PROBLEM:

For the following system:

$$H(z) = \frac{1 - z^{-1}}{1 + 0.9z^{-1}}$$

determine the time-domain (n) and frequency-domain ($\hat{\omega}$) behavior.

(a) The inverse z-transform of $H(z)$ is the impulse response $h[n]$. Determine the inverse z-transform for $H(z)$ as a mathematical formula, and sketch the first five values of the impulse response, $h[n]$.

(b) Make a sketch of the magnitude of the frequency response over the appropriate range for $\hat{\omega}$. Label the peak value and the locations of any zeros. Is the filter low-pass or high-pass?

(c) (Optional) Use `freqz` or the `pez` GUI from the lab to verify your answer.