

Decoders

Digital Electronics

Wolfgang Neff

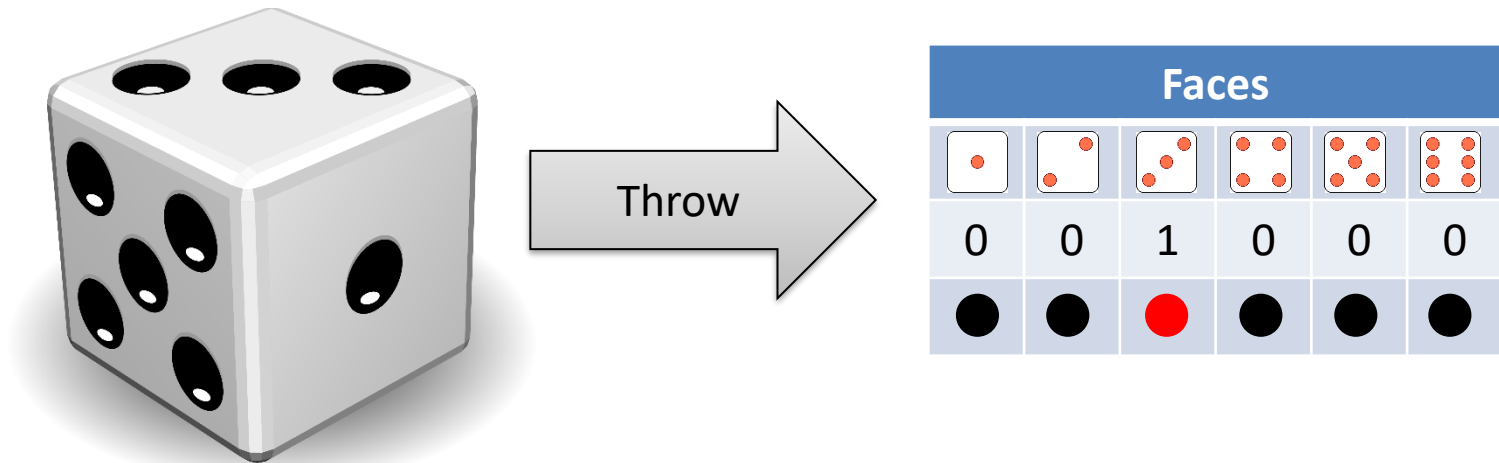
One-Hot Encoding (1)

- One Bit Per State
 - Exactly one bit must be set

State	Binary Encoding	One-Hot Encoding
0	000	000001
1	001	000010
2	010	000100
3	011	001000
4	100	010000
5	101	100000

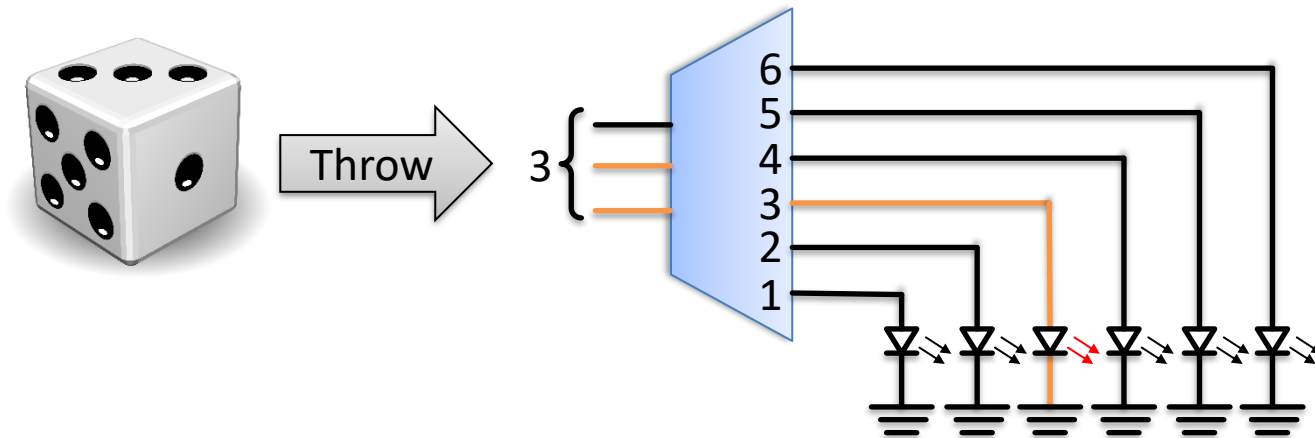
One-Hot Encoding (2)

- Example
 - A dice has been thrown
 - We want to show the result



Decoders (1)

