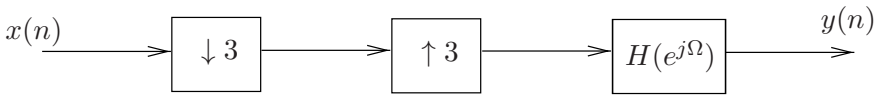
## Problem 15 (Multirate Digital Signal Processing)

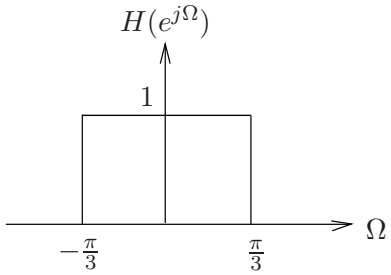
Consider the system shown in the figure. For each of the following input signals $x(n)$, indicate whether the output $y(n) = x(n)$.

(a) $x(n) = cos(\pi n/4)$

(b) $x(n) = cos(\pi n/2)$

(c) $x(n) = (\frac{sin(\pi n/8)}{\pi n})^2$




## Problem 16 (Multirate Digital Signal Processing)

Consider the systems shown in the figure. Suppose that $H_1(e^{j\Omega})$ is fixed and known. Find $H_2(e^{j\Omega})$, the frequency response of an LTI system, such that $y_2(n) = y_1(n)$, if the inputs to the systems are the same.