ALU Slices PLA truth tables
Instructor: Prof. Lei

Slices 1-30

Instruction	In8 func5	In7 func4	In6 func3	In5 func2	In4 func1	In3 func0	In2 A	In1 B	In0 Ci	Out2 TS	Out1 Co	Out0 R	TS PLA terms	Co PLA terms	R PLA terms	
add	1	0	0	0	0	0	0	0	0	1	0	0	1xxxxxxx			Co, R = A + B+ C
	1	0	0	0	0	0	0	0	1	1	0	1	1xxxxxxx		100000001	
	1	0	0	0	0	0	0	1	0	1	0	1	1xxxxxxx		100000010	
	1	0	0	0	0	0	0	1	1	1	1	0	1xxxxxxx	100000011		
	1	0	0	0	0	0	1	0	0	1	0	1	1xxxxxxx		100000100	
	1	0	0	0	0	0	1	0	1	1	1	0	1xxxxxxx	100000101		
	1	0	0	0	0	0	1	1	0	1	1	0	1xxxxxxx	100000110		
	1	0	0	0	0	0	1	1	1	1	1	1	1xxxxxxx	100000111	100000111	
addu	1	0	0	0	0	1	0	0	0	1	0	0	1xxxxxxx			same as add
	1	0	0	0	0	1	0	0	1	1	0	1	1xxxxxxx		100001001	
	1	0	0	0	0	1	0	1	0	1	0	1	1xxxxxxx		100001010	
	1	0	0	0	0	1	0	1	1	1	1	0	1xxxxxxx	100001011		
	1	0	0	0	0	1	1	0	0	1	0	1	1xxxxxxx		100001100	
	1	0	0	0	0	1	1	0	1	1	1	0	1xxxxxxx	100001101		
	1	0	0	0	0	1	1	1	0	1	1	0	1xxxxxxx	100001110		
	1	0	0	0	0	1	1	1	1	1	1	1	1xxxxxxx	100001111	100001111	
sub	1	0	0	0	1	0	0	0	0	1	0	1	1xxxxxxx		100010000	Co,R = A+B'+Ci
	1	0	0	0	1	0	0	0	1	1	1	0	1xxxxxxx	100010001		
	1	0	0	0	1	0	0	1	0	1	0	0	1xxxxxxx			
	1	0	0	0	1	0	0	1	1	1	0	1	1xxxxxxx		100010011	
	1	0	0	0	1	0	1	0	0	1	1	0	1xxxxxxx	100010100		
	1	0	0	0	1	0	1	0	1	1	1	1	1xxxxxxx	100010101	100010101	
	1	0	0	0	1	0	1	1	0	1	0	1	1xxxxxxx		100010110	
	1	0	0	0	1	0	1	1	1	1	1	0	1xxxxxxx	100010111		
subu	1	0	0	0	1	1	0	0	0	1	0	1	1xxxxxxx		100011000	same as sub
	1	0	0	0	1	1	0	0	1	1	1	0	1xxxxxxx	100011001		
	1	0	0	0	1	1	0	1	0	1	0	0	1xxxxxxx			
	1	0	0	0	1	1	0	1	1	1	0	1	1xxxxxxx		100011011	
	1	0	0	0	1	1	1	0	0	1	1	0	1xxxxxxx	100011100		
	1	0	0	0	1	1	1	0	1	1	1	1	1xxxxxxx	100011101	100011101	
	1	0	0	0	1	1	1	1	0	1	0	1	1xxxxxxx		100011110	
	1	0	0	0	1	1	1	1	1	1	1	0	1xxxxxxx	100011111		
and 0X24	1	0	0	1	0	0	0	0	0	1	0	0	1xxxxxxx			R = A & B; Co = 0
	1	0	0	1	0	0	0	0	1	1	0	0	1xxxxxxx			
	1	0	0	1	0	0	0	1	0	1	0	0	1xxxxxxx			
