

Computer Performance

“X is N% faster than Y.”

$$\frac{\text{Execution Time of Y}}{\text{Execution Time of X}} = 1 + \frac{N}{100}$$

Amdahl's law for overall speedup

$$\text{Overall Speedup} = \frac{1}{(1 - F) + \frac{F}{S}}$$

F = The fraction enhanced

S = The speedup of the enhanced fraction

Using Amdahl's law

Overall speedup if we make 90% of a program run 10 times faster.

$$F = 0.9 \quad S = 10$$

$$\text{Overall Speedup} = \frac{1}{(1-0.9) + \frac{0.9}{10}} = \frac{1}{0.1 + 0.09} = 5.26$$

Overall speedup if we make 80% of a program run 20% faster.

$$F = 0.8 \quad S = 1.2$$

$$\text{Overall Speedup} = \frac{1}{(1-0.8) + \frac{0.8}{1.2}} = \frac{1}{0.2 + 0.66} = 1.153$$