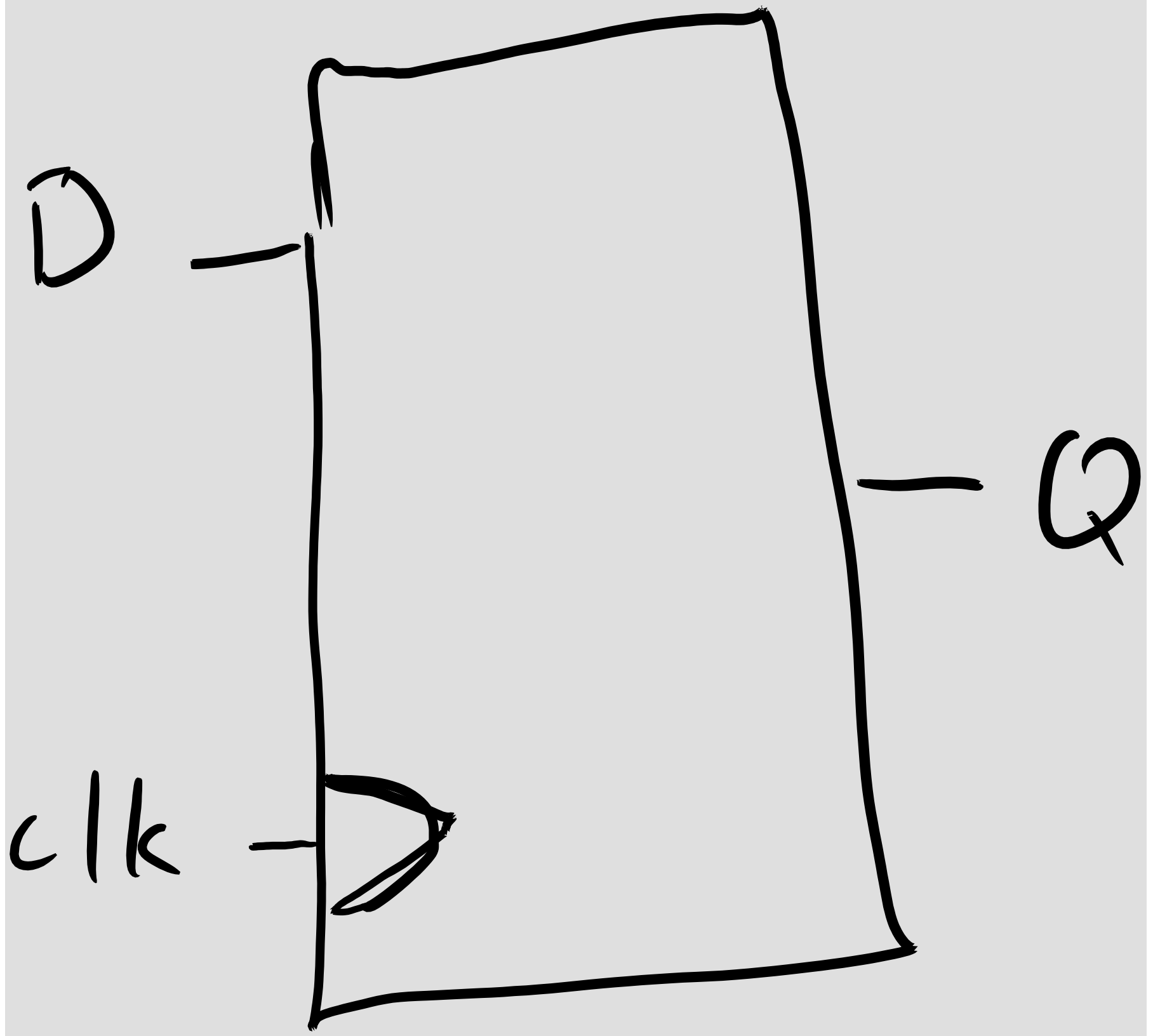


byte - Octect - 8 bits

nibble  
nibble } 4 bits





X	Y
0	1
1	1
1	2
2	3
3	5

Time

0

1

