ALU Slices PLA truth tables

Instructor: Prof. Lei

Slices 1-30

	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	Ci	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	1xxxxxxxx			Co, R = A + B+ C	
	1	0	0	0	0	0	0	0	1	1	0	1	1xxxxxxxx		100000001		
	1	0	0	0	0	0	0	1	0	1	0	1	1xxxxxxxx		100000010		
	1	0	0	0	0	0	0	1	1	1	1	0	1xxxxxxxx	100000011			
	1	0	0	0	0	0	1	0	0	1	0	1	1xxxxxxxx		100000100		
	1	0	0	0	0	0	1	0	1	1	1	0	1xxxxxxxx	100000101			
	1	0	0	0	0	0	1	1	0	1	1	0	1xxxxxxxx	100000110			
	1	0	0	0	0	0	1	1	1	1	1	1	1xxxxxxxx	100000111	100000111		
addu	1	0	0	0	0	1	0	0	0	1	0	0	1xxxxxxxx			same as add	
	1	0	0	0	0	1	0	0	1	1	0	1	1xxxxxxxx		100001001		
	1	0	0	0	0	1	0	1	0	1	0	1	1xxxxxxxx		100001010		
	1	0	0	0	0	1	0	1	1	1	1	0	1xxxxxxxx	100001011			
	1	0	0	0	0	1	1	0	0	1	0	1	1xxxxxxxx		100001100		
	1	0	0	0	0	1	1	0	1	1	1	0	1xxxxxxxx	100001101			
	1	0	0	0	0	1	1	1	0	1	1	0	1xxxxxxxx	100001110			
	1	0	0	0	0	1	1	1	1	1	1	1	1xxxxxxxx	100001111	100001111		
sub	1	0	0	0	1	0	0	0	0	1	0	1	1xxxxxxxx		100010000	Co,R = A+B'+Ci	
	1	0	0	0	1	0	0	0	1	1	1	0	1xxxxxxxx	100010001			
	1	0	0	0	1	0	0	1	0	1	0	0	1xxxxxxxx				
	1	0	0	0	1	0	0	1	1	1	0	1	1xxxxxxxx		100010011		
	1	0	0	0	1	0	1	0	0	1	1	0	1xxxxxxxx	100010100			
	1	0	0	0	1	0	1	0	1	1	1	1	1xxxxxxxx	100010101	100010101		
	1	0	0	0	1	0	1	1	0	1	0	1	1xxxxxxxx		100010110		
	1	0	0	0	1	0	1	1	1	1	1	0	1xxxxxxxx	100010111			
subu	1	0	0	0	1	1	0	0	0	1	0	1	1xxxxxxxx		100011000	same as sub	
	1	0	0	0	1	1	0	0	1	1	1	0	1xxxxxxxx	100011001			
	1	0	0	0	1	1	0	1	0	1	0	0	1xxxxxxxx				
	1	0	0	0	1	1	0	1	1	1	0	1	1xxxxxxxx		100011011		
	1	0	0	0	1	1	1	0	0	1	1	0	1xxxxxxxx	100011100			
	1	0	0	0	1	1	1	0	1	1	1	1	1xxxxxxxx	100011101	100011101		
	1	0	0	0	1	1	1	1	0	1	0	1	1xxxxxxxx		100011110		
	1	0	0	0	1	1	1	1	1	1	1	0	1xxxxxxxx	100011111			
and	1	0	0	1	0	0	0	0	0	1	0	0	1xxxxxxxx			R = A & B; Co = 0	
0X24	1	0	0	1	0	0	0	0	1	1	0	0	1xxxxxxxx				
	1	0	0	1	0	0	0	1	0	1	0	0	1xxxxxxxx				
	1	0	0	1	0	0	0	1	1	1	0	0	1xxxxxxxx				
	1	0	0	1	0	0	1	0	0	1	0	0	1xxxxxxxx				
