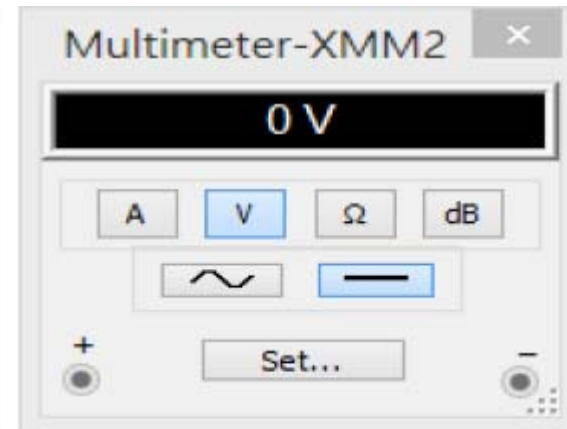
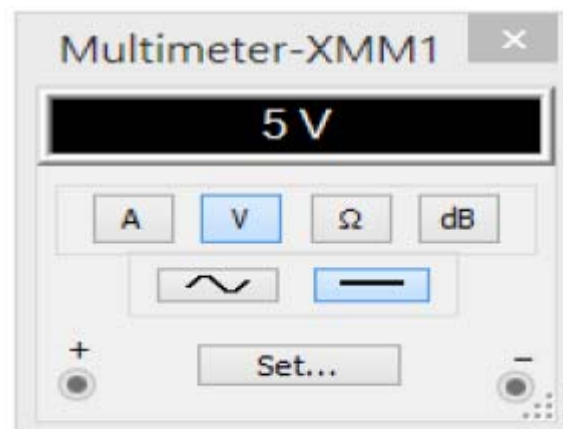
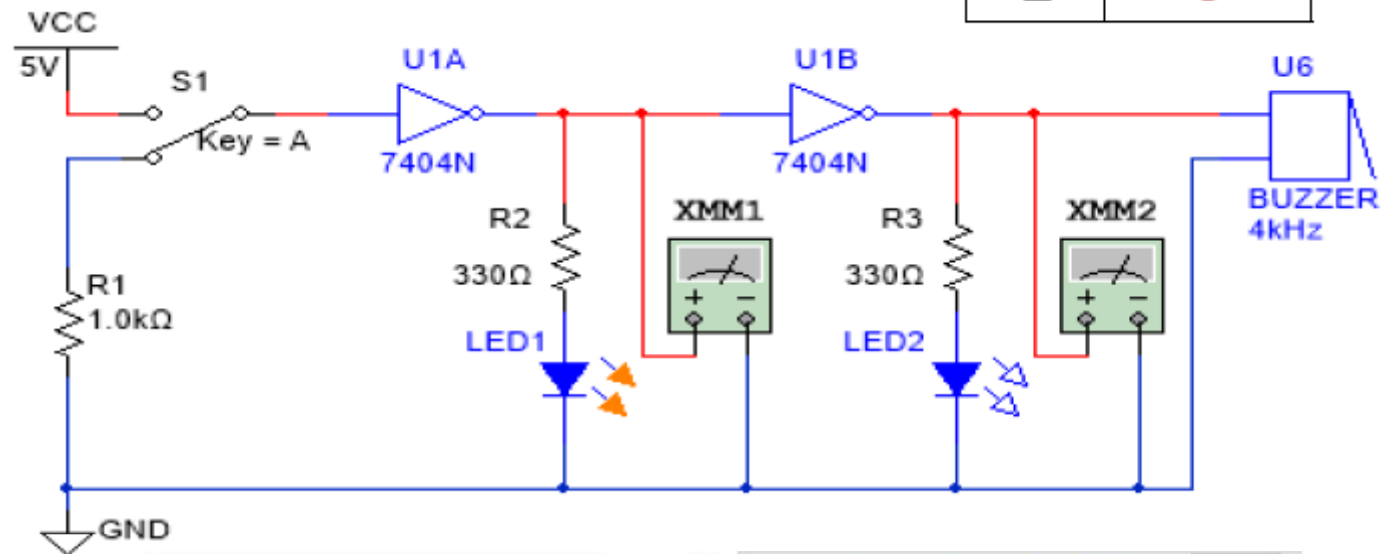




