ICT283Assignent2

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1. Guide:

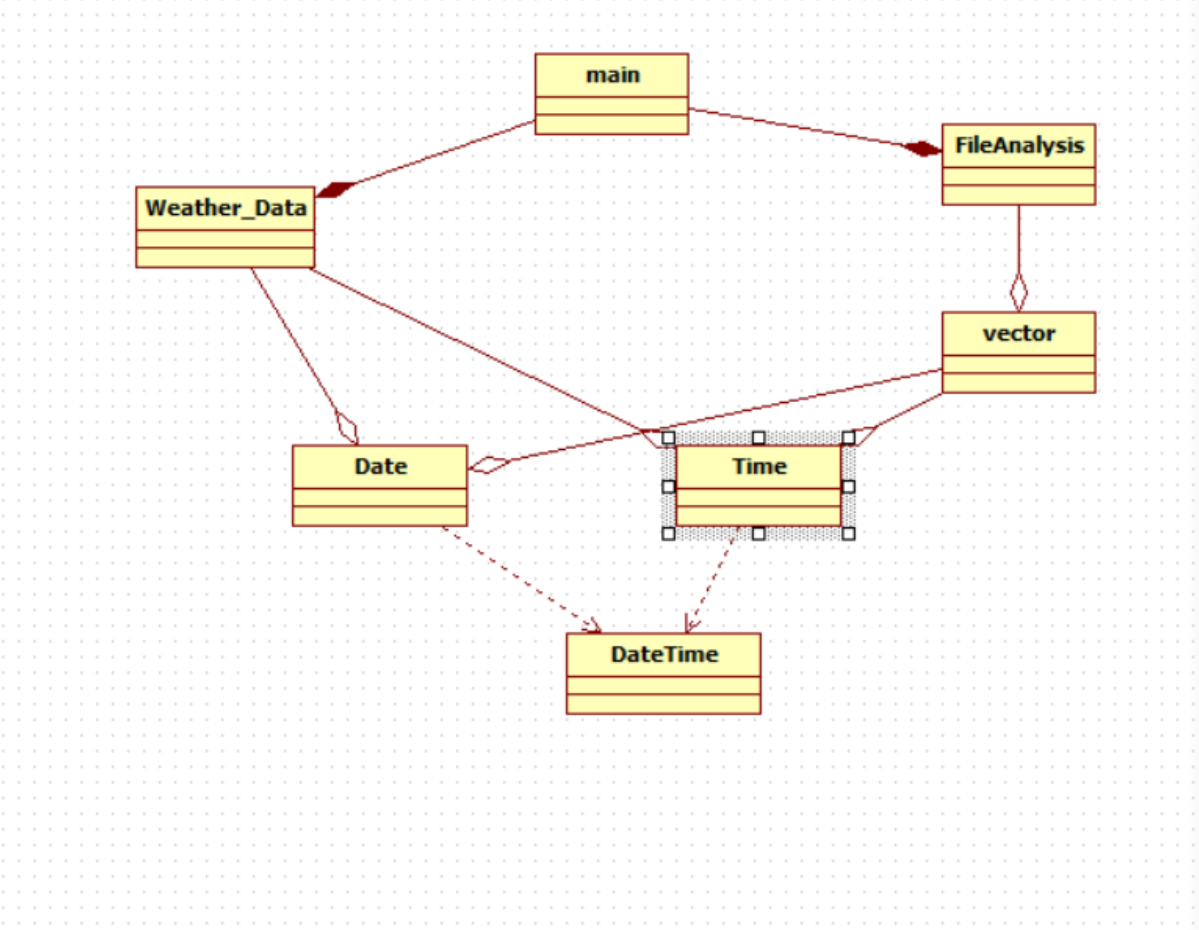
   Where to find:

   Open the file named ‘ICT283A_Assignment1Demo_34073803_chenying_zhao’, for running this program, click ’AssignmentDemo1’, as you open this file, click the ‘AssignmentDemo1.cbp’, after entering the program, you can find the run button on the top, click run, the program will run.

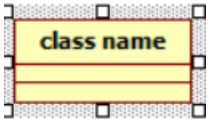
   How to use:

   After running the program, users can enter number ‘1-6’ to try different case, enter ‘1-3’, and follow the instruction pop on the screen, it will show the expected result. Enter ‘4’, and type the year from keyboard, you can find ‘WindTempSolar.csv’ under the ‘data’ file, type’5’, it will show the highest solar radiation, about ‘6’, it will exit the program.

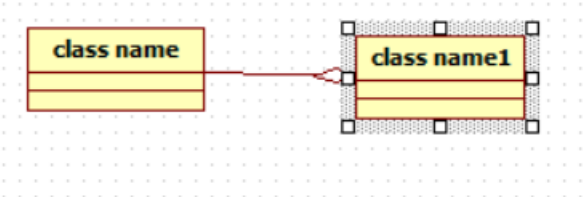
2. UML diagram:



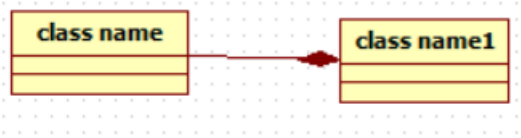
legend:



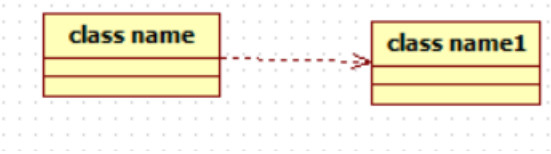
It is an entity, also a class.



Aggregation relationship: It is the relationship between the whole and the part, and the part can exist separately from the whole. Class name1 still can exist without class name.



Combination relationship: It is the relationship between the whole and the parts, but the parts cannot exist independently of the whole. Class name1 cannot exist without class name.



Dependency: It is a relationship of use, that is, the implementation of one class requires the assistance of another class. Class name1's achieves need class name.

3. Data dictionary:

Name	Type	Protection	Description
Date	String	Public	Get the Date value
Year	String	Public	the year value
Month	String	Public	the month value
Days	String	Public	the day value
FileAnalysis			Analytical the data in file
FileAnalysis (string filepath1, string filepath2)		public	Read data from file1.file2 which is in the 2014-2015

			csv and 2015-2016 csv.
~FileAnalysis ()		public	Release the vector
getFileContent ()		public	Read data line by line from file
print_Vector();	Void	public	Print the value.
Weather_Data paraseLine(string line);		public	Read each message separated by commas
getCMD1(int year, int month); string	String	Public	Get data to case1
getCMD2(int year, int month);	String	Public	Get data to case2
string getCMD3(int year, int month);	String	Public	Get data to case3
string getCMD4(int year, int month);	String	Public	Get data to case4
file_path	String	Private	File path
fstream file1		Private	Find and read the file in the file location (2014-2015)
fstream file2;		Private	Find and read the file in the file location (2015-2016)
Time			Read the time
hours	int	public	The value of hours
Second	int	public	The value of second
min	int	public	The value of min
Date_Time			Read the data and time together
date	Date	Public	The value of date
time	Time	Public	The value of time
getDataTime(string data);	Date_Time	Public	Read the year, month and day which spilt by"/"
getMouthEnglish (int month);	String	Public	Covert the number of month to string.

