Yeheli I have a headache and it won't go away so i can't actually study

This is actually so bad, i didn't study yesterday, and i barely studied the day before yesterday, as well as the day before that one.

And I am doing this instead of trying to study anyway ;-;

anyways, enjoy

In a parallel circuit with resistors $R_1, R_2, \ldots, R_n$, the total resistance R_{tot} is given by:

$$\frac{1}{R_{\text{tot}}} = \frac{1}{R_1} + \frac{1}{R_2} + \cdots + \frac{1}{R_n}$$

Let R_{min} be the smallest resistance among $R_1, R_2, \ldots, R_n$. Since all resistances R_i are positive, each term $\frac{1}{R_i}$ is positive. Therefore:

$$\frac{1}{R_i} \geq \frac{1}{R_{\text{min}}} \text{ for all } i$$

Summing these inequalities gives:

$$\frac{1}{R_1} + \frac{1}{R_2} + \cdots + \frac{1}{R_n} \geq \frac{n}{R_{\text{min}}}$$

Since the total resistance $\frac{1}{R_{\text{tot}}}$ is the sum of these reciprocals:

$$\frac{1}{R_{\text{tot}}} \geq \frac{1}{R_{\text{min}}}$$

However, this sum is always greater than the reciprocal of the smallest resistance:

$$\frac{1}{R_{\text{tot}}} > \frac{1}{R_{\text{min}}}$$

Taking the reciprocal of both sides (which reverses the inequality):

$$R_{\text{tot}} < R_{\text{min}}$$

Thus, the total resistance R_{tot} in a parallel circuit is always less than the smallest resistance R_{min} among the resistors.