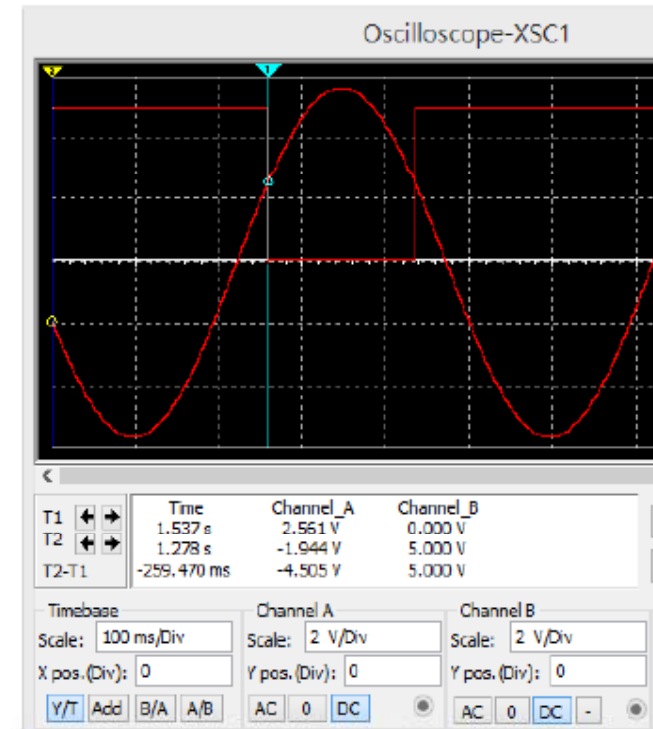
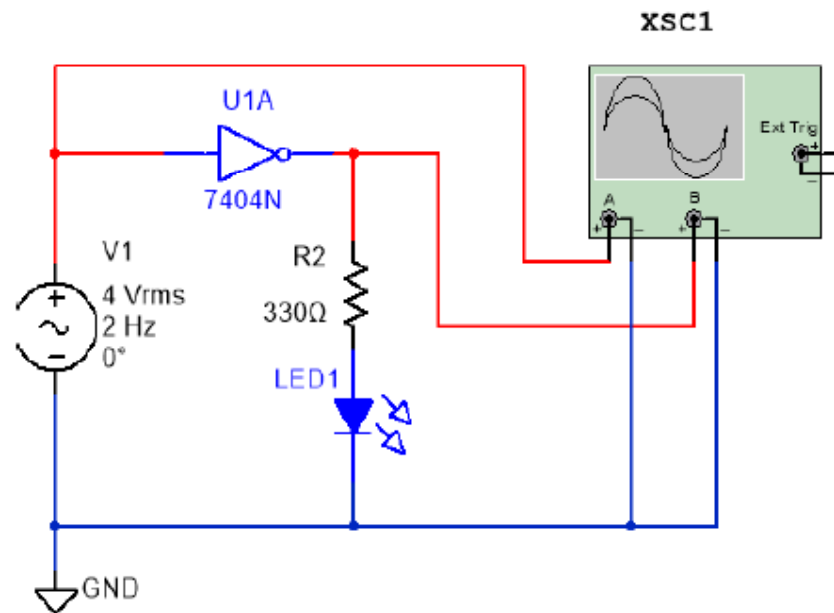
Application of Digital System

