HW6
COMBINATIONAL SYSTEM 2

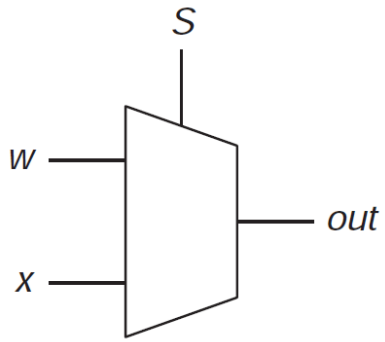
Handong university

Jong-won Lee

2021.04.09

HW6

- 1. Design 8-to-1 mux with 2-to-1 mux. (10점)
  - Operation of 2-to-1 mux



If S=0, *out*=*w*
If S=1, *out*=*x*

  - Operation of 8-to-1 mux
    - If $S_2S_1S_0$=0b000, out=i_0, If $S_2S_1S_0$=0b001, out=i_1,
    - If $S_2S_1S_0$=0b010, out=i_2, If $S_2S_1S_0$=0b011, out=i_3,
    - If $S_2S_1S_0$=0b100, out=i_4, If $S_2S_1S_0$=0b101, out=i_5,
    - If $S_2S_1S_0$=0b110, out=i_6, If $S_2S_1S_0$=0b111, out=i_7,

HW6

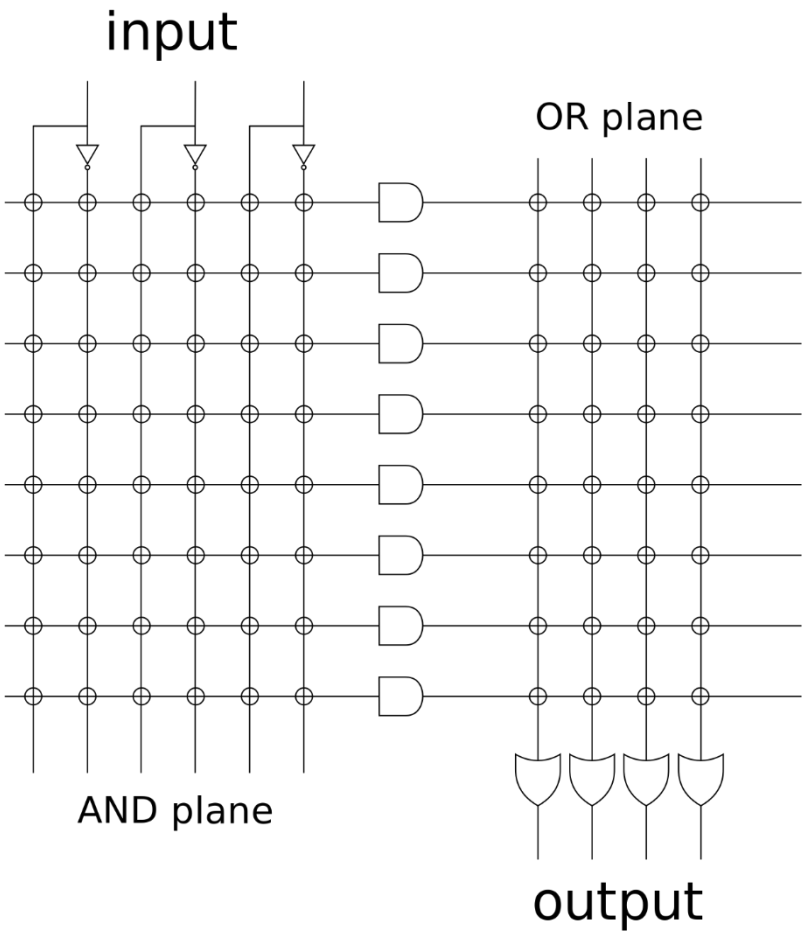
- 2. Design the following function (각각 5점)

