

CSE 130
Principles of Computer System Design

Elijah Hantman

About

1. Understanding problems and how to manage complexity
2. Implement process concurrency and inter process communication
3. Implement Multi-threading and intra process communication

The Problem

- Combination of software and hardware
- More interconnected components create exponential complexity
 - Emergent Behavior
 - Propagation of effect: intercomponent communication
 - Incommensurate scaling: asymmetric requirements
 - Tradeoffs: scarcity of resources (runtime, devtime, and memory)
- Tools
 - Abstraction
 - Modularity and Layering
 - Caching
 - Virtualization
 - Concurrency

Concurrency and Inter-process Communication

- Process represents a program in execution
- Multiple process run concurrently
 - single cores use timesharing
 - Multi-core machines use both timesharing and concurrency
 - Multiple machines
- Concurrent processes may need to interact
 - Shared virtual memory
 - message passing via sockets