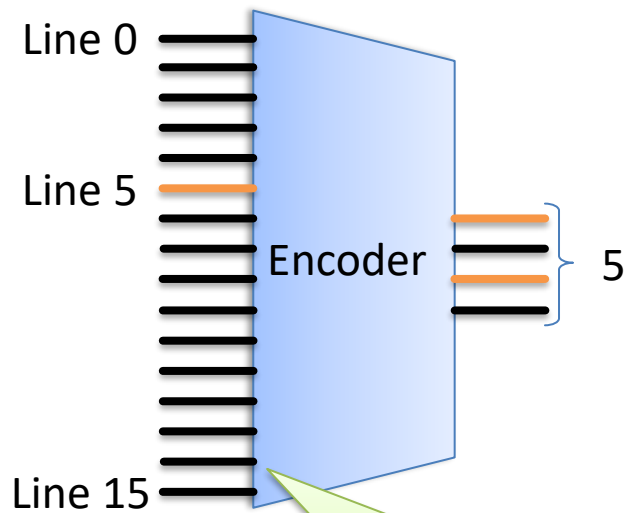
- Example (continued)
 - Realization with a decoder



Decoders (2)

- Encoder

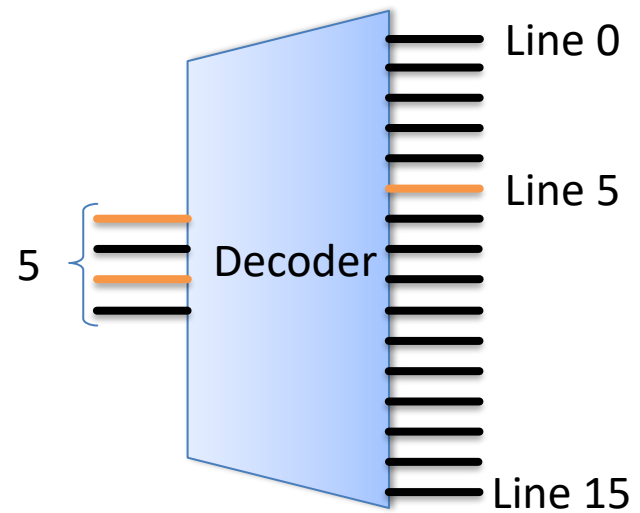
Tells which line is active



Just one line may be active

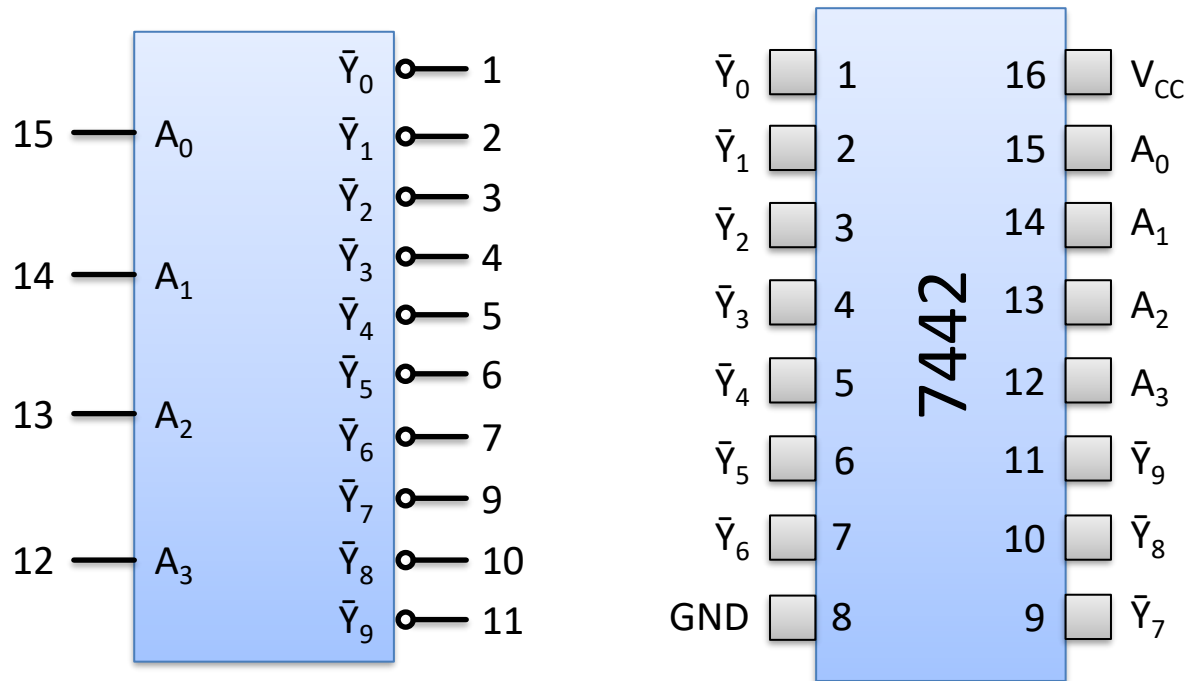
- Decoder

Activates the selected line



Decoders (3)

- 7442 – BCD to decimal decoder



Decoders (4)

- 7442 – BCD to decimal decoder (continued)

Symbol	Pin	Description
$Q_0, Q_1, Q_2, \dots, Q_9$	1, 2, 3, 4, 5, 6, 7, 9, 10, 11	multiplexer outputs
GND	8	ground
A_0, A_1, A_2, A_3	15, 14, 13, 12	data inputs
V_{SS}	16	supply voltage