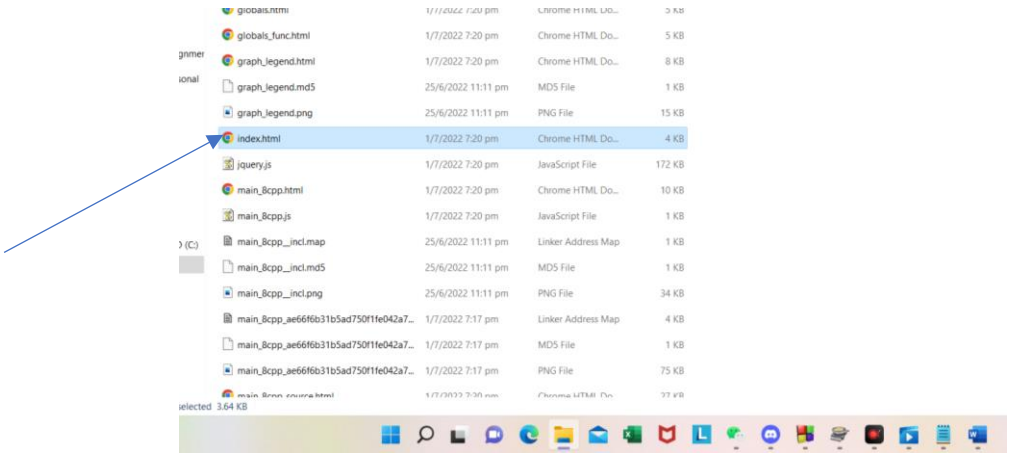
Vector			Save the data into vectoer
Vector ()		Public	Initialise the value
clear ()	Void	Public	Clear the vector
~Vector ()		Public	Release the vector
insert (Type value)	Void	Public	Insert data into vector
Type at (int index)		Public	Return the value of vector
getSize ()	Int	Public	Return the size of the vector
Type *vec_info	Int	Private	Vector
size_vec	Int	Private	Size of vector
capture_vec	Int	Private	Content of vector
Weather_Data			Get Data from file
WAST	String	Public	Date and time value
DP	String	Public	Dew Point Temperature value
Dta	String	Public	Wind Direction (10min Avg) value
Dts	String	Public	Wind Direction (10min SD) value
EV	String	Public	Evaporation
QFE	String	Public	Barometric Pressure value
QFF	String	Public	Barometric Pressure (QFE*Kqff) value
QNH	String	Public	Barometric Pressure (Aviation Standard) value
RF	String	Public	Rainfall (Year to Date) value
RH	String	Public	Relative Humidity value
S	String	Public	Wind Speed value
SR	String	Public	Solar Radiation (Average)
ST1	String	Public	Soil Temperature (125mm depth)
ST2	String	Public	Soil Temperature (250mm depth)
ST3	String	Public	Soil Temperature (500mm depth)
ST4	String	Public	Soil Temperature (1000mm depth)

Sx	String	Public	Wind Speed (max wind gust)
T	String	Public	Temperature (Air)
getWAST()	String	Public	Output date and time
setWAST(string wast)	Void	Public	Get date and time
getDP()	String	Public	Output Dew Point Temperature value
setDP(string DP)	Void	Public	Get Dew Point Temperature value
getDta()	String	Public	Output Wind Direction (10min Avg) value
setDta(string Dta)	Void	Public	Get Wind Direction (10min Avg) value
getDts()	String	Public	Output Wind Direction (10min SD) value
setDts(string Dts)	Void	Public	Get Wind Direction (10min SD) value
getEV()	String	Public	Output Evaporation
setEV(string Dts)	Void	Public	Get Evaporation
getQFE()	String	Public	Output Barometric Pressure value
setQFE(string Dts)	Void	Public	Get Barometric Pressure value
getQFF()	String	Public	Output Barometric Pressure (QFE*Kqff) value
setQFF(string Dts)	Void	Public	Get Barometric Pressure (QFE*Kqff) value
getQNH()	String	Public	Output Barometric Pressure (Aviation Standard) value
setQNH(string Dts)	Void	Public	Get Barometric Pressure (Aviation Standard) value
getRF()	String	Public	Output Rainfall (Year to Date) value
setRF(string Dts)	Void	Public	Get Rainfall (Year to Date) value
getRH()	String	Public	Output Relative Humidity Value
setRH(string Dts)	Void	Public	Get Relative Humidity

			value
getS()	String	Public	Output Wind Speed value
setS(string Dts)	Void	Public	Get Wind Speed value
getSR()	String	Public	Output Solar Radiation (Average)
setSR(string Dts)	Void	Public	Get Solar Radiation (Average)
getST1&2&4()	String	Public	Output case1&2&3&4
setST1&2&3&4(string Dts)	Void	Public	Get date and time for case1&2&3&4
getSx()	String	Public	Output Wind Speed (max wind gust)
setSx(string Dts)	Void	Public	Get Wind Speed (max wind gust)
getT()	String	Public	Output Temperature (Air)
setT(string Dts)	Void	Public	Get Temperature (Air)
Test			Test the vector
Test1()	void		Test the vector.h

4. Doxygen:

   Open the AssignmentDemo1, click html file, click ‘index.html’, and here is my Doxygen for assignment 2.



5. Algorithm:

   Average of wind speed, temperature, and solar radiation: Add the sum of wind speed and divide the count of testing wind speed. The average of solar radiation and temperature is same way as above.

6. Why:

   Vector:

When I read data from file, I save data into vector, so that if the user wants to use the data, the system does not need to ren the system and read the file again.

And I use template in the vector class, it can put int, double or char. Various types can be placed, with more functions.

Time:

Using the convert function in my time class, it is more friendly for users, no matter user types the number '1' or the letter 'January', the program all works well.

File analysis:

I use paraseLine() function, which can analytical the content, the data in file are sperate by comma, using find(key word) and fins the comma first and then plus one, can find the data what we need. I also use 'key' keyword for stl map.

BST:

BST is used as a template class to store and save data which is got from data file in case 1/4 using STL to process the program and output.

STL map:

For STL map I use "key" keyword in case 5. I use STL set to store the data and make the output.

