Lab-06

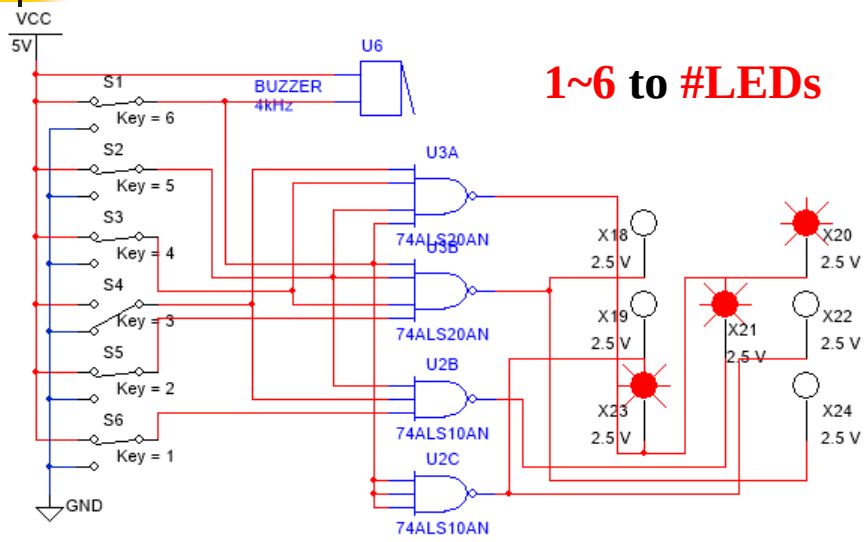
Application of Logic Gates

Chia-Chun Tsai

Objectives

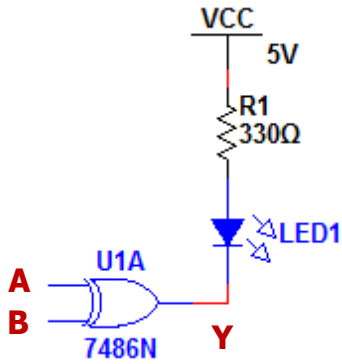
- Understand to use basic gates to form a digital system what you want.
- Implement an e-Dice using basic gates.
- Implement an e-Key using XOR gates.
- Implement an e-Key using 4-bit comparator.

