

# Decoders

Networks and Embedded Systems

First Grade Level

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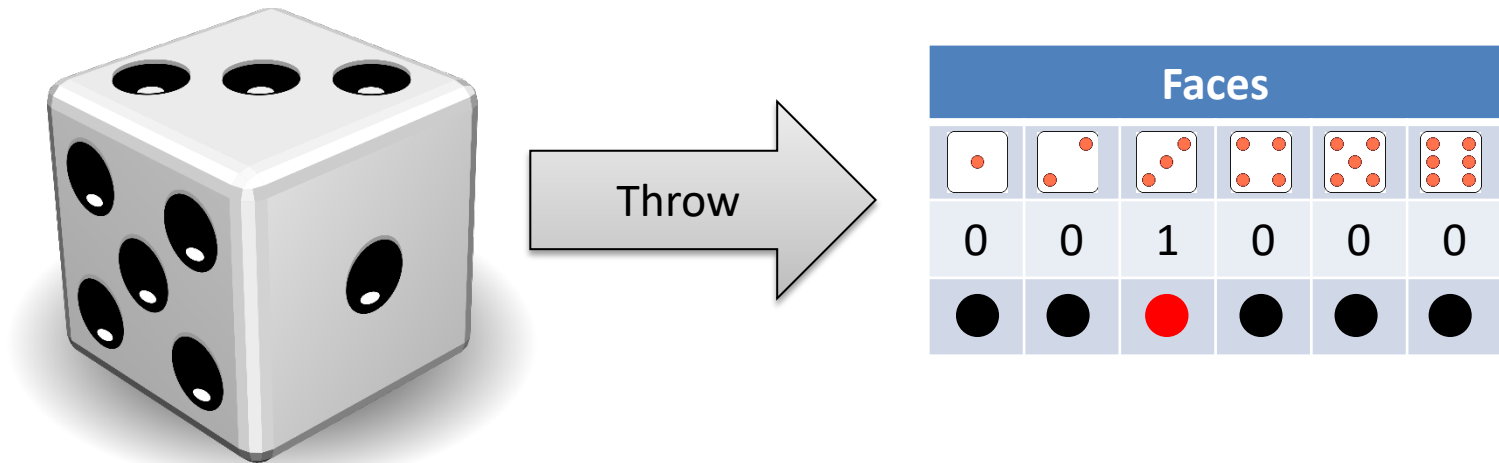
# One-Hot Encoding (1)

- 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

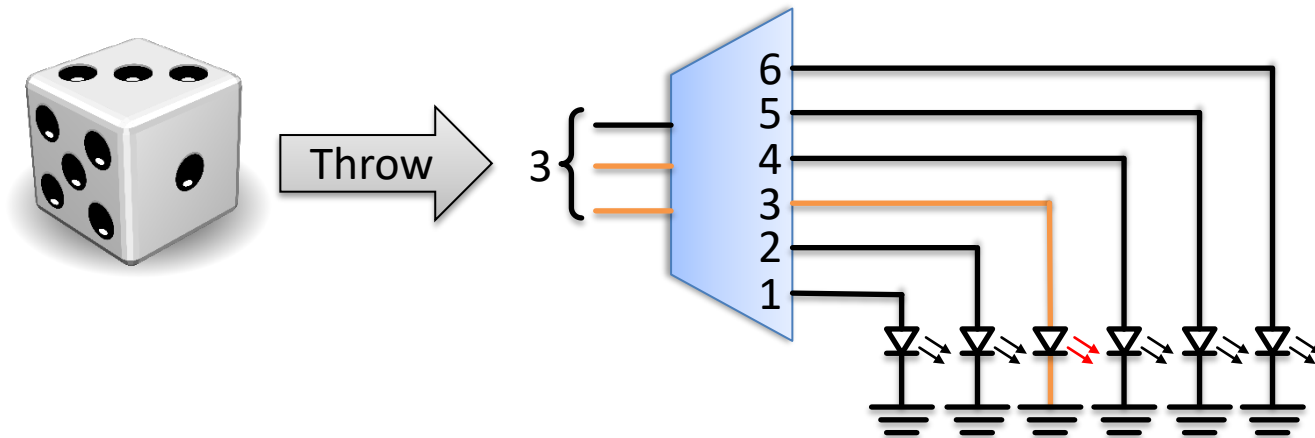
# One-Hot Encoding (2)