7. Test plan& Output of test run(s):

Case	Input	Expected output	actual output
1	2014 3	Average of wind speed and temperature of March 2014	March 2014: 3.69236km/h, 16.2761 degrees c
	2015 3	Average of wind speed and temperature of March 2015	March 2015: 5.35475km/h, 19.0346 degrees c
	2016 12	Average of wind speed and temperature of December 2016	December 2016: 5.30556km/h, 22.1082 degrees c
2	2014	Average of wind speed and temperature in specific year of 2014.	2014 January: 4.61365km/h, 17.8368 degrees c February: 3.80694km/h, 17.4442 degrees c March: 3.69236km/h, 16.2761 degrees c April:4.02431km/h, 17.3123 degrees c May:

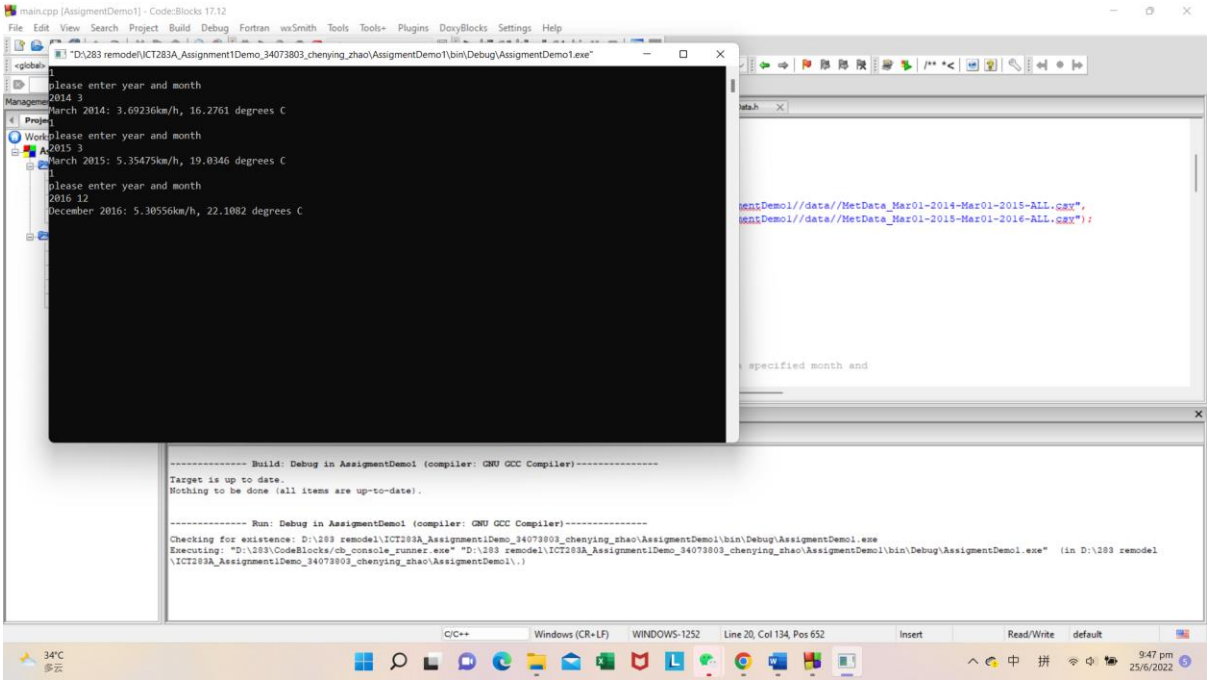
			4.65625km/h, 18.24 degrees c June:4.91944km/h, 18.3695 degrees c Duly: 5.18472km/h, 18.1365 degrees c August:5.9km/h, 16.9508 degrees c September:5.1km/h, 17.7587 degrees c October:5.04028km/h, 17.492 degrees c November: 4.60069km/h, 18.2493 degrees c December: 5.36042km/h, 17.7238 degrees
	2015	Average of wind speed and temperature in specific year of 2015.	2015 January: 5.66046km/h, 18.4229 degrees c February: 5.61516km/h, 18.3886 degrees c March:5.35475km/h, 19.0346 degrees c April: 5.08044km/h, 18.604 degrees c May:5.32986km/h, 18.5059 degrees c June:5.17245km/h, 17.7433 degrees c July:5.28125km/h, 18.2921 degrees c August: 5.06424km/h, 17.898 degrees c September: 4.80787km/h, 18.4539 degrees c October: 5.88831km/h, 19.1062 degrees c November: 5.50174km/h, 19.6283 degrees c December: 4.59606km/h, 19.0785 degrees c
	2016	Average of wind speed and temperature in specific year of 2016.	2016 January:6.50871km/h, 20.5453 degrees c February: 5.89236km/h, 22.2541 degrees c March: 6.48958km/h24.8978

			degrees c April:5.23958km/h, 25.3218 degrees c May:4.78819km/h, 24.541 degrees c June:4.55556km/h, 24.6747 degrees C July: 7.45833km/h, 30.6904 degrees c August: 6.68056km/h, 31.5871 degrees c September: 4.20486km/h, 27.841 degrees C October: 4.45833km/h, 25.0573 degrees c November: 4.37153km/h, 23.7497 degrees C December:5.30556km/h, 22.1082 degrees c
3	2015	Average of solar radiation in specific year of 2015.	2015 January:242.9 kwh /m2 February:218.23 kWh /m2 March:245.817 kwh /m2 April:238.172 kWh /m2 May:238.13 kwh /m2 June: 217.247 kwh /m2 July: 222.383 kwh /m2 August:255.804 kwh /m2 September: 251.057 kWh /m2 October: 244.207 kwh /m2 November:261.816 kwh /m2 December:239.468 kWh /m2
	2014	Average of solar radiation in specific year of 2014.	2014 January:229.818 kWh /m2 February:215.045 kWh /m2 March:240.165 kwh /m2 April:229.287 kwh /m2 May:211.438 kWh/m2 June:208.157 kwh /m2 July: 200.03 kWh /m2 August:208.718 kwh /m2 September: 215.265 kWh /m2 October: 220.867 kwh /m2 November:232.096 kWh /m2 December:221.89 kWh /m23