	1	0	0	1	0	0	1	0	1	1	0	0	1xxxxxxxx				
	1	0	0	1	0	0	1	1	0	1	0	1	1xxxxxxxx				
	1	0	0	1	0	0	1	1	1	1	0	1	1xxxxxxxx		100100111		
or	1	0	0	1	0	1	0	0	0	1	0	0	1xxxxxxxx			R = A I B; Co = 0	
	1	0	0	1	0	1	0	0	1	1	0	0	1xxxxxxxx				
	1	0	0	1	0	1	0	1	0	1	0	1	1xxxxxxxx		100101010		
	1	0	0	1	0	1	0	1	1	1	0	1	1xxxxxxxx		100101011		
	1	0	0	1	0	1	1	0	0	1	0	1	1xxxxxxxx		100101100		
	1	0	0	1	0	1	1	0	1	1	0	1	1xxxxxxxx		100101101		
	1	0	0	1	0	1	1	1	0	1	0	1	1xxxxxxxx		100101110		
	1	0	0	1	0	1	1	1	1	1	0	1	1xxxxxxxx		100101111		
xor	1	0	0	1	1	0	0	0	0	1	0	0	1xxxxxxxx			R = A^B; Co = 0	
	1	0	0	1	1	0	0	0	1	1	0	0	1xxxxxxxx				
	1	0	0	1	1	0	0	1	0	1	0	1	1xxxxxxxx		100110010		
	1	0	0	1	1	0	0	1	1	1	0	1	1xxxxxxxx		100110011		
	1	0	0	1	1	0	1	0	0	1	0	1	1xxxxxxxx		100110100		
	1	0	0	1	1	0	1	0	1	1	0	1	1xxxxxxxx		100110101		
	1	0	0	1	1	0	1	1	0	1	0	0	1xxxxxxxx				
	1	0	0	1	1	0	1	1	1	1	0	0	1xxxxxxxx				
nor	1	0	0	1	1	1	0	0	0	1	0	1	1xxxxxxxx		100111000	R = (A I B)'; Co = 0	
	1	0	0	1	1	1	0	0	1	1	0	1	1xxxxxxxx		100111001		
	1	0	0	1	1	1	0	1	0	1	0	0	1xxxxxxxx				
	1	0	0	1	1	1	0	1	1	1	0	0	1xxxxxxxx				
	1	0	0	1	1	1	1	0	0	1	0	0	1xxxxxxxx				
	1	0	0	1	1	1	1	0	1	1	0	0	1xxxxxxxx				
	1	0	0	1	1	1	1	1	0	1	0	0	1xxxxxxxx				
	1	0	0	1	1	1	1	1	1	1	0	0	1xxxxxxxx				
slt	1	0	1	0	1	0	0	0	0	1	0	0	1xxxxxxxx			Co same as for sub/subu; R = 0	
	1	0	1	0	1	0	0	0	1	1	1	0	1xxxxxxxx	101010001			
	1	0	1	0	1	0	0	1	0	1	0	0	1xxxxxxxx				
	1	0	1	0	1	0	0	1	1	1	0	0	1xxxxxxxx				
	1	0	1	0	1	0	1	0	0	1	1	0	1xxxxxxxx	101010100			
	1	0	1	0	1	0	1	0	1	1	1	0	1xxxxxxxx	101010101			
	1	0	1	0	1	0	1	1	0	1	0	0	1xxxxxxxx				
	1	0	1	0	1	0	1	1	1	1	1	0	1xxxxxxxx	101010111			

sltu	1	0	1	0	1	1	0	0	0	1	0	0	1xxxxxxxx			Same as for slt	
	1	0	1	0	1	1	0	0	1	1	1	0	1xxxxxxxx	101011001			
	1	0	1	0	1	1	0	1	0	1	0	0	1xxxxxxxx				
	1	0	1	0	1	1	0	1	1	1	0	0	1xxxxxxxx				
	1	0	1	0	1	1	1	0	0	1	1	0	1xxxxxxxx	101011100			
	1	0	1	0	1	1	1	0	1	1	1	0	1xxxxxxxx	101011101			
	1	0	1	0	1	1	1	1	0	1	0	0	1xxxxxxxx				
	1	0	1	0	1	1	1	1	1	1	1	0	1xxxxxxxx	101011111			

