6-Day-Course — ETH Zurich — 1st day — OpenMP

Content

Shared memory parallelization with OpenMP
- Overview
- Execution model
- Worksharing directives
- Worksharing – continued (Exe 2b)
- Data environment
- Heat example (on next day)
- Summary
- Pitfalls
- Q&A

File: openmp-intro13.pdf

Schedule

08:45 Login to ZOOM
(and establishing the break-out rooms)
09:00 Welcome
09:15 Lectures and exercises on OpenMP
(including some breaks)
12:30 Lunch break
13:30 Lectures and exercises on OpenMP
(including some breaks)
16:30 Final end

6-Day-Course — ETH Zurich — 2nd day — OpenMP

Content

Verifying an OpenMP Parallelization with the Intel Inspector XE

Shared memory parallelization with OpenMP (continued)
- Heat example

Advanced shared memory parallelization with OpenMP
- OpenMP-4.0 / 4.5 / 5.0 Extensions
- Taskloops (talk+practical)
- Q & A

Files: 02_inspector_xe.pdf
openmp-intro13.pdf → **Outline → Exercise 4: Heat**
openmp-4.0+4.5-extensions.pdf

Schedule

08:45 Login to ZOOM
(and establishing the break-out rooms)
09:00 Lectures and exercises on OpenMP
(including some breaks)
12:30 Lunch break
13:30 Lectures and exercises on OpenMP
(including some breaks)
16:30 Final end

6-Day-Course — ETH Zurich — 3rd day — MPI

beginners/intermediate

Content

MPI on beginners' level 

1. MPI Overview
2. Process model and language bindings
3. Messages and point-to-point communication
4. Nonblocking communication

Ch.1 Homework exercise: domain decomposition
(needed as preparation for Step 1 of the MPI heat exercise on the next day)

File: mpi_3.1_rab.pdf

Schedule

08:45 Login to ZOOM
(and establishing the break-out rooms)
09:00 Welcome
09:05 Lectures and exercises on MPI
(including some breaks)
12:00 Lunch break **[30 Minutes earlier!]**
13:00 Lectures and exercises on MPI
(including some breaks)
16:30 Final end

~20 Min. Homework exercise

6-Day-Course — ETH Zurich — 4th day — MPI

beginners/intermediate

Content

MPI on beginners' level – continued 

6.(1) Collective communication

MPI on intermediate level

7. Error handling
9. Virtual topologies
   (1) A multi-dimensional process naming scheme
12. Derived datatypes
   (1) transfer any combination of typed data

Additional exercise on MPI and Q&A

19. Heat example with MPI: (0) preparation
   (1) domain decomposition
   (2) halo communication
   (3) reduction for abort criterion
   (4) derived datatypes (homework)
   (5) speed-up (homework)

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Schedule

08:45 Login to ZOOM
(and establishing the break-out rooms)
09:00 Lectures and exercises on MPI
(including some breaks)
12:30 Lunch break
13:30 Lectures and exercises on MPI
(including some breaks)
16:30 Official end

~30 Min. Homework exercise

6-Day-Course — ETH Zurich — 5th day — MPI
intermediate/advanced

Content

MPI on intermediate/advanced level 

8. Groups & Communicators, Environment Management
   (1) MPI_Comm_split, intra- & inter-communicators
   (2) Rank re-numbering, inter-communicators, … (short talk + quiz)

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9. Virtual topologies
   (2) Neighborhood-communication + MPI_BOTTOM (no practical)
   (3) Optimized re-numbering (short talk)
12. Derived datatypes
   (2) Advanced topics on derived datatypes (short tour)

6.(2) Advanced topics on collective communication

Short tour through
   13. Parallel File I/O (title + 5 slides)
   14. MPI and Threads (title +1 slide)
   15. Probe, Persistent Requests, Cancel (title + 3 slides)
   16. Process Creation and Management (title + 3 slides)
   17. Other MPI features (regular 4 slides)

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5. The New Fortran Module mpi_f08 (Fortran users only)

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Schedule

08:45 Login to ZOOM
(and establishing the break-out rooms)
09:00 Lectures & exercises on interm. MPI
(including some breaks)
12:30 Lunch break
13:30 Lectures & exercises on advanced MPI
(including some breaks)
16:00 End for C/C++/Python programmers
16:00 For Fortran participants only:
Additional lecture + exercises on
the mpi_f08 module/interface
16:30 Final end

6-Day-Course — ETH Zurich — 6th day — MPI
intermediate/advanced

Content

Advanced MPI 

10. One-sided Communication

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11. Shared Memory One-sided Communication
   (1) MPI_Comm_split_type & MPI_Win_allocate_shared

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   (2) MPI memory models and synchronization rules (no pract.)

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18. Best practice

Q&A

MPI Summary

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Schedule

08:45 Login to ZOOM
(and establishing the break-out rooms)
09:00 Lectures & exercises on advanced MPI
(including some breaks)
12:30 Lunch break
13:30 Lectures & exercises on advanced MPI
(including some breaks)
16:00 Final end