

CS 315-02 ROMs Decoders Encoders

Today

ROMs

Instruction Memory

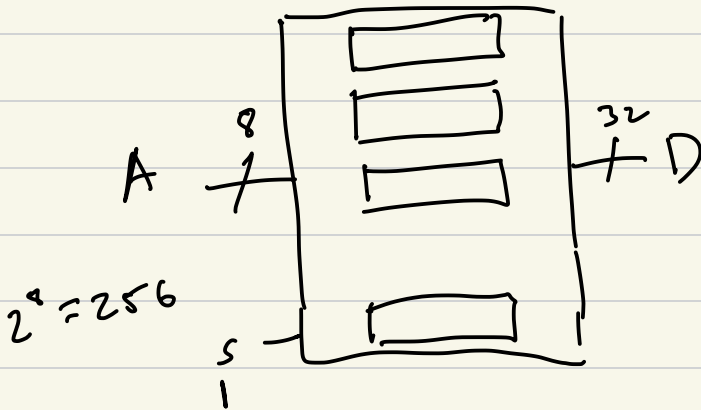
Decoders

Encoders

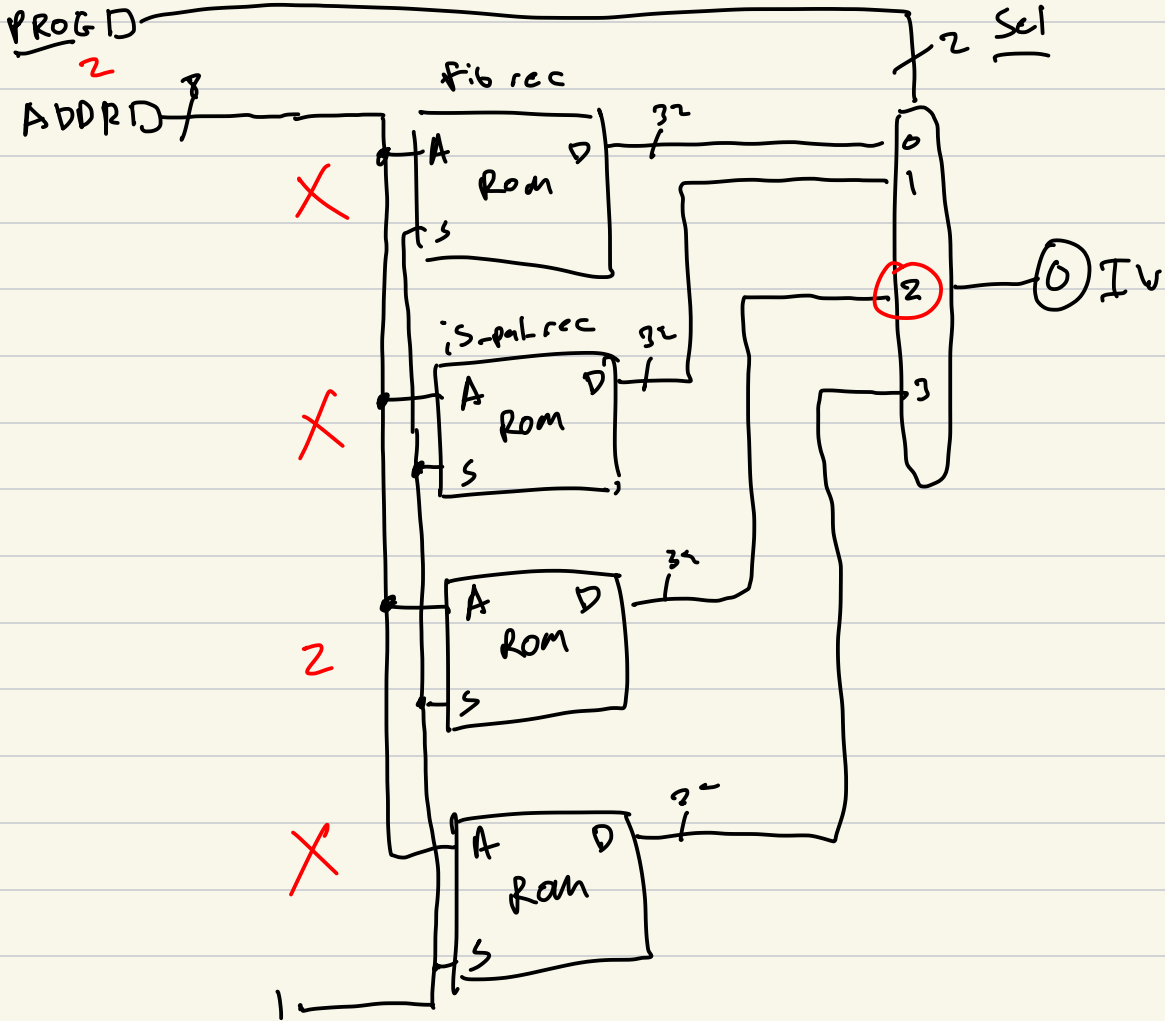
Instruction decoding

RAM
Random access
memory

ROM Read Only Memory



Instruction Memory

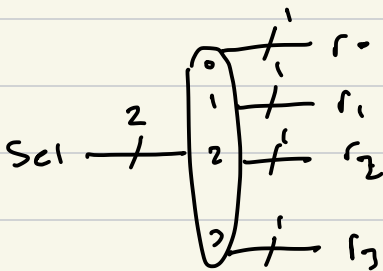


Decoder

2 to 4 decoder

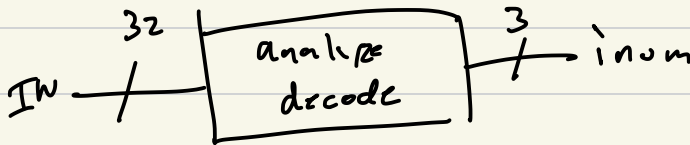
2 to 8

4 to 16



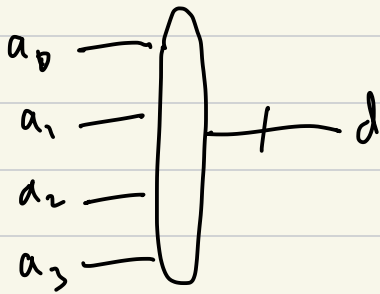
| S_1 | S_0 | r_3 | r_2 | r_1 | r_0 | |
|-------|-------|-------|-------|-------|-------|-------------------------------------|
| 0 | 0 | 0 | 0 | 0 | 1 | $r_0 = (\bar{S}_1 \cdot \bar{S}_0)$ |
