

# Task 1: Data Rep. and Boolean logic

Save this document in your repository for Unit 2 with name:

**data\_rep\_boolean\_log.md**

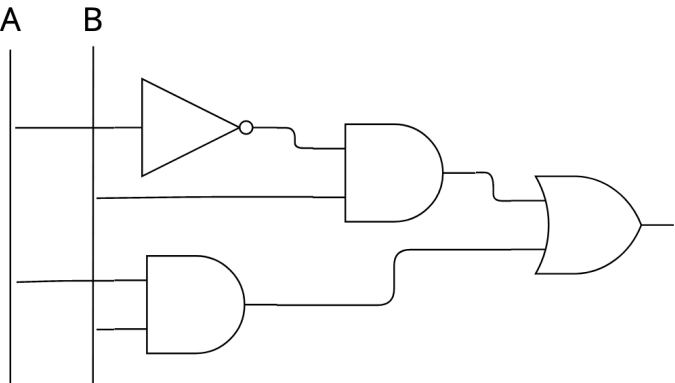
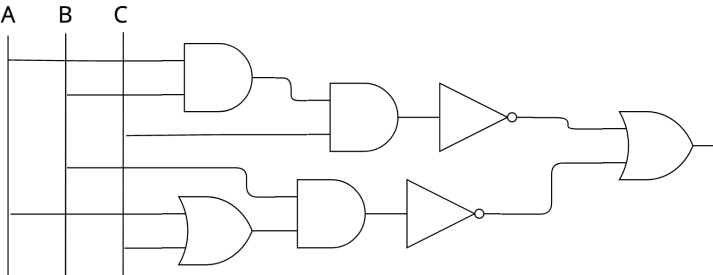
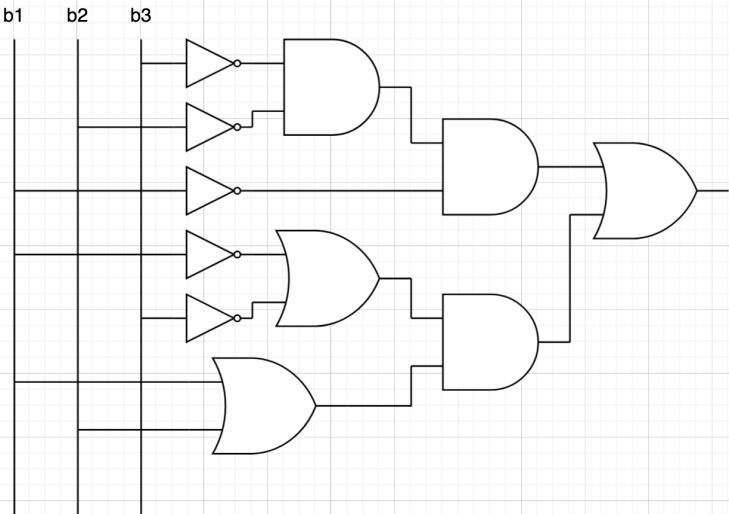
🤔 Resources (Learning Log):

4	<a href="#">Notes Topic 2:</a>	Computer Architecture
5	<a href="#">Boolean Algebra</a>	Video about boolean algebra
6	<a href="#">Examples Base Conversion</a>	Whiteboard notes on conversion of numbers with different bases

## Boolean Logic

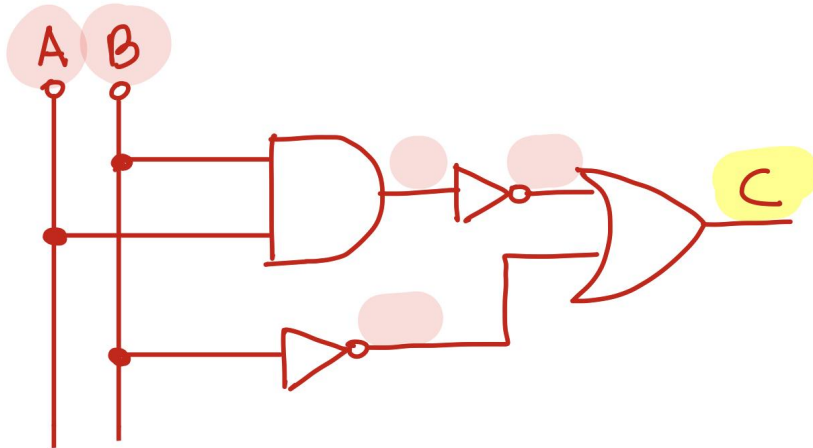
Draw the circuit for the boolean equations provided