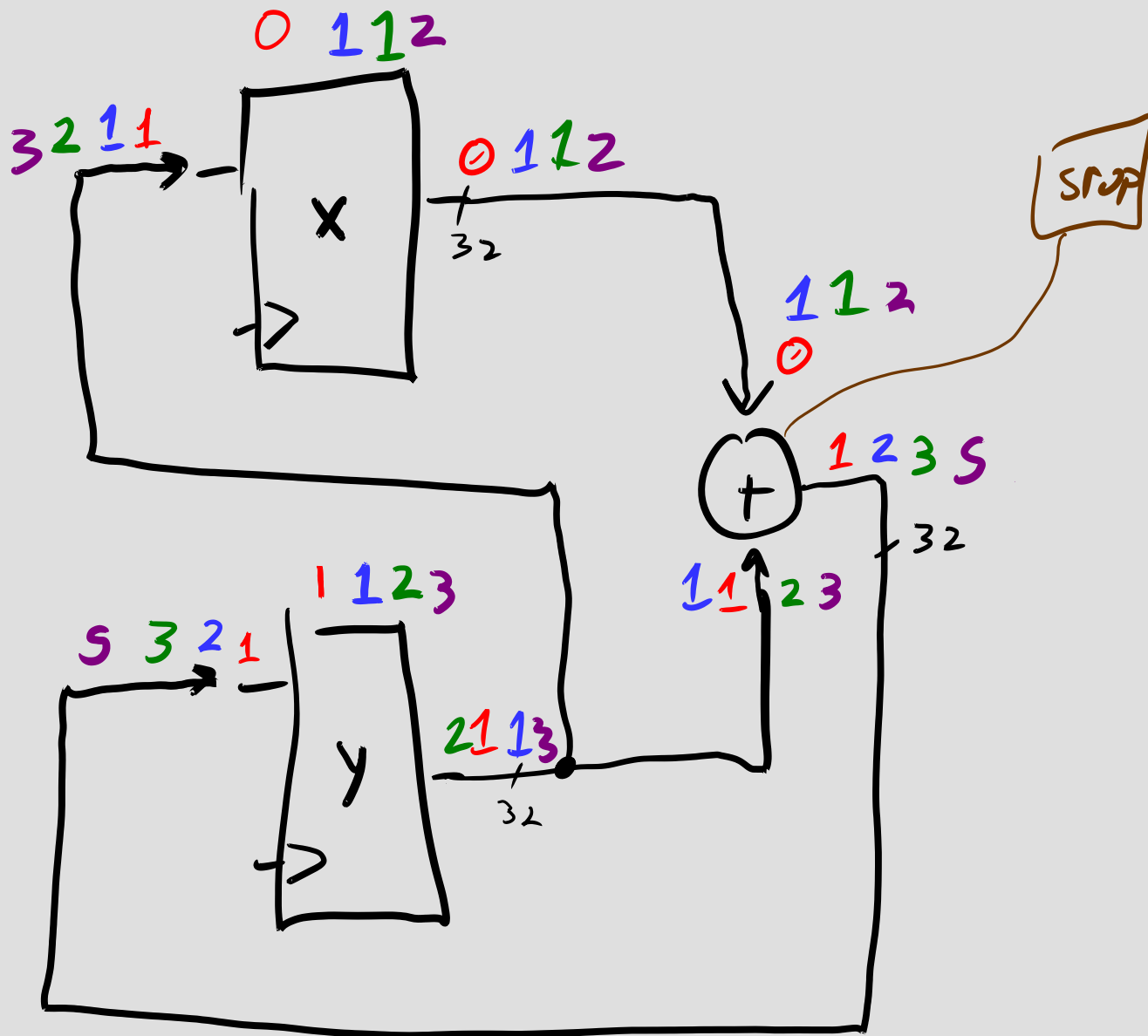
2

3

4

5

6

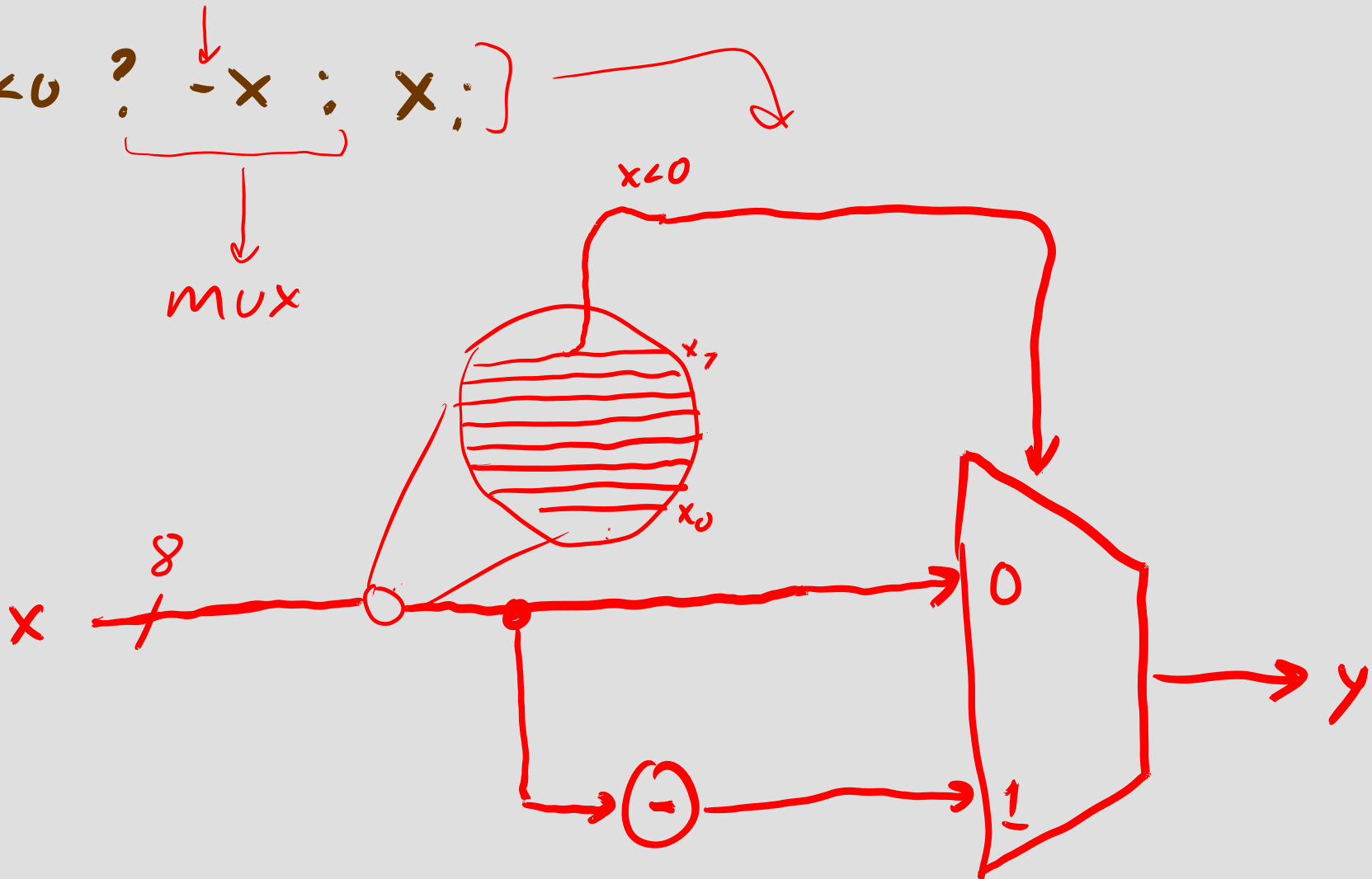


abs(x)

Flip & add 1

$y = x < 0 ? -x : x ;$

return y



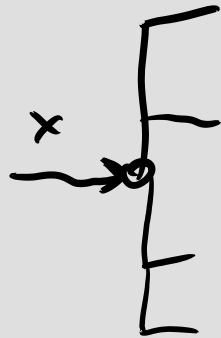
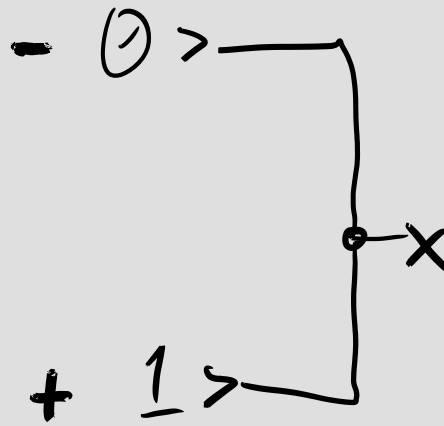
# Hardware Description Languages

