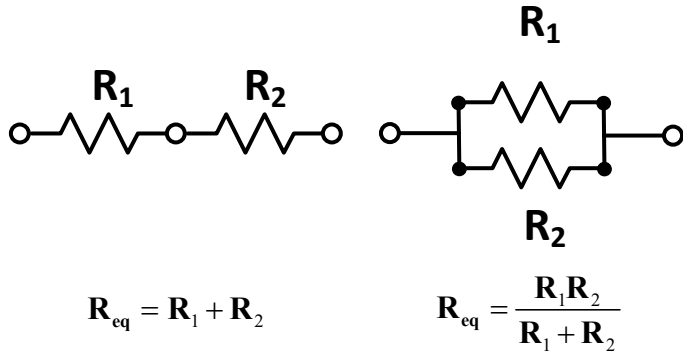## (a) Series:
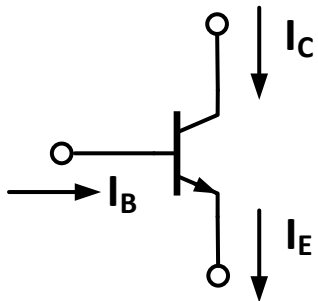
$$R_{eq} = \sum_{k=1}^{N} R_k$$

(b) Parallel:

$$\frac{1}{R_{eq}} = \sum_{k=1}^{N} \frac{1}{R_k}$$

R_1

R_2

$$R_{eq} = R_1 + R_2$$

$$R_{eq} = \frac{R_1 R_2}{R_1 + R_2}$$

RC and RL Circuits

R   t=0   i(t)

$v_s(t)$ $+$ C $\tau = RC$ $-$

t=0   i(t)

$i_s(t)$ R $v(t)$ L $\tau = \dfrac{L}{R}$

I_C

I_B

I_E
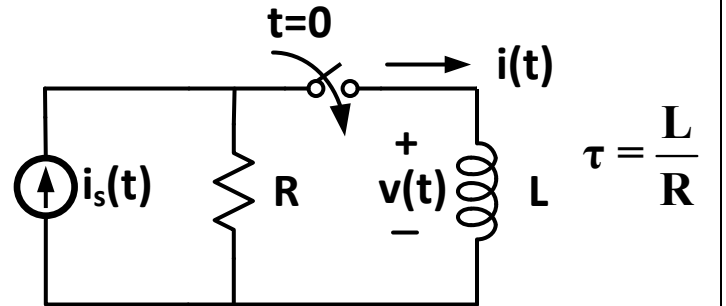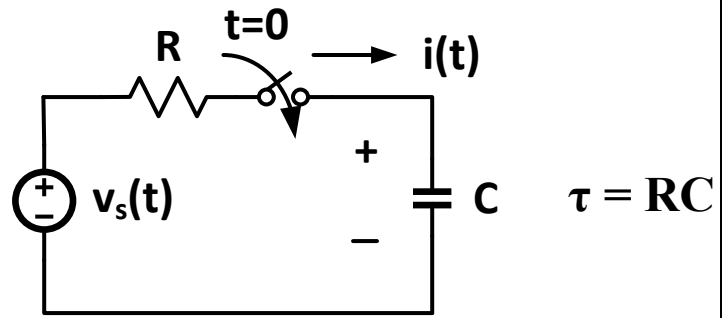
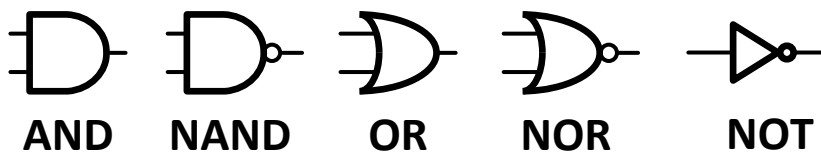**OFF:** $V_{BE} < V_{BE}$ (on), $I_B = I_C = I_E = 0$

FA: $V_{BE} = V_{BE}$ (on), $I_C = \beta\, I_B$

SAT: $V_{BE} = V_{BE}$ (on), $V_{CE} = V_{CE}$ (sat)

Basic Gates:

AND   NAND   OR   NOR   NOT

Selected rules of boolean algebra:

$(a.b).c = a.(b.c);\ \ (a+b)+c = a+(b+c)$
$a.b = b.a\ ;\ a+b = b+a$
$a.(b+c) = a.b + a.c$
$NOT(NOT(a)) = a$
$a + \bar{a}.b = a + b$

Voltage/Current Divider

$+$ V_1 $-$ R_1 $V_1 = \dfrac{V R_1}{R_1 + R_2}$

V

$+$ V_2 $-$ R_2 $V_2 = \dfrac{V R_2}{R_1 + R_2}$

I_1 I_2

I R_1 R_2 $I_1 = \dfrac{I R_2}{R_1 + R_2}$

$I_2 = \dfrac{I R_1}{R_1 + R_2}$