Boolean Equation	Circuit
$AB + \overline{(A + B)}$	
$\overline{A(A + B)} + B$	

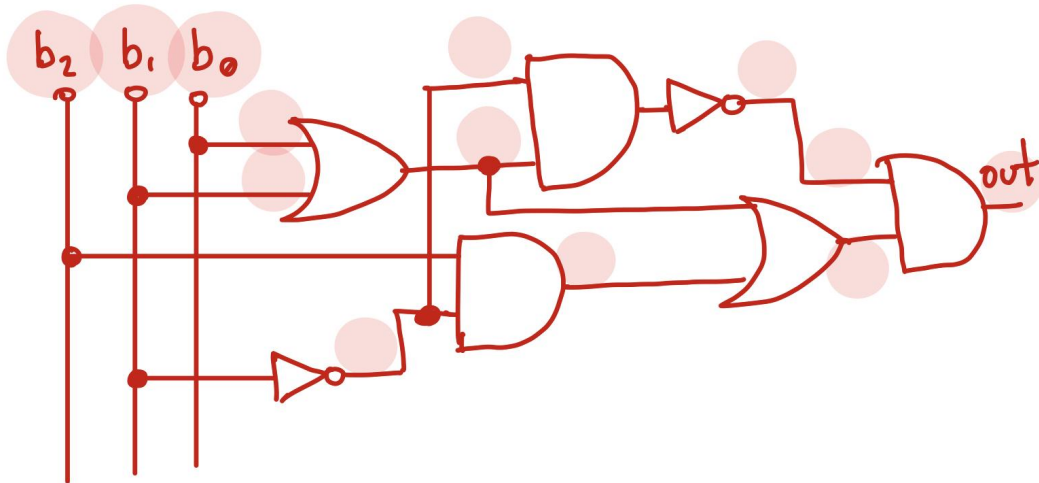
<div>((not A) and B) or (A and B)</div>	<div><div>A B</div></div>
<div><math>\overline{ACB} + \overline{(A + C)B}</math></div>	<div><div>A B C</div></div>
<div><div>[HL]</div><div><math>\overline{b1b2b3} + \overline{(b1 + b3)(b1 + b2)}</math></div></div>	<div><div>b1 b2 b3</div></div>

## Get the Equation

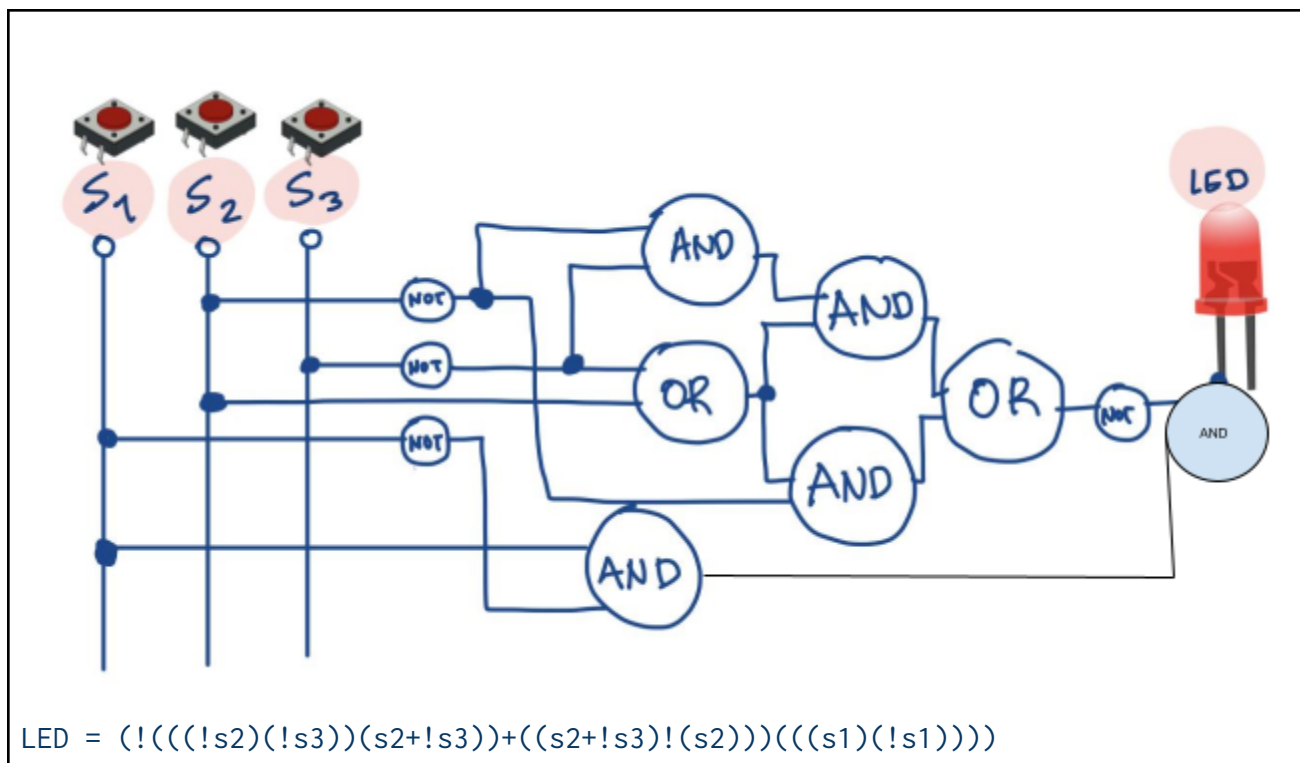
Write the boolean equation for the circuit shown



