EE3093: C++ Assignment

UNIVERSITY OF ABERDEEN SESSION 2021-22

EE3093: Cpp Assignment

Degree Examination in EE3093 C/C++ PROGRAMMING
First Half Session: 2021-22
Release Date: 29 / 11 / 2021
Submission Date: 03 / 12 / 2021

This is an open book online assessment which is expected to take up to 3 hours to complete; submission will be accepted until the above submission deadline. Students who have not submitted after this time will be required to present for reassessment in the resit diet.

Please follow the instructions and answer the questions accordingly. Please upload files through MyAberdeen as instructed. You **must not** attempt to communicate with any candidate regarding this exam by any means including but not limited to, electronically, orally or passing/showing written material to another candidate and you **must not** attempt to view another candidate's work. All submissions will be checked for plagiarism.

PLEASE READ AND FAMILIARISE YOURSELF WITH THE REGULATIONS DETAILED ON THIS PAGE BEFORE ATTEMPTING THIS EXAMINATION

Assessment weighting: The weighting of this assessment is 20% of course mark.

For details of the performance descriptors associated with each CGS grade, please refer to the Common Grading Scale site https://www.abdn.ac.uk/staffnet/teaching/common-grading-scale-2840.php.

Submission of work for assessment

Each student must submit their own solution or report on the assessment *via* MyAberdeen by the deadline stated on the exam paper or on the assignment specification. Students who submit their solution or report on the assessment after the stated deadline will be required to present for assessment in the resit diet.

If illness, injury, IT/internet related problem, or any other condition prevents you from completing an assessment, coursework, or examination, or if you consider that your performance may have been detrimentally affected having taken the exam or done the assignment, then you must complete the Absence form on MyAberdeen within **three** working days of the submission deadline of the alternative assessment.

Plagiarism, Collusion and Contract Cheating
Your solution to the assessment **must** be entirely your own personal work or, where the intellectual work of others is used, it must be clearly identified and referenced. This applies to everything you submit for assessment. Copying someone else's work, colluding with someone else in doing the set exercise or exam, and plagiarism will be regarded as academic misconduct.

The rules approved by the University for the conduct of examinations are set out in a separate document entitled "Rules for the Conduct of Written Examinations for Degrees and Diplomas" which can be found at: https://www.abdn.ac.uk/staffnet/teaching/assessment-policies-and-guidance-6099.php

Where there is reason to believe that cheating in a prescribed degree assessment (including the alternative assessment to end of course written exam) has occurred this will be dealt with in accordance with the Code of Practice on Student Discipline, which can be found at: https://www.abdn.ac.uk/staffnet/documents/academic-quality-handbook/Code of Practice in Student Discipline (Academic).pdf

The University's definition of Plagiarism is *the use, without adequate acknowledgement, of the intellectual work of another person in work submitted for assessment*. This definition includes the unattributed use of course materials. A student cannot be found to have committed plagiarism where it can be shown that the student has taken all reasonable care to avoid representing the work of others as his or her own.

Student details

(1) Fill in the table below: Replace text within the # # symbols with your data (do not delete the # # symbols).

Student ID:	[#_5_ _1_ _9_ _8_ **_5_** **_9_** **_6_** **_1_** #]
Digit:	[_1st_ _2nd_ _3rd_ _4th_ **_5th_** **_6th_** **_7th_** **_8th_**]

(2) Update all fields in the document header: Double click on the page **header**; Press "**CTR** + **A**"; Press **F9**.

Marks: Total out of 22 CGS marks

Part 1 awards 13 CGS marks. Part 2 awards 5 CGS marks. Part 3 awards 4 CGS marks.

Instructions to users

- Ensure you have followed the instructions in the "Student Details" section of this document so that **your student ID** is (automatically) **reported on each page of this document**.
- Answer the questions indicated in the INSTRUCTIONS file (PDF). In that document, specific requirements for your implementation are set depending on your student ID. You must **report in the present document** the options that you have selected (based on your student ID).
- **Source code** (header/cpp) **file** should be clearly **named and indicated** in the **present document**.

Submission info

Your **submission** via **myAberdeen** should include:

- The **StudentSelections document** (this document), reporting the selections you made based on your student ID (as instructed throughout the document) and indicating the source code files that contribute to each answer. This StudentSelections document is used to report sample test results (see page limits indicated in the INSTRUCTIONS document). Prior to submission, **convert** this word file **into a PDF file**.
- **Source code** in header/cpp **files**. Each submitted file must be mentioned in **this document.** These **files** are submitted via myAberdeen (may be zipped together for simplicity; then a single zip file is submitted).

