

# CSCI 251: Concepts of Parallel and Distributed Systems

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## Topics

- Exercise Problems
- Challenges in Parallel Programming

## Costs of Communication

We want to minimize the idling time of a processor. The cost of communication can depend on the size of the message being passed. We need to keep in mind the concept of granularity in our programs, whether or not we have coarse grain parallelism or fine grain parallelism.

**Fine grained parallelism** involves a low ratio of computation to communication, with very high levels of parallelism. Often, this entails small tasks distributed and communicated between many processors.

**Coarse grained parallelism** involves a high ratio of computation to communication. This will have very low overhead since each processor will tend to do large amounts of computation and less communication.

The measure of the ratio between communication and computation is relative since it depends on the CPU and communication network architecture. One also needs to take into account data transmission latency and bandwidths as an additional bottleneck when analyzing parallel programs.

**In degree** refers to how long a processor has to wait before it starts computing.

**Out degree** refers to how much is spent in terms of communication.

## Reminders

The midterm is on October 11th. Refer to MyCourses for details on Project 1.

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