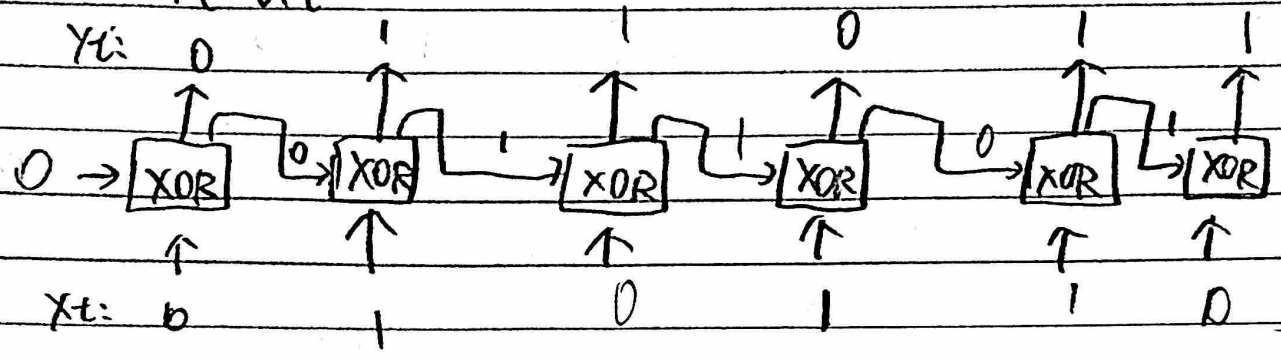
1. Design a sequence parity function with vanilla RNN. we can use XOR
input $x = [0,1,0,1,1,0]$ and output is $y = [0,1,1,0,1,1]$
the hidden units can be written as:

$h_0 = 0$

$h_t = h_{t-1}$ XOR X_t

$Y_t = h_t$



XOR can be represented as $XOR(a,b) = \bar{a} \cdot b + a \cdot \bar{b}$

XOR(0,0) = 0

XOR(1,0) = 1

XOR(0,1) = 1

XOR(1,1) = 0

In our RNN, we have

Y_{t-1}	x_t	Y_t
0	0	0
0	1	1
1	1	0
1	0	1