Variable  $\cong$  wire

$\rightarrow$  set only once

$\rightarrow$  use often

NO control constructs



$X * y$

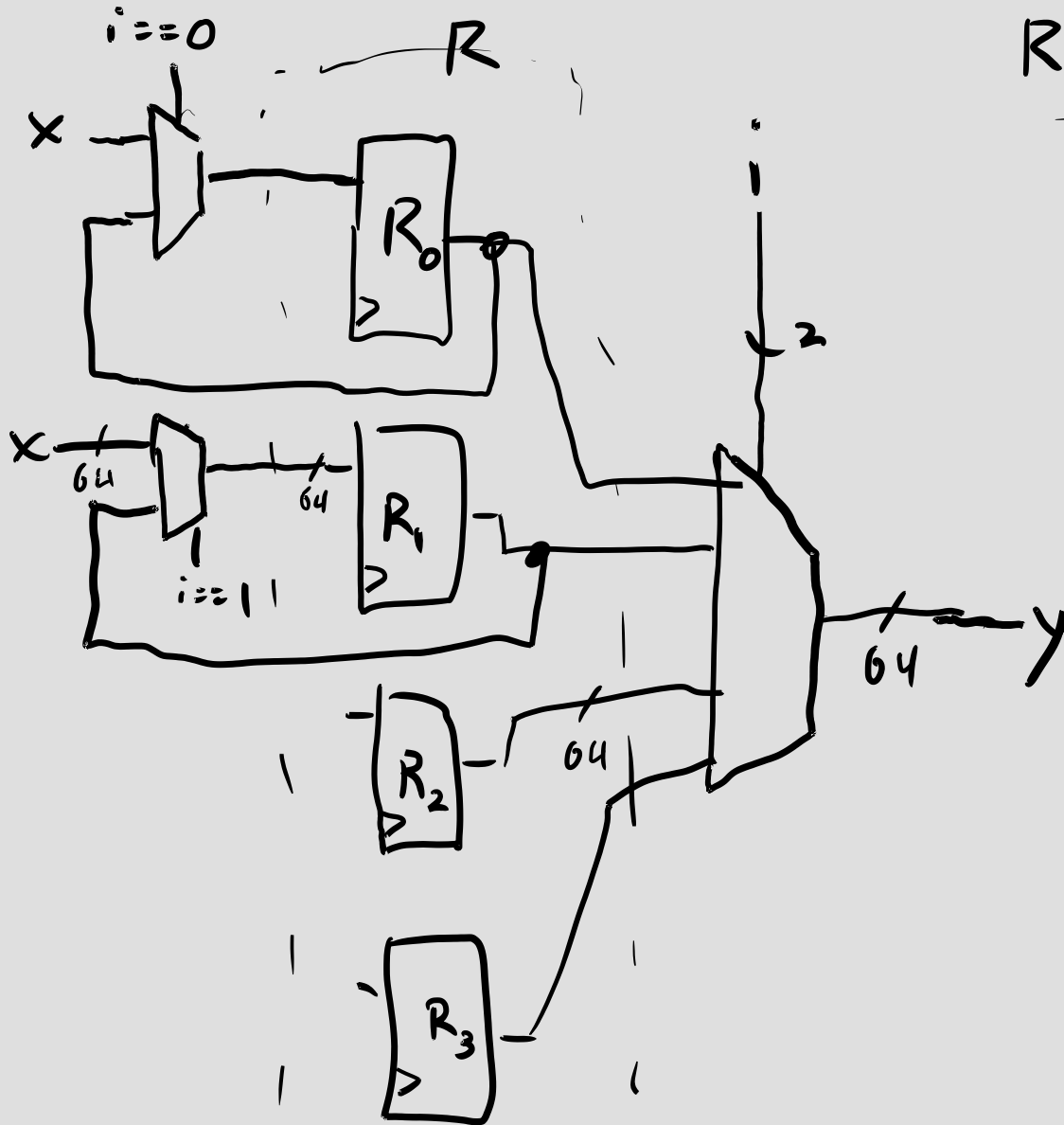
$(x_0 \& y_0) +$

$(x_{i-1} \& y_{i-1}) +$

$\vdots$

$(x_{63} \& y_{63})$

# Register Banks

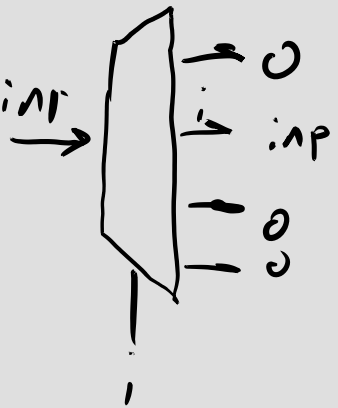


$$\underline{R[i]} = \underline{X}$$

$$Y = R[i]$$

