

CS315-02 Instruction ROM and Decoding

Instruction Memory (ROM)

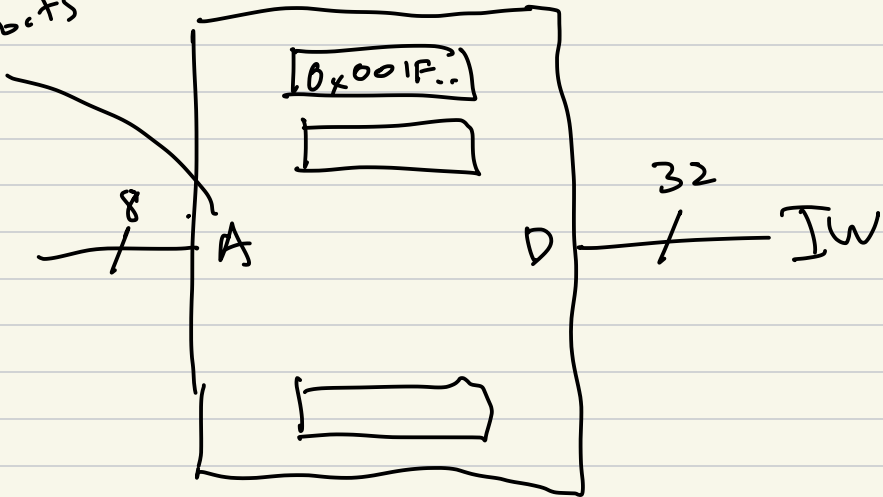
Decoding

Priority Decoder

Instruction Decoder

ROM Read Only Memory

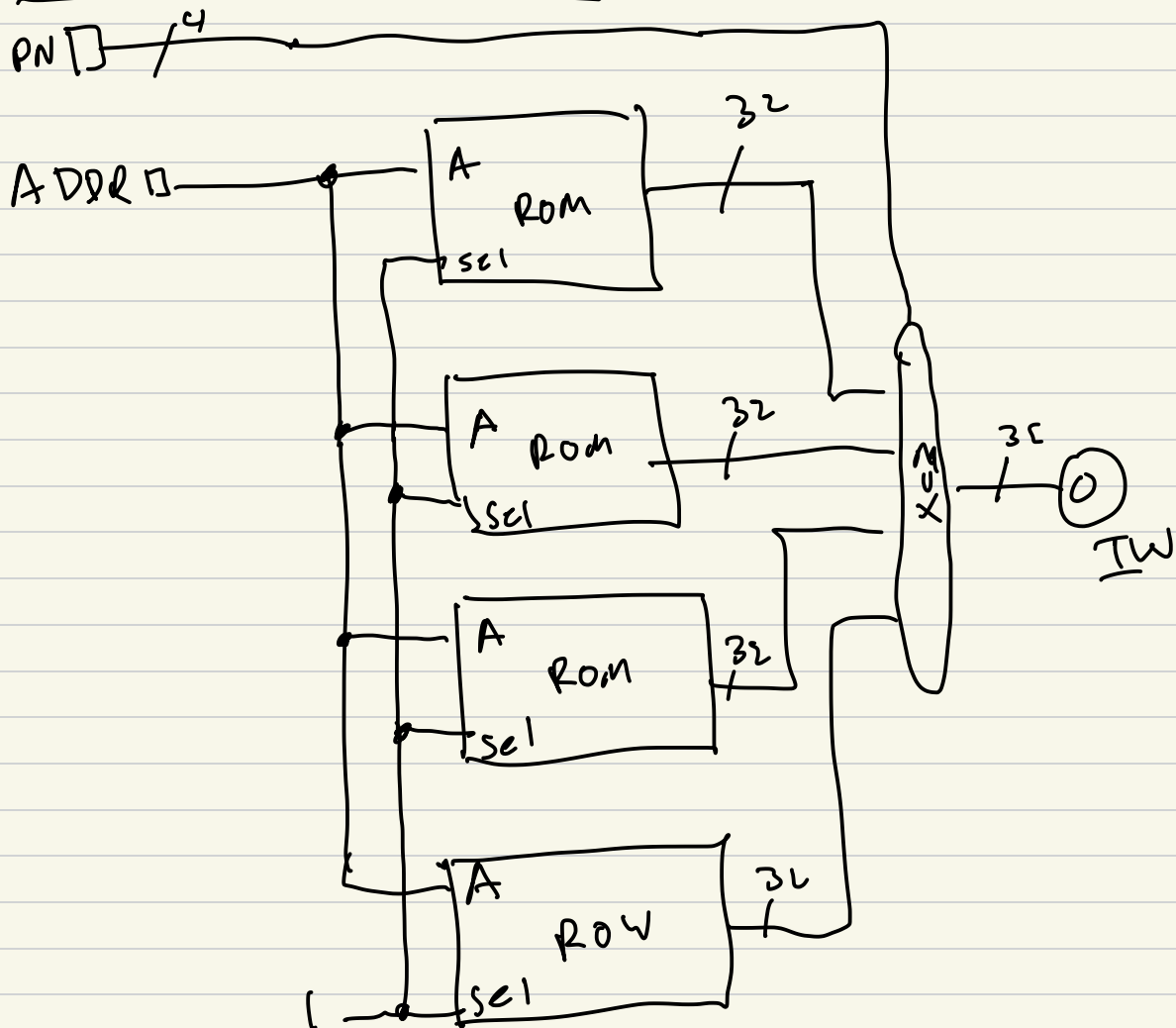
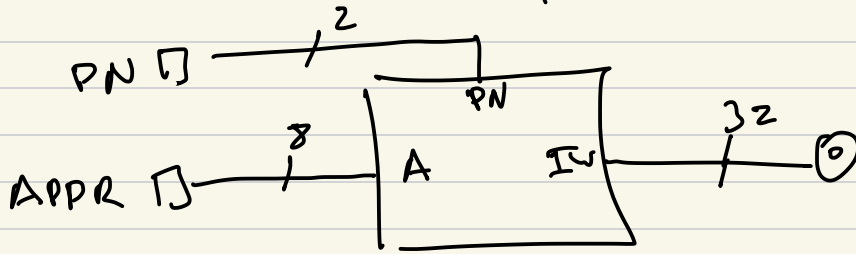
address
bits