Part 1:

Report your selection for this section

Table 1: Fill in the table below to report your options for **Part 1** and the names of the files implementing and testing part 1

Your selection	ID digit leading to that selection
WeatherTag_Option: ___0___	Based on 8th ID digit being: __1____
WeatherMeasuremen_Option: ____1__	Based on 7th ID digit being: ___6___
Name of submitted Files that implement your answers:	Source files: _____WeatherTag.h, WeatherMeasurement.h, main.cpp

Sample Test results

```
 Test WeatherTag

Using setRandomTag() and then printTag():
The tag was taken on this month: 5, on this day: 11


Test whether getTag() works properly
myMonth initialized to: 5
myDay initialized to: 11

Test WeatherTag - manual input - try input value when object already init

Error in setTag() - tag already initialized
Task failed successfully.

Test WeatherTag - manual input - input must fail (30th of February)

Error in setTag() - wrong day value provided
Task failed successfully.

Test resetTag() - check if unitialized object can be reset
Error in resetTag() - tag already uninitialized
Test isTagSet() and printTag() on an uninitialized object
Error in printTag() - tag not initialized
Task failed successfully


 Test WeatherMeasurement

Using setRandomMeasurement() and then printMeasurement():
The measured humidity is: 75.74%


Test whether getMeasurement() works properly
myHumidity initialized to: 75.74
Test WeatherMeasurement - manual input - try input value when object already init.

Error in setMeasurement() - measurement already initialized
Task failed successfully.

Test WeatherTag - manual input - input must fail (105%)

Error in setMeasurement() - wrong humidity value provided
Task failed successfully.

Test resetMeasurement() - check if unitialized object can be reset
Error in resetMeasurement() - measurement already uninitialized
Test isMeasurementSet() and printMeasurement() on an uninitialized object
Error in printMeasurement() - tag not initialized
Task failed successfully

Test WeatherTag

set A and B with Random values then print:
Object A: The tag was taken on this month: 9, on this day: 26
Object B: The tag was taken on this month: 6, on this day: 3
then test A < B, A == B, A > B
A > B is True.
```

```
Test WeatherTag - = operator & copy constructor

set A with Random values, set B = A and weatherMeasurement C(A) :
Object A: The tag was taken on this month: 8, on this day: 29
Object B: The tag was taken on this month: 8, on this day: 29
Object C: The tag was taken on this month: 8, on this day: 29
then test A < B, A == B, A > B
A == B is True.
A == C is True.
Test WeatherMeasurement

set A and B with Random values then print:
Object A: The measured humidity is: 83.27%
Object B: The measured humidity is: 92.97%
then test A < B, A == B, A > B
A < B is True.
Test WeatherMeasurement - = operator & copy constructor

set A with Random values, set B = A and weatherMeasurement C(A) :
Object A: The measured humidity is: 53.49%
Object B: The measured humidity is: 53.49%
Object C: The measured humidity is: 53.49%
then test A < B, A == B, A > B
A == B is True.
A == C is True.
```

Marking (leave blank for staff)

Note: **no mark** awarded **for implementing options not required** (based on your ID).

Table 2: Marks allocation for Part 1 (out of **22 CGS marks** for the **entire assignment**):

