Exercise 1

Programming SS 2019 - Problem Set 4

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Problem:

We are asked to calculate the theoretical maximum speed-up a code with 0.4% serial instructions could achieve with 100 CPUs.

Resolution:

If a program of size *W* has a serial component *Ws*, the speedup *S* of the program is

$$S = \frac{W}{\frac{W-Ws}{p} + Ws}$$

In our case *Ws = 0.4%* and *W-Ws = 99.6%*, thefore:

$$S = \frac{1}{\frac{0.996}{p} + 0.004}$$

But since $p \to \infty$:

$$S = \frac{1}{0.004} = 250$$

No matter how many processors are used, the speedup can not be greater than 250.