  $g(a,b,c)=\sum m(1,4,6,7)$

  - (a) Using a PLA
  - (b) Using a PAL
  - (c) Using a ROM

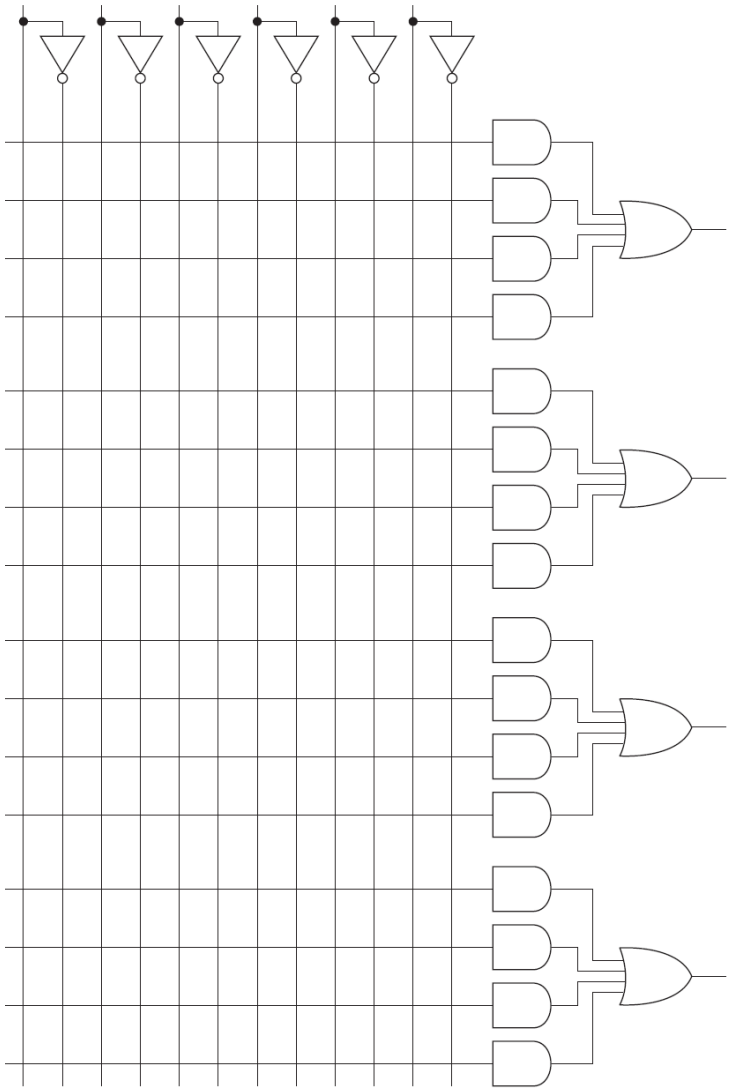
HW6

- 2. (a) Using a PLA



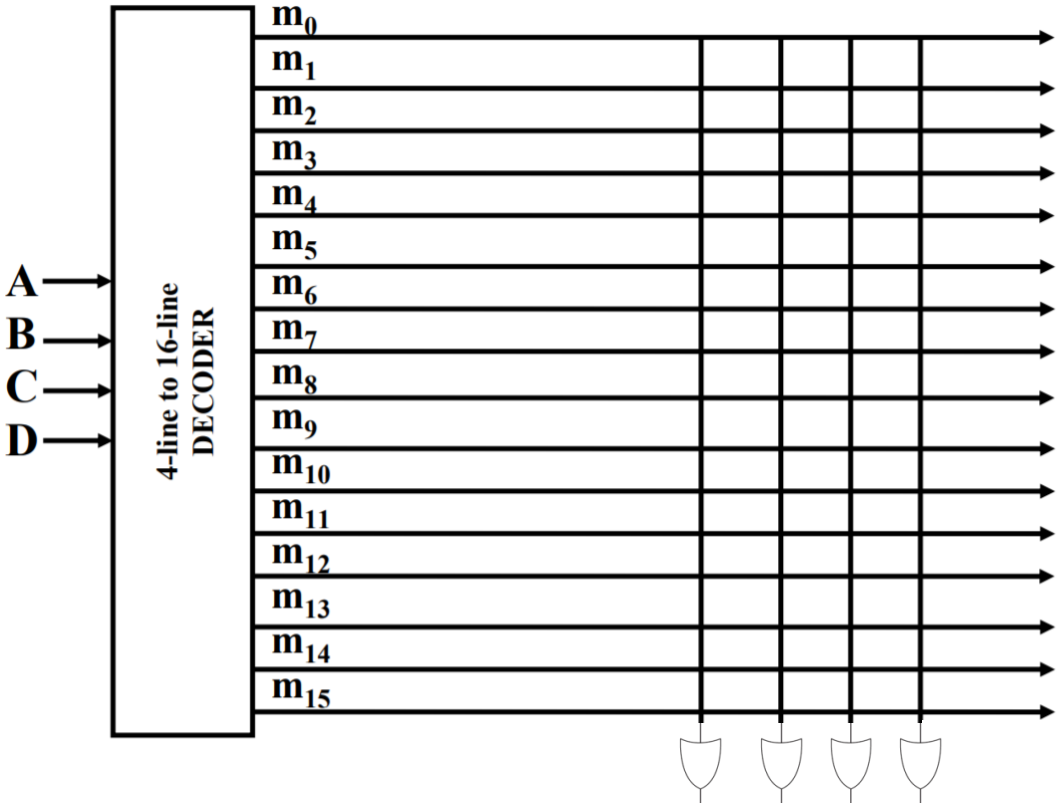
HW6

- 2.
  - (b) Using a PAL



HW6

- 2. (c) Using a ROM



HW6

- 3. Design a combinational system to convert 5-bit binary to a BCD (50점)
  - Design it and confirm its operation via logisim-evolution.
  - Design “add- 3” module using multiplexer
    - You can use “8-to-1 multiplexer” device in logisim-evolution.
  - Display the result converted to BCD on 7-segment LEDs.
  - Refer to the explanation in lecture.

HW6

- 4. Design a circuit which converts a BCD signal to drive for 7-segment LED and confirm its operation via logisim-evolution. (20점)
  - Design it via decoders
    - You can use “3-to-8 decoder” device in logisim-evolution.
  - Refer to the explanation in lecture.

HW6

- 5. Design an encoder and a decoder for (7,4) Hamming code.
  - Design them and confirm their operation via logisim-evolution. (40점)
  - You can use “3-to-8 decoder” device for a Hamming decoder in logisim-evolution.
  - Refer to the explanation in lecture.