PSEUDOCODE FOR ASSIGNMENT 2
NICO O'NEILL
SADMAN SOBHAN RAABITH
SUBMISSION DATE: 9/4/2025

1. Set the initial parameters, such as the initial position and initial velocity, as well as constants like gravity and mass
    - Gets the velocity values
    - The x force is only facing drag force which is opposite to motion; make sure it alternates with the direction of motion {speed*velocity*c}
    - Y force has gravity and drag in opposing directions. Same consideration for direction for drag force.
    - Do you need position values? Possibly can change calculations when the wind density changes with position.
2. Creating the force vectors, which takes the initial velocity and calculates the force(knowing that both gravity and wind resistance act on the cow)

    Use euler approximation to update position and velocity by multiplying initial velocity with time step and acceleration with time step respectively.

3. Update the positions(and velocity) based on the forces acting on the cow
4. Calculate the energies and sum them
5. Run the previous code over and over until the height reaches 0, while storing each data point to graph later
6. Solve the analytic solution, assuming no air resistance
7. Graph the trajectory at different time steps as well as the analytic solution
8. Graphing the energies to see if it is conserved or not

7. Answer to questions:

i. Since we have drag force, we do not have conservation of mechanical energy.
ii. Our simulation's accuracy depends on the time step. The smaller the time step, the more accurate the simulation is and the better and smoother the plot is.
iii. If the air resistance is set zero, the mechanical energy would be conserved and it would be parabolic motion.