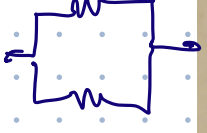
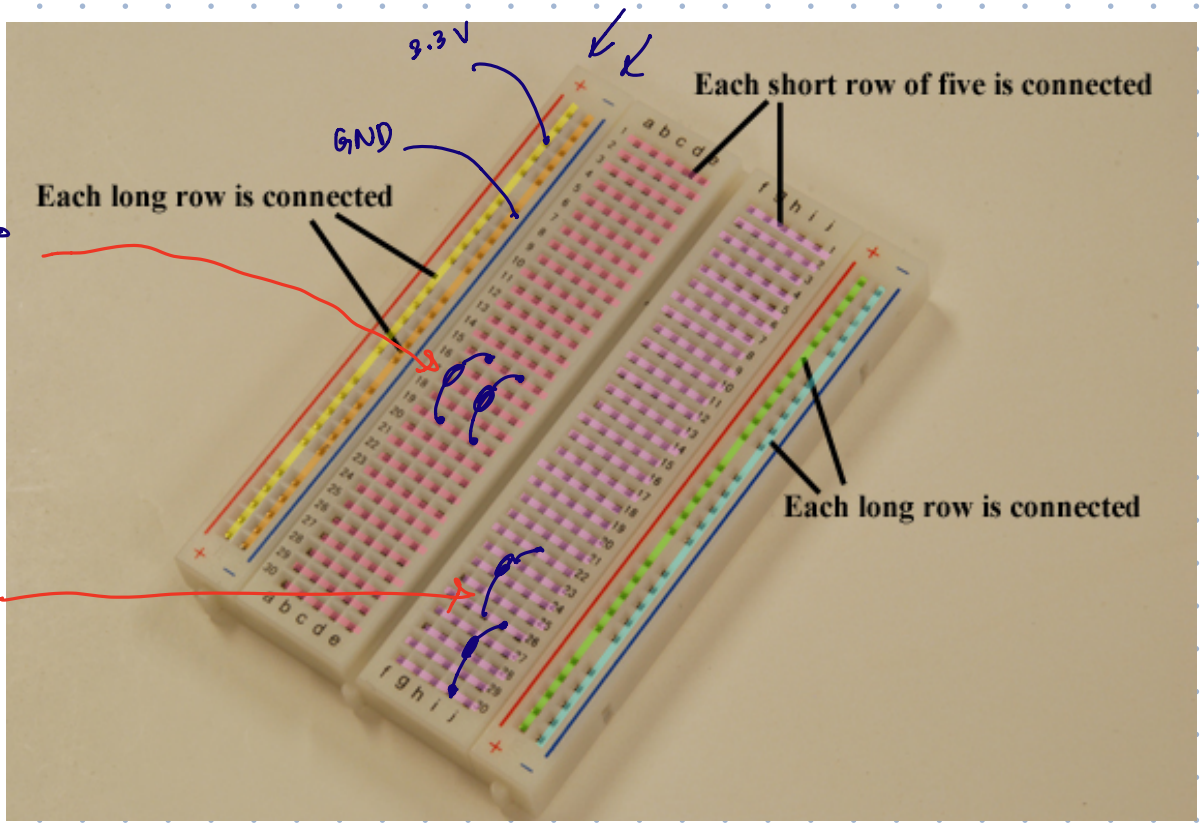
Breadboard / parallel vs series resistors

