

## Task 9.12 (first part)

$$H(z) = \frac{1}{z-1}$$

$$\frac{Y(z)}{X(z)} = \frac{1}{z-1}$$

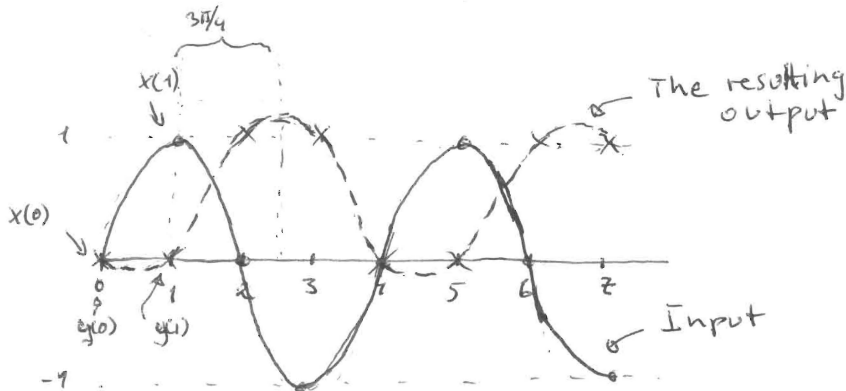
$$(z-1)Y(z) = X(z)$$

$$zY(z) = X(z) + Y(z)$$

⇓

$$y(n+1) = x(n) + y(n)$$

Input is a sinusoidal waveform of peak height 1 at  $f_s/4$



The initial output state is zero ( $y(0) = 0$ )

$$y(1) = x(0) + y(0) = 0 + 0 = 0$$

$$y(2) = x(1) + y(1) = 1 + 0 = 1$$

$$y(3) = 0 + 1 = 1$$

$$y(4) = 1 + 1 = 0$$

$$y(5) = 0 + 0 = 0$$

$$y(6) = 1 + 0 = 1$$

$$y(7) = 0 + 1 = 1 \dots$$

The phase is  
 $\div 3\pi/4$  ( $\div 135^\circ$ )

which is consistent with  
our frequency domain analysis.

~~...~~ (from 02.19.)