Slice MSB	PLA inputs									PLA outputs							
	In8	**In7**	**In6**	**In5**	**In4**	**In3**	**In2**	**In1**	**In0**	**Out3**	**Out2**	**Out1**	**Out0**				
Instruction	**func5**	**func4**	**func3**	**func2**	**func1**	**func0**	**A**	**B**	**C**	**Ov**	**TS**	**slt**	**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		1xxxxxxxx		
	1	0	0	0	0	0	0	0	1	1	1	0	1	100000001	1xxxxxxxx		100000001
	1	0	0	0	0	0	0	1	0	0	1	0	1		1xxxxxxxx		100000010
	1	0	0	0	0	0	0	1	1	0	1	0	0		1xxxxxxxx		
	1	0	0	0	0	0	1	0	0	0	1	0	1		1xxxxxxxx		100000100
	1	0	0	0	0	0	1	0	1	0	1	0	0		1xxxxxxxx		
	1	0	0	0	0	0	1	1	0	1	1	0	0	100000110	1xxxxxxxx		
	1	0	0	0	0	0	1	1	1	0	1	0	1		1xxxxxxxx		100000111
addu	1	0	0	0	0	1	0	0	0	0	1	0	0		1xxxxxxxx		
	1	0	0	0	0	1	0	0	1	1	1	0	1	100001001	1xxxxxxxx		100001001
	1	0	0	0	0	1	0	1	0	0	1	0	1		1xxxxxxxx		100001010
	1	0	0	0	0	1	0	1	1	0	1	0	0		1xxxxxxxx		
	1	0	0	0	0	1	1	0	0	0	1	0	1		1xxxxxxxx		100001100
	1	0	0	0	0	1	1	0	1	0	1	0	0		1xxxxxxxx		
	1	0	0	0	0	1	1	1	0	1	1	0	0	100001110	1xxxxxxxx		
	1	0	0	0	0	1	1	1	1	0	1	0	1		1xxxxxxxx		100001111
sub	1	0	0	0	1	0	0	0	0	0	1	0	1		1xxxxxxxx		100010000
	1	0	0	0	1	0	0	0	1	0	1	0	0		1xxxxxxxx		
	1	0	0	0	1	0	0	1	0	0	1	0	0		1xxxxxxxx		
	1	0	0	0	1	0	0	1	1	1	1	0	1	100010011	1xxxxxxxx		100010011
	1	0	0	0	1	0	1	0	0	1	1	0	0	100010100	1xxxxxxxx		
	1	0	0	0	1	0	1	0	1	0	1	0	1		1xxxxxxxx		100010101
	1	0	0	0	1	0	1	1	0	0	1	0	1		1xxxxxxxx		100010110
	1	0	0	0	1	0	1	1	1	0	1	0	0		1xxxxxxxx		
subu	1	0	0	0	1	1	0	0	0	0	1	0	1		1xxxxxxxx		100011000
	1	0	0	0	1	1	0	0	1	0	1	0	0		1xxxxxxxx		
	1	0	0	0	1	1	0	1	0	0	1	0	0		1xxxxxxxx		
	1	0	0	0	1	1	0	1	1	1	1	0	1	100011011	1xxxxxxxx		100011011
	1	0	0	0	1	1	1	0	0	1	1	0	0	100011100	1xxxxxxxx		
	1	0	0	0	1	1	1	0	1	0	1	0	1		1xxxxxxxx		100011101
	1	0	0	0	1	1	1	1	0	0	1	0	1		1xxxxxxxx		100011110
	1	0	0	0	1	1	1	1	1	0	1	0	0		1xxxxxxxx		
and	1	0	0	1	0	0	0	0	0	0	1	0	0		1xxxxxxxx		
	1	0	0	1	0	0	0	0	1	0	1	0	0		1xxxxxxxx		
	1	0	0	1	0	0	0	1	0	0	1	0	0		1xxxxxxxx		
	1	0	0	1	0	0	0	1	1	0	1	0	0		1xxxxxxxx		
