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.

1. UML diagram:

图示

描述已自动生成

legend:

日历

低可信度描述已自动生成

It is an entity, also a class.

图示

描述已自动生成

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.

图片包含 表格

描述已自动生成

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.

表格

中度可信度描述已自动生成

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.

1. 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 |

1. Doxygen:

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

图形用户界面, 文本, 应用程序

描述已自动生成

1. 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.

1. 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.

1. 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:

电脑萤幕的截图

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Case2:

电脑萤幕的截图

描述已自动生成

图形用户界面

描述已自动生成

Case3:

图形用户界面, 应用程序

描述已自动生成

图形用户界面, 应用程序

描述已自动生成

Case4:

电脑萤幕的截图

描述已自动生成

图形用户界面, 应用程序, 表格, Excel

描述已自动生成

电脑软件截图

描述已自动生成

电脑软件截图

描述已自动生成

Case5:

电脑萤幕的截图

描述已自动生成

Case 6:

图形用户界面, 应用程序, PowerPoint

描述已自动生成

1. Evaluation: on the txt file.