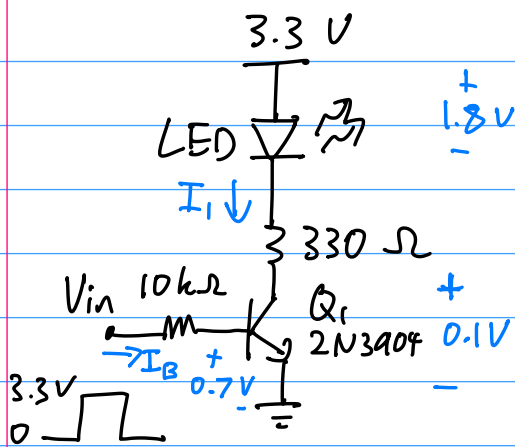# AoE Ex 2.1



What is the LED current? Min $\beta$?

Guess LED drops $\approx$ 1.8 V as per Fig 2.8.

The 2N3904 datasheet shows typ. $V_{CE}$ in saturation $\approx$ 0.1 V.

Considering these voltages, $I_1 = \dfrac{3.3 - 1.8 - 0.1}{330} = 4.2$ mA.

Also $I_B \approx \dfrac{3.3 - 0.7}{10\,000} = 0.26$ mA.

$\therefore$ Required $\beta = \dfrac{4.2 \text{ mA}}{0.26 \text{ mA}} = 16.$