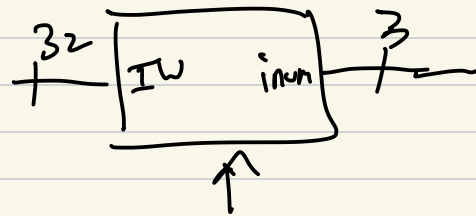
$$2^8 = 256$$

Instruction Memory

PN = Program Num



Instruction Decoder (analyze_decode)



① i-type

4 b-type

1 r-type

5 jal

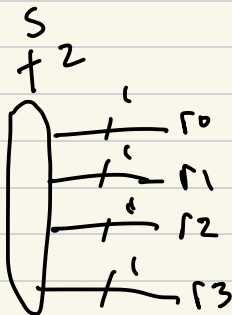
2 load

6 j

3 s-type

7 jalr

Decoder

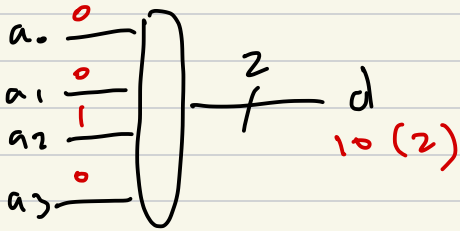


S	S0	r3	r2	r1	r0
0	0	0	0	0	1
0	1	0	0	1	0
1	0	0	1	0	0
1	1	1	0	0	0

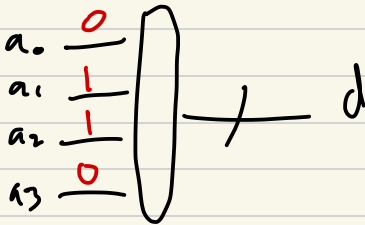
$$r_0 = (\bar{S}_1 \cdot \bar{S}_0) \quad r_2 = (S_1 \cdot \bar{S}_0)$$

$$r_1 = (\bar{S}_1 \cdot S_0) \quad r_3 = (S_1 \cdot S_0)$$

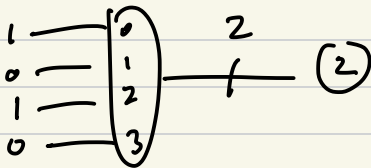
Encoder



a_3	a_2	a_1	a_0	$d_1 d_0$	
0	0	0	1	00	0
0	0	1	0	01	1
0	1	0	0	10	2
1	0	0	0	11	3



Priority Encoder



analyze-decode

$IW \xrightarrow{32} \boxed{} \xrightarrow{3} \text{imm}$
 priority encode