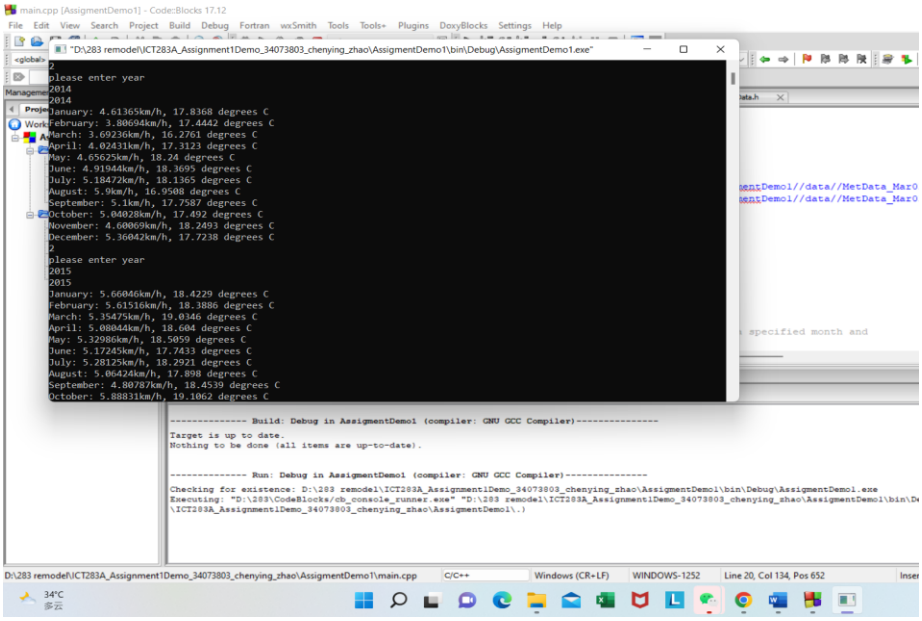
	2016	Average of solar radiation in specific year of 2016.	2016 January:330.136 kWh /m2 February: 374.181 kwh /m2 March: 380.594 kWh /m2 April:292.729 kwh /m2 May:369.76 kwh/m2. June:375.392 kwh /m2 July:379.406 kwh /m2 August:302.646 kwh /m2 September: 366.167 kwh /m2 October:290.872 kWh /m2. November: 304.122 kwh /m2 December: 346.306 kwh /m2
4	2014	Save in the csv file.	2014 file show in the folder.
	2015	Save in the csv file.	2015 file show in the folder.
	2016	Save in the csv file.	2016 file show in the folder.
5	2014 3 11	Output the highest solar radiation.	Date: 3/11/2014 Highest solar radiation:349.944
	2015 4 10	Output the highest solar radiation.	Date: 4/10/2015 Highest solar radiation:215.708
	2016 5 12	Output the highest solar radiation.	Date: 5/12/2016 Highest solar radiation: nan
	2011 1 2	Output the highest solar radiation.	Date:1/2/2011 Highest solar radiation: 374.937
6	6	Exit	Exit

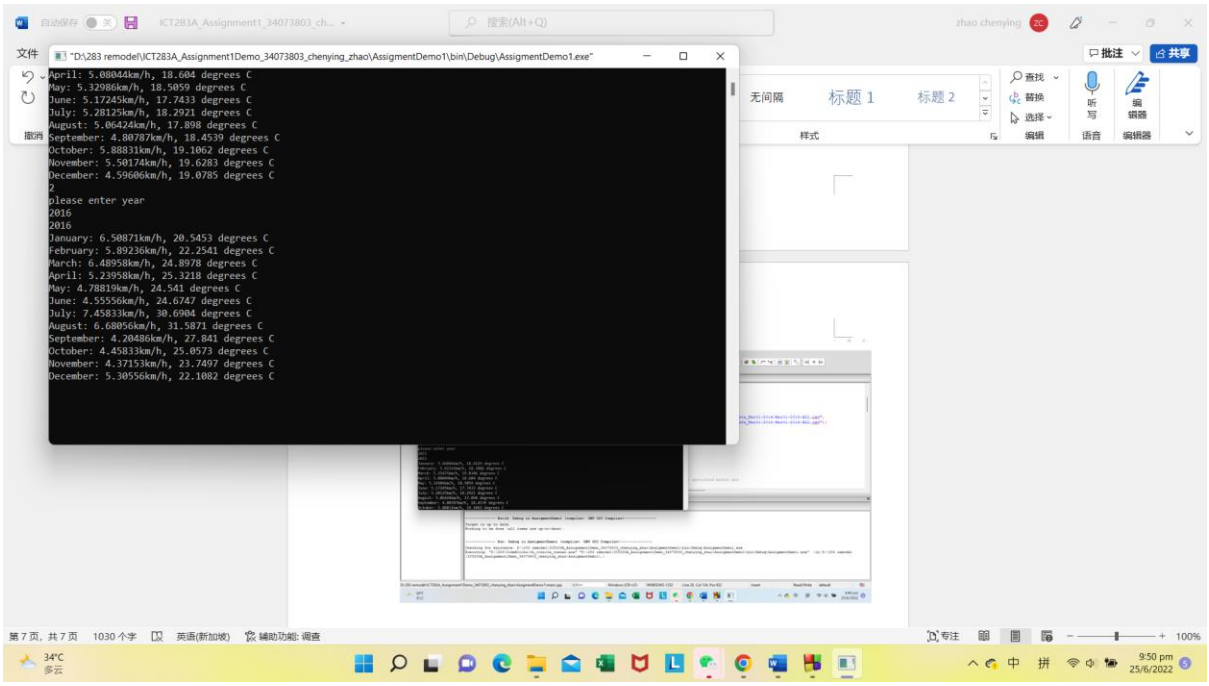
Screenshot:

Case1:

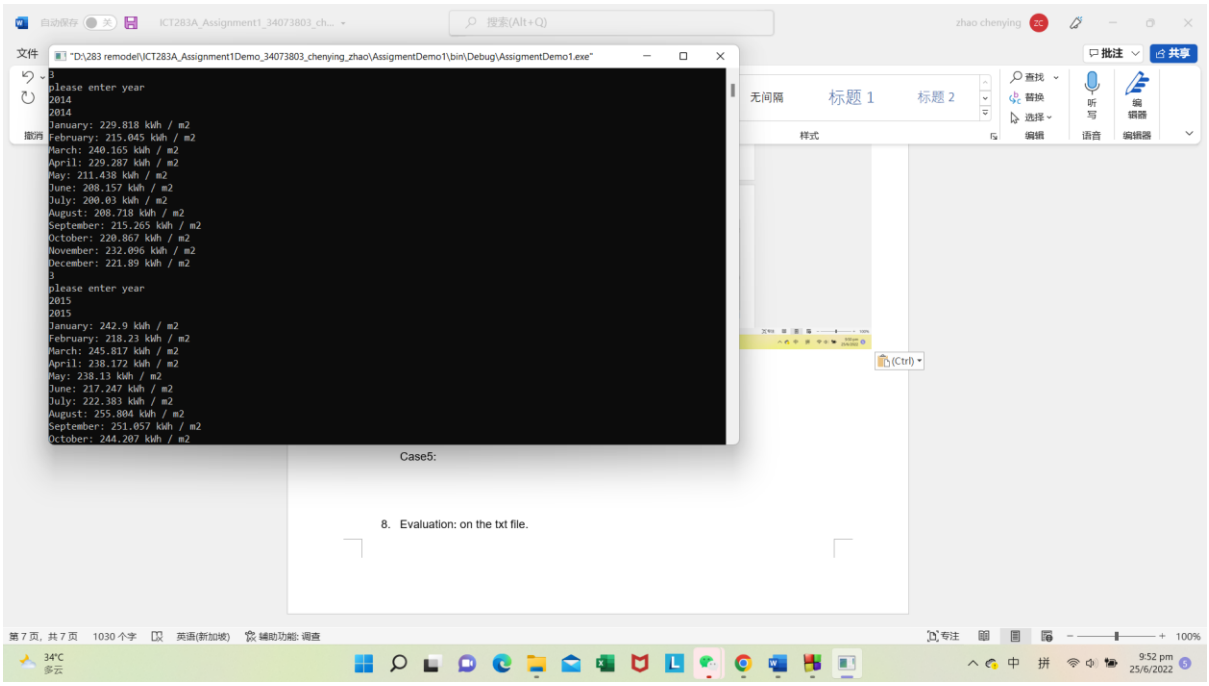

"D:\283 remodel\ICT283A_Assignment1Demo_34073803_chenying_zhao\AssigmentDemo1\bin\Debug\AssigmentDemo1.exe"
1
please enter year and month
2014 3
March 2014: 3.69236km/h, 16.2761 degrees C
1
please enter year and month
2015 3
March 2015: 5.35475km/h, 19.0346 degrees C
1
please enter year and month
2016 12
December 2016: 5.30556km/h, 22.1082 degrees C
-------------- Build: Debug in AssigmentDemo1 (compiler: GNU GCC Compiler)---------------
Target is up to date.
Nothing to be done (all items are up-to-date).
-------------- Run: Debug in AssigmentDemo1 (compiler: GNU GCC Compiler)---------------
Checking for existence: D:\283 remodel\ICT283A_Assignment1Demo_34073803_chenying_zhao\AssigmentDemo1\bin\Debug\AssigmentDemo1.exe
Executing: "D:\283\CodeBlocks/cb_console_runner.exe" "D:\283 remodel\ICT283A_Assignment1Demo_34073803_chenying_zhao\AssigmentDemo1\bin\Debug\AssigmentDemo1.exe" (in D:\283 remodel
\ICT283A_Assignment1Demo_34073803_chenying_zhao\AssigmentDemo1\.)

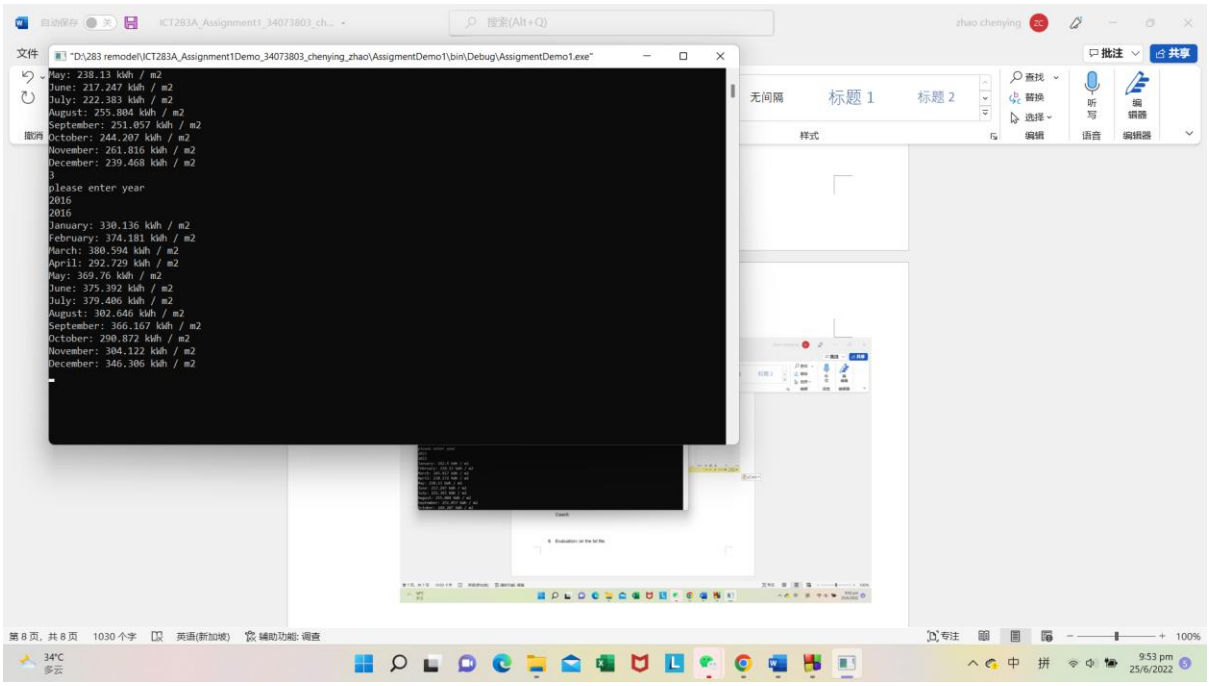
Case2:


"D:\283 remodel\ICT283A_Assignment1Demo_34073803_chenying_zhao\AssigmentDemo1\bin\Debug\AssigmentDemo1.exe"
2
please enter year
2014
2014
January: 4.61365km/h, 17.8368 degrees C
February: 3.80694km/h, 17.4442 degrees C
March: 3.69236km/h, 16.2761 degrees C
April: 4.02431km/h, 17.3123 degrees C
May: 4.65625km/h, 18.24 degrees C
June: 4.91944km/h, 18.3695 degrees C
July: 5.18472km/h, 18.1365 degrees C
August: 5.9km/h, 16.9508 degrees C
September: 5.1km/h, 17.7587 degrees C
October: 5.04028km/h, 17.492 degrees C
November: 4.60069km/h, 18.2493 degrees C
December: 5.36042km/h, 17.7238 degrees C
2
please enter year
2015
2015
January: 5.66046km/h, 18.4229 degrees C
February: 5.61516km/h, 18.3886 degrees C
March: 5.35475km/h, 19.0346 degrees C
April: 5.08044km/h, 18.604 degrees C
May: 5.32986km/h, 18.5059 degrees C
June: 5.17245km/h, 17.7433 degrees C
July: 5.28125km/h, 18.2921 degrees C
August: 5.06424km/h, 17.898 degrees C
September: 4.80787km/h, 18.4539 degrees C
October: 5.88831km/h, 19.1062 degrees C
-------------- Build: Debug in AssigmentDemo1 (compiler: GNU GCC Compiler)---------------
Target is up to date.
Nothing to be done (all items are up-to-date).
-------------- Run: Debug in AssigmentDemo1 (compiler: GNU GCC Compiler)---------------
Checking for existence: D:\283 remodel\ICT283A_Assignment1Demo_34073803_chenying_zhao\AssigmentDemo1\bin\Debug\AssigmentDemo1.exe
Executing: "D:\283\CodeBlocks/cb_console_runner.exe" "D:\283 remodel\ICT283A_Assignment1Demo_34073803_chenying_zhao\AssigmentDemo1\bin\D
\ICT283A_Assignment1Demo_34073803_chenying_zhao\AssigmentDemo1\.)