Part 1	**CGS Marks**
setTag(…): implementation and test (via test routine)	**____/ 0.6**
setRandomTag (): implementation and test (via test routine)	**____/ 0.6**
resetTag (): implementation and test (via test routine)	**____/ 0.6**
isTagSet(): implementation and test (via test routine)	**____/ 0.6**
getTag(…): implementation and test (via test routine)	**____/ 0.6**
printTag(): implementation and test (via test routine)	**____/ 0.6**
operator **<** for weatherTag: implementation and test (via test routine)	**____/ 0.5**
operator **==** for weatherTag: implementation and test (via test routine)	**____/ 0.5**
operator **>** for weatherTag: implementation and test (via test routine)	**____/ 0.5**
operator **=** for weatherTag: implementation and test (via test routine)	**____/ 0.5**
Copy constructor for weatherTag: implementation and test (via test routine)	**____/ 0.5**
setMeasurement(…): implementation and test (via test routine)	**____/ 0.6**
setRandomMeasurement(): implementation and test (via test routine)	**____/ 0.6**
resetMeasurement(): implementation and test (via test routine)	**____/ 0.6**
isMeasurementSet(): implementation and test (via test routine)	**____/ 0.6**
getMeasurement(…): implementation and test (via test routine)	**____/ 0.6**
printMeasurement(): implementation and test (via test routine)	**____/ 0.6**
operator **<** for weatherMeasurement: implementation and test (via test routine)	**____/ 0.5**
operator **==** for weatherMeasurement: implementation and test (via test routine)	**____/ 0.5**
operator **>** for weatherMeasurement: implementation and test (via test routine)	**____/ 0.5**
operator **=** for weatherMeasurement: implementation and test (via test routine)	**____/ 0.5**
Copy constructor for weatherMeasurement: implementation and test (via test routine)	**____/ 0.5**
Reporting of test results (fit your sample results in **max 1 side** of the Selection Document)	**____/ 0.8**
Tot Part 1 = ____/ 13 CGS Marks	

Part 2:

Report your selection for this section

Table 3: Fill in the table below to report your options for **Part 2** and the names of the files implementing and testing Part 2

Your selection	ID digit leading to that selection
Comparison_Option: __3___	Based on 6th ID digit being: __9___
Name of submitted Files that implement your answers (no need to repeat a file already submitted in Part 1 that also forms part of your answer to Part 2 [and used via #include], as long as the content is the same as those indicated in Part 1):	Source files: _____WeatherLog.h_____

Sample Test results

```
Testing setRandomLog() and printLog()..

The tag was taken on this month: 8, on this day: 16
The measured humidity is: 6.23%

Testing if setRandomLog() behaves properly when log set

Error in setRandomLog() - log already initialized

Is testA set? Ans: 1
Testing operator =

Obj A: The tag was taken on this month: 8, on this day: 16
The measured humidity is: 6.23%


Obj B: The tag was taken on this month: 8, on this day: 16
The measured humidity is: 6.23%

Test A < B, A == B, A > B
A == B is True.


Testing copy constructor weatherLog B(A)

Obj A: The tag was taken on this month: 8, on this day: 16
The measured humidity is: 6.23%


Obj B: The tag was taken on this month: 8, on this day: 16
The measured humidity is: 6.23%

Test A < B, A == B, A > B
A == B is True.


Testing random comparisons...

Reseting testB...
Is testB set? Ans: 0
Setting random value for testB...

Obj A: The tag was taken on this month: 8, on this day: 16
The measured humidity is: 6.23%


Obj B: The tag was taken on this month: 12, on this day: 7
The measured humidity is: 18.24%

Test A < B, A == B, A > B
A < B is True.
```

```
Testing comparisons when measurements are the same...

Obj A: The tag was taken on this month: 7, on this day: 9
The measured humidity is: 4.4%


Obj B: The tag was taken on this month: 7, on this day: 31
The measured humidity is: 4.4%

Test A < B, A == B, A > B
A > B is True.
```

Marking (leave blank for staff)

Note: **no mark** awarded **for implementing options not required** (based on your ID).

Table 4: Marks allocation for Part 2 (out of **22 CGS marks** for the **entire assignment**):

Part 2	**CGS Marks**
setRandomLog(): implementation and test (via your test routine)	**____/0.5**
isLogSet(): implementation and test (via your test routine)	**____/0.5**
printLog(): implementation and test (via your test routine)	**____/0.5**
operator **==** for weatherLog: implementation and test (via your test routine)	**____/0.5**
operator **<** for weatherLog: implementation and test (via your test routine)	**____/0.5**
operator **>** for weatherLog: implementation and test (via your test routine)	**____/0.5**
operator **=** for weatherLog: implementation and test (via your test routine)	**____/0.5**
Copy constructor for weatherLog: implementation and test (via test routine)	**____/0.5**
Test Routine and test results (fit sample results in **max 1 side** of the Selection Document)	**____/1**
Tot Part 2 = ____/5 CGS Marks	

Part 3:

Report your selection for this section

Table 5: Fill in the table below to report your options for **Part 3** and the names of the files implementing and testing Part 3

