數位系統實驗

陳培殷老師

國立成功大學　資訊工程系

LAB **- 01**
LAB **- 02**

陳培殷老師

國立成功大學　資訊工程系
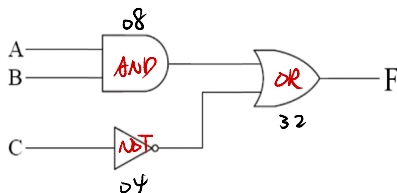
Lab I

Please (a) draw the truth table of the following circuit and (b) implement the circuit on the breadboard.

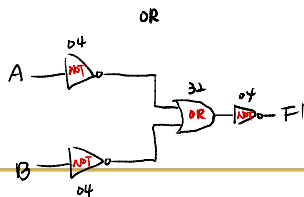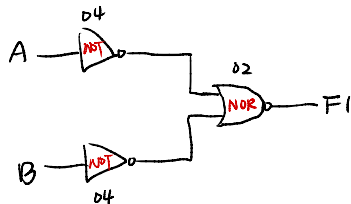| A	B	C	C'	AB	F = AB + C'
1	1	1	0	1	1
1	1	0	1	1	1
1	0	1	0	0	0
0	1	1	0	0	0
1	0	0	1	0	1
0	1	0	1	0	1
0	0	1	0	0	0
0	0	0	1	0	1

$F = AB + C'$

Lab II

Please (a) draw the truth table and (b) implement the circuit on the breadboard.

- $F1(A, B) = (A' + B')'$

A	B	A'	B'	$(A'+B')$	$F1 = (A'+B')'$
1	1	0	0	0	1
0	1	1	0	1	0
1	0	0	1	1	0
0	0	1	1	1	0

OR

Lab III - Half Adder (1/2)

- A half adder (HA) consists of two inputs (A and B) and two outputs (Sum and Carry). "A" denotes the summand and "B" is the addend. Sum and Carry mean the output sum and carry for input "A" and "B". The truth table and Boolean algebra for the half adder are as follows.

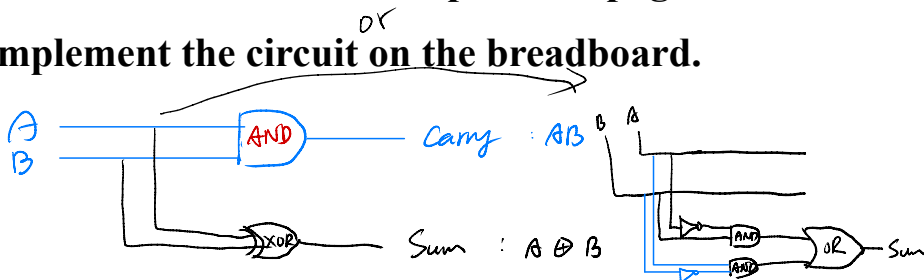| A	B	Sum	Carry
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

Carry = $A \cdot B$

Sum = $A' \cdot B + A \cdot B'$

Lab III - Half Adder (2/2)

Please

   (a) draw the circuit diagram of the half adder according to the truth table shown in previous page.

   (b) implement the circuit on the breadboard.

XOR:

A	B	A XOR B = A'B + AB'
1	1	0
0	1	1
1	0	1
0	0	0

Lab IV – Comparator(1/2)

- There are two inputs denoted as A and B. Both A and B are 1-bit value. A comparator is designed to determine whether A is greater than B or not. The output results are represented with G .

- The function and truth table of the comparator is described as follows.

$$G = \begin{cases} 1 & , if\ A\ is\ > B \\ 0 & , else \end{cases}$$

Lab IV – Comparator(2/2)

Please

    (a) draw the truth table of the comparator.

    (b) draw the circuit diagram of the comparator.

    (c) implement the circuit on the breadboard.

A	B	A′	B′	AB′	= G
1	1	0	0	0	0
1	0	0	1	1	1
0	1	1	0	0	0
0	0	1	1	0	0