COL380

Introduction to
Parallel & Distributed Programming

Measure Performance

- A function of: input size, number of processors
  - ➡ communication, dependencies
- Scaling
- How fast does a job complete?
  - ➡ Elapsed wall time (Latency)
    - ⏵ compute + communicate + synchronize
- How many jobs complete in a given time?
  - ➡ Throughput

Performance Metrics

$$\text{Speedup, } S_p = \frac{\text{Exec time using 1 processor system } (t_1)}{\text{Exec time using p processors } (t_p)}$$

$$\text{Efficiency, } \mathscr{E}_p = \frac{S_p}{p}$$

$$\text{Cost, } C_p = p \times t_p$$

Cost Optimal if $C_p = t_1$

Look out for inefficiency:

$t_1 = n^3$

$t_p = n^2$, for $p = n^2$

$C_p = n^4$

Parallelization Overhead

$$\overline{\mathbf{o}}_{\boldsymbol{p}} = p \times t_p - t_1$$

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