e-Dice based on 3-input NANDs



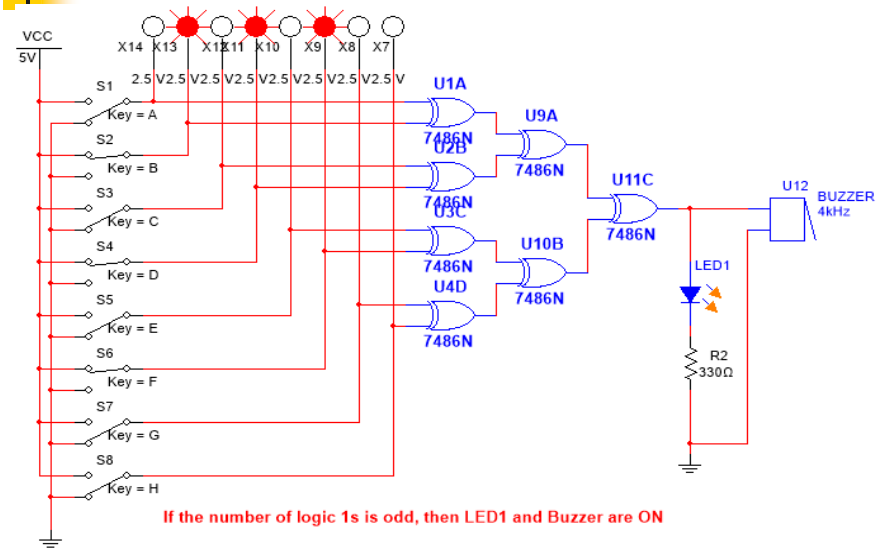
1~6 to #LEDs

e-Key based on an XOR Gate

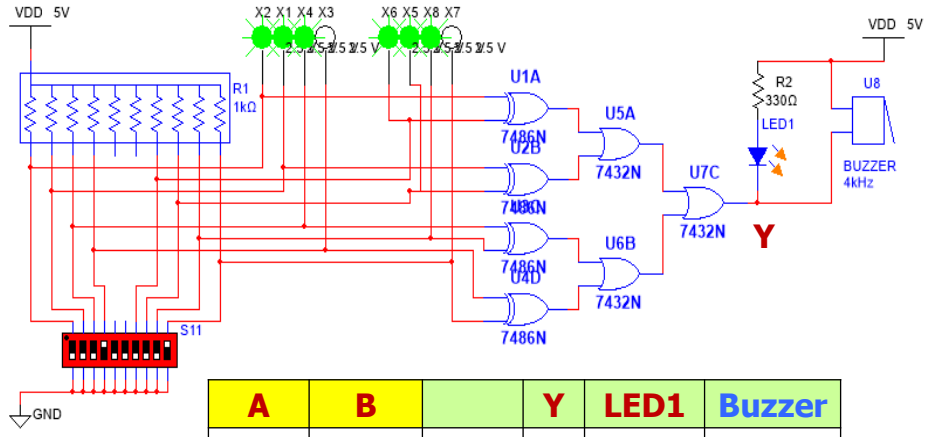


A	B		Y	LED1
0	0	A=B	0	ON
0	1	A≠B	1	OFF
1	0	A≠B	1	OFF
1	1	A=B	0	ON

Odd Parity based on XORs

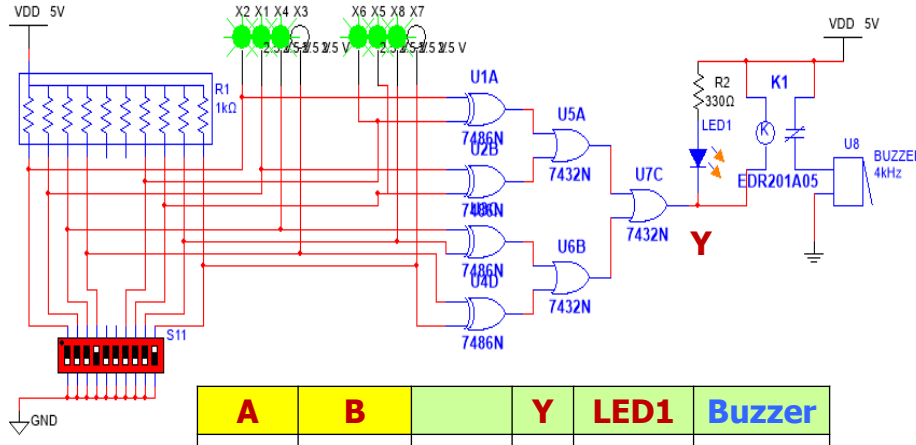


e-Key based on XORs &ORs



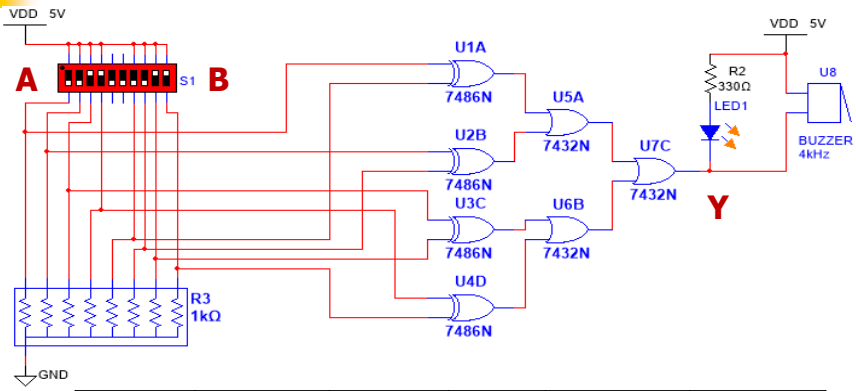
A	B		Y	LED1	Buzzer
0011	0011	A=B	0	ON	ON
0001	0011	A≠B	1	OFF	OFF