	1	0	0	1	0	0	0	1	1	1	0	0	1xxxxxxx			
	1	0	0	1	0	0	1	0	0	1	0	0	1xxxxxxx			
	1	0	0	1	0	0	1	0	1	1	0	0	1xxxxxxx			
	1	0	0	1	0	0	1	1	0	1	0	1	1xxxxxxx			
	1	0	0	1	0	0	1	1	1	1	0	1	1xxxxxxx		100100111	
or	1	0	0	1	0	1	0	0	0	1	0	0	1xxxxxxx			R = A | B; Co = 0
	1	0	0	1	0	1	0	0	1	1	0	0	1xxxxxxx			
	1	0	0	1	0	1	0	1	0	1	0	1	1xxxxxxx		100101010	
	1	0	0	1	0	1	0	1	1	1	0	1	1xxxxxxx		100101011	
	1	0	0	1	0	1	1	0	0	1	0	1	1xxxxxxx		100101100	
	1	0	0	1	0	1	1	0	1	1	0	1	1xxxxxxx		100101101	
	1	0	0	1	0	1	1	1	0	1	0	1	1xxxxxxx		100101110	
	1	0	0	1	0	1	1	1	1	1	0	1	1xxxxxxx		100101111	
xor	1	0	0	1	1	0	0	0	0	1	0	0	1xxxxxxx			R = A^B; Co = 0
	1	0	0	1	1	0	0	0	1	1	0	0	1xxxxxxx			
	1	0	0	1	1	0	0	1	0	1	0	1	1xxxxxxx		100110010	
	1	0	0	1	1	0	0	1	1	1	0	1	1xxxxxxx		100110011	
	1	0	0	1	1	0	1	0	0	1	0	1	1xxxxxxx		100110100	
	1	0	0	1	1	0	1	0	1	1	0	1	1xxxxxxx		100110101	
	1	0	0	1	1	0	1	1	0	1	0	0	1xxxxxxx			
	1	0	0	1	1	0	1	1	1	1	0	0	1xxxxxxx			
nor	1	0	0	1	1	1	0	0	0	1	0	1	1xxxxxxx		100111000	R = (A | B)'; Co = 0
	1	0	0	1	1	1	0	0	1	1	0	1	1xxxxxxx		100111001	
	1	0	0	1	1	1	0	1	0	1	0	0	1xxxxxxx			
	1	0	0	1	1	1	0	1	1	1	0	0	1xxxxxxx			
	1	0	0	1	1	1	1	0	0	1	0	0	1xxxxxxx			
	1	0	0	1	1	1	1	0	1	1	0	0	1xxxxxxx			
	1	0	0	1	1	1	1	1	0	1	0	0	1xxxxxxx			
	1	0	0	1	1	1	1	1	1	1	0	0	1xxxxxxx			
slt	1	0	1	0	1	0	0	0	0	1	0	0	1xxxxxxx			Co same as for sub/subu; R = 0
	1	0	1	0	1	0	0	0	1	1	1	0	1xxxxxxx	101010001		
	1	0	1	0	1	0	0	1	0	1	0	0	1xxxxxxx			
	1	0	1	0	1	0	0	1	1	1	0	0	1xxxxxxx			
	1	0	1	0	1	0	1	0	0	1	1	0	1xxxxxxx	101010100		
	1	0	1	0	1	0	1	0	1	1	1	0	1xxxxxxx	101010101		
	1	0	1	0	1	0	1	1	0	1	0	0	1xxxxxxx			
	1	0	1	0	1	0	1	1	1	1	1	0	1xxxxxxx	101010111		
sltu	1	0	1	0	1	1	0	0	0	1	0	0	1xxxxxxx			Same as for slt
	1	0	1	0	1	1	0	0	1	1	1	0	1xxxxxxx	101011001		
	1	0	1	0	1	1	0	1	0	1	0	0	1xxxxxxx			
	1	0	1	0	1	1	0	1	1	1	0	0	1xxxxxxx			
	1	0	1	0	1	1	1	0	0	1	1	0	1xxxxxxx	101011100		
	1	0	1	0	1	1	1	0	1	1	1	0	1xxxxxxx	101011101		
	1	0	1	0	1	1	1	1	0	1	0	0	1xxxxxxx			
