Assignment 3

Brady Mitchelmore - 202112249

Question 1: Analyzing Amdahl's Law for Different Levels of Parallelism

$$speedup \leq \frac{1}{S + \frac{1-S}{N}}$$

Where `S` is the percent of the application that is **not** parallelizable and `N` is the number of processing cores.

a) `40%` of the application is parallelizable:

- With `4` processing cores: `S = 0.6` `N = 4`

$$\frac{1}{0.60 + \frac{1-0.60}{4}} = 1.43$$

Here we can see that `speedup = 1.43`

- With `16` processing cores: `S = 0.6` `N = 16`

$$\frac{1}{0.60 + \frac{1-0.60}{16}} = 1.60$$

Here we can see that `speedup = 1.60`

b) `90%` of the application is parallelizable:

- With `4` processing cores: `S = 0.1` `N = 4`

$$\frac{1}{0.10 + \frac{1-0.10}{4}} = 3.08$$

Here we can see that `speedup = 3.08`

- With `8` processing cores: `S = 0.1` `N = 8`

$$\frac{1}{0.10 + \frac{1-0.10}{8}} = 4.71$$

Here we can see that `speedup = 4.71`