Basic Logic Gates

A	$Y = \neg A$
0	1
1	0

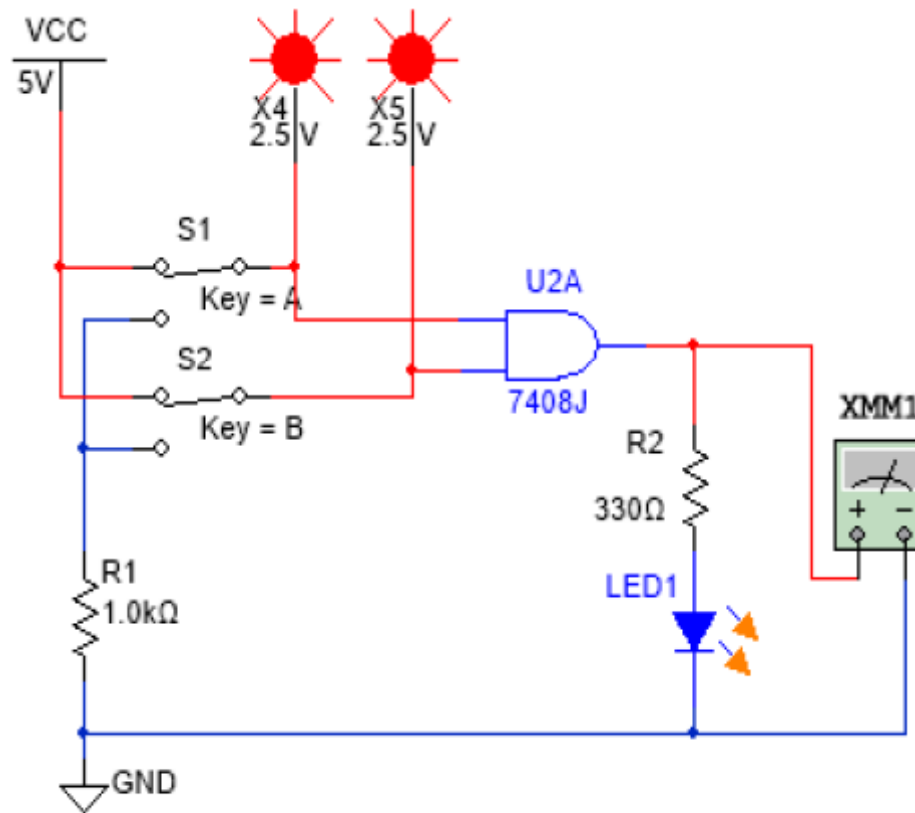


Transfer Voltage for NOT

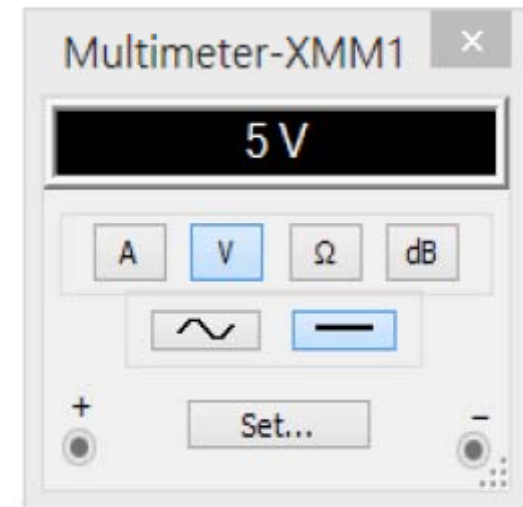


Transfer Voltage $V_{tr} = 2.561V$

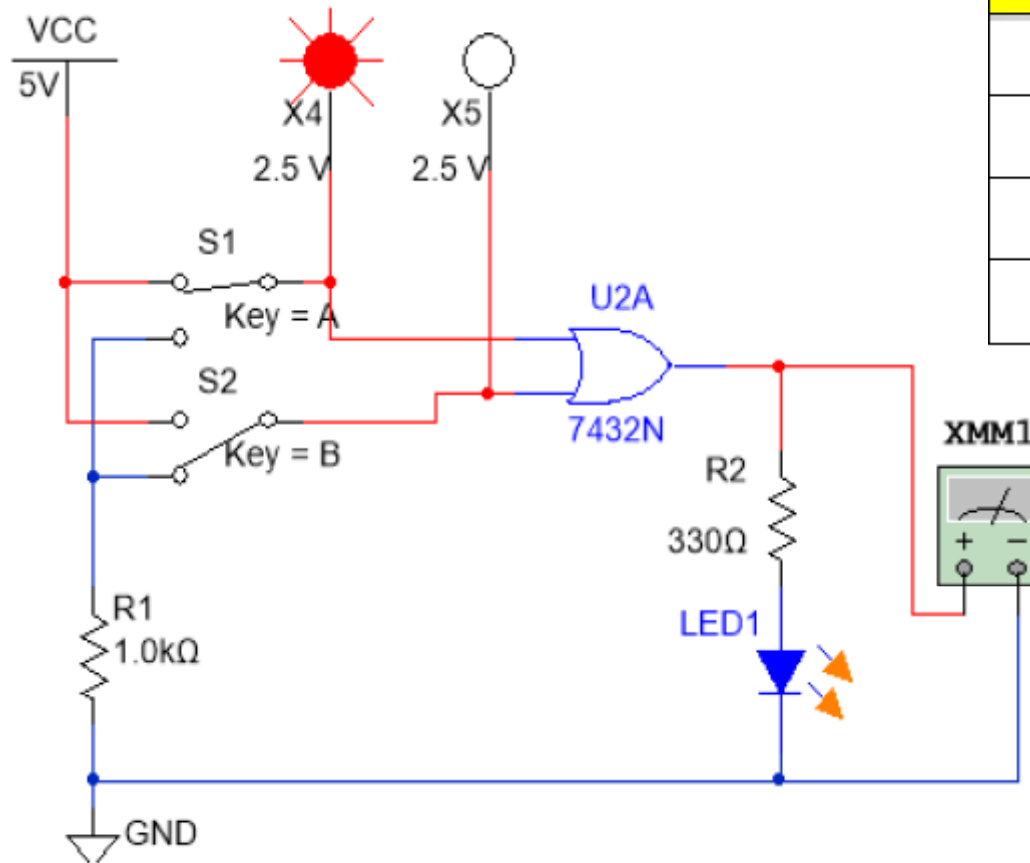
AND Gate



