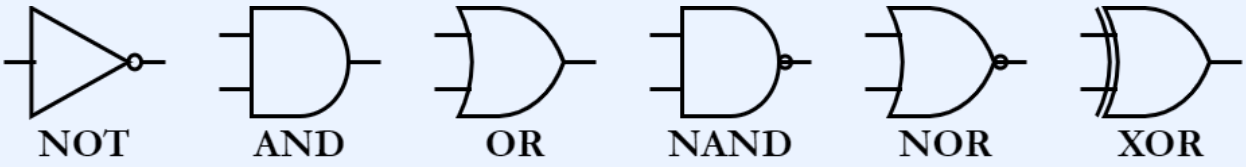
Section 03.2 - Logic Gates and Logic Circuits

Layer 1: Logic Gates

Syllabus Content Section 03: Hardware

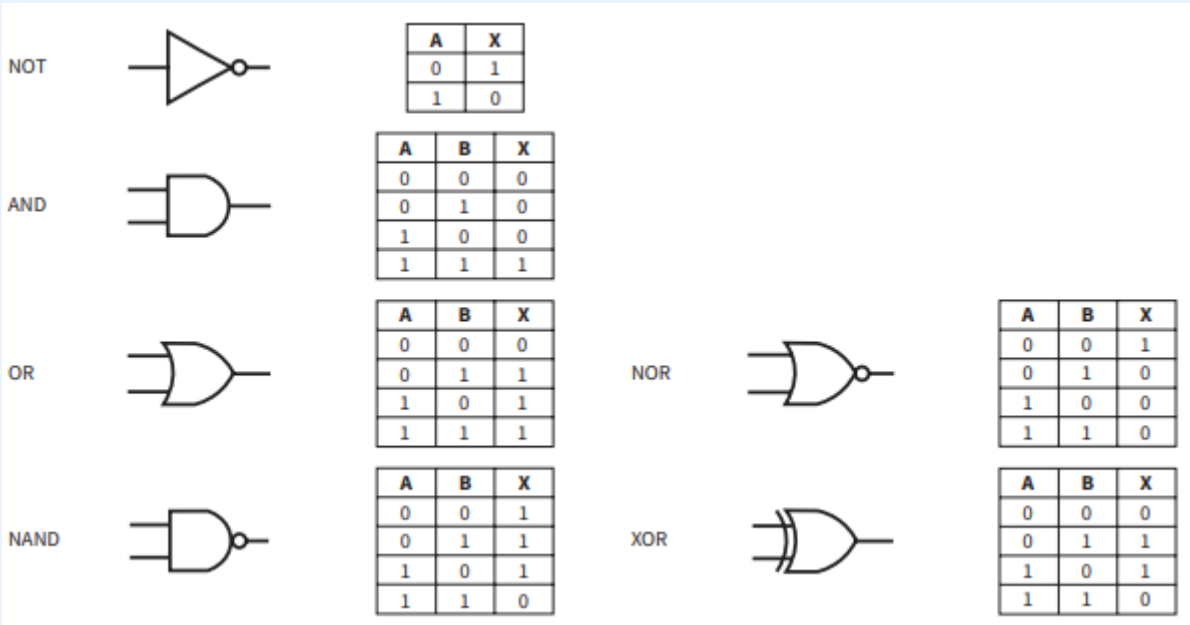
S03.2.1 Use the following logic gate symbols:



Logic proposition: a statement that is either TRUE or FALSE
Problem statement: an informal definition of an outcome which is dependent on one logic proposition or a combination of two or more logic propositions
Logic expression: logic propositions combined using Boolean operators, which may be equated to a defined outcome

S03.2.2 Understand and define the functions of : NOT, AND, OR, NAND, NOR and XOR (EOR) gates

All gates except the NOT gate will have two inputs only.