	1	0	0	1	0	0	1	0	0	0	1	0	0		1xxxxxxxx		
	1	0	0	1	0	0	1	0	1	0	1	0	0		1xxxxxxxx		
	1	0	0	1	0	0	1	1	0	0	1	0	1		1xxxxxxxx		100100110
	1	0	0	1	0	0	1	1	1	0	1	0	1		1xxxxxxxx		100100111
or	1	0	0	1	0	1	0	0	0	0	1	0	0		1xxxxxxxx		
	1	0	0	1	0	1	0	0	1	0	1	0	0		1xxxxxxxx		
	1	0	0	1	0	1	0	1	0	0	1	0	1		1xxxxxxxx		100101010
	1	0	0	1	0	1	0	1	1	0	1	0	1		1xxxxxxxx		100101011
	1	0	0	1	0	1	1	0	0	0	1	0	1		1xxxxxxxx		100101100
	1	0	0	1	0	1	1	0	1	0	1	0	1		1xxxxxxxx		100101101
	1	0	0	1	0	1	1	1	0	0	1	0	1		1xxxxxxxx		100101110
	1	0	0	1	0	1	1	1	1	0	1	0	1		1xxxxxxxx		100101111
xor	1	0	0	1	1	0	0	0	0	0	1	0	0		1xxxxxxxx		
	1	0	0	1	1	0	0	0	1	0	1	0	0		1xxxxxxxx		
	1	0	0	1	1	0	0	1	0	0	1	0	1		1xxxxxxxx		100110010
	1	0	0	1	1	0	0	1	1	0	1	0	1		1xxxxxxxx		100110011
	1	0	0	1	1	0	1	0	0	0	1	0	1		1xxxxxxxx		100110100
	1	0	0	1	1	0	1	0	1	0	1	0	1		1xxxxxxxx		100110101
	1	0	0	1	1	0	1	1	0	0	1	0	0		1xxxxxxxx		
	1	0	0	1	1	0	1	1	1	0	1	0	0		1xxxxxxxx		
nor	1	0	0	1	1	1	0	0	0	0	1	0	1		1xxxxxxxx		100111000
	1	0	0	1	1	1	0	0	1	0	1	0	1		1xxxxxxxx		100111001
	1	0	0	1	1	1	0	1	0	0	1	0	0		1xxxxxxxx		
	1	0	0	1	1	1	0	1	1	0	1	0	0		1xxxxxxxx		
	1	0	0	1	1	1	1	0	0	0	1	0	0		1xxxxxxxx		
	1	0	0	1	1	1	1	0	1	0	1	0	0		1xxxxxxxx		
	1	0	0	1	1	1	1	1	0	0	1	0	0		1xxxxxxxx		
	1	0	0	1	1	1	1	1	1	0	1	0	0		1xxxxxxxx		
slt	1	0	1	0	1	0	0	0	0	0	1	1	0		1xxxxxxxx	101010000	

	1	0	1	0	1	0	0	0	1	0	1	0	0		1xxxxxxxx	
	1	0	1	0	1	0	0	1	0	0	1	0	0		1xxxxxxxx	
	1	0	1	0	1	0	0	1	1	0	1	0	0		1xxxxxxxx	
	1	0	1	0	1	0	1	0	0	0	1	1	0		1xxxxxxxx	101010100
	1	0	1	0	1	0	1	0	1	0	1	1	0		1xxxxxxxx	101010101
	1	0	1	0	1	0	1	1	0	0	1	1	0		1xxxxxxxx	101010110
	1	0	1	0	1	0	1	1	1	0	1	0	0		1xxxxxxxx	
sltu	1	0	1	0	1	1	0	0	0	0	1	1	0		1xxxxxxxx	101011000
	1	0	1	0	1	1	0	0	1	0	1	0	0		1xxxxxxxx	
	1	0	1	0	1	1	0	1	0	0	1	1	0		1xxxxxxxx	101011010
	1	0	1	0	1	1	0	1	1	0	1	1	0		1xxxxxxxx	101011011
	1	0	1	0	1	1	1	0	0	0	1	0	0		1xxxxxxxx	
	1	0	1	0	1	1	1	0	1	0	1	0	0		1xxxxxxxx	
	1	0	1	0	1	1	1	1	0	0	1	1	0		1xxxxxxxx	101011110
	1	0	1	0	1	1	1	1	1	0	1	0	0		1xxxxxxxx	

