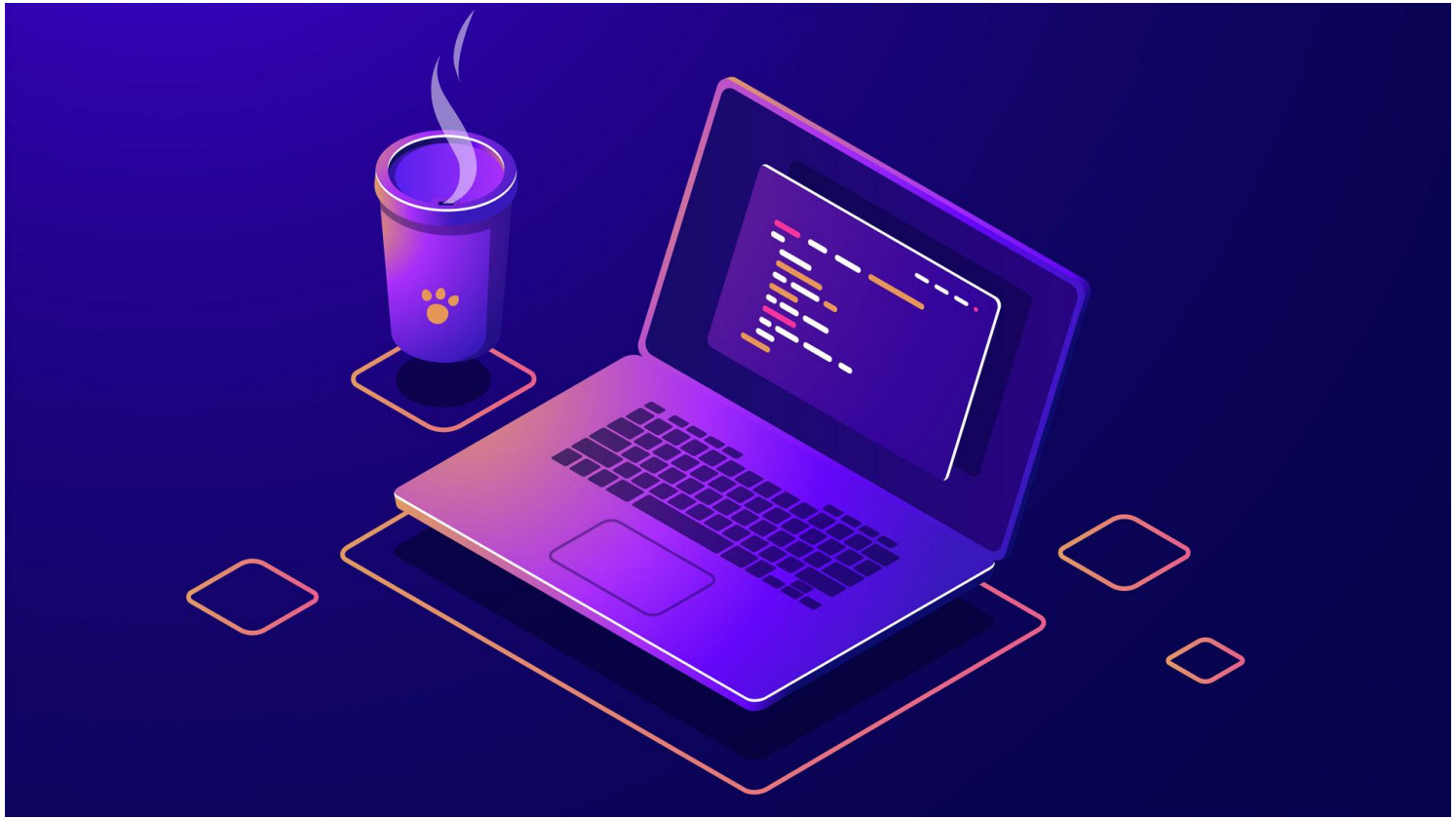
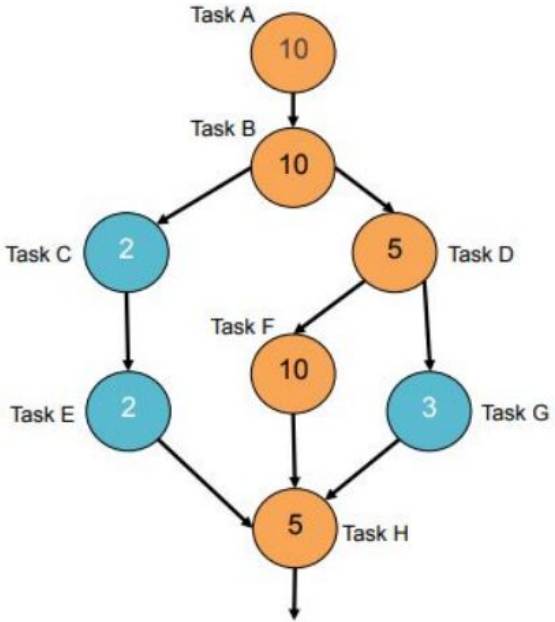
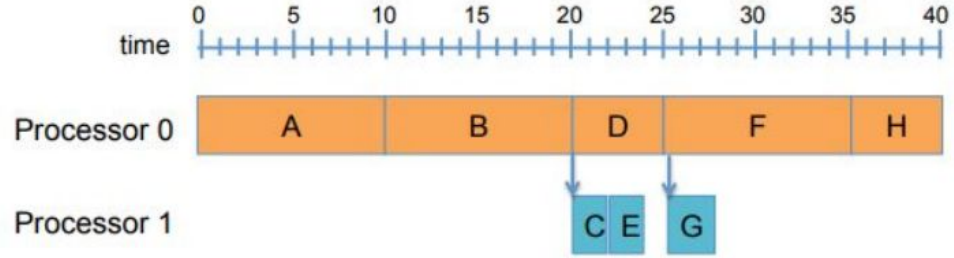
Speedup and Efficiency