| 0 | 1 | 0 | 0 | 1 | 0 | $r_1 = (\bar{S}_1 \cdot S_0)$ |
| 1 | 0 | 0 | 1 | 0 | 0 | $r_2 = (S_1 \cdot \bar{S}_0)$ |
| 1 | 1 | 1 | 0 | 0 | 0 | $r_3 = (S_1 \cdot S_0)$ |

Instruction Decoder



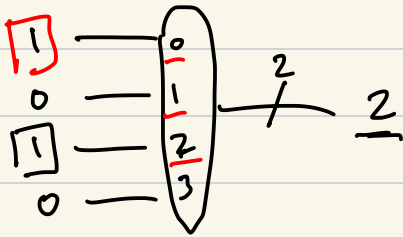
- | | | | |
|---|-------|---|-------|
| 0 | itype | 4 | btype |
| 1 | rtype | 5 | jal |
| 2 | load | 6 | i |
| 3 | stype | 7 | jalr |

Encoder



| a_3 | a_2 | a_1 | a_0 | $d_1 d_0$ |
|-------|-------|-------|-------|-----------|
| 0 | 0 | 0 | 1 | 00 |
| 0 | 0 | 1 | 0 | 01 |
| 0 | 1 | 0 | 0 | 10 |
| 1 | 0 | 0 | 0 | 11 |

Priority Encoder



analyze decode

