# Introduction to High-Performance Computing Exercise

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# **Agenda**

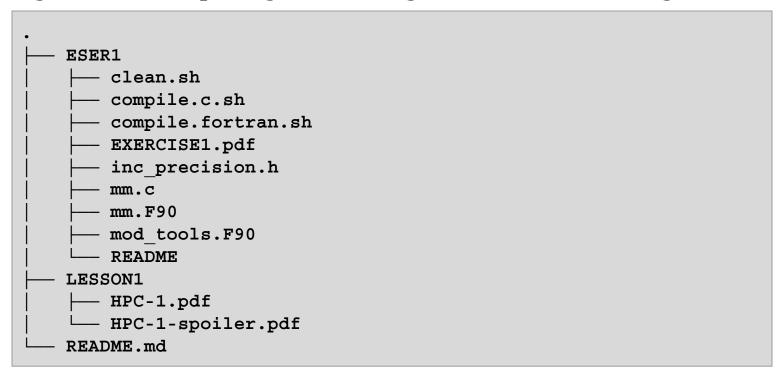
- ✓ Simple "warm-up" exercise: Matrix-Matrix Multiplication
- Complete the code
  - Fortran/C
- Check the results
- ✓ Extract some Performance figure (in MFLOPs)

#### You can use:

- ✓ Any available HW
- ✓ Any available Compiler
- ✓ Any compiler option

#### How to do

- Clone the repository
  - git clone https://github.com/gamati01/HPCLessons.git



#### ✓ Complete the code

## compile.fortran.sh

- ✓ simple script to compile the code
- ✓ choose the available compiler & compiler options

```
rm -rf *.o mm.x *.mod
#
# gfortran (GNU)
COMP=gfortran
OPT=
echo "compiling with " $COMP $OPT
$COMP $OPT mod tools.F90 -c
$COMP $OPT mm.F90 -c
$COMP $OPT mod tools.o mm.o -o mm.x
#
echo "That's all folks!!!"
```

./mm.x

✓ If correctly code it should give an output like that

```
Matrix-Matrix Multiplication
 precision used
 rel. 0, naive multiplication
 Which matrix size?
1024
 Matrix size = 1024
 Memory size (MB) = 24
initialization 1.171875000000000E-002
  0.4293334354359644 0.9410485065499756
                                                  0.0000000000000
CPU: time for moltiplication 3.140625000000000
                           683.7758861940298
CPU: MFLOPS
CPU: check
                           257.1789318419338
```

- ✓ size (e.g. 1024) given by standard input
- ✓ check ~ size/4

#### mm.c

### ✓ Complete the code

## compile.c.sh

- ✓ simple script to compile the code
- ✓ choose the available compiler & compiler options

```
rm -rf *.o mm.x *.mod
#
# gcc (GNU)
COMP=gcc
OPT=
echo "compiling with " $COMP $OPT
$COMP $OPT mm.c -c
$COMP $OPT mm.o -o mm.x
echo "That's all folks!!!"
```

./mm.x

✓ If correctly code it should give an output like that

- ✓ size (e.g. 1024) hard-coded in the code
- ✓ check ~ size/4

## **Homework: Fill the table**

Size	Fortran	С
1024*1024		
2048*2048		
4096*4096		
8192*8192		

- ✓ Compiler used:
- ✓ Compiler option used:
- ✓ HW used: