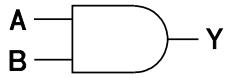


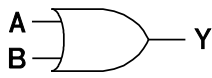
## Basic Logic Functions

*AND*  
 $Y = A \cdot B = AB$



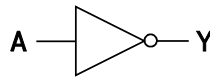
A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

*OR*  
 $Y = A + B$



A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

*NOT*  
 $Y = \bar{A}$



A	Y
0	1
1	0

M3S10002

EE for EE

## Truth Table

$$Y = AB + \bar{B}\bar{C} + C\bar{A}$$

A	B	C	AB	$\bar{B}\bar{C}$	$C\bar{A}$	Y
0	0	0	0	1	0	1
0	0	1	0	0	1	1
0	1	0	0	0	0	0
0	1	1	0	0	1	1
1	0	0	0	1	0	1
1	0	1	0	0	0	0
1	1	0	1	0	0	1
1	1	1	1	0	0	1

M3S10005

EE for EE

## Truth Table to Equation

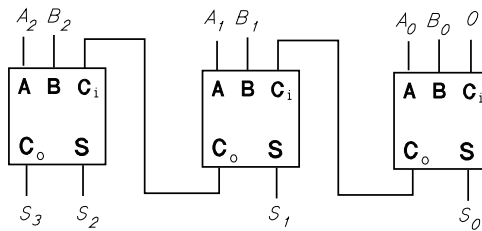
A	B	C	Y
0	0	0	1 ← $\bar{A}\bar{B}\bar{C}$
0	0	1	0
0	1	0	1 ← $\bar{A}B\bar{C}$
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	1 ← $AB\bar{C}$
1	1	1	1 ← $ABC$

$$Y = \bar{A}\bar{B}\bar{C} + \bar{A}B\bar{C} + AB\bar{C} + ABC$$

M3S1005a

EE for EE

## Full Adder Design



A	B	C <sub>i</sub>	C <sub>o</sub>	S
0	0	0	0	0
0	0	1	0	1
0	1	0	0	1
0	1	1	1	0
1	0	0	0	1
1	0	1	1	0
1	1	0	1	0
1	1	1	1	1

M3S10008

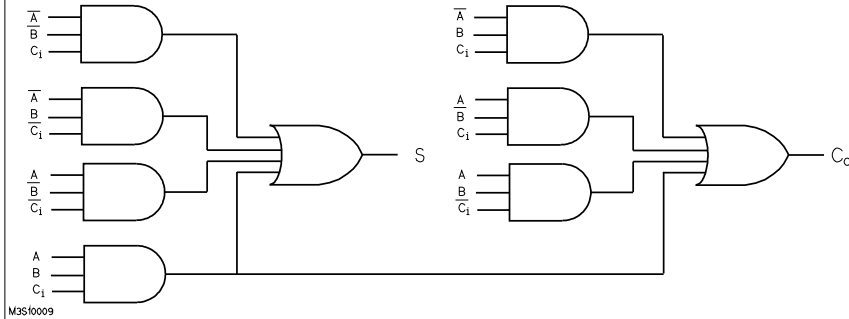
EE for EE

## Full Adder Design

One Solution:

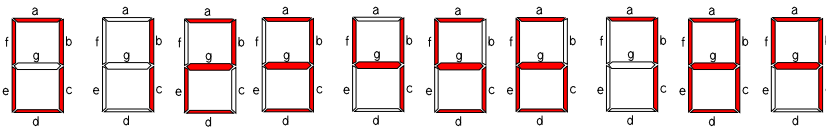
$$S = \bar{A}\bar{B}C_i + \bar{A}B\bar{C}_i + A\bar{B}\bar{C}_i + ABC_i$$

$$C_o = \bar{A}BC_i + A\bar{B}C_i + ABC_i + ABC_i$$



EE for EE

## Seven Segment Display Driver



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

M3Sf0012

EE for EE