	1	0	1	0	1	1	1	1	1	1	1	0	1xxxxxxx	101011111		

Slice MSB

Instruction	In8 func5	In7 func4	In6 func3	In5 func2	In4 func1	In3 func0	In2 A	In1 B	In0 C	Out3 Ov	Out2 TS	Out1 slt	Out0 R	Ov PLA terms	TS PLA terms	slt PLA terms	R PLA terms
add	1	0	0	0	0	0	0	0	0	0	1	0	0		1xxxxxxx		
	1	0	0	0	0	0	0	0	1	1	1	0	1	100000001	1xxxxxxx		100000001
	1	0	0	0	0	0	0	1	0	0	1	0	1		1xxxxxxx		100000010
	1	0	0	0	0	0	0	1	1	0	1	0	0		1xxxxxxx		
	1	0	0	0	0	0	1	0	0	0	1	0	1		1xxxxxxx		100000100
	1	0	0	0	0	0	1	0	1	0	1	0	0		1xxxxxxx		
	1	0	0	0	0	0	1	1	0	1	1	0	0	100000110	1xxxxxxx		
	1	0	0	0	0	0	1	1	1	0	1	0	1		1xxxxxxx		100000111
addu	1	0	0	0	0	1	0	0	0	0	1	0	0		1xxxxxxx		
	1	0	0	0	0	1	0	0	1	1	1	0	1	100001001	1xxxxxxx		100001001
	1	0	0	0	0	1	0	1	0	0	1	0	1		1xxxxxxx		100001010
	1	0	0	0	0	1	0	1	1	0	1	0	0		1xxxxxxx		

Instruction	In8 func5	In7 func4	In6 func3	In5 func2	In4 func1	In3 func0	In2 A	In1 B	In0 slt	Out2 TS	Out1 Co	Out0 R	TS PLA terms	Co PLA terms	R PLA terms
	1	0	0	0	0	1	1	0	0	0	1	0	1	1xxxxxxx		100001100
	1	0	0	0	0	1	1	0	1	0	1	0	0	1xxxxxxx		
	1	0	0	0	0	1	1	1	0	1	1	0	0	100001110	1xxxxxxx	
	1	0	0	0	0	1	1	1	1	0	1	0	1	1xxxxxxx		100001111
sub	1	0	0	0	1	0	0	0	0	0	1	0	1	1xxxxxxx		100010000
	1	0	0	0	1	0	0	0	1	0	1	0	0	1xxxxxxx		
	1	0	0	0	1	0	0	1	0	0	1	0	0	1xxxxxxx		
	1	0	0	0	1	0	0	1	1	1	1	0	1	100010011	1xxxxxxx	100010011
	1	0	0	0	1	0	1	0	0	1	1	0	0	100010100	1xxxxxxx	
	1	0	0	0	1	0	1	0	1	0	1	0	1	1xxxxxxx		100010101
	1	0	0	0	1	0	1	1	0	0	1	0	1	1xxxxxxx		100010110
	1	0	0	0	1	0	1	1	1	0	1	0	0	1xxxxxxx		
subu	1	0	0	0	1	1	0	0	0	0	1	0	1	1xxxxxxx		100011000
	1	0	0	0	1	1	0	0	1	0	1	0	0	1xxxxxxx		
	1	0	0	0	1	1	0	1	0	0	1	0	0	1xxxxxxx		
	1	0	0	0	1	1	0	1	1	1	1	0	1	100011011	1xxxxxxx	100011011
	1	0	0	0	1	1	1	0	0	1	1	0	0	100011100	1xxxxxxx	
	1	0	0	0	1	1	1	0	1	0	1	0	1	1xxxxxxx		100011101
	1	0	0	0	1	1	1	1	0	0	1	0	1	1xxxxxxx		100011110
	1	0	0	0	1	1	1	1	1	0	1	0	0	1xxxxxxx		
and	1	0	0	1	0	0	0	0	0	0	1	0	0	1xxxxxxx		
