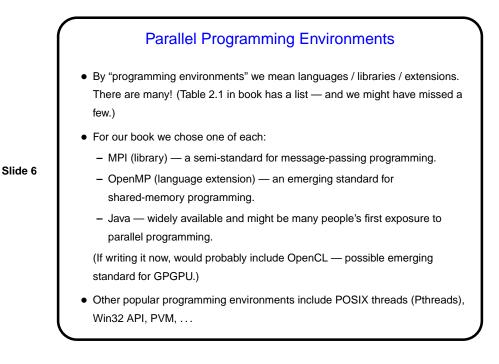
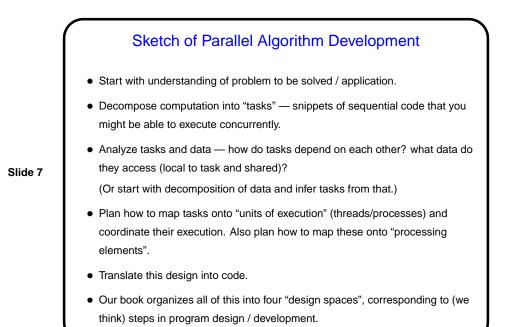


What Programming Languages Support This? A regular sequential language, with a parallelizing compiler. A language designed to support parallel programming (Java, Ada, PCN). A regular sequential language plus calls to parallel library functions (PVM, MPI, Pthreads). A regular sequential language with some added features (CC++, OpenMP). For each of these categories: How attractive is it for programmers? How easy is it to implement?



- A regular sequential language with a parallelizing compiler: Attractive, but such compilers are not easy.
- A language designed to support parallel programming (Java, Ada, PCN): Perhaps the most expressive, but more work for programmers and implementers.
- A regular sequential language plus calls to parallel library functions (PVM, MPI, Pthreads): More familiar for users, easier to implement.
- A regular sequential language with some added features (CC++, OpenMP): Also familiar for users, can be difficult to implement.





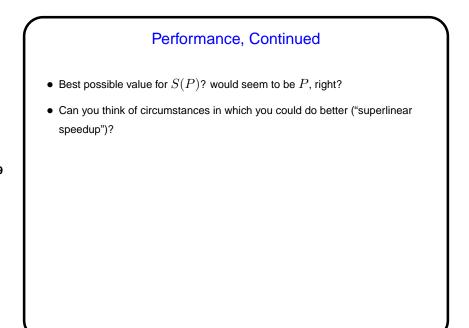
A Few Words About Performance

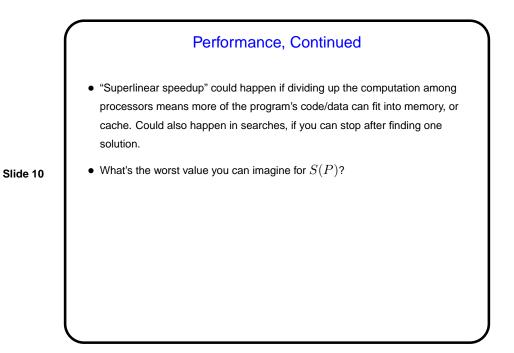
- If the point is to "make the program run faster" can we quantify that?
- Sure. Several ways to do that. One is "speedup" --

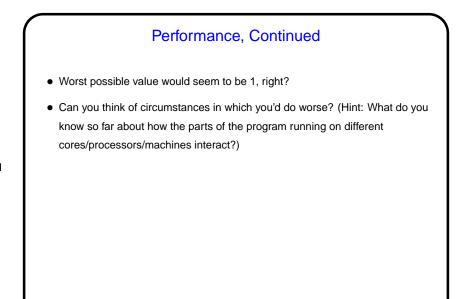
$$S(P) = \frac{T_{total}(1)}{T_{total}(P)}$$

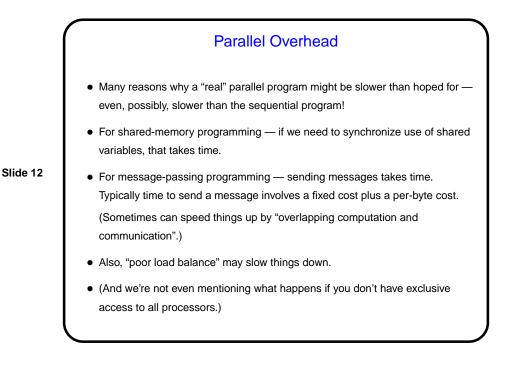
Slide 8

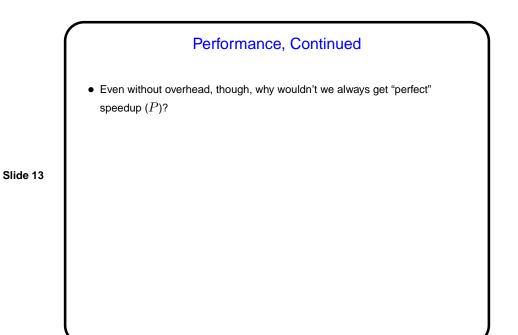
• What's the best possible value you can imagine for S(P)?

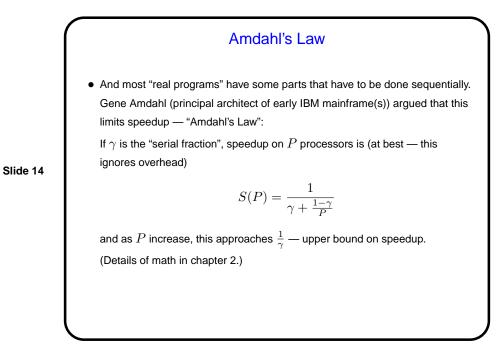


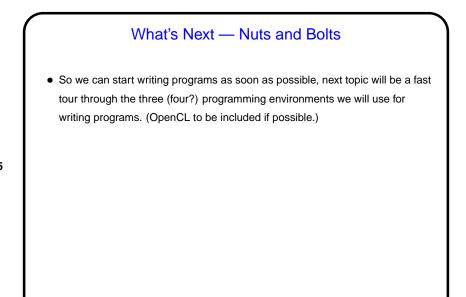




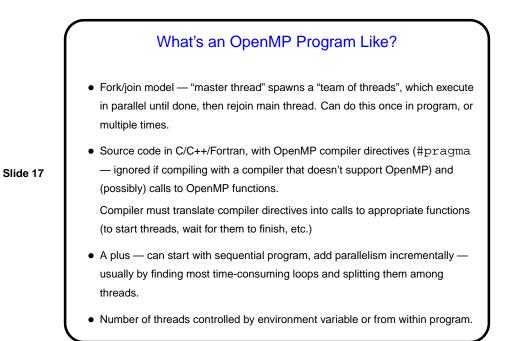








Slide 16 First release 1997 (for Fortran, followed in 1998 by version for C/C++). First release 1997 (for Fortran, followed in 1998 by version for C/C++). Production-quality commercial compilers appeared first. At one point, only no-cost compilers were "research software" or in work. Support then added to GNU compilers.



Simple Example / Compiling and Executing

- Look at simple program hello.c on sample programs page.
- Compile with compiler supporting OpenMP.
- Execute like regular program. Can set environment variable OMP_NUM_THREADS to specify number of threads. Default value seems to be one thread per processor.
- (To be continued.)

