The time that the simulation should run
- The step size used in the simulation

As output, the program should return
- A graphical representation of the motion of the system
- The final positions and velocities of the mass

The program should be written using good object oriented programming techniques.

You are then to write up a technical report that answers the following questions:
1. If \( x_0=0.524, y_0=0.546, u_0=-0.036, v_0=-0.841, m=1.0, L=0.5, \) and \( K=50.0, \) what is the position of the mass at \( T=5.0? \) How accurate is your answer?
2. Are there initial conditions for which the solution remains above the x-axis for all time?
3. Does the system display sensitive dependence on initial conditions? If so, does this always happen, or is it true only for some data?
4. Consider
   \[
   E = \frac{1}{2}m(x^2 + y^2) - \frac{1}{2}k\left[\sqrt{(x+1)^2 + y^2 - L} + \sqrt{(x-1)^2 + y^2 - L}\right].
   \]
   Show that this quantity is conserved. What is its significance?

When answering these questions, you must address the question of how the choice of step size affects the result.

Your grade for the project will be based on the following criteria:
- The quality of your program
- The quality of your results
- The quality of your written report