S03.2.3 Construct the truth table for each of the logic gates above

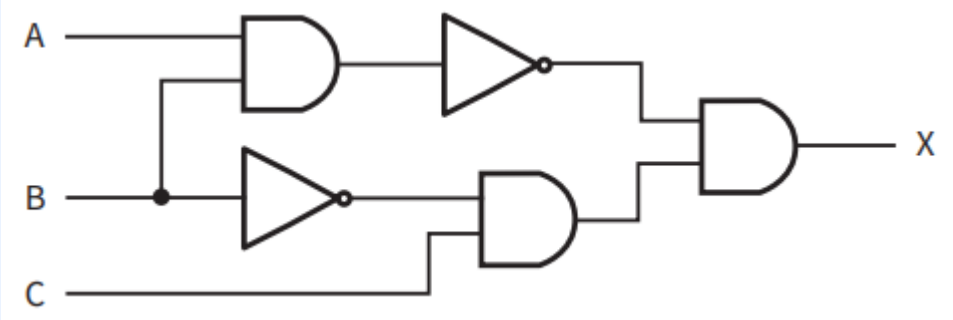
NOT			AND				OR		
Input	Output		Input-1	Input-2	Output		Input-1	Input-2	Outp
0	1		0	0	0		0	0	0
1	0		0	1	0		0	1	1
			1	0	0		1	0	1
			1	1	1		1	1	1

NAND				NOR				XOR	
Input-1	Input-2	Output		Input-1	Input-2	Output		Input-1	Inpu 2
0	0	1		0	0	1		0	0
0	1	1		0	1	0		0	1
1	0	1		1	0	0		1	0
1	1	0		1	1	0		1	1

S03.2.4 Construct a logic circuit

From:

- a problem statement
- a logic expression
- a truth table



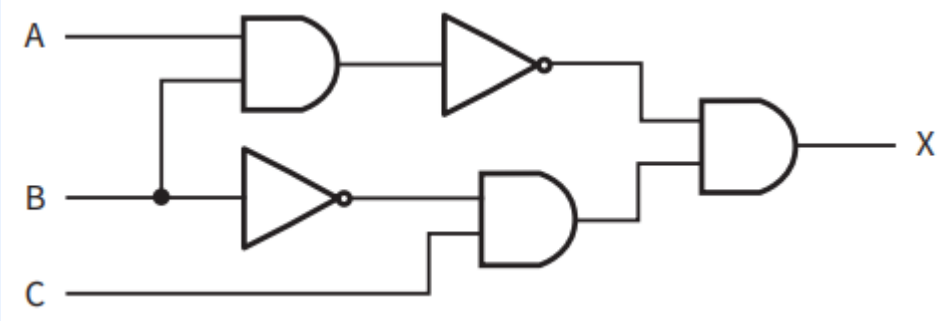
Logic Expression: (NOT(A AND B))AND((NOT B)AND C)
Truth table:

A	B	C	Output
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	0

S03.2.5 Construct a truth table

From:

- a problem statement
- a logic circuit
- a logic expression



Logic Expression: (NOT(A AND B))AND((NOT B)AND C)
Truth table:

A	B	C	Output
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	0
1	0	1	0

A	B	C	Output
1	1	0	1
1	1	1	0

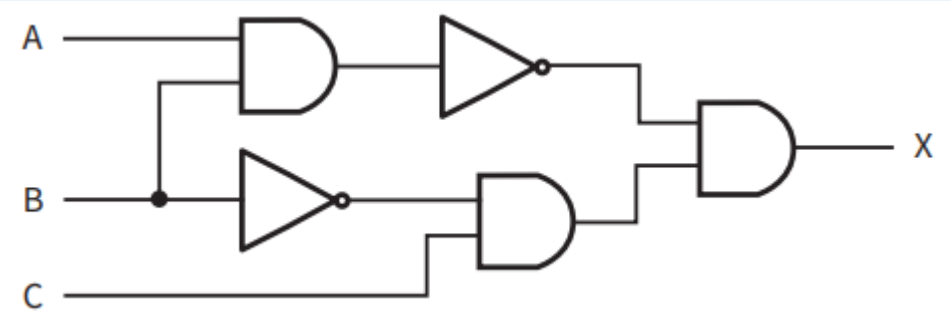
S03.2.6 Construct a logic expression

From:

- a problem statement
- a logic circuit
- a truth table

(NOT(A AND B))AND((NOT B)AND C)

Logic circuit:



Truth table:

A	B	C	Output
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	0