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	1xxxxxxxx		
	1	0	0	0	0	0	0	0	1	1	0	0	1xxxxxxxx		
	1	0	0	0	0	0	0	1	0	1	0	1	1xxxxxxxx		100000010
	1	0	0	0	0	0	0	1	1	1	0	1	1xxxxxxxx		100000011
	1	0	0	0	0	0	1	0	0	1	0	1	1xxxxxxxx		100000100
	1	0	0	0	0	0	1	0	1	1	0	1	1xxxxxxxx		100000101
	1	0	0	0	0	0	1	1	0	1	1	0	1xxxxxxxx	100000110	
	1	0	0	0	0	0	1	1	1	1	1	0	1xxxxxxxx	100000111	
addu	1	0	0	0	0	1	0	0	0	1	0	0	1xxxxxxxx		
	1	0	0	0	0	1	0	0	1	1	0	0	1xxxxxxxx		
	1	0	0	0	0	1	0	1	0	1	0	1	1xxxxxxxx		100001010
	1	0	0	0	0	1	0	1	1	1	0	1	1xxxxxxxx		100001011
	1	0	0	0	0	1	1	0	0	1	0	1	1xxxxxxxx		100001100
	1	0	0	0	0	1	1	0	1	1	0	1	1xxxxxxxx		100001101
	1	0	0	0	0	1	1	1	0	1	1	0	1xxxxxxxx	100001110	
	1	0	0	0	0	1	1	1	1	1	1	0	1xxxxxxxx	100001111	
sub	1	0	0	0	1	0	0	0	0	1	1	0	1xxxxxxxx	100010000	
	1	0	0	0	1	0	0	0	1	1	1	0	1xxxxxxxx	100010001	
	1	0	0	0	1	0	0	1	0	1	0	1	1xxxxxxxx		100010010
	1	0	0	0	1	0	0	1	1	1	0	1	1xxxxxxxx		100010011
	1	0	0	0	1	0	1	0	0	1	1	1	1xxxxxxxx	100010100	100010100
	1	0	0	0	1	0	1	0	1	1	1	1	1xxxxxxxx	100010101	100010101
	1	0	0	0	1	0	1	1	0	1	1	0	1xxxxxxxx	100010110	
	1	0	0	0	1	0	1	1	1	1	1	0	1xxxxxxxx	100010111	
subu	1	0	0	0	1	1	0	0	0	1	1	0	1xxxxxxxx	100011000	
	1	0	0	0	1	1	0	0	1	1	1	0	1xxxxxxxx	100011001	
	1	0	0	0	1	1	0	1	0	1	0	1	1xxxxxxxx		100011010
	1	0	0	0	1	1	0	1	1	1	0	1	1xxxxxxxx		100011011
	1	0	0	0	1	1	1	0	0	1	1	1	1xxxxxxxx	100011100	100011100
	1	0	0	0	1	1	1	0	1	1	1	1	1xxxxxxxx	100011101	100011101
	1	0	0	0	1	1	1	1	0	1	1	0	1xxxxxxxx	100011110	
	1	0	0	0	1	1	1	1	1	1	1	0	1xxxxxxxx	100010111	
and	1	0	0	1	0	0	0	0	0	1	0	0	1xxxxxxxx		
	1	0	0	1	0	0	0	0	1	1	0	0	1xxxxxxxx		
	1	0	0	1	0	0	0	1	0	1	0	0	1xxxxxxxx		
	1	0	0	1	0	0	0	1	1	1	0	0	1xxxxxxxx		
	1	0	0	1	0	0	1	0	0	1	0	0	1xxxxxxxx		
	1	0	0	1	0	0	1	0	1	1	0	0	1xxxxxxxx		
	1	0	0	1	0	0	1	1	0	1	0	1	1xxxxxxxx		100100110
	1	0	0	1	0	0	1	1	1	1	0	1	1xxxxxxxx		100100111
or	1	0	0	1	0	1	0	0	0	1	0	0	1xxxxxxxx		
	1	0	0	1	0	1	0	0	1	1	0	0	1xxxxxxxx		
	1	0	0	1	0	1	0	1	0	1	0	1	1xxxxxxxx		100101010