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



# Decoders (1)

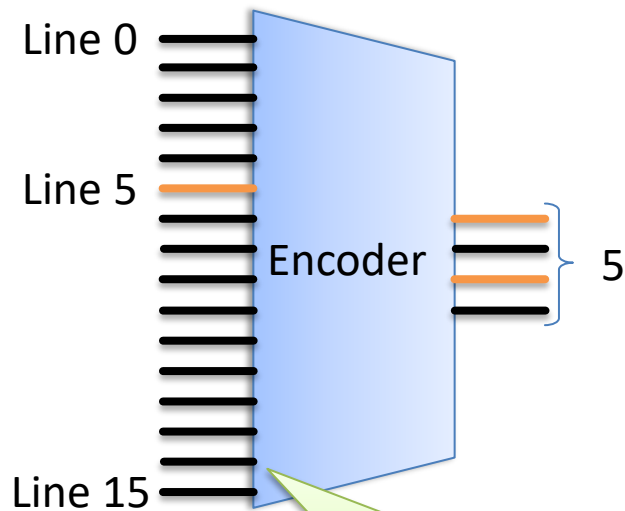
- Example (continued)
  - Realization with a decoder



# Decoders (2)

- Encoder

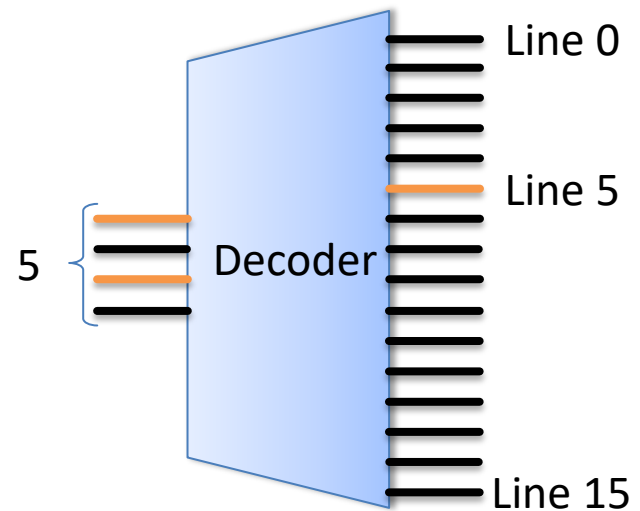
Tells which line is active



Just one line may be active

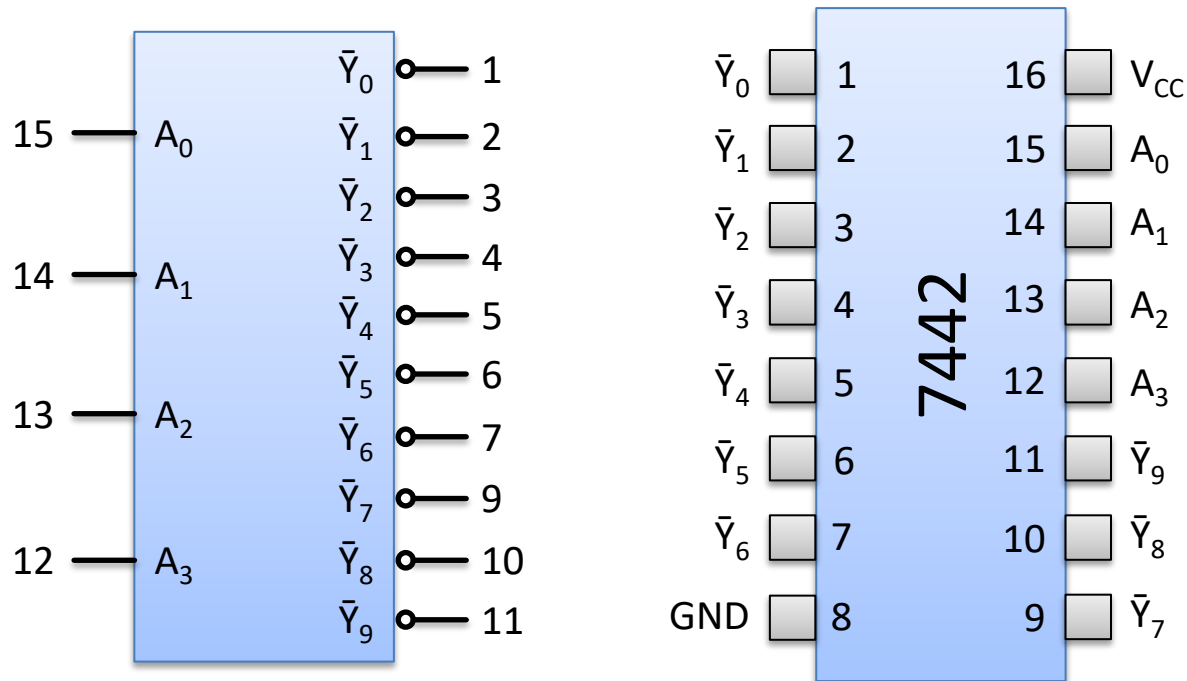
- Decoder

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