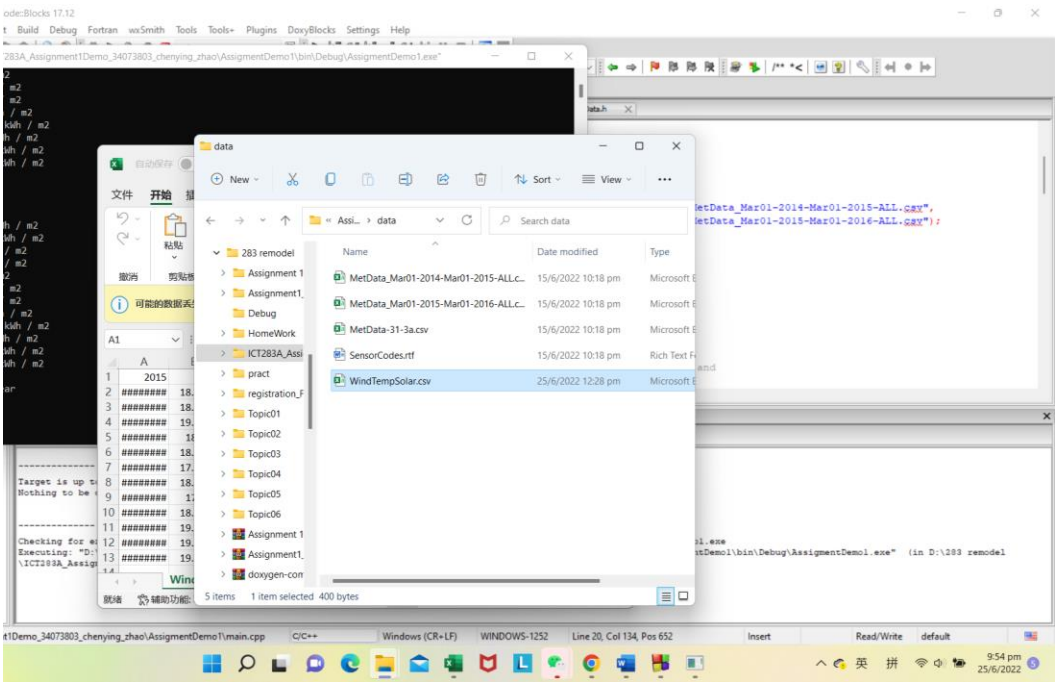

"D:\283 remodel\ICT283A_Assignment1Demo_34073803_chenying_zhao\AssigmentDemo1\bin\Debug\AssigmentDemo1.exe"
April: 5.08044km/h, 18.604 degrees C
May: 5.32986km/h, 18.5059 degrees C
June: 5.17245km/h, 17.7433 degrees C
July: 5.28125km/h, 18.2921 degrees C
August: 5.06424km/h, 17.898 degrees C
September: 4.80787km/h, 18.4539 degrees C
October: 5.88831km/h, 19.1062 degrees C
November: 5.50174km/h, 19.6283 degrees C
December: 4.59606km/h, 19.0785 degrees C
2
please enter year
2016
2016
January: 6.50871km/h, 20.5453 degrees C
February: 5.89236km/h, 22.2541 degrees C
March: 6.48958km/h, 24.8978 degrees C
April: 5.23958km/h, 25.3218 degrees C
May: 4.78819km/h, 24.541 degrees C
June: 4.55556km/h, 24.6747 degrees C
July: 7.45833km/h, 30.6904 degrees C
August: 6.68056km/h, 31.5871 degrees C
September: 4.20486km/h, 27.841 degrees C
October: 4.45833km/h, 25.0573 degrees C
November: 4.37153km/h, 23.7497 degrees C
December: 5.30556km/h, 22.1082 degrees C

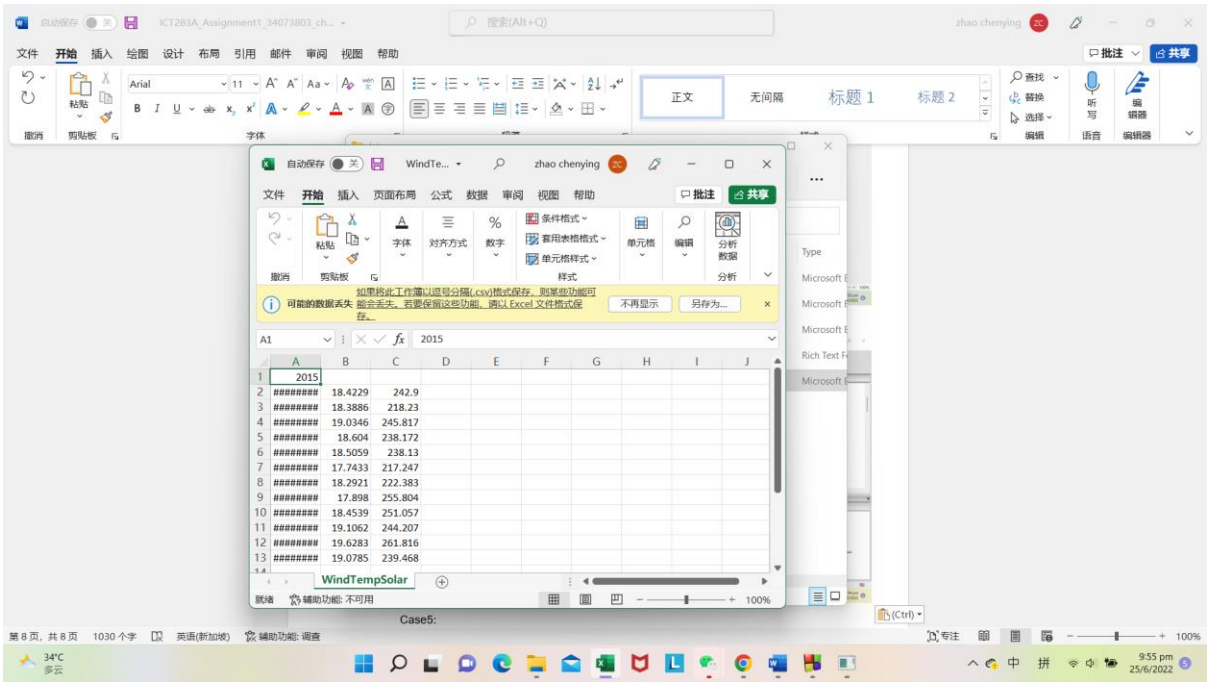
Case3:

