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 \_\_\_\_\_ relationship between E and h (fill and in the blank and explain) where the \_\_\_\_ 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)?