

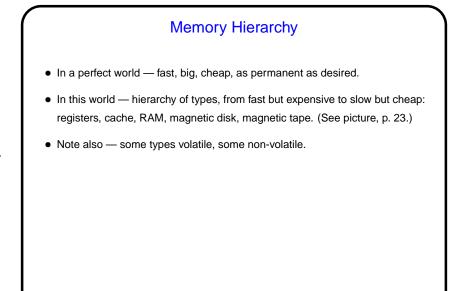
generates an interrupt (more about interrupts later).

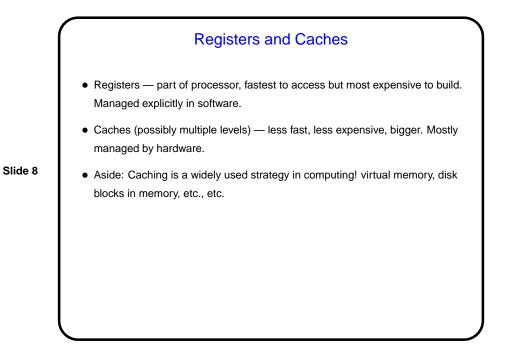
Multithreaded and Multicore Chips • For many years (at least 20, to my knowledge) advocates of parallel programming have been saying that eventually hardware designers would run out of ways to make single processors faster - and finally it seems to be happening. • Basic idea - number of transistors one can put on a chip is still increasing, but how to use them to make single processors faster isn't clear. So, instead, hardware designers have chosen to provide (more) hardware support for

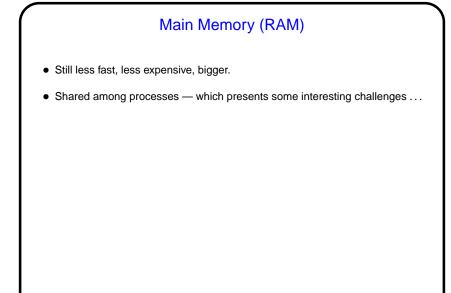
- Multithreading - e.g., Intel's "hyperthreading" basically allows fast switching between two threads, but not true parallel execution.

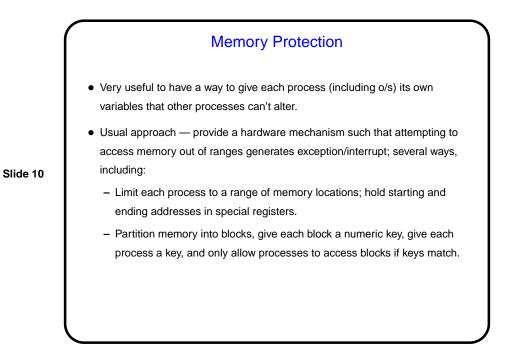
parallelism. Two basic approaches:

- Multicore — multiple independent CPUs on a chip, possibly sharing cache.









Minute Essay

- I once had a learning experience about "how DOS is different from a real o/s". Summary version: A program using pointers (possibly uninitialized) caused the whole machine to lock up, so thoroughly that the only recovery was to power-cycle.
 - What do you think went wrong?

Slide 11

Slide 12 Minute Essay Answer