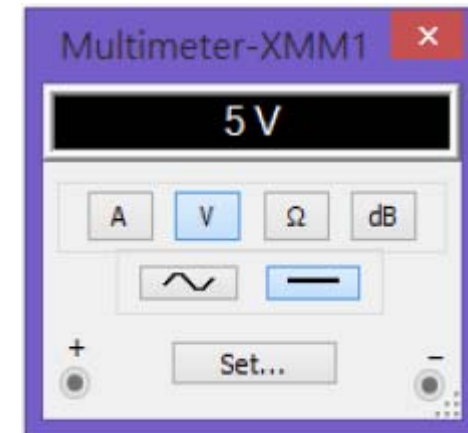
A	B	Y=AB
0	0	0
0	1	0
1	0	0
1	1	1



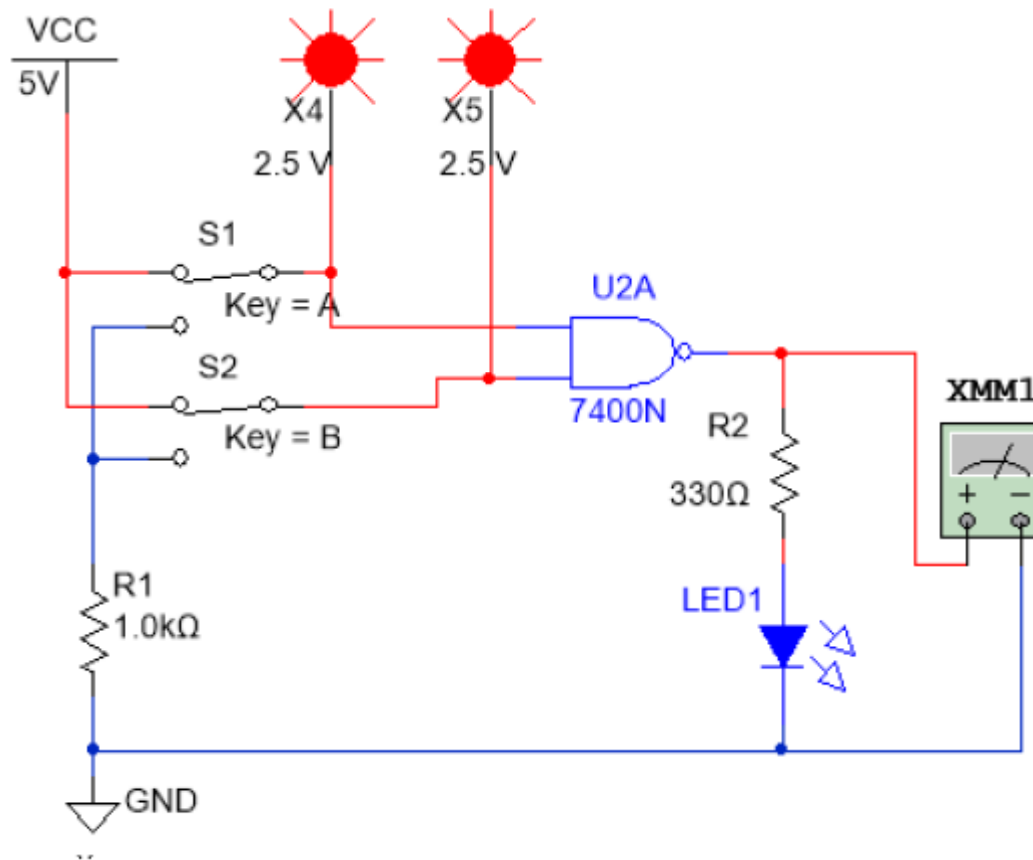
OR Gate



A	B	Y=A+B
0	0	0
0	1	1
1	0	1
1	1	1

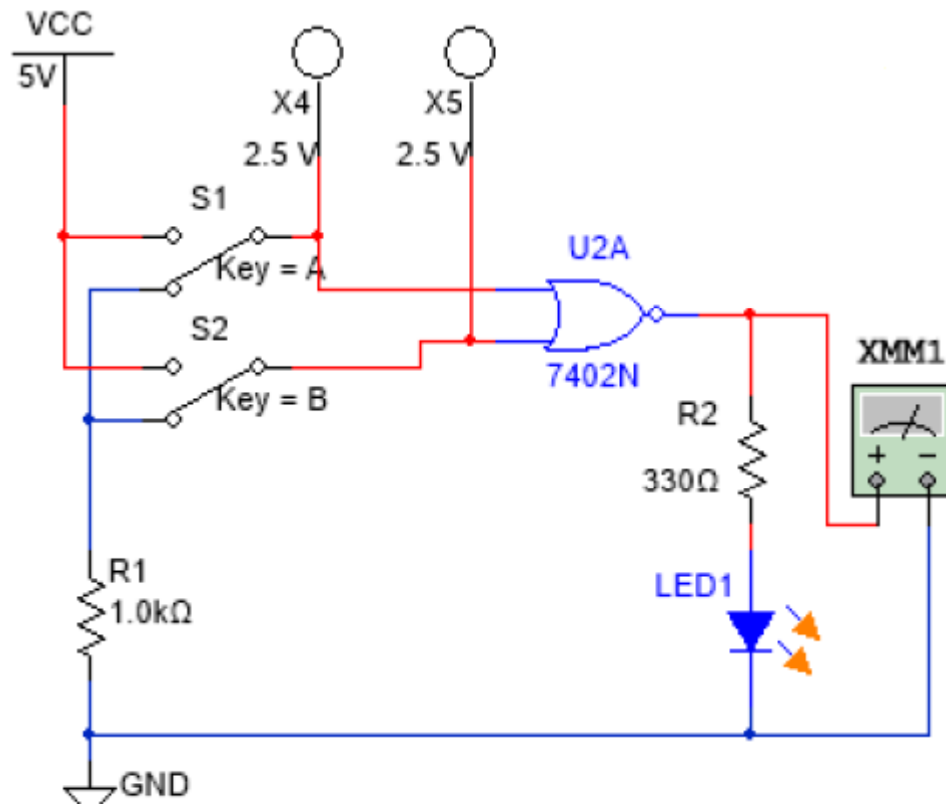


Experiment 1 NAND Gate



A	B	Y=/(AB)
0	0	
