

15-213

Concurrent Programming November 28, 2007

Topics

- Limitations of iterative servers
- Process-based concurrent servers
- Event-based concurrent servers
- Threads-based concurrent servers

Concurrent Programming is Hard!

- The human mind tends to be sequential
- The notion of time is often misleading
- Thinking about all possible sequences of events in a computer system is at least error prone and frequently impossible
- Classical problem classes of concurrent programs:
 - Races: outcome depends on arbitrary scheduling decisions elsewhere in the system
 - Example: who gets the last seat on the airplane?
 - Deadlock: improper resource allocation prevents forward progress
 - Example: traffic gridlock
 - Lifelock / Starvation / Fairness: external events and/or system scheduling decisions can prevent sub-task progress
 - Example: people always jump in front of you in line
- Many aspects of concurrent programming are beyond the scope of 15-213

Echo Server Operation

