HW 4a: Leapfrog Algorithm

1. Copy and rewrite the SHO program to use the leapfrog algorithm.
2. Compute the global truncation error as the difference in the final position evaluated using the Euler-Cromer method and the theoretical solution.
3. Evaluate the error E for step sizes of h=1, 0.1, 0.001 etc keeping the final time the same.
4. Create a log-log plot of E vs. h. A line reveals a Linear relationship between E and h (fill and in the blank and explain) where the slope is the exponent.
5. Repeat for the leapfrog algorithm.
6. Have you successfully verified that Euler-Cromer converges as O(h) and leapfrog converges as O(h2)?
   1. I verified that the Euler Cromer Method and the Leapfrog Algorithm both converge as approcimately O(h) I have no clue why my leapfrog algorithm is acting almost just like the Euler Cromer. Instead I have discovered the “Triangle Effect.”