	1	0	0	1	0	0	0	0	1	0	1	0	0	1xxxxxxx		
	1	0	0	1	0	0	0	1	0	0	1	0	0	1xxxxxxx		
	1	0	0	1	0	0	0	1	1	0	1	0	0	1xxxxxxx		
	1	0	0	1	0	0	1	0	0	0	1	0	0	1xxxxxxx		
	1	0	0	1	0	0	1	0	1	0	1	0	0	1xxxxxxx		
	1	0	0	1	0	0	1	1	0	0	1	0	1	1xxxxxxx		100100110
	1	0	0	1	0	0	1	1	1	0	1	0	1	1xxxxxxx		100100111
or	1	0	0	1	0	1	0	0	0	0	1	0	0	1xxxxxxx		
	1	0	0	1	0	1	0	0	1	0	1	0	0	1xxxxxxx		
	1	0	0	1	0	1	0	1	0	0	1	0	1	1xxxxxxx		100101010
	1	0	0	1	0	1	0	1	1	0	1	0	1	1xxxxxxx		100101011
	1	0	0	1	0	1	1	0	0	0	1	0	1	1xxxxxxx		100101100
	1	0	0	1	0	1	1	0	1	0	1	0	1	1xxxxxxx		100101101
	1	0	0	1	0	1	1	1	0	0	1	0	1	1xxxxxxx		100101110
	1	0	0	1	0	1	1	1	1	0	1	0	1	1xxxxxxx		100101111
xor	1	0	0	1	1	0	0	0	0	0	1	0	0	1xxxxxxx		
	1	0	0	1	1	0	0	0	1	0	1	0	0	1xxxxxxx		
	1	0	0	1	1	0	0	1	0	0	1	0	1	1xxxxxxx		100110010
	1	0	0	1	1	0	0	1	1	0	1	0	1	1xxxxxxx		100110011
	1	0	0	1	1	0	1	0	0	0	1	0	1	1xxxxxxx		100110100
	1	0	0	1	1	0	1	0	1	0	1	0	1	1xxxxxxx		100110101
	1	0	0	1	1	0	1	1	0	0	1	0	0	1xxxxxxx		
	1	0	0	1	1	0	1	1	1	0	1	0	0	1xxxxxxx		
nor	1	0	0	1	1	1	0	0	0	0	1	0	1	1xxxxxxx		100111000
	1	0	0	1	1	1	0	0	1	0	1	0	1	1xxxxxxx		100111001
	1	0	0	1	1	1	0	1	0	0	1	0	0	1xxxxxxx		
	1	0	0	1	1	1	0	1	1	0	1	0	0	1xxxxxxx		
	1	0	0	1	1	1	1	0	0	0	1	0	0	1xxxxxxx		
	1	0	0	1	1	1	1	0	1	0	1	0	0	1xxxxxxx		
	1	0	0	1	1	1	1	1	0	0	1	0	0	1xxxxxxx		
	1	0	0	1	1	1	1	1	1	0	1	0	0	1xxxxxxx		
slt	1	0	1	0	1	0	0	0	0	0	1	1	0	1xxxxxxx	101010000	
	1	0	1	0	1	0	0	0	1	0	1	0	0	1xxxxxxx		
	1	0	1	0	1	0	0	1	0	0	1	0	0	1xxxxxxx		
	1	0	1	0	1	0	0	1	1	0	1	0	0	1xxxxxxx		
	1	0	1	0	1	0	1	0	0	0	1	1	0	1xxxxxxx	101010100	
	1	0	1	0	1	0	1	0	1	0	1	1	0	1xxxxxxx	101010101	
	1	0	1	0	1	0	1	1	0	0	1	1	0	1xxxxxxx	101010110	
	1	0	1	0	1	0	1	1	1	0	1	0	0	1xxxxxxx		
sltu	1	0	1	0	1	1	0	0	0	0	1	1	0	1xxxxxxx	101011000	
	1	0	1	0	1	1	0	0	1	0	1	0	0	1xxxxxxx		
	1	0	1	0	1	1	0	1	0	0	1	1	0	1xxxxxxx	101011010	
	1	0	1	0	1	1	0	1	1	0	1	1	0	1xxxxxxx	101011011	
	1	0	1	0	1	1	1	0	0	0	1	0	0	1xxxxxxx		
	1	0	1	0	1	1	1	0	1	0	1	0	0	1xxxxxxx		