0	1	
1	0	
1	1	

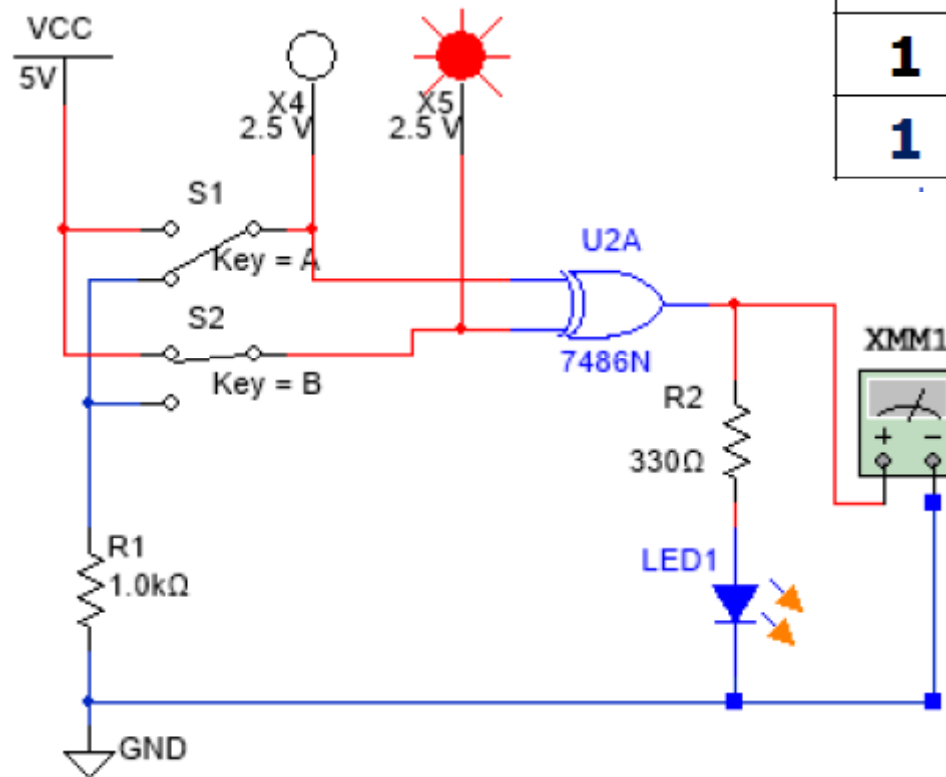
Experiment 2 NOR Gate



A	B	$Y = \overline{A+B}$
0	0	
0	1	
1	0	
1	1	

Experiment 3 XOR Gate

A	B	$Y=A/B+B/A$
0	0	
0	1	
1	0	
1	1	



Decoder

- **What is Decoder?**

0000 → 0

0001 → 1

...

