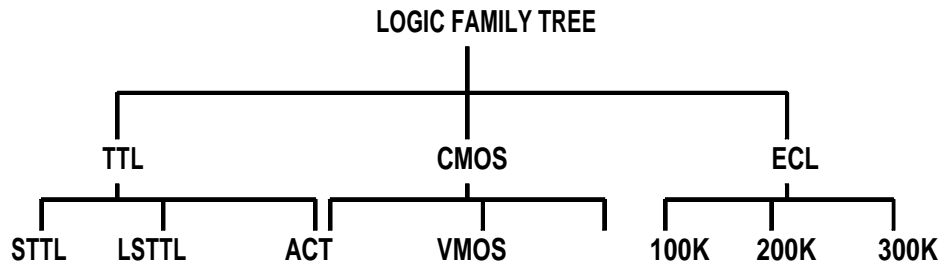


- The required voltages at the inputs to logic gates are determined by the integrated circuit technology in use.
 - Interface circuits allow the voltage levels to be changed for conversion from one family type to another.
 - Logic gates are represented by symbols which are independent of the type of logic technology in use.
-



Logic gate families.

Make choice on basis of

- Speed,
 - Power
 - Size
 - Cost
-

Logical principles are independent of the hardware and of the specific logic family used.

Logic 0	OFF	FALSE	LOW	Not OK	STOP	
Logic 1	ON	TRUE	HIGH	OK	GO	G

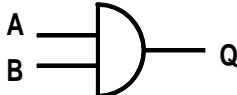
WARNING

It is usually possible to fully test a logic system.

Most catastrophic failures of logic systems occur due to a mistake at the interface.

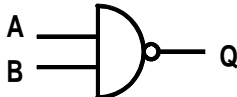
Symbolic representation of logic gates.

A	B	Q
0	0	0
0	1	0
1	0	0
1	1	1



The AND gate.

A	B	Q
0	0	1
0	1	1
1	0	1
1	1	0

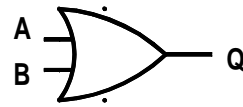


The NAND gate.

Unit 5

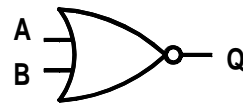
Logic gates

A	B	Q
0	0	0
0	1	1
1	0	1
1	1	1



The OR gate.

A	B	Q
0	0	1
0	1	0
1	0	0
1	1	0



The NOR gate.

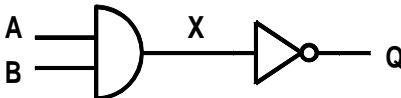
A	\bar{A}
0	1
1	0



The INVERT gate.

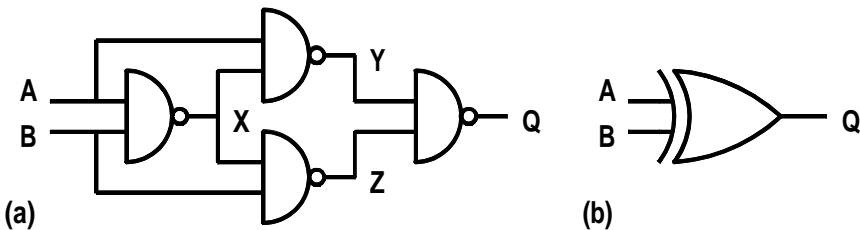
All digital electronics can be implemented using devices from one row of:

AND	INVERT
OR	INVERT
NAND	
NOR	



Truth table

A	B	X	$Q = \bar{X}$
0	0	0	1
0	1	0	1
1	0	0	1
1	1	1	0



The XOR Exclusive OR gate.

A	B	X	Y	Z	Q
0	0	1	1	1	0
0	1	1	1	0	1
1	0	1	0	1	1
1	1	0	1	1	0