e-Key based on XORs &ORs



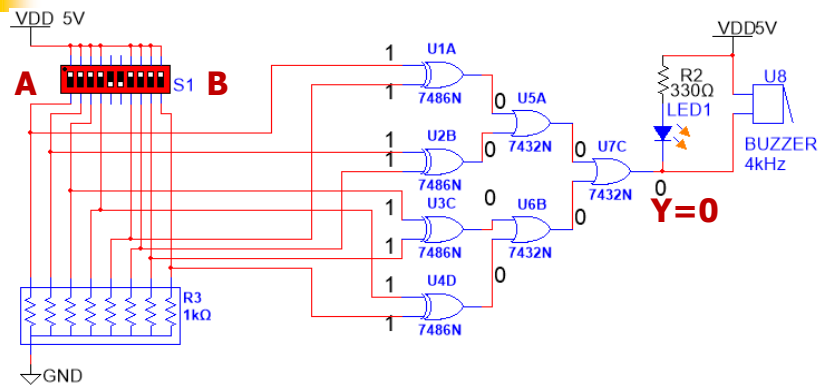
A	B		Y	LED1	Buzzer
0011	0011	A=B	0	ON	ON
0001	0011	A≠B	1	OFF	OFF

e-Key based on XORs &ORs



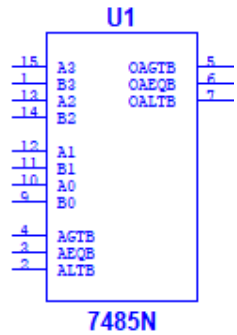
A	B		Y	LED1	Buzzer
0011	0011	A=B	0	ON	ON
0001	0011	A≠B	1	OFF	OFF

Fixed Checking for e-Key



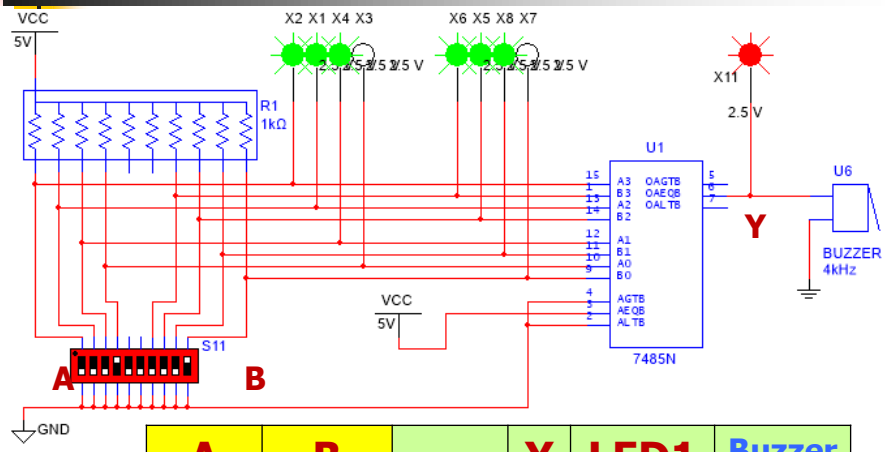
A	B		Y	LED1	Buzzer
1111	1111	A=B	0	ON	ON
0001	0011	A≠B	1	OFF	OFF