1001 → 9

...

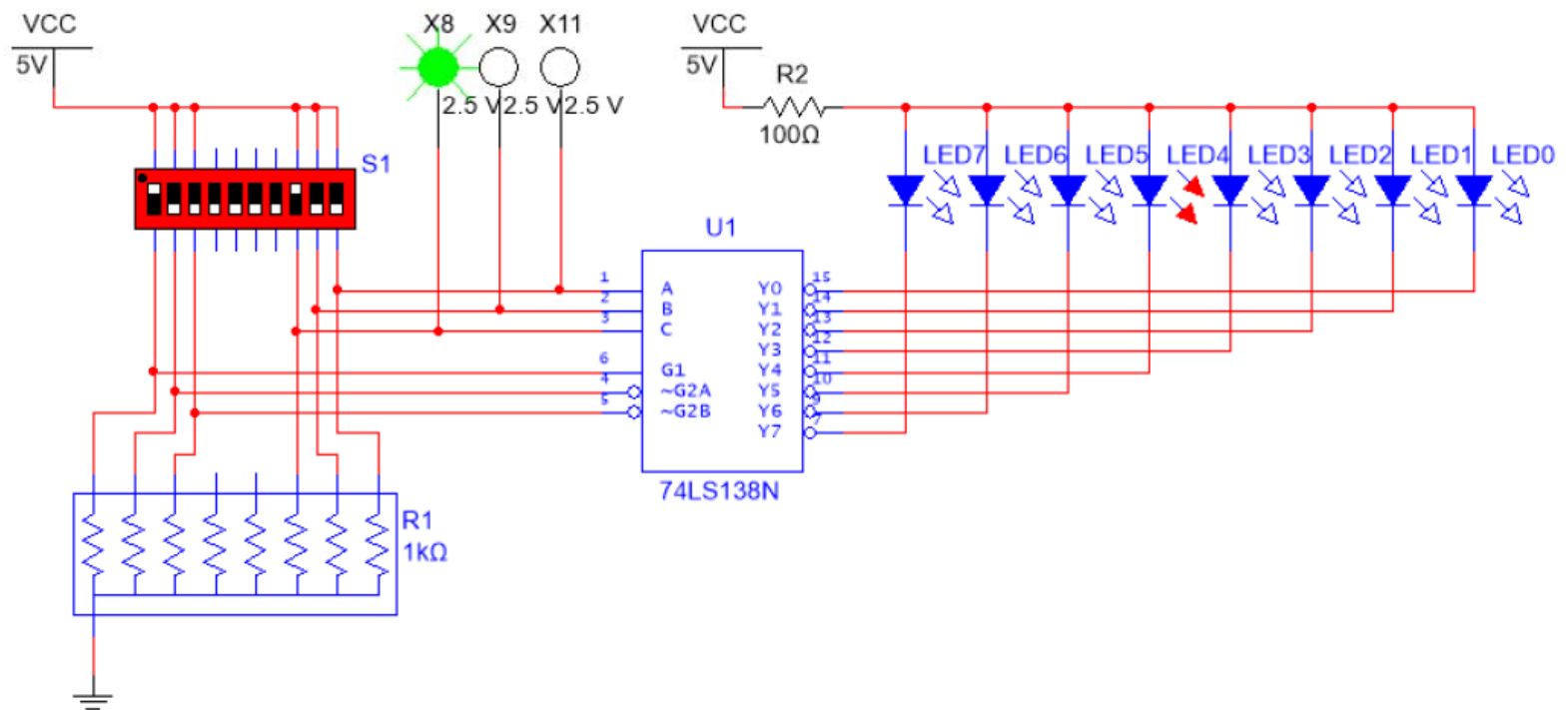
1111 → 15

→ A binary code is converted to be a decimal number.