① parallel

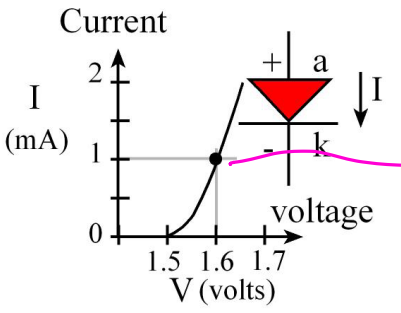


② series



LED

① Resistance calculation



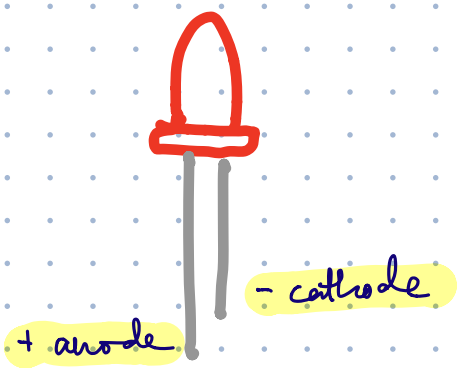
(a) LED curve

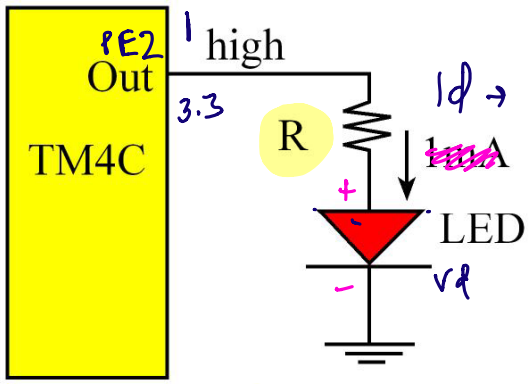
(Vd, Id)

Vd = 1.8 V

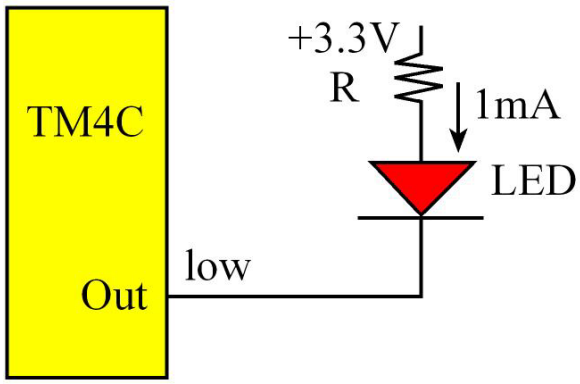
Id = 3 mA

Power = VI ⇒ brightness





(b) Positive logic interface



(c) Negative logic interface

D	A
1	3.3 V
0	0 V

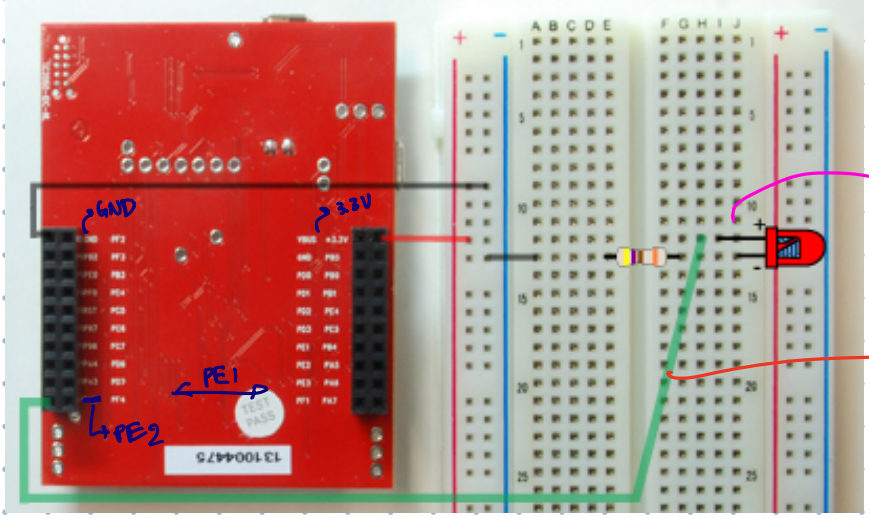
↳ negligible Vd, don't care

$3.3 - IR - V_d = 0$ (I: 3mA, V_d: 1.8)

$\Rightarrow R = \frac{3.3 - V_d}{I_d} = \frac{3.3 - 1.8}{3 \times 10^{-3}}$

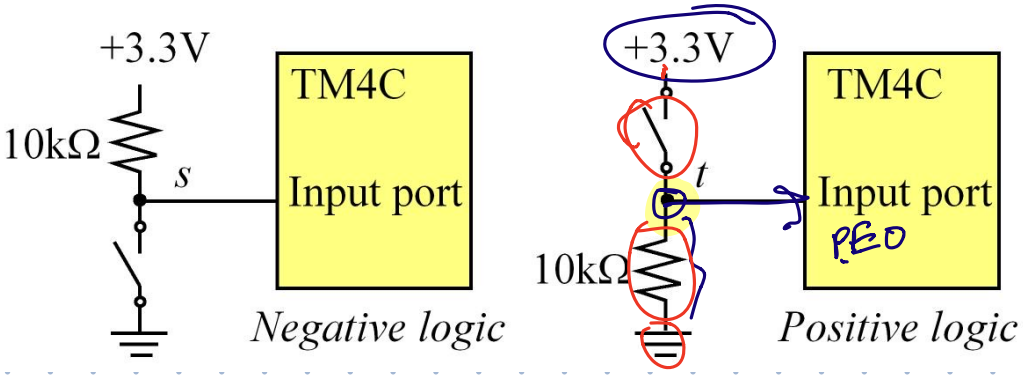
$= 500\ \Omega \approx \boxed{470\ \Omega}$