	1	0	1	0	1	1	1	1	0	0	1	1	0	1xxxxxxx	101011110	
	1	0	1	0	1	1	1	1	1	0	1	0	0	1xxxxxxx		

Slice 0				PLA Inputs						PLA outputs					
	In8	In7	In6	In5	In4	In3	In2	In1	In0	Out2	Out1	Out0			
Instruction	func5	func4	func3	func2	func1	func0	A	B	slt	TS	Co	R	TS PLA terms	Co PLA terms	R PLA terms
add	1	0	0	0	0	0	0	0	0	1	0	0	1xxxxxxx		
	1	0	0	0	0	0	0	0	1	1	0	0	1xxxxxxx		
	1	0	0	0	0	0	0	1	0	1	0	1	1xxxxxxx		100000010
	1	0	0	0	0	0	0	1	1	1	0	1	1xxxxxxx		100000011
	1	0	0	0	0	0	1	0	0	1	0	1	1xxxxxxx		100000100
	1	0	0	0	0	0	1	0	1	1	0	1	1xxxxxxx		100000101
	1	0	0	0	0	0	1	1	0	1	1	0	1xxxxxxx	100000110	
	1	0	0	0	0	0	1	1	1	1	1	0	1xxxxxxx	100000111	
addu	1	0	0	0	0	1	0	0	0	1	0	0	1xxxxxxx		
	1	0	0	0	0	1	0	0	1	1	0	0	1xxxxxxx		
	1	0	0	0	0	1	0	1	0	1	0	1	1xxxxxxx		100001010
	1	0	0	0	0	1	0	1	1	1	0	1	1xxxxxxx		100001011
	1	0	0	0	0	1	1	0	0	1	0	1	1xxxxxxx		100001100
	1	0	0	0	0	1	1	0	1	1	0	1	1xxxxxxx		100001101
	1	0	0	0	0	1	1	1	0	1	1	0	1xxxxxxx	100001110	
	1	0	0	0	0	1	1	1	1	1	1	0	1xxxxxxx		100001111
sub	1	0	0	0	1	0	0	0	0	1	1	0	1xxxxxxx	100010000	
	1	0	0	0	1	0	0	0	1	1	1	0	1xxxxxxx	100010001	
	1	0	0	0	1	0	0	1	0	1	0	1	1xxxxxxx		100010010
	1	0	0	0	1	0	0	1	1	1	0	1	1xxxxxxx		100010011
	1	0	0	0	1	0	1	0	0	1	1	1	1xxxxxxx	100010100	100010100
	1	0	0	0	1	0	1	0	1	1	1	1	1xxxxxxx	100010101	100010101
	1	0	0	0	1	0	1	1	0	1	1	0	1xxxxxxx	100010110	
	1	0	0	0	1	0	1	1	1	1	1	0	1xxxxxxx	100010111	
subu	1	0	0	0	1	1	0	0	0	1	1	0	1xxxxxxx	100011000	
	1	0	0	0	1	1	0	0	1	1	1	0	1xxxxxxx	100011001	
	1	0	0	0	1	1	0	1	0	1	0	1	1xxxxxxx		100011010
	1	0	0	0	1	1	0	1	1	1	0	1	1xxxxxxx		100011011
	1	0	0	0	1	1	1	0	0	1	1	1	1xxxxxxx	100011100	100011100
	1	0	0	0	1	1	1	0	1	1	1	1	1xxxxxxx	100011101	100011101
	1	0	0	0	1	1	1	1	0	1	1	0	1xxxxxxx	100011110	

Op															
	1	0	0	0	1	1	1	1	1	1	1	0	1xxxxxxx	100010111	
and	1	0	0	1	0	0	0	0	0	1	0	0	1xxxxxxx		
	1	0	0	1	0	0	0	0	1	1	0	0	1xxxxxxx		
	1	0	0	1	0	0	0	1	0	1	0	0	1xxxxxxx		
	1	0	0	1	0	0	0	1	1	1	0	0	1xxxxxxx		