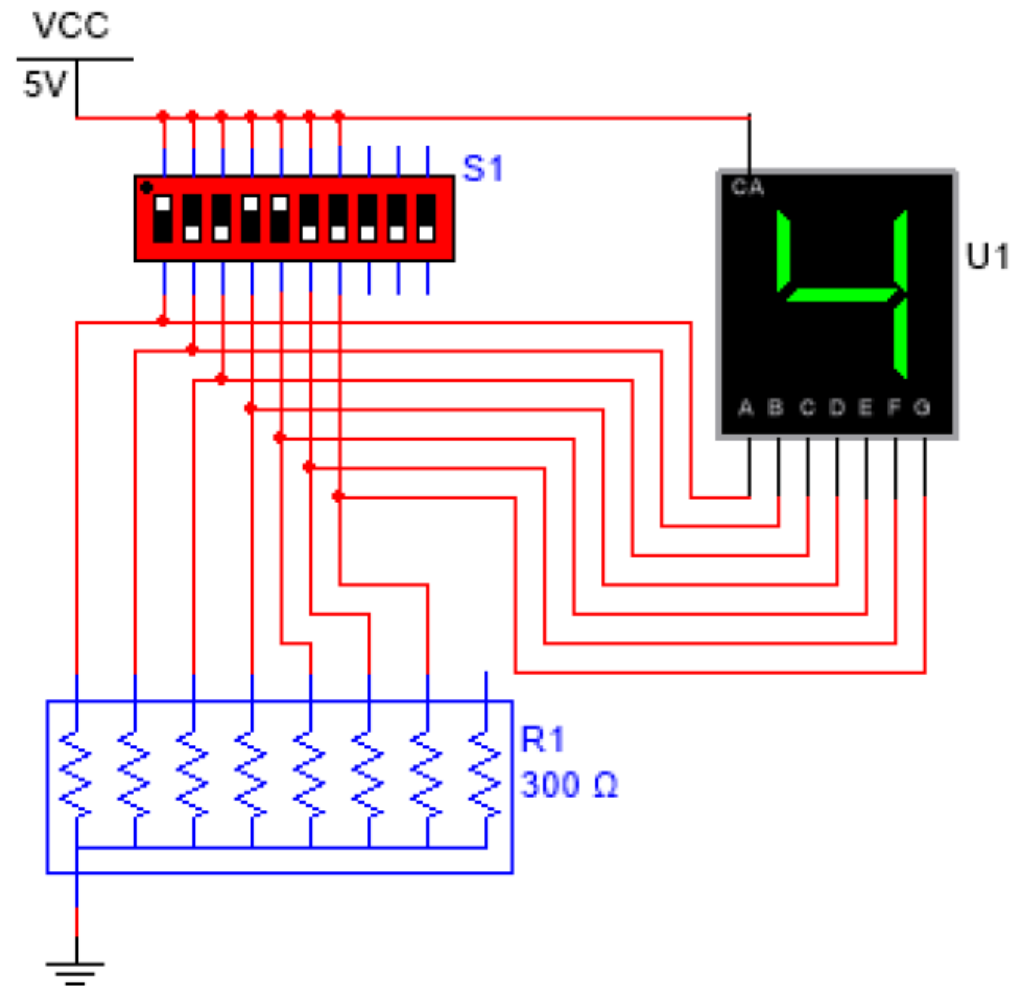
2 to 4 Decoder

Input		Output			
B	A	0	1	2	3
0	0	1	0	0	0
0	1	0	1	0	0
1	0	0	0	1	0
1	1	0	0	0	1

3 to 8 Decoder with Active Low



Example of CA 7-segment Display



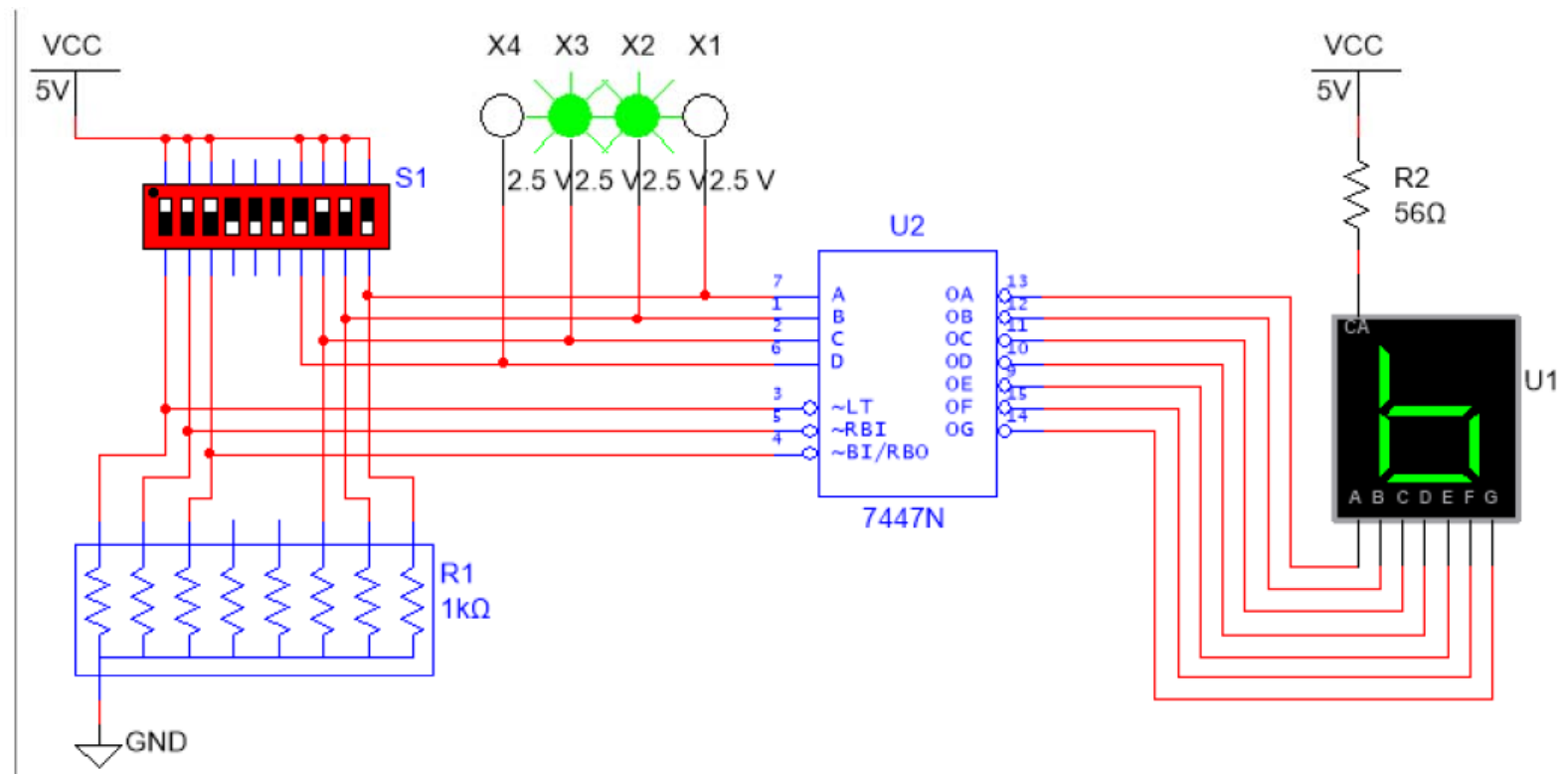
BCD to 7-segment Decoder

Input				Output						
D	C	B	A	/a	/b	/c	/d	/e	/f	/g
0	0	0	0	0	0	0	0	0	0	1
0	0	0	1	1	0	0	1	1	1	1
0	0	1	0	0	0	1	0	0	1	0
0	0	1	1	0	0	0	0	1	1	0
0	1	0	0	1	0	0	1	1	0	0
0	1	0	1	0	1	0	0	1	0	0
0	1	1	0	1	1	0	0	0	0	0
0	1	1	1	0	0	0	1	1	1	1
1	0	0	0	0	0	0	0	0	0	0
1	0	0	1	0	0	0	0	1	0	0

TTL 7447: BCD to CA 7-segment decoder with active low output.

Experiment 4

BCD to 7-segment Decoder



Encoder

- **What is Encoder**

0 → 0000

3 → 0011

...

9 → 1001

...

15 → 1111

→ A decimal number is converted to be a binary code.

4 to 2 Encoder

Input				Output	
0	1	2	3	B	A
1	0	0	0	0	0
0	1	0	0	0	1
0	0	1	0	1	0
0	0	0	1	1	1

Decimal to BCD Encoder

Input										Output			
0	1	2	3	4	5	6	7	8	9	D	C	B	A
1	0	0	0	0	0	0	0	0	0	0	0	0	0
0	1	0	0	0	0	0	0	0	0	0	0	0	1
0	0	1	0	0	0	0	0	0	0	0	0	1	0
0	0	0	1	0	0	0	0	0	0	0	0	1	1
0	0	0	0	1	0	0	0	0	0	0	1	0	0
0	0	0	0	0	1	0	0	0	0	0	1	0	1
0	0	0	0	0	0	1	0	0	0	0	1	1	0
0	0	0	0	0	0	0	1	0	0	0	1	1	1
0	0	0	0	0	0	0	0	1	0	1	0	0	0
0	0	0	0	0	0	0	0	0	1	1	0	0	1

Experiment 5

Decimal to BCD Encoder

