

Topics for Midterm 1

CS 220

Fall, 2011

Any of the following topics may be covered on the midterm this Wednesday (October 5).

- What is parallel computing.
- Why it's suddenly become so important.
- Moore's Law.
- Overview of writing parallel programs.
- Shared memory vs distributed memory.
- Coordination: communication, synchronization, load-balancing.
- Trapezoidal rule in Python, Java and C.
- gcc
- Phases of C compiler: preprocess, translate, link
- Basic C: types, operations, semi-colons, curly braces, control structures
- `stdio.h`: `printf`, `fprintf`, `scanf`, `stdin`, `stdout`, `stderr`, EOF
- Functions: call, return, pass-by-value.
- Pointers: simulating pass-by-reference, ampersand, asterisk
- Arrays in C: no subscript check
- Merge in C

- C strings, null character, `string.h`
- Command line arguments: `argc`, `argv`
- `stdlib.h`: `exit`
- Man pages
- Structs: passing by reference, member access
- Dynamic data structures, stack, heap, `malloc`, `free`, `NULL`
- Singly linked list: insert, print, member, free list, delete.
- Basic cluster use: `mcs`, `mpicc`, `mpiexec`
- MPI: `MPI_Init`, `MPI_Comm_size`, `MPI_Comm_rank`, `MPI_Finalize`
- `MPI_Send`, `MPI_Recv`
- Blocking vs buffered send
- `sprintf`
- Parallelizing the trapezoidal rule.
- Speedup, efficiency, scalability
- Finding run-times.
- `MPI_Barrier`
- Tracing the execution of an MPI program