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

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)
16:00 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

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)
16:00 Final end
Content

**MPI on beginners' level**

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

Heat example with MPI: (1) domain decomposition

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**Schedule**

08:45 Login to ZOOM (and establishing the break-out rooms)
09:00 Welcome
09:15 Lectures and exercises on MPI (including some breaks)
12:45 Lunch break [15 Minutes later!]
13:45 Lectures and exercises on MPI (including some breaks)
16:00 Final end

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

Content

**MPI on beginners' level — continued**

4. Nonblocking communication
6. (1) Collective communication

**MPI on intermediate level**

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

**Additional self-paced exercise on MPI and Q&A**

Heat example with MPI: (2) halo communication
(3) reduction for abort criterion
(4) centralized result printing

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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)
16:00 Official end
16:00 Additional self-paced exercise and Q&A
17:00 End of additional Q&A

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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)

9. Virtual topologies
   (2) Neighborhood-communication + MPI_BOTTOM (no practical)
   (3) Optimized re-numbering (short talk)

12. Derived datatypes
   (1) Transfer any combination of typed data
   (2) Advanced topics on derived datatypes (short tour)

6.(2) Advanced topics on collective communication

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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

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

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**Content**

**Advanced MPI**

10. One-sided Communication

11. Shared Memory One-sided Communication
   (1) MPI_Comm_split_type & MPI_Win_allocate_shared
   (2) MPI memory models and synchronization rules (no pract.)

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

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