

Cardiff School of Computer Science and Informatics

Coursework Assessment Pro-forma

Module Code: CMT205

Module Title: Object-Oriented Development with Java

Lecturer: Dr Matt Morgan

Assessment Title: Simple Weather Data Viewer using JavaFX

Assessment Number: 1

Date Set: Thursday 27th February 2020 (Teaching Week 5)

Submission Date and Time: Monday 20th April 2020 at 9:30am (Teaching Week 10)

Return Date: Thursday 7th May 2020

This assignment is worth 30% of the total marks available for this module. If coursework is submitted late (and where there are no extenuating circumstances):

- 1 If the assessment is submitted no later than 24 hours after the deadline, the mark for the assessment will be capped at the minimum pass mark;
- 2 If the assessment is submitted more than 24 hours after the deadline, a mark of 0 will be given for the assessment.

Your submission must include the official Coursework Submission Cover sheet, which can be found here:

<https://docs.cs.cf.ac.uk/downloads/coursework/Coversheet.pdf>

Submission Instructions

Your solution must include:

- A (standard) cover page that details: Student No., Module Code, Module Title, Coursework Title, Lecturer(s), Hours Spent on this Exercise, (Special Provision if applicable).
- A typeset PDF report (approximately 1000 words/roughly 3-4 pages of text; diagrams, screenshots etc. are encouraged) detailing the following:
 - An overview of your program design and implementation.
 - A basic algorithmic description of the main elements of your solution and how they satisfy the basic requirement listed below. You can use any suitable way to describe your solution, for example using pseudocode, UML diagrams, text description and/or screen snapshots etc.
 - A brief user guide describing how major features can be used.

You should explicitly highlight any novel features — i.e. those features developed beyond the basic requirements.

- A copy of all Java source code.
 - Include all Java source files, and related files (e.g. dependent third-party libraries and graphics)
 - Java files should be submitted as a single zip file collection.

Ensure that your student number is in each file that makes up your submission and adheres to the following requirements:

Description		Type	Name
Cover sheet	Compulsory	One PDF (.pdf) file	[student number].pdf
Q1	Compulsory	One PDF (.pdf) or Word file (.doc or .docx)	Q1_[student number].pdf/doc/docx
	Compulsory	One or more Java source file(s) (.java)	Q1_[student number].zip

Any code submitted will be run on the same University provided Linux laptop that you have been provided and must be submitted as stipulated in the instructions above.

Any deviation from the submission instructions above (including the number and types of files submitted) will result in a reduction in marks for that assessment or question part of 15%.

Staff reserve the right to invite students to a meeting to discuss coursework submissions

Assignment

Individual Project: Simple Weather Data using JavaFX

You will need to use the file CMT205CWDATA.zip, which you can find under the “Assessment” tab in the CMT205 module on Learning Central. This zip archive file contains historical monthly weather data, covering each month in the period from 2011 to 2019, for 37 UK meteorological stations (NOTE: You will need to use appropriate software to extract these files from the zip archive). The uncompressed archive contains 37 CSV (Comma-Separated Values) files, each relating to a specific meteorological station. The list of meteorological stations is as follows:

Aberporth, Armagh, Ballypatrick Forest, Bradford, Braemar, Camborne, Cambridge NIAB, Cardiff Bute Park, Chivenor, Cwmystwyth, Dunstaffnage, Durham, Eastbourne, Eskdalemuir, Heathrow, Hurn, Lerwick, Leuchars, Lowestoft, Manston, Nairn, Newton Rigg, Oxford, Paisley, Ringway, Ross-on-Wye, Shawbury, Sheffield, Southampton, Stornoway Airport, Sutton Bonington, Tiree, Valley, Waddington, Whitby, Wick Airport, Yeovilton

The relevant weather data is stored in [Meteorological Station].csv. For instance, Aberporth.csv stores the weather data for the Aberporth station.

Each CSV file is structured with the following fields, separated by commas:

year,month,tmax,tmin,af,rain

The following table provides an explanation of each field:

year	The year for the weather data
month	The month for the weather data
tmax	The mean maximum temperature in the month
tmin	The mean minimum temperature in the month
af	The number of days of air frost in the month
rain	The total rainfall in the month

Assessment Tasks

You are required to create a Java application for interactively exploring the historical weather data contained in the given data files using JavaFX.

The following basic requirements should be met in order to gain average to good marks:

1. The application should read the data stored within all CSV files and present the data in a suitable format, using a grid, with the following information:

Meteorological Station

as well as statistics from the last year (2019):

Highest monthly mean maximum temperature (tmax)

Lowest monthly mean minimum temperature (tmin)

Total air frost days

Total rainfall

As a basic requirement, the list of and CSV files can be hard-coded in your program.

2. The application should allow individual meteorological station to be selected, which provides the user with a more detailed view in a separate tab. This view should present the user with historical data pertaining to that station and include suitable charts to present the data.
3. The application should also allow users to generate a report containing a summary of key facts for all the meteorological stations. The report should be a single text file containing the following information for each station:

Number: <sequence number>

Station: <station name>

Highest: <month/year with the highest tmax>
Lowest: <month/year with the lowest tmin>
Average annual af: <average days of air frost per year>
Average annual rainfall: <average annual rainfall>

In the above, texts in the angular brackets (<>) are placeholders and should be replaced with the actual statistics calculated based on all the available data of the station. The sequence number is a natural number assigned to each station in the order they appear in the report (i.e. 1, 2, 3, 4, ...).

4. You should develop an appropriate GUI for your application, using JavaFX.

In order to gain higher marks you need to add some novel extensions or additional features. You need only provide two further different novel extensions. Here are a few suggestions.

- Advanced GUI features
- Advanced formatting of the report
- Advanced visualisation of weather data

There are endless possibilities here and you are encouraged to think of your own extensions.

Learning Outcomes Assessed

1. Write Java applications which include a Graphical User Interface (GUI).
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Criteria for assessment

Credit will be awarded against the following criteria.

- A Pass mark (50-60%) will be awarded for solutions that satisfy most of the main points of the basic requirements (specified below).
- Good marks (60-70%) will be awarded for solutions that satisfy all the main points of the basic requirements thoroughly, with some justification of design philosophy (specified below).
- High marks (over 70%) will be awarded for solutions that provide thorough solutions to addressing the basic requirements and also some novel extensions/additional features, with a good justification of design philosophy.
- Solutions that do not satisfy all the requirements given in the coursework will get lower marks.

Specifically, the marks will be apportioned as follow:

- 50 marks are available for your solution to a working functional system with suitable JavaFX implementations of basic exercise criteria.
- 20 marks are available for a clear write up. The write up should clearly state your design and implementation strategy.
- 30 marks are available for your design and incorporation of other features beyond the basic coursework specification.

Feedback and suggestion for future learning

Feedback on your coursework will address the above criteria. Feedback and marks will be returned on Thursday 7th May (Teaching Week 12) during the revision session for the CMT205 module.