4-bit Comparator 7485



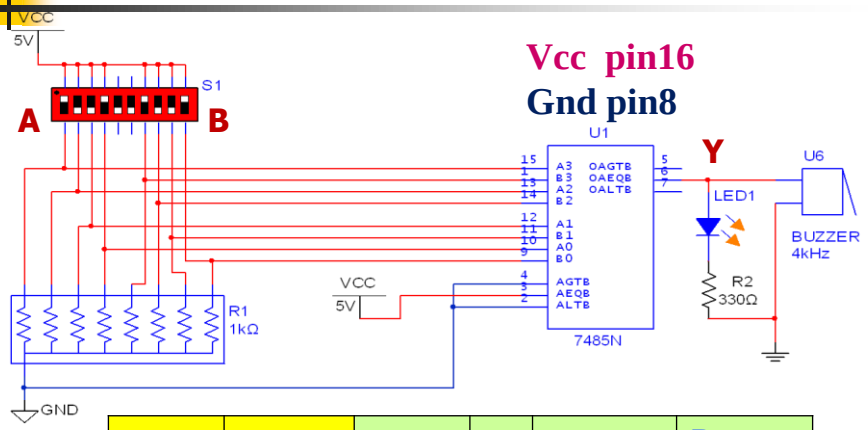
OAEGB		OAEGB
1	A3=B3,A2=B2,A1=B1,A0=B0	1
0	A = B	0
0	A ≠ B	0

e-Key based on comparator 7485



A	B		Y	LED1	Buzzer
0001	0001	A=B	1	ON	ON
0001	0011	A≠B	0	OFF	OFF

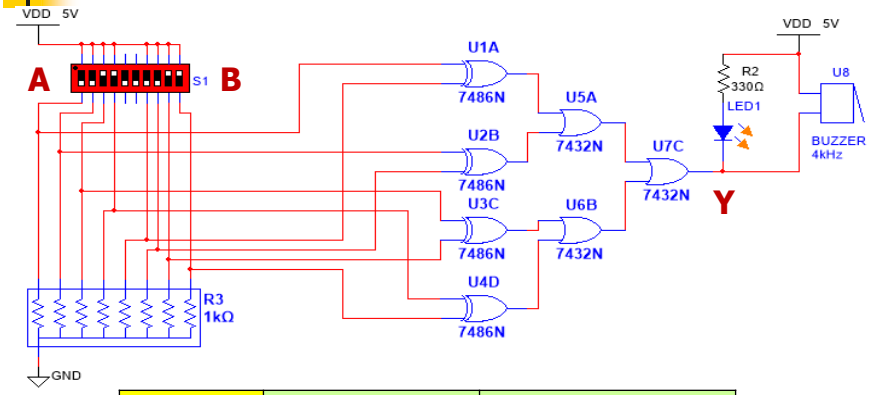
e-Key based on comparator 7485



A	B		Y	LED1	Buzzer
1001	1001	A=B	1	ON	ON
0001	0011	A≠B	0	OFF	OFF

Eeperment-1

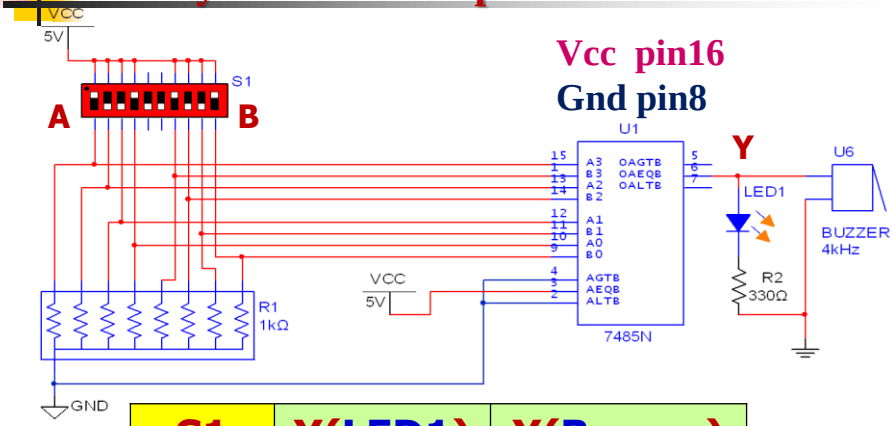
e-Key based on XORs &ORs



S1	Y(LED1)	Y(Buzzer)
A=B		
A≠B		

Experiment-2

e-Key based on comparator 7485



S1	Y(LED1)	Y(Buzzer)
A=B		
A≠B		