CSCI 176 (Parallel Processing): topics covered after exam2 (Spring 2020)
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* Message-passing Programming with MPI (MK book, Ch3)
  - MPI concepts
  - Point-to-point communication with send/receive, and synchronization issues
  - Trapezoid (integral) computation with MPI
  - Collective communication: reduce, broadcast, all_reduce
  - Data distribution: block, cyclic, block_cyclic partition, scatter
  - Performance evaluation and time checking: using barrier
  - Merge sort with MPI (prog. assignment)
  - MPI+OpenMP hybrid computing

* Cache Coherence Protocols in Shared-mem Systems
  - Three sources of cache incoherence
  - Snoopy bus protocols: write upate vs. write invalidate
  - SI protocol for WT cache
  - MESI protocol for WB cache
  - Directory-based protocol for DSM machines
    each memory block status: uncached, shared, modified;
    local node, home node, remote node;
    diagrams for read-miss, write-miss;

* C++ 11/14 Multithreading (from advanced book)
  - Multiprocessing vs. multithreading
  - Thread spawn and join/detach
  - Thread creation: vector vs. dynamic array way
  - Handling return values from the slave function
    ref. parameter way, promise/future way, packaged task way;
  - Scheduling: block, cyclic, block-cyclic distribution
  - Matrix-vector multiplication example
    application to prefix sum computation;
    block distribution version,
    block distribution with Lambda function version,
    cyclic distribution with Lambda function version,
      fine-grained cyclic distribution and false-sharing problem;
    block-cyclic distribution with Lambda function version