

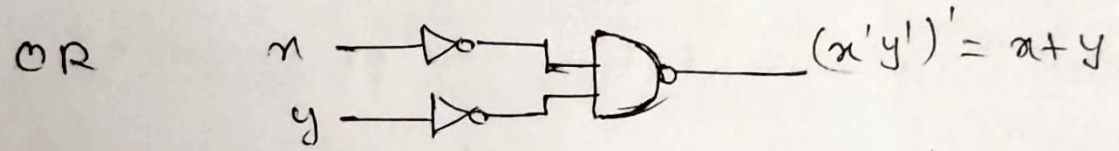
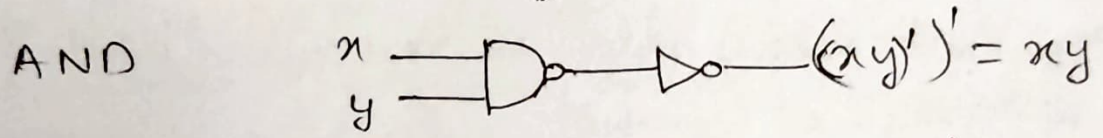
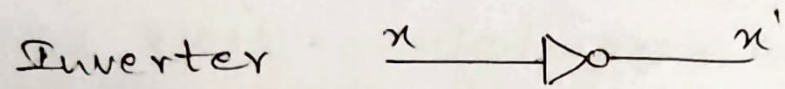
• Universal Gates

→ NAND and NOR gates are used extensively as standard logic gates and are more popular than the AND and OR gates.

→ This is because NAND and NOR gates are easily constructed with transistor circuits and because digital circuits can be easily implemented with them. So the NAND and NOR gates are called universal gates.

→ The NAND gate is called universal gate because any logic circuit can be implemented with it.

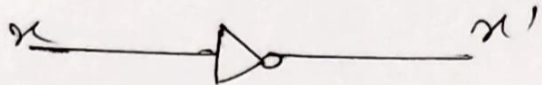
→ To show that any Boolean function can be implemented with NAND gates, we need to show that the logical operations of AND, OR and Complement (~~open~~) can be obtained with NAND gates alone.



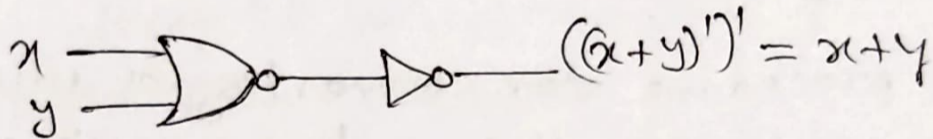
It is not a matter of whether all variables that can be represented by Booleans, functions, etc.

→ The implementation of the complement, OR, and AND operations with NOR gates is as follows:

Inverter



OR



AND

