- **How is the speedup of a parallel program defined?**
  S(p) = Execution time with 1 processor / Execution time with n processors
  gives an increase in speed by using multiple processors.

- **What is the formal definition of Amdahl's law and what relationship does it describe for parallel programs (explain in your own words)? Why/How is this significant?**
  Formal Definition: “In computer programming, Amdahl's law is that, in a program with parallel processing , a relatively few instruction s that have to be performed in sequence will have a limiting factor on program speedup such that adding more processor s may not make the program run faster.”
  My definition: Amdahl´s law describes an a maximum expected increasement in performance based on the amount of parallelizable processes
  It is significant for evaluating if the amount of time and money spent is worth the work.

  Compute the theoretical speedup of a program that spends 10% of its time in unparallelizable, sequential regions for 6 cores and for a hypothetically unlimited number of cores.
  if I have infinte cores the increasement is still 1/f = 10

$$\frac{6}{1+(p-1)*0.1} = 4 \quad \frac{1}{0.1} = 10$$

- **Compute the theoretical speedup of a program that spends 20% of its time in unparallelizable, sequential regions for 6 cores and for a hypothetically unlimited number of cores.**
  if I have infinte cores the increasement is still 1/f = 10

$$\frac{6}{1+(p-1)*0.2} = 6 \quad \frac{1}{0.2} = 5$$

- Given an algorithm of time complexity O(n^3). How large (in %) can the unparallelizable, sequential region be at most, such that a speedup of 10 can be achieved using 64 cores?

$$10 = \frac{64}{1+(64-1)*f} \rightarrow 64 = 10 + 630f \rightarrow f = \frac{54}{630} = 0.0857 \ldots$$