	1	0	0	1	0	0	1	0	0	1	0	0	1xxxxxxx		
	1	0	0	1	0	0	1	0	1	1	0	0	1xxxxxxx		
	1	0	0	1	0	0	1	1	0	1	0	1	1xxxxxxx	100100110	
	1	0	0	1	0	0	1	1	1	1	0	1	1xxxxxxx	100100111	
or	1	0	0	1	0	1	0	0	0	1	0	0	1xxxxxxx		
	1	0	0	1	0	1	0	0	1	1	0	0	1xxxxxxx		
	1	0	0	1	0	1	0	1	0	1	0	1	1xxxxxxx	100101010	
	1	0	0	1	0	1	0	1	1	1	0	1	1xxxxxxx	100101011	
	1	0	0	1	0	1	1	0	0	1	0	1	1xxxxxxx	100101100	
	1	0	0	1	0	1	1	0	1	1	0	1	1xxxxxxx	100101101	
	1	0	0	1	0	1	1	1	0	1	0	1	1xxxxxxx	100101110	
	1	0	0	1	0	1	1	1	1	1	0	1	1xxxxxxx	100101111	
xor	1	0	0	1	1	0	0	0	0	1	0	0	1xxxxxxx		
	1	0	0	1	1	0	0	0	1	1	0	0	1xxxxxxx		
	1	0	0	1	1	0	0	1	0	1	0	1	1xxxxxxx	100110010	
	1	0	0	1	1	0	0	1	1	1	0	1	1xxxxxxx	100110011	
	1	0	0	1	1	0	1	0	0	1	0	1	1xxxxxxx	100110100	
	1	0	0	1	1	0	1	0	1	1	0	1	1xxxxxxx	100110101	
	1	0	0	1	1	0	1	1	0	1	0	0	1xxxxxxx		
	1	0	0	1	1	0	1	1	1	1	0	0	1xxxxxxx		
nor	1	0	0	1	1	1	0	0	0	1	0	1	1xxxxxxx	100111000	
	1	0	0	1	1	1	0	0	1	1	0	1	1xxxxxxx	100111001	
	1	0	0	1	1	1	0	1	0	1	0	0	1xxxxxxx		
	1	0	0	1	1	1	0	1	1	1	0	0	1xxxxxxx		
	1	0	0	1	1	1	1	0	0	1	0	0	1xxxxxxx		
	1	0	0	1	1	1	1	0	1	1	0	0	1xxxxxxx		
	1	0	0	1	1	1	1	1	0	1	0	0	1xxxxxxx		
	1	0	0	1	1	1	1	1	1	1	0	0	1xxxxxxx		
slt	1	0	1	0	1	0	0	0	0	1	1	0	1xxxxxxx	101010000	
	1	0	1	0	1	0	0	0	1	1	1	1	1xxxxxxx	101010001	101010001
	1	0	1	0	1	0	0	1	0	1	0	0	1xxxxxxx		
	1	0	1	0	1	0	0	1	1	1	0	1	1xxxxxxx		101010011
	1	0	1	0	1	0	1	0	0	1	1	0	1xxxxxxx	101010100	
	1	0	1	0	1	0	1	0	1	1	1	1	1xxxxxxx	101010101	101010101
	1	0	1	0	1	0	1	1	0	1	1	0	1xxxxxxx	101010110	
	1	0	1	0	1	0	1	1	1	1	1	1	1xxxxxxx	101010111	101010111
sltu	1	0	1	0	1	1	0	0	0	1	1	0	1xxxxxxx	101011000	
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	1	0	1	0	1	1	0	1	0	1	0	0	1xxxxxxx		
	1	0	1	0	1	1	0	1	1	1	0	1	1xxxxxxx		101011011
	1	0	1	0	1	1	1	0	0	1	1	0	1xxxxxxx	101011100	
	1	0	1	0	1	1	1	0	1	1	1	1	1xxxxxxx	101011101	101011101
	1	0	1	0	1	1	1	1	0	1	1	0	1xxxxxxx	101011110	
	1	0	1	0	1	1	1	1	1	1	1	1	1xxxxxxx	101011111	101011111