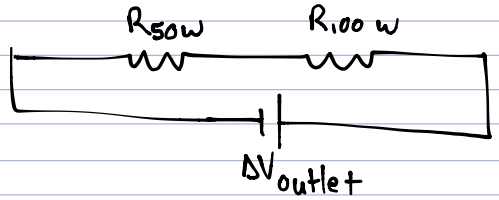
Ch 09 / s6.html

Q#1 [C] equally bright since they have the same current and R

$P_A = I^2R = P_B$

Q#2 [A] The current in Circuit b is 2x greater, so $P = I^2R$ means 4x brighter

Example



What is the current?

Assume 120 V

You may combine into one equivalent resistor, but you still need their individual resistances to do that step

$P_{50w} = \frac{V^2}{R_{50w}} = \frac{(120V)^2}{R_{50w}}$

$\Rightarrow R_{50w} = \frac{(120V)^2}{50w} = 288\,\Omega$

$R_{100w} = \frac{(120V)^2}{100w} = 144\,\Omega \rightarrow R_{eq} = 288\,\Omega + 144\,\Omega = 432\,\Omega$

$I = \frac{V}{R_{eq}} = \frac{120V}{432\,\Omega} = 280\,mA$

In parallel, resistances add inversely $\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \cdots$

ch10 s1.html

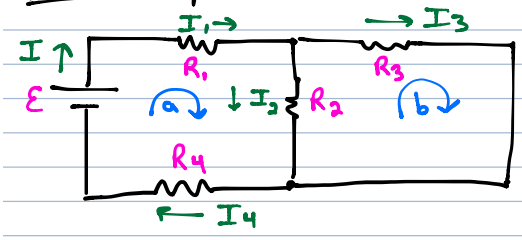
Adding more resistors drops R_{eq}

s2.html (A)

s3html Bulb B is short-circuited ⇒ B goes out and A now has 2x the current

$\Rightarrow P_A' = (2I)^2 R_A = 4I^2 R_A = 4P_A$

full example



What is I through the battery?

- Draw diagram; label!!
- Use junction rule to eliminate extraneous current subscripts
- loop through all mini-loops until all elements covered

eqn a) $\sum \Delta V = 0 : \mathcal{E} - I_1 R_1 - I_2 R_2 - I R_4 = 0$

eqn b) $\sum \Delta V = 0 : -I_3 R_3 + I_2 R_2 = 0$

eqn c) $\sum I = 0$ at any junction : $I = I_2 + I_3$