

# Assignment 2

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**Question:** Consider the signal  $h[n] = \left(\frac{1}{2}\right)^{n-1} (u[n+3] - u[n-10])$ .  
Given that

$$h[n-k] = \begin{cases} \left(\frac{1}{2}\right)^{n-k-1} & A \leq k \leq B \\ 0 & \text{otherwise} \end{cases} \quad (0.1)$$

Find A and B.

**Solution:**

$$h[n] = \left(\frac{1}{2}\right)^{n-1} (u[n+3] - u[n-10]) \quad (0.2)$$

$$\Rightarrow h[n-k] = \left(\frac{1}{2}\right)^{n-k-1} (u[n-k+3] - u[n-k-10]) \quad (0.3)$$

$$u[n-k+3] = 1 \quad (0.4)$$

$$\Rightarrow n+3 \geq k \quad (0.5)$$

$$u[n-k-10] = 0 \quad (0.6)$$

$$\Rightarrow n-10 < k \quad (0.7)$$

$$\Rightarrow n-9 \leq k \quad (0.8)$$

$$h[n-k] = \begin{cases} \left(\frac{1}{2}\right)^{n-k-1} & n-9 \leq k \leq n+3 \\ 0 & \text{otherwise} \end{cases} \quad (0.9)$$

Hence  $A = n - 9$  and  $B = n + 3$ .

wget <https://github.com/Abhipank/Digital-Signal-Processing/blob/main/CODES/ASSIGN2.py>

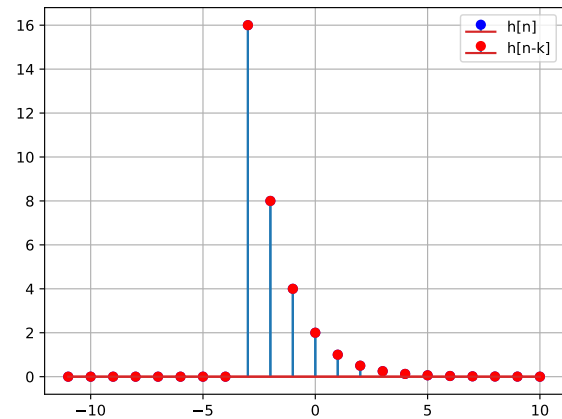


Fig. 0