University of West Scotland

School of Computing and Engineering

COURSEWORK ASSESSMENT SPECIFICATION

MODULE CODE	**:**	COMP09044
MODULE TITLE	**:**	Algorithms and Collections
MODULE LEADER	**:**	Dr Joanna Isabelle Olszewska
TUTOR(S)	**:**	Dr Joanna Isabelle Olszewska
TITLE	**:**	Coursework 2 (100 marks)
LEARNING OUTCOMES ASSESSED	**:**	L1, L2, L3, L4
CONTRIBUTION TO ELEMENT	**:**	Assessment Category 2 (worth 60% of that final mark)
DATE SET	**:**	Monday 12th September 2022 (Teaching Week 2)
DATE OF SUBMISSION	**:**	Monday 17th April 2023 (Teaching Week 33)
SUBMISSION METHOD	**:**	Moodle Dropbox
FEEDBACK DATE	**:**	Monday 8th May 2023 (Teaching Week 39)
FEEDBACK METHOD	**:**	Written feedback on Moodle
NOTE	**:**	The usual University penalties apply for late submission and plagiarism. Please consult your student handbook for further details.

I. Assessment Requirements

Given the problem scenario in Section II, **produce a report, a software program, and a video.**

The coursework is individual and should be submitted electronically through *Moodle Dropbox by Monday 17th April 2023 23:55 BST (Teaching Week 33)*

- *Students should use the following convention for naming their folders and files: 'BannerID_COMP09044_CW2'*
  You are also advised to add this information to all your submitted documents, e.g. in the header section of text files, at the beginning of your code files, etc.
- *All files must be submitted in a single, main zip folder.*
- *This folder should include 3 subfolders such as:*

*- DOC with your **report** (single docx and/or pdf file which includes the test plan in an appendix);*
*- CODE containing all the **code** files, including any test dataset/database/readme file;*
*- RESULTS with your **demo video** (avi or mp4 file) and additional test result images/videos/material, if any.*

The assessment contributes to all learning outcomes as indicated.

Take regular backups of your work. This will enable you to recover quickly should the system fail and also allow you to backtrack if your development goes astray.

Use the development environment of your choice. For example, you can use the same environment you used during the formative lab sessions.

Keep evidence of the submission of your assignment, and a copy of your assignment in case of the unlikely event of any loss.

Special Instructions

Warning on Assessment Offences:

Careful referencing of sources is vital when making use of the work of others. You are expected to employ the referencing conventions recommended in the Course, i.e. Harvard style. These conventions apply to information taken from internet sources, as well as books, journals and lectures. If you are unsure of the way to reference properly, seek advice from a member of staff before you submit the assessment. These are some of the points you should check before submitting your work:

- Are all direct quotations, from both primary *and* secondary sources, suitably acknowledged (placed in quotation marks or indented)?
- have you provided full details of the source of the quotation, according to the referencing convention used in the Course?
- have you acknowledged the source of ideas not your own, even if you are not quoting directly from the source?
- have you avoided close paraphrase from sources? (Check that you are not presenting other people's words or phrasing as if they are your own.)

- if you have worked closely with others in preparing for this assessment, is the material you are presenting sufficiently your own?

More details about referencing, including a quick referencing guide and a tutorial about plagiarism, details of how to reference sources such as websites, online journals, newspaper articles, and official publications, could be found in the Library.

If you are unsure of the way to reference properly, look at the "Cite them right" book (Richard Pears and Graham Shields (2008). *Cite Them Right: The Essential Referencing Guide*. Newcastle-upon-Tyne: Pear Tree Books.) available on Amazon.

In submitting your work for assessment, you are making a statement that it is your own work, it has not been submitted for any other assessment, and it does not infringe the ethical principles set out in the University's Research Ethics: Principles and Procedures.

II. Assessment Scenario/Problem

Problem

The purpose of this assignment is to provide some experience and insight:

- in designing a piece of software using:
  - at least one of the data structures (e.g. graph, tree, etc.) proposed in the lectures;
  - at least one of the sorting and/or searching algorithms studied during the lectures;
- in implementing the corresponding code in C++ or Java;
- in producing the related documentation, including:
  - software design and specifications using UML;
  - software tests and analysis of performance and algorithm complexity.

Students have the freedom to make their own choice about the software requirements, implemented functionalities, adopted design, used analytical methods, and built test cases, while students should respect at all times the University Regulations, in particular Ethic Procedures, GDPR, and BCS Code of Conduct. The project should also comply with all H&S regulations.

Submission

For each student's work, the following three components should be submitted:

1. Report (40 marks)

The report should consist of:

- a concise overview of the studied problem;
- an outline of the adopted SDLC to develop the product, with evidence of its use through the project;

- requirements specifications using:
  - Up-to-date UML Use Case Diagram,
  - Up-to-date UML Class Diagram;
- a description of your adopted approach, including:
  - comments about the software implementation such as used object-oriented paradigms, adopted design patterns, selected technologies and standard C++ or Java libraries. Make links to the state of the art to back your claims/ choices;
  - detailed explanations of the chosen data structure(s) and its/their use in the developed system. Provide analytical details and assumptions. Justify your choices.
  - among the algorithms studied in the lectures, explain how the algorithm(s) you chose work(s) within your system and detail its steps;
  - analysis of the complexity of the developed software. Analyse the performance of the implemented algorithm(s) using big O-notation and reflect on their computational efficiency;
  - adopted software testing process and metrics, providing also the Requirement Traceability Matrix (RTM). Moreover, include your test plan in an appendix.
- a discussion about your results. Reflect on your software quality, including robustness, reliability, scalability, portability, usability, security, etc.;
- conclusions, including:
  - reflection on V&V, addressing the questions such as 'Have you built the product right?' and 'Have you built the right product?' and mentioning possible improvements;
  - reflection on the adopted methods, including limitations and alternatives;
  - SWOT analysis of the developed software;
  - reflection on Professional, Social, Ethical, and Legal aspects.

The report must include relevant references to the source materials.

The report must also contain in appendix tables with test cases, test plan, test images, test results such as output images, comments/notes, etc. It could also include other pictures such as flow charts, design diagrams, printscreens of set-up/windows, performance histograms, user guide, etc.

2. Code (50 marks)

Debugged source code, in C++ or Java, should be structured and commented.

3. Video (10 marks)

A short (2-3 minutes) video should summarize the key points of your coursework (e.g. general presentation/context of the problem, proposed solution, technical explanations and code walkthrough, demo of achievements/results, conclusions). Your video should have a proper quality of image and audio. To create this video, please refer to the 'Instructions for Video Recording' document. Please note that you need to upload your video (mp4 or avi) file on Moodle or provide it via a platform (e.g. YouTube, DropBox, etc.), depending on the size of the file.

III. Assessment Criteria & Feedback

Whilst you're working on the coursework

You will frequently be given informal verbal or written feedback regarding your (or the class) performance on tasks relating to the coursework assessment during seminars/workshops/tutorials and/or laboratory sessions. Attendance is therefore important for your development and thus coursework success.

After you've submitted the coursework

You will receive specific feedback regarding your coursework, when it is returned to you. Clearly, feedback provided with your coursework is only for developmental purposes so that you can improve for the next assessment or subject-related module(s).