Assignment 6

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Q1.

```
violetxu — ssh ese-xurm@172.18.6.175 — 109×44
[ese-xurm@login02 Assignment6]$ ls ./fortran_demo1
DoLoopTest.f90   HelloWorld.x          N.dat              TestLear.x
DoLoopTest.x     IfElseTest.f90        PrecisionTest.f90  TestRelationalOps.f90
DoWhileTest.f90  ImplicitTypeTest.f90  TestArray.f90      TestUndeclared.f90
HelloWorld.f90   M.dat                 TestLear.f90       VariableShowcase.f90
[ese-xurm@login02 Assignment6]$ gfortran Matrix_multip.f90 Main.f90 -o Q1.x
[ese-xurm@login02 Assignment6]$ chmod 777 ./Q1.x
[ese-xurm@login02 Assignment6]$ ./Q1.x
[ese-xurm@login02 Assignment6]$ ls ./fortran_demo1
DoLoopTest.f90   HelloWorld.x          MN.dat             TestLear.f90          VariableShowcase.f90
DoLoopTest.x     IfElseTest.f90        N.dat              TestLear.x
DoWhileTest.f90  ImplicitTypeTest.f90  PrecisionTest.f90  TestRelationalOps.f90
HelloWorld.f90   M.dat                 TestArray.f90      TestUndeclared.f90
[ese-xurm@login02 Assignment6]$ nano ./fortran_demo1/MN.dat
[ese-xurm@login02 Assignment6]$
```

```
violetxu — ssh ese-xurm@172.18.6.175 — 87×39
  GNU nano 2.3.1              文件：  ./fortran_demo1/M.dat

19.48 15.79 19.28
19.28 12.92 15.86
15.86 11.29 14.04
11.93 18.60 18.23
19.28 12.92 15.86
```

```
violetxu — ssh ese-xurm@172.18.6.175 — 87×39
  GNU nano 2.3.1              文件：  ./fortran_demo1/N.dat

7.72 4.11 1.44 4.80 5.55
5.55 4.80 4.04 0.59 8.58
0.59 8.58 2.26 7.72 4.11
```

```
violetxu — ssh ese-xurm@172.18.6.175 — 87×39
  GNU nano 2.3.1              文件：  ./fortran_demo1/MN.dat

  249.40   321.28   135.42   251.66   322.83
  229.90   277.34   115.80   222.61   283.04
  193.38   239.84   100.18   191.18   242.60
  206.09   294.73   133.52   208.97   300.72
  229.90   277.34   115.80   222.61   283.04
```

Q2.

```
violetxu — ssh ese-xurm@172.18.6.175 — 109×44
[ese-xurm@login02 Assignment6]$ vi Solar_hour_angle.f90
[ese-xurm@login02 Assignment6]$ vi Solar_elevation_angle.f90
[ese-xurm@login02 Assignment6]$ vi Declination_angle.f90
[ese-xurm@login02 Assignment6]$ gfortran -c Solar_hour_angle.f90
[ese-xurm@login02 Assignment6]$ gfortran -c Declination_angle.f90
[ese-xurm@login02 Assignment6]$
[ese-xurm@login02 Assignment6]$ ar rcvf libsolar.a Solar_hour_angle.o Declination_angle.o
a - Solar_hour_angle.o
a - Declination_angle.o
[ese-xurm@login02 Assignment6]$ gfortran Solar_elevation_angle.f90 -o Q2.x -L. -lsolar
[ese-xurm@login02 Assignment6]$ chmod 777 ./Q2.x
[ese-xurm@login02 Assignment6]$
[ese-xurm@login02 Assignment6]$ ./Q2.x
 SEA for Shenzhen (22.542883N, 114.062996E) at 10:32 (Beijing time; UTC+8) on 2021-12-31:   36.63505466177102
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[ese-xurm@login02 Assignment6]$
[ese-xurm@login02 Assignment6]$ ls .
Declination_angle.f90  fortran_demo1  Makefile           Solar_elevation_angle.f90  Solar_hour_angle.o
declination_angle.mod  libsolar.a     Matrix_multip.f90  Solar_hour_angle.f90
Declination_angle.o    Main.f90       Q2.x               solar_hour_angle.mod
[ese-xurm@login02 Assignment6]$
```

Comparing with the answer on the website:

Solar elevation angle calculator

Select the date & time and your timezone, enter your longitude & latitude to calculate the solar elevation angle (or solar latitude angle) and zenith angle.

Select date: 2021/12/31

Enter time: 10:32

Select time zone: (UTC+08:00) Beijing, Chongqing, Hor

Enter latitude (e.g. Los Angeles: 34.052° N): 22.54288 North

Enter longitude (e.g. Los Angeles: 118.24° W): 114.06299 East

Solar elevation angle: 36.61°

Solar zenith angle: 53.39°