

# Programming OpenMP

## *Using OpenMP Compilers & Exercises*

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# Production Compilers w/ OpenMP Support

- GCC
- clang/LLVM
- Intel Classic and Next-gen Compilers
- AOCC, AOMP, ROCmCC
- IBM XL
- ... and many more
  
- See <https://www.openmp.org/resources/openmp-compilers-tools/> for a list

# Compiling OpenMP

- Enable OpenMP via the compiler's command-line switches
  - GCC: `-fopenmp`
  - clang: `-fopenmp`
  - Intel: `-fopenmp` or `-qopenmp (classic)` or `-fiopenmp (next-gen)`
  - AOCC, AOCL, ROCmCC: `-fopenmp`
  - IBM XL: `-qsmp=omp`
- Switches have to be passed to both compiler and linker:

```
$ gcc [...] -fopenmp -o matmul.o -c matmul.c
$ gcc [...] -fopenmp -o matmul matmul.o
$ ./matmul 1024
Sum of matrix (serial): 134217728.000000, wall time 0.413975, speed-up 1.00
Sum of matrix (parallel): 134217728.000000, wall time 0.092162, speed-up 4.49
```

# Exercises: Overview

Exercise no.	Exercise name	OpenMP Topic	Day / Order (proposal)
1	Hello World	Getting started	Start with this (if OpenMP is new for you)
2	Pi	Worksharing, Scoping	First day
3	Jacobi	Worksharing, Scoping, NUMA	First day
4	Fibonacci	Tasking	Second day
5	Work-Distribution	Worksharing	First day, review on Second day
6	Min/Max	Worksharing, Reduction	First day
7	QuickSort	Tasking	Second day
8	Primes	Correctness w/ Tool	Only if you are interested in this topic
9	Mandelbrot	Correctness by Hand	Only if you are interested in this topic