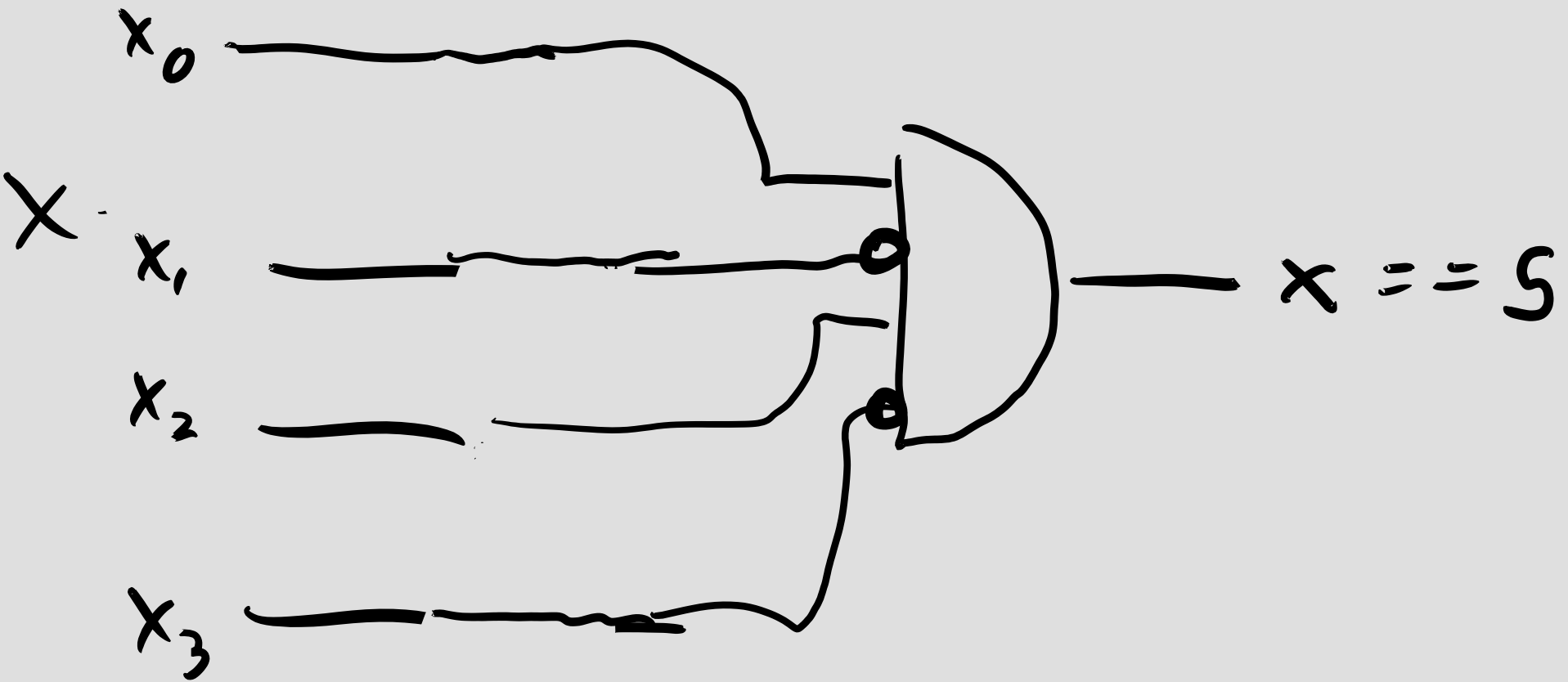
$X \rightarrow$

decoder



4-bit  $X = 5$

0101



# Types of memory/storage

\$\$\$  
↓  
\$

SRAM

DRAM

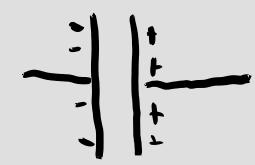
Flash

Magnetic disk

→ similar to register  
*cache*

clocked  
6 trans<sup>†</sup> each  
Power - *volatile*

→ capacitor  
+ 1 transistor



*volatile*



*non-volatile*