Your selection	ID digit leading to that selection
Filter_Option: __2___	Based on 7th ID digit being: __6___
Name of submitted Files that implement your answers (no need to repeat a file already submitted in Part 1 or 2 that also forms part of your answer to Part 3 [and used via #include], as long as the content is the same as those indicated in Part 1, 2):	Source files: ___WeatherLog.h_____

Sample Test results

```
---UBSORTED ARRAY HERE:---

The tag was taken on this month: 4, on this day: 23
The measured humidity is: 91.92%

The tag was taken on this month: 8, on this day: 11
The measured humidity is: 90.13%

The tag was taken on this month: 5, on this day: 20
The measured humidity is: 66.71%

The tag was taken on this month: 6, on this day: 9
The measured humidity is: 25.25%

The tag was taken on this month: 4, on this day: 8
The measured humidity is: 86.79%

The tag was taken on this month: 2, on this day: 16
The measured humidity is: 8.03%

The tag was taken on this month: 9, on this day: 29
The measured humidity is: 63.99%

The tag was taken on this month: 12, on this day: 12
The measured humidity is: 3.58%

The tag was taken on this month: 9, on this day: 26
The measured humidity is: 16.42%

The tag was taken on this month: 6, on this day: 10
The measured humidity is: 56.37%



---SORTED ARRAY HERE:---

The tag was taken on this month: 12, on this day: 12
The measured humidity is: 3.58%

The tag was taken on this month: 2, on this day: 16
The measured humidity is: 8.03%

The tag was taken on this month: 9, on this day: 26
The measured humidity is: 16.42%

The tag was taken on this month: 6, on this day: 9
The measured humidity is: 25.25%

The tag was taken on this month: 6, on this day: 10
The measured humidity is: 56.37%

The tag was taken on this month: 9, on this day: 29
The measured humidity is: 63.99%

The tag was taken on this month: 5, on this day: 20
The measured humidity is: 66.71%

The tag was taken on this month: 4, on this day: 8
The measured humidity is: 86.79%

The tag was taken on this month: 8, on this day: 11
The measured humidity is: 90.13%

The tag was taken on this month: 4, on this day: 23
The measured humidity is: 91.92%
```

```
---UNFILTERED ARRAY HERE:---

The tag was taken on this month: 6, on this day: 19
The measured humidity is: 15.13%

The tag was taken on this month: 11, on this day: 29
The measured humidity is: 39.39%

The tag was taken on this month: 9, on this day: 21
The measured humidity is: 63.14%

The tag was taken on this month: 6, on this day: 17
The measured humidity is: 47.63%

The tag was taken on this month: 8, on this day: 13
The measured humidity is: 11.32%

The tag was taken on this month: 9, on this day: 21
The measured humidity is: 83.78%

The tag was taken on this month: 8, on this day: 14
The measured humidity is: 69.86%

The tag was taken on this month: 8, on this day: 4
The measured humidity is: 69.89%

The tag was taken on this month: 7, on this day: 6
The measured humidity is: 10.8%

The tag was taken on this month: 11, on this day: 13
The measured humidity is: 55.01%



The average logs are as follows:
Boundary1:
The tag was taken on this month: 2, on this day: 17
The measured humidity is: 83.65%

Boundary2:
The tag was taken on this month: 4, on this day: 17
The measured humidity is: 47.78%

the following average log has been produced:
The tag was taken on this month: 3, on this day: 17
The measured humidity is: 65.715%



---FILTERED ARRAY HERE:---

The tag was taken on this month: 8, on this day: 14
The measured humidity is: 69.86%

The tag was taken on this month: 8, on this day: 4
The measured humidity is: 69.89%

The tag was taken on this month: 9, on this day: 21
The measured humidity is: 83.78%
```

Marking (leave blank for staff)

Note: **no mark** awarded **for implementing options not required** (based on your ID).

Table 6: Marks allocation for Part 3 (out of **22 CGS marks** for the **entire assignment**):

Part 3	**CGS Marks**
sortWeatherLogArray (): implementation and test (via your test routine)	**____/1.4**
filterWeatherLogArray (): implementation and test (via your test routine)	**____/1.4**
Test Routine and test results (fit sample results in **max 2 sides** of the Selection Document)	**____/1.6**
Tot Part 3 = ____/4 CGS Marks	

Total Score (for staff)

Marking: leave blank for staff

Task:	**Marks (up to)**
Part 1	_____ / **13**
Part 2	_____ / **5**
Part 2	_____ / **4**
TOT	_____ / **22**