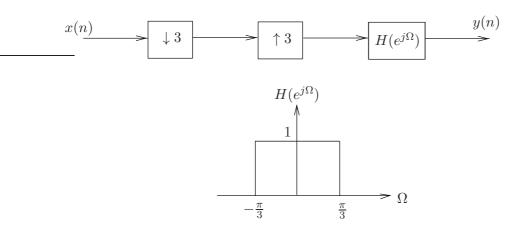




<u>Problem 15</u> (Multirate Digital Signal Processing)

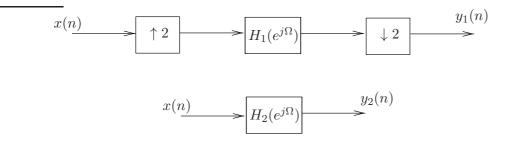
Consider the system shown in the figure. For each of the following input signals x(n), indicate whether the output y(n) = x(n).

- (a) $x(n) = cos(\pi n/4)$
- (b) $x(n) = cos(\pi n/2)$
- (c) $x(n) = (\frac{\sin(\pi n/8)}{\pi n})^2$



<u>Problem 16</u> (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.



Digital Signal Processing and System Theory, Prof. Dr.-Ing. Gerhard Schmidt, www.dss-kiel.de Advanced Digital Signal Processing, Exercises WS 2022/2023