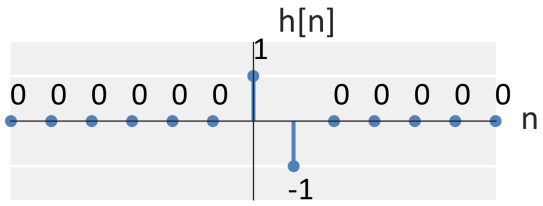
Full Name: _____

EEE 5502 (Fall 2022) – Practice **Impulse Responses and Difference Equations, 2022**

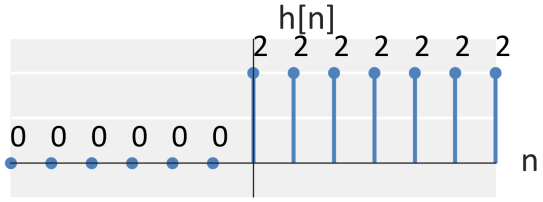
Question #1: For each impulse response corresponding to an LTI system below, determine if the system is causal (or anti-causal or acausal), memoryless, and BIBO stable.

(a) $h[n] = \delta[n] - \delta[n-1]$



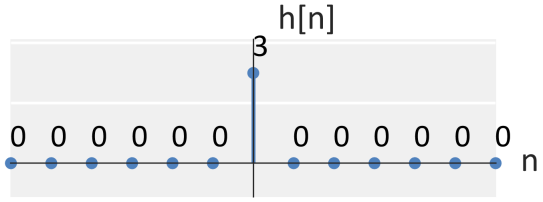
Solution: Causal, not memoryless, BIBO stable

(b) $h[n] = 2u[n]$



Solution: Causal, not memoryless, not BIBO stable

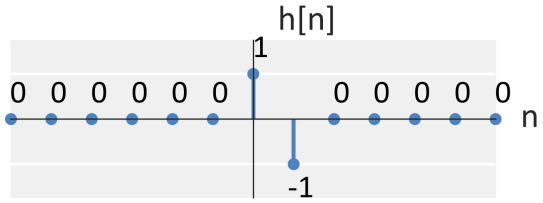
(c) $h[n] = 3\delta[n]$



Solution: Causal, memoryless, BIBO stable

Question #2: For each impulse response corresponding to an LTI system below, determine the corresponding difference equation.

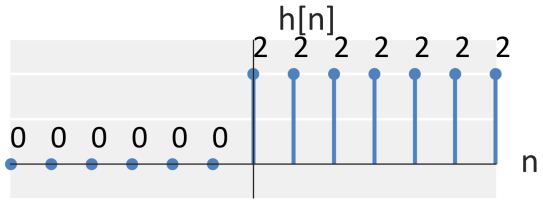
(a) $h[n] = \delta[n] - \delta[n-1]$



Solution:

$$y[n] = x[n] - x[n-1]$$

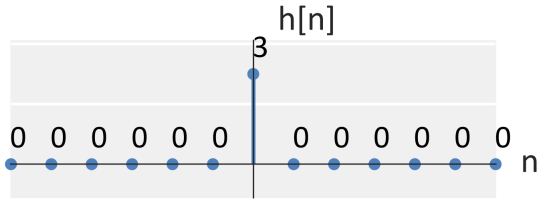
(b) $h[n] = 2u[n]$



Solution:

$$y[n] = 2\sum_{m=0}^{\infty} x[n-m]$$

(c) $h[n] = 3\delta[n]$



Solution:

$$y[n] = 3x[n]$$