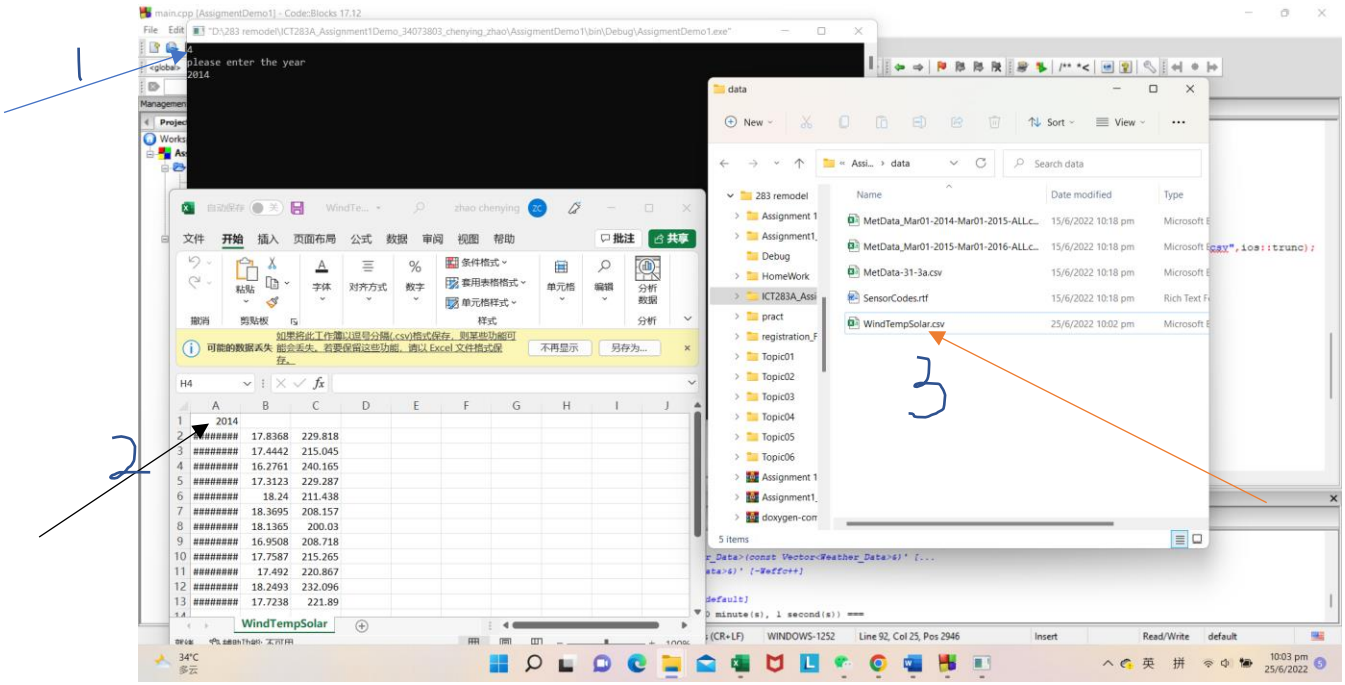

"D:\283 remodel\ICT283A_Assignment1Demo_34073803_chenying_zhao\AssigmentDemo1\bin\Debug\AssigmentDemo1.exe"
3
please enter year
2014
2014
January: 229.818 kWh / m2
February: 215.045 kWh / m2
March: 240.165 kWh / m2
April: 229.287 kWh / m2
May: 211.438 kWh / m2
June: 208.157 kWh / m2
July: 200.03 kWh / m2
August: 208.718 kWh / m2
September: 215.265 kWh / m2
October: 220.867 kWh / m2
November: 232.096 kWh / m2
December: 221.89 kWh / m2
3
please enter year
2015
2015
January: 242.9 kWh / m2
February: 218.23 kWh / m2
March: 245.817 kWh / m2
April: 238.172 kWh / m2
May: 238.13 kWh / m2
June: 217.247 kWh / m2
July: 222.383 kWh / m2
August: 255.804 kWh / m2
September: 251.057 kWh / m2
October: 244.207 kWh / m2
Case5:
8. Evaluation: on the txt file.

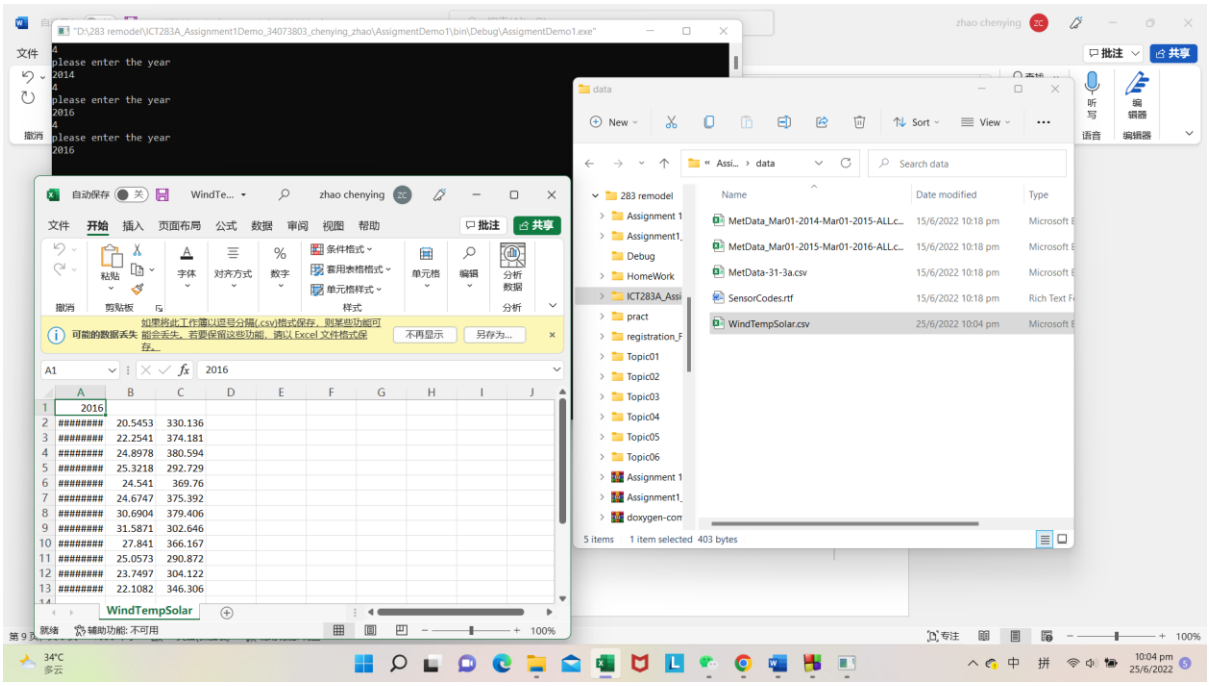

"D:\283 remodel\ICT283A_Assignment1Demo_34073803_chenying_zhao\AssigmentDemo1\bin\Debug\AssigmentDemo1.exe"
May: 238.13 kWh / m2
June: 217.247 kWh / m2
July: 222.383 kWh / m2
August: 255.804 kWh / m2
September: 251.057 kWh / m2
October: 244.207 kWh / m2
November: 261.816 kWh / m2
December: 239.468 kWh / m2
0
Please enter year
2016
2016
January: 330.136 kWh / m2
February: 374.181 kWh / m2
March: 380.594 kWh / m2
April: 292.729 kWh / m2
May: 369.76 kWh / m2
June: 375.392 kWh / m2
July: 379.486 kWh / m2
August: 302.646 kWh / m2
September: 366.167 kWh / m2
October: 290.872 kWh / m2
November: 304.122 kWh / m2
December: 346.306 kWh / m2

Case4:

