

Lecture 9 Sample Processing methods:

①

$$X(n) \rightarrow \boxed{H} \rightarrow y(n)$$

H denotes a linear, time-invariant system

$$X(n) \rightarrow \boxed{D} \rightarrow x(n-D)$$

a delay

$$x(n) \rightarrow \boxed{z^{-1}} \rightarrow x(n-1)$$

single sample delay

Basic DSP building blocks are:

$$x_1 \rightarrow \textcircled{+} \xrightarrow{x_2} x_1(n) + x_2(n) \quad \text{adder}$$

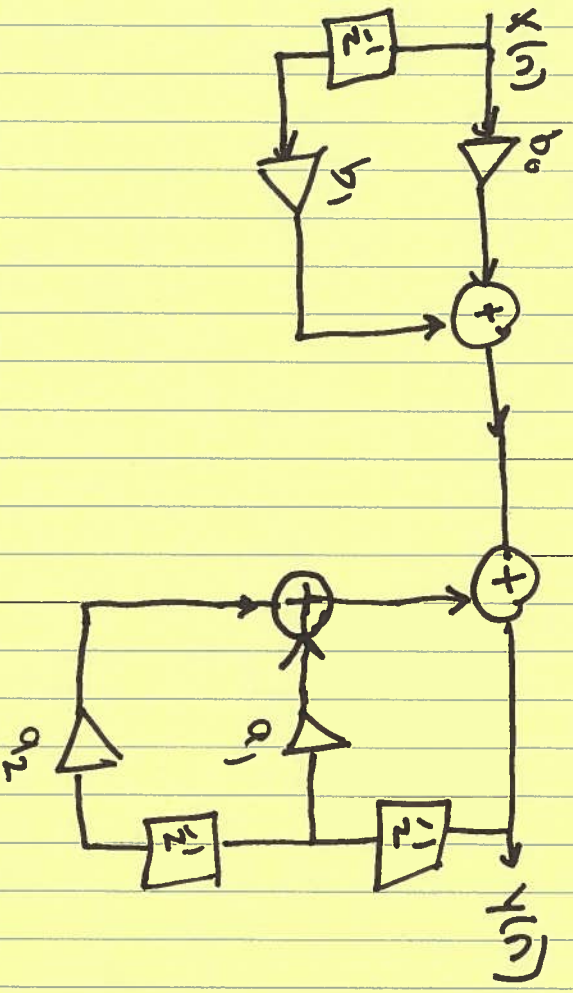
$$x_1(n) \rightarrow \triangle^a \rightarrow ax(n) \quad \text{gain amplifier}$$

$$x_1(n) \rightarrow \boxed{z^{-1}} \rightarrow y(n) = x_1(n-1) \quad \text{delay}$$

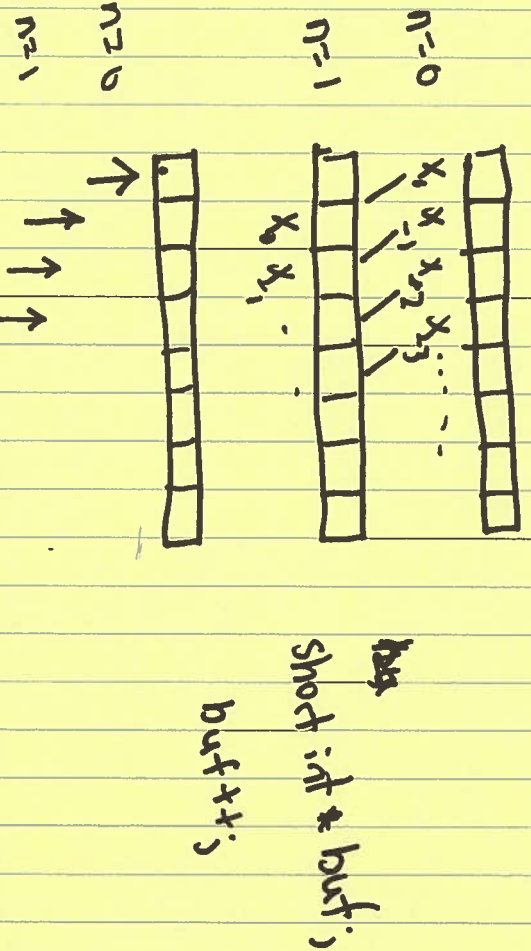
②

$$y[n] = a_1 y[n-1] + a_2 y[n-2] + b_0 x[n] + b_1 x[n-1]$$

Direct Form Realization:



Circular Buffer:



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