② Wiring an LED

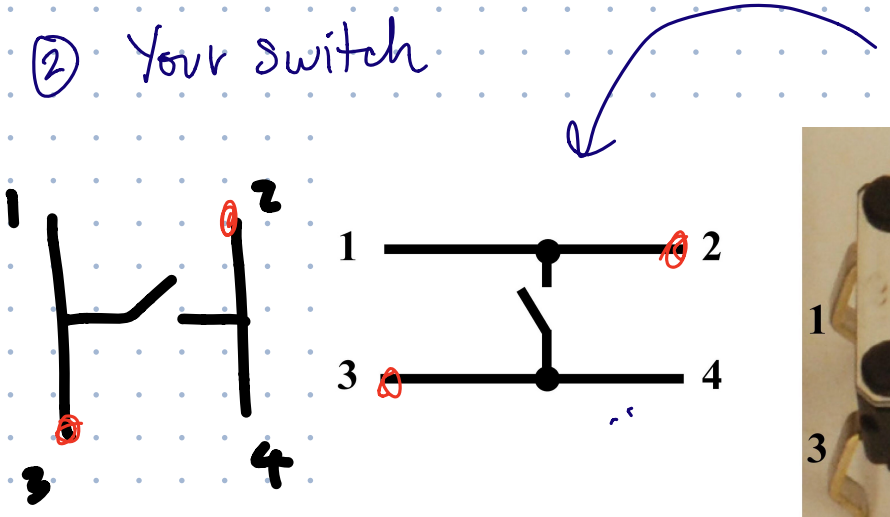


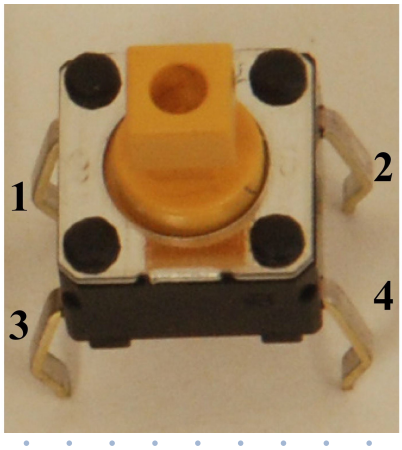
Switch

① Positive vs. negative logic switch diagrams

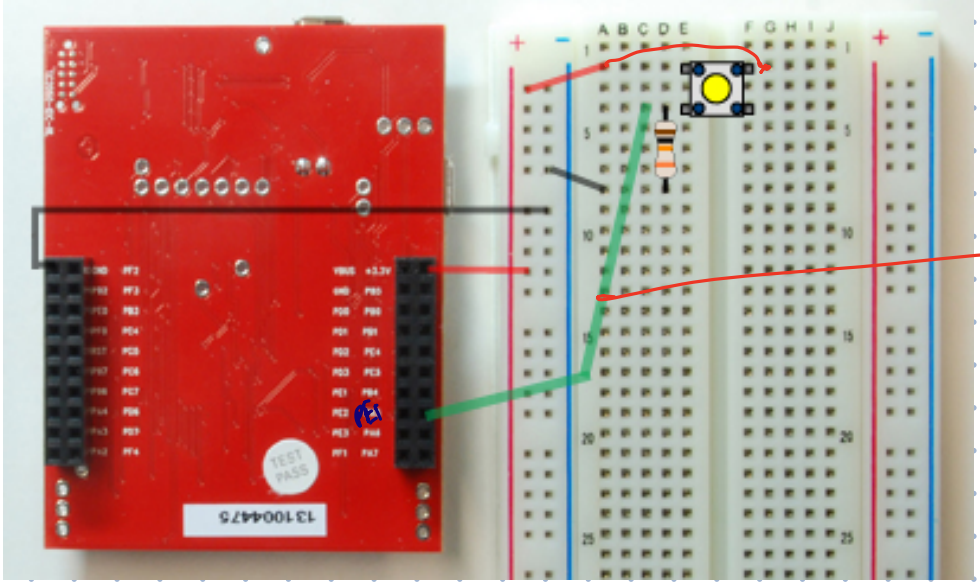


② Your switch





③ Wiring a switch → recommended → wire diagonally



FINAL SETUP