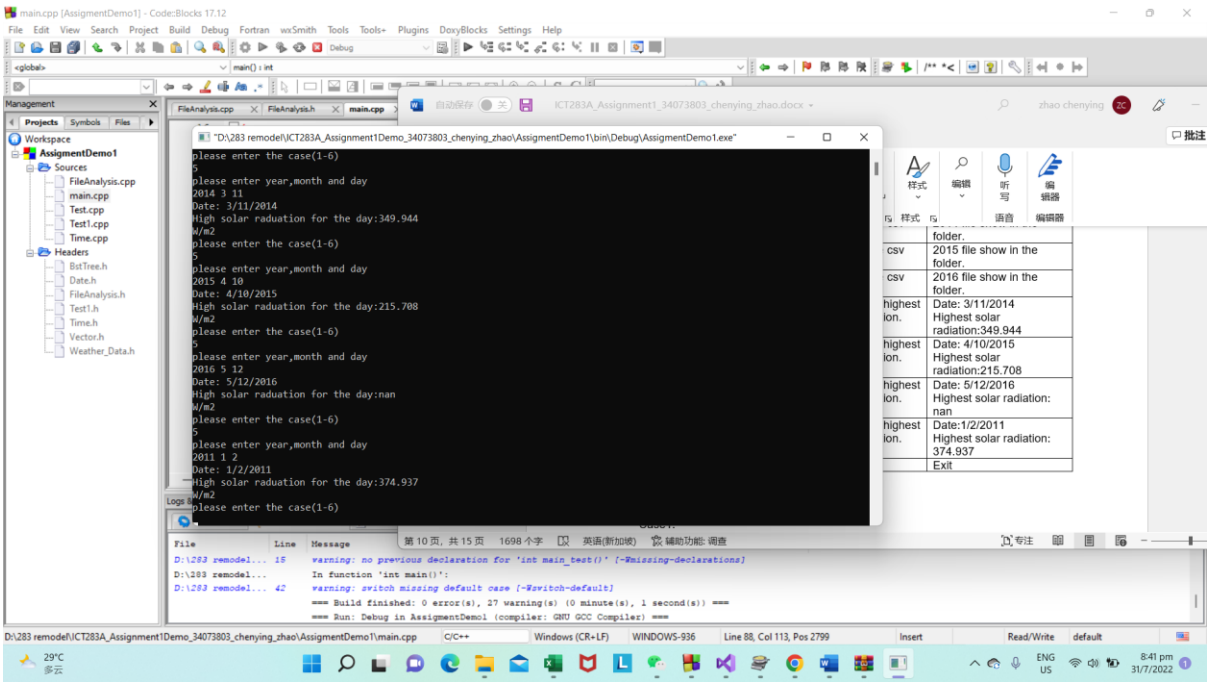

data
283 remodel
Assignment 1
Debug
HomeWork
pract
registration_F
Topic01
Topic02
Topic03
Topic04
Topic05
Topic06
MetData_Mar01-2014-Mar01-2015-ALL.csv
MetData_Mar01-2015-Mar01-2016-ALL.csv
MetData-31-3a.csv
SensorCodes.rtf
WindTempSolar.csv
5 items
1 item selected 400 bytes


WindTempSolar
Case5:

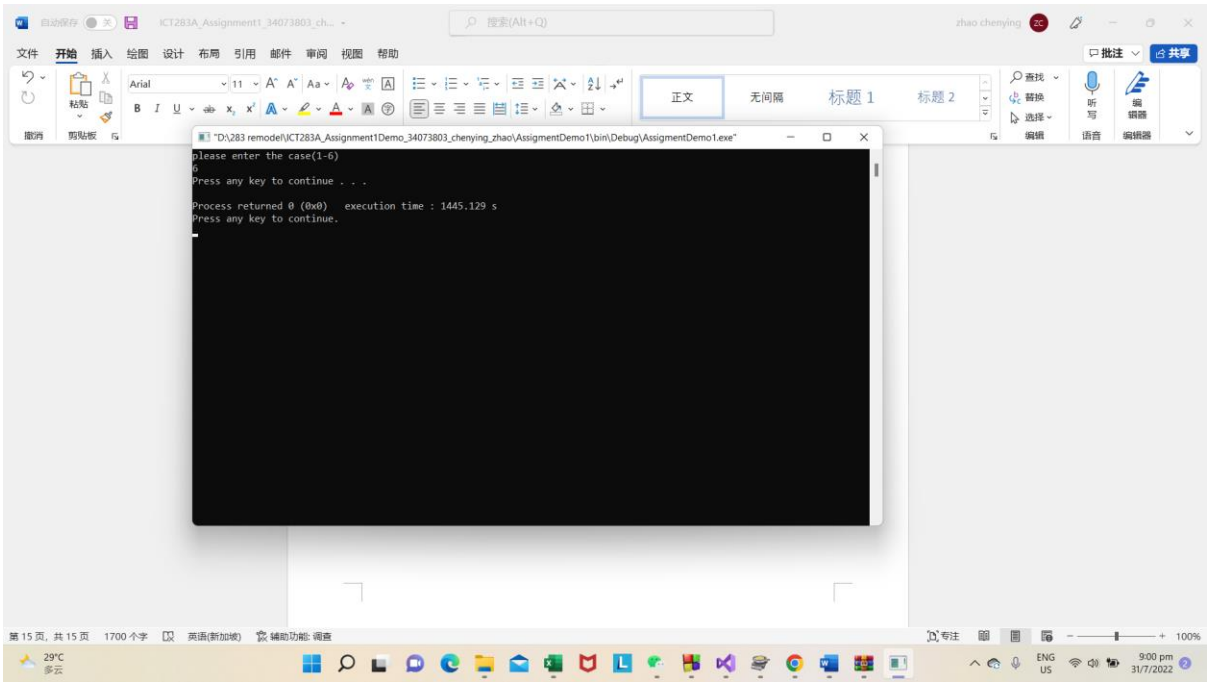

1
please enter the year
2014
2
3
WindTempSolar


4
please enter the year
2014
4
please enter the year
2016
4
please enter the year
2016
WindTempSolar
WindTempSolar.csv
MetData_Mar01-2014-Mar01-2015-ALLc...
MetData_Mar01-2015-Mar01-2016-ALLc...
MetData-31-3a.csv
SensorCodes.rtf

Case5:


please enter the case(1-6)
5
please enter year,month and day
2014 3 11
Date: 3/11/2014
High solar raduation for the day:349.944
w/m2
please enter the case(1-6)
5
please enter year,month and day
2015 4 10
Date: 4/10/2015
High solar raduation for the day:215.708
w/m2
please enter the case(1-6)
5
please enter year,month and day
2016 5 12
Date: 5/12/2016
High solar raduation for the day:nan
w/m2
please enter the case(1-6)
5
please enter year,month and day
2011 1 2
Date: 1/2/2011
High solar raduation for the day:374.937
w/m2
please enter the case(1-6)
csv
2015 file show in the folder.
csv
2016 file show in the folder.
Date: 3/11/2014 Highest solar radiation:349.944
Date: 4/10/2015 Highest solar radiation:215.708
Date: 5/12/2016 Highest solar radiation: nan
Date:1/2/2011 Highest solar radiation: 374.937
Exit

Case 6:



8. Evaluation: on the txt file.