

Lecture 25: Concurrency

- Why concurrency?
- Threads
- Race conditions

Announcements:

- Discussions are review this week
- Practice exams posted; Study guide up soon
- PG up soon.
- Course evaluations

- Processor does one thing at a time.
- Computers seem to do many things at once.
- Operating system keeps track of many tasks, switches back and forth between them (rapidly). Doesn't make computer faster!
- adds "context switching" overhead.

Modern computers may have multiple processors, which may have multiple cores each core is doing one thing at a time. }

clock speed:
how often
processor
does this

(or core)
Processor repeatedly

- fetches an instruction from memory.
- execute instruction
- writes results back to memory.

'cycles per second'
hz = $\frac{1}{\text{second}}$.

clock speeds increased exponentially for many decades.

"Moore's law" :- clock speeds double every 2 years
or so.

- transistors per chip also double every 2 years or so.

} barriers caused by heat dissipation
become less useful because processors can only be so complicated!

Thread represents a task.
 like a separate running program.
 - current line of code executing

