

ECMWF training course – 2015 Compiling environment

Practical examples - solutions

Have a look at the Makefile in .solutions/Makefile

EXERCISE 1 (Compiling, linking)

```
% gfortran -o hello hello.f
% ./hello
```

EXERCISE 2 (Creating libraries)

Static version:

```
% gfortran -c prime.f
% ar -rv libmy.a prime.o
% gfortran -o primecheck primecheck.f -L. -lmy
```

or

```
% gfortran -o primecheck primecheck.f libmy.a
% ./primecheck
(% rm libmy.a; ./primecheck)
```

Dynamic version:

```
% gfortran -c -fPIC prime.f
% gfortran -shared -o libmy.so prime.o
% gfortran -o primecheck primecheck.f -L$PWD -Wl,-rpath,$PWD -lmy
```

EXERCISE 3 (Using libraries)

GRIB API:

```
% gfortran -o grdemo grdemo.f90 $GRIB_API_INCLUDE $GRIB_API_LIB
% ./grdemo
```

EMOSLIB:

```
% gfortran -o bfdemo bfdemo.f90 $EMOSLIB # this is the single precision version of EMOSLIB
% ./bfdemo
```

EXERCISE 4 (Basic Debugging)

```
% gfortran -o debug debug.f
% ./debug
```

What can you do to get more information about the problems? (see lecture notes)

```
% gfortran -ffpe-trap=overflow,invalid,zero -o debug debug.f
% ./debug
```

Possibly ...

```
% gfortran -ffpe-trap=overflow,invalid,zero -g -O0 -fbacktrace -fdump-core -o debug debug.f
% ./debug
```

EXERCISE 5 (Profiling and 'optimisation')

```
% gfortran -o primecheck primecheck.f prime.f
% time ./primecheck
```

Any trivial way to improve the execution time of this program?

```
% gfortran -O3 -o primecheck primecheck.f prime.f
% time ./primecheck
```