$$C = !(AB) + !B$$



$$\text{out} = !((b_1+b_0)(!b_1))((b_1+b_0)+(b_2!b_1))$$



## Truth table

Write the truth table for the equations below

Boolean Equation	Truth Table		
X = A and B	A	B	X
	0	0	0
	0	1	0
	1	1	1
	1	0	0
Out = input1 or input2	input1	input2	Out
	0	0	0
	0	1	1
	1	1	1

	<table><tr><td>1</td><td>0</td><td>1</td></tr></table>	1	0	1																																	
1	0	1																																			
$\text{Light} = \overline{S_1} + \overline{(S_2 + S_3)} + S_1 S_2 \overline{S_3}$	<table><tr><th>A</th><th>B</th><th>C</th><th>Light</th></tr><tr><td>0</td><td>0</td><td>0</td><td>T</td></tr><tr><td>0</td><td>0</td><td>1</td><td>T</td></tr><tr><td>0</td><td>1</td><td>0</td><td>T</td></tr><tr><td>0</td><td>1</td><td>1</td><td>T</td></tr><tr><td>1</td><td>0</td><td>0</td><td>T</td></tr><tr><td>1</td><td>0</td><td>1</td><td>F</td></tr><tr><td>1</td><td>1</td><td>0</td><td>T</td></tr><tr><td>1</td><td>1</td><td>1</td><td>F</td></tr></table>	A	B	C	Light	0	0	0	T	0	0	1	T	0	1	0	T	0	1	1	T	1	0	0	T	1	0	1	F	1	1	0	T	1	1	1	F
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<div>[HL]</div> $\text{Login} = \overline{P_1 P_2 P_3} + \overline{(P_3 P_2 P_1)} + \overline{P_1} + P_3$	<table><tr><th><math>P_1</math></th><th><math>P_2</math></th><th><math>P_3</math></th><th>Login</th></tr><tr><td>0</td><td>0</td><td>0</td><td>T</td></tr><tr><td>0</td><td>0</td><td>1</td><td>T</td></tr><tr><td>0</td><td>1</td><td>0</td><td>T</td></tr><tr><td>0</td><td>1</td><td>1</td><td>T</td></tr><tr><td>1</td><td>0</td><td>0</td><td>T</td></tr><tr><td>1</td><td>0</td><td>1</td><td>T</td></tr><tr><td>1</td><td>1</td><td>0</td><td>T</td></tr><tr><td>1</td><td>1</td><td>1</td><td>T</td></tr></table>	$P_1$	$P_2$	$P_3$	Login	0	0	0	T	0	0	1	T	0	1	0	T	0	1	1	T	1	0	0	T	1	0	1	T	1	1	0	T	1	1	1	T
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## Data Conversion

Information can be represented in different systems, for example the number 10 in decimal (system base 10) can be represented in binary (system base 2) as 1010 or 12 in base 8.

It is critical for you to understand how to represent information in different ways, this will help you visualize how the computer processes data.

Original Number	Convert to
256 (Decimal)	Base 2 (Binary) 100000000  Base 4 10000  Base 6 1104
433 (Base 5)	Base 10 (Decimal) 118  Base 8 (Octal) 166

	Base 16 (Hexadecimal)
FA32 (Base 16)	Base 10 64050  Base 2 1111101000110010  Base 8 175062