	1	0	0	1	0	1	0	1	1	1	0	1	1xxxxxxxx		100101011
	1	0	0	1	0	1	1	0	0	1	0	1	1xxxxxxxx		100101100
	1	0	0	1	0	1	1	0	1	1	0	1	1xxxxxxxx		100101101
	1	0	0	1	0	1	1	1	0	1	0	1	1xxxxxxxx		100101110
	1	0	0	1	0	1	1	1	1	1	0	1	1xxxxxxxx		100101111
xor	1	0	0	1	1	0	0	0	0	1	0	0	1xxxxxxxx		
	1	0	0	1	1	0	0	0	1	1	0	0	1xxxxxxxx		
	1	0	0	1	1	0	0	1	0	1	0	1	1xxxxxxxx		100110010
	1	0	0	1	1	0	0	1	1	1	0	1	1xxxxxxxx		100110011
	1	0	0	1	1	0	1	0	0	1	0	1	1xxxxxxxx		100110100
	1	0	0	1	1	0	1	0	1	1	0	1	1xxxxxxxx		100110101
	1	0	0	1	1	0	1	1	0	1	0	0	1xxxxxxxx		
	1	0	0	1	1	0	1	1	1	1	0	0	1xxxxxxxx		
nor	1	0	0	1	1	1	0	0	0	1	0	1	1xxxxxxxx		100111000
	1	0	0	1	1	1	0	0	1	1	0	1	1xxxxxxxx		100111001

	1	0	0	1	1	1	0	1	0	1	0	0	1xxxxxxxx																
	1	0	0	1	1	1	0	1	1	1	0	0	1xxxxxxxx																
	1	0	0	1	1	1	1	0	0	1	0	0	1xxxxxxxx																
	1	0	0	1	1	1	1	0	1	1	0	0	1xxxxxxxx																
	1	0	0	1	1	1	1	1	0	1	0	0	1xxxxxxxx																
	1	0	0	1	1	1	1	1	1	1	0	0	1xxxxxxxx																
slt	1	0	1	0	1	0	0	0	0	1	1	0	1xxxxxxxx	101010000															
	1	0	1	0	1	0	0	0	1	1	1	1	1xxxxxxxx	101010001	101010001														
	1	0	1	0	1	0	0	1	0	1	0	0	1xxxxxxxx																
	1	0	1	0	1	0	0	1	1	1	0	1	1xxxxxxxx		101010011														
	1	0	1	0	1	0	1	0	0	1	1	0	1xxxxxxxx	101010100															
	1	0	1	0	1	0	1	0	1	1	1	1	1xxxxxxxx	101010101	101010101														
	1	0	1	0	1	0	1	1	0	1	1	0	1xxxxxxxx	101010110															
	1	0	1	0	1	0	1	1	1	1	1	1	1xxxxxxxx	101010111	101010111														
sltu	1	0	1	0	1	1	0	0	0	1	1	0	1xxxxxxxx	101011000															
	1	0	1	0	1	1	0	0	1	1	1	1	1xxxxxxxx	101011001	101011001														
	1	0	1	0	1	1	0	1	0	1	0	0	1xxxxxxxx																
	1	0	1	0	1	1	0	1	1	1	0	1	1xxxxxxxx		101011011														
	1	0	1	0	1	1	1	0	0	1	1	0	1xxxxxxxx	101011100															
	1	0	1	0	1	1	1	0	1	1	1	1	1xxxxxxxx	101011101	101011101														
	1	0	1	0	1	1	1	1	0	1	1	0	1xxxxxxxx	101011110															
	1	0	1	0	1	1	1	1	1	1	1	1	1xxxxxxxx	101011111	101011111														