

Resultant decimal number =  $0+2+0+8+0+32 = 42$

2	98	
2	49	0
2	24	1
2	12	0
2	6	0
2	3	0
	1	1

$(98)_{10} = (1100010)_2$

### Hexadecimal to Decimal Conversion

$$(8EB4)_{16} \longrightarrow (?)_{10}$$

$$\begin{aligned}
 &8 \times 16^3 + 14 \times 16^2 + 11 \times 16^1 + 4 \times 16^0 \\
 &32768 + 3584 + 176 + 4 \\
 &(36532)_{10}
 \end{aligned}$$

### Hexadecimal to Binary Conversion

$$(B2E)_{16} \longrightarrow (?)_2$$

B	2	E	
↓	↓	↓	
11	2	14	→ EQUIVALENT DECIMAL VALUE
↓	↓	↓	
1011	0010	1110	→ EQUIVALENT BINARY BITS
→ (101100101110) <sub>2</sub>			








### Decimal to Hexadecimal Conversion

$$(243)_{10} \longrightarrow (?)_{16}$$

16	243	3	↑
15			

→ (F3)<sub>16</sub>

# Basic Logic Gates

Logic	Schematic	Boolean Expression	Truth Table	English Expression															
AND		$A \cdot B = Y$	<table><tr><th>A</th><th>B</th><th>Y</th></tr><tr><td>0</td><td>0</td><td></td></tr><tr><td>0</td><td>1</td><td></td></tr><tr><td>1</td><td>0</td><td></td></tr><tr><td>1</td><td>1</td><td></td></tr></table>	A	B	Y	0	0		0	1		1	0		1	1		The only time the output is positive is when all the inputs are positive.
A	B	Y																	
0	0																		
0	1																		
1	0																		
1	1																		
OR		$A + B = Y$	<table><tr><th>A</th><th>B</th><th>Y</th></tr><tr><td>0</td><td>0</td><td></td></tr><tr><td>0</td><td>1</td><td></td></tr><tr><td>1</td><td>0</td><td></td></tr><tr><td>1</td><td>1</td><td></td></tr></table>	A	B	Y	0	0		0	1		1	0		1	1		The output will be positive when any one or all inputs are positive.
A	B	Y																	
0	0																		
0	1																		
1	0																		
1	1																		
XOR		$A \oplus B = Y$	<table><tr><th>A</th><th>B</th><th>Y</th></tr><tr><td>0</td><td>0</td><td></td></tr><tr><td>0</td><td>1</td><td></td></tr><tr><td>1</td><td>0</td><td></td></tr><tr><td>1</td><td>1</td><td></td></tr></table>	A	B	Y	0	0		0	1		1	0		1	1		The only time the output is positive is when the inputs are not the same.
A	B	Y																	
0	0																		
0	1																		
1	0																		
1	1																		
NOT		$\bar{A} = Y$	<table><tr><th>A</th><th>Y</th></tr><tr><td>0</td><td></td></tr><tr><td>1</td><td></td></tr></table>	A	Y	0		1		The output is the opposite of the input.									
A	Y																		
0																			
1																			
NAND		$\overline{A \cdot B} = Y$	<table><tr><th>A</th><th>B</th><th>Y</th></tr><tr><td>0</td><td>0</td><td></td></tr><tr><td>0</td><td>1</td><td></td></tr><tr><td>1</td><td>0</td><td></td></tr><tr><td>1</td><td>1</td><td></td></tr></table>	A	B	Y	0	0		0	1		1	0		1	1		The output is positive provided all the inputs are not positive.
A	B	Y																	
0	0																		
0	1																		
1	0																		
1	1																		
NOR		$\overline{A + B} = Y$	<table><tr><th>A</th><th>B</th><th>Y</th></tr><tr><td>0</td><td>0</td><td></td></tr><tr><td>0</td><td>1</td><td></td></tr><tr><td>1</td><td>0</td><td></td></tr><tr><td>1</td><td>1</td><td></td></tr></table>	A	B	Y	0	0		0	1		1	0		1	1		The only time the output is positive is when all the inputs are negative.
A	B	Y																	
0	0																		
0	1																		
1	0																		
1	1																		
XNOR		$\overline{A \oplus B} = Y$	<table><tr><th>A</th><th>B</th><th>Y</th></tr><tr><td>0</td><td>0</td><td></td></tr><tr><td>0</td><td>1</td><td></td></tr><tr><td>1</td><td>0</td><td></td></tr><tr><td>1</td><td>1</td><td></td></tr></table>	A	B	Y	0	0		0	1		1	0		1	1		The only time the output is positive is when all the inputs are the same.
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