

1. Matrix multiplication

Good (15/15)

! Operation and some results

```
[ese-jianqh@login03 fortran_demo1]$ gfortran Matrix_multip.f90 Main.f90 -o Q1.x
[ese-jianqh@login03 fortran_demo1]$ ./Q1.x
M is following:
 19.480000000000000      15.789999999999999      19.280000000000001
 19.280000000000001      12.920000000000000      15.859999999999999
 15.859999999999999      11.289999999999999      14.039999999999999
 11.930000000000000      18.600000000000001      18.230000000000000
 19.280000000000001      12.920000000000000      15.859999999999999

N is following:
 7.719999999999999      4.110000000000000      1.439999999999999
 4.799999999999999      5.549999999999999
 5.549999999999999      4.799999999999999      4.040000000000000
 0.589999999999999      8.580000000000000
 0.589999999999999      8.580000000000001      2.259999999999999
 7.719999999999999      4.110000000000000

MN is following:
 249.3953000000000      321.2771999999999      135.4155999999999
 251.6617000000000      322.8329999999999
 229.9049999999999      277.3356000000000      115.8036000000000
 222.6059999999999      283.0421999999999
 193.3822999999999      239.8398000000000      100.1803999999999
 191.1778999999999      242.5955999999999
 206.0852999999999      294.7256999999999      133.5230000000000
 208.9736000000000      300.7248000000000
 229.9049999999999      277.3356000000000      115.8036000000000
 222.6059999999999      283.0421999999999
[ese-jianqh@login03 fortran_demo1]$ nano MN.dat
```

GNU nano 2.3.1					File: 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					

2. Calculate the Solar Elevation Angle

21/25

2.1 Declination_angle

For 2.1, I think it is good to write the code for calculating the number of days before a given date, although that is beautiful enough. Please refer to this method for calculating the number of days: <https://www.cnblogs.com/Pupa/p/10467523.html>

As well, you did not calculate the j , i.e., declination angle, correctly. Firstly, that is $\sin(-23.44 \times 2 \times \pi / 180)$, not $\sin(-23.44 \times 2 \times \pi / 360.0)$. Second if you wanted to calculate a $\sin(\text{value})$ with the value in degree, I suggest you to use $\text{sind}()$ directly.

So, 1 point was deducted for 2.1.

Better formula

The following equation gives a more accurate value of the declination angle.

$$\delta = \sin^{-1} \left[\sin(-23.44^\circ) \cos \left(\frac{360}{365.24} (d + 10) + \frac{360}{\pi} \times 0.0167 \sin \left(\frac{360}{365.24} (d - 2) \right) \right) \right]$$

2.2 Solar_hour_angle

见网站公式

Please use correct name for the document, it should be Solar_hour_angle.f90, not Solar_hour_angle. But the code you wrote is roughly correct.

2.3 Solar_elevation_angle.f90

见网站公式

本答案未跑通，仅提交f90文件

I tried running your code, and you need to check at least the following bugs.

1. I think that is not right to integer:: yy,mm,dd,days=0 within subroutine since yy,mm,dd,days are as input values.
2. I am not sure whether you can use the list of integer::dayofmonth(12)=[31,28,31,30,31,30,31,31,30,31,30,31] in Fortran.
3. use endif instead of end if

Beside, for 2.3 and 2.4, I can not know whether you have understood how to use model and how to create library and compile by using library in your report or code. So, 3 points were deducted.