Execution Time in P processors



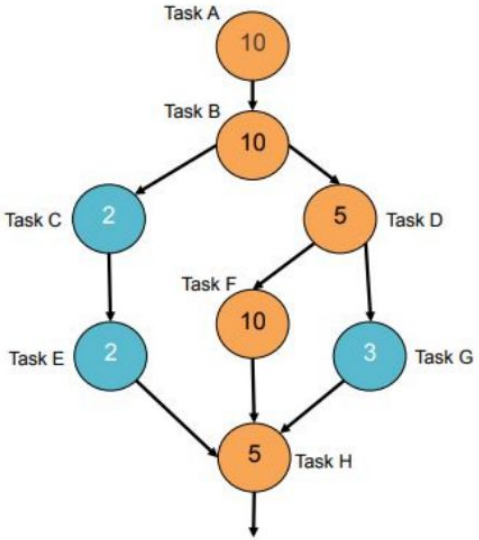
- T_p = execution time on P processors
- **Task scheduling**: how are tasks assigned to processors? For example:



- Lower bounds
  - $T_p \geq T_1/P$
  - $T_p \geq T_\infty$

Speedup

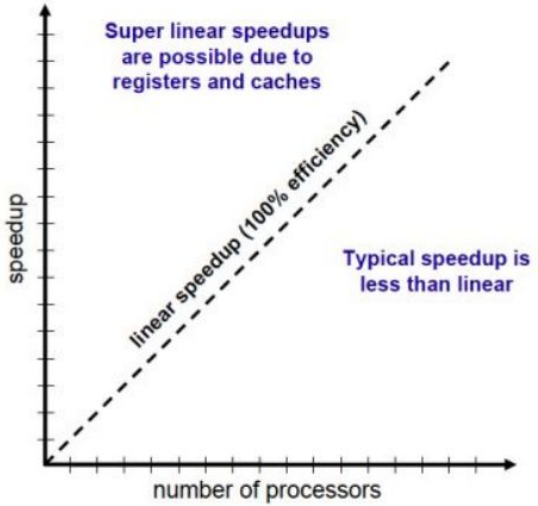
Speedup S_p: relative reduction of the sequential execution time when using P processors



- $S_p = T_1 \div T_p$
- In this example:
  $T_2 = 40,\ S_2 = 47/40 = 1.175$

Scalability and Efficiency

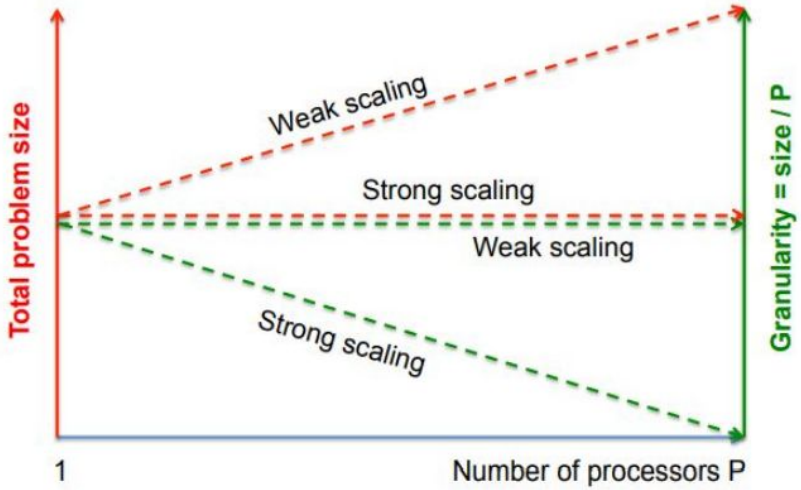
- Scalability: how the speed-up evolves when the number of processors is increased
- Efficiency: $E_p = S_p \div P$



Strong vs Weak Scalability

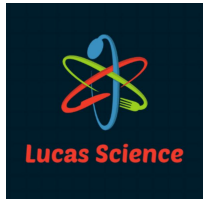
Two usual scenarios to evaluate the scalability of one application:

- Increase the number of processors P with constant problem size (strong scaling $\rightarrow$ reduce the execution time)
- Increase the number of processors P with problem size proportional to P (weak scaling $\rightarrow$ solve larger problem)



Instructor Social Media

Youtube: Lucas Science



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