

## **CS132 Computer Organisation and Architecture Coursework 2 2021-22**

### **Introduction**

The aim of Coursework 2 (CW2) is to assess your understanding of the material covered in lectures and labs. You should complete all questions in CW2.

### **Deadline and Submission**

The submission deadline for CW2 is noon on Thursday Week 3 of Term 2.

You should submit a digital copy of your solutions in a ZIP file using Tabula. Your ZIP file should include all files you would like to be considered for credit.

All cases of plagiarism will be treated in accordance with University procedures.

### **Access to Equipment and Software**

All solutions will be evaluated on Department of Computer Science (DCS) machines. This means that, whilst you can complete the programming elements of CW2 on your own machine, you should test them on DCS machines.

### **Hints and Advice**

The objective of the coursework is to assess your understanding of the material covered in CS132. It is in your best interests to answer as many questions as you can as fully as possible. If you aren't able to answer a question completely it is still a good idea to do as much as you can.

Credit will be awarded for technical understanding, correctness, software engineering, communication and presentation. As such, you should try to be as thorough as possible in your methods, explanations and documentation.

As you progress you will have increasing freedom to decide how to develop your solutions. Try not to be afraid of making sensible assumptions and design decisions, especially where you can provide robust justifications and detailed explanations.

All coursework for CS132 is marked by the module organiser. The execution and testing of all software will be done manually so you do not need to worry about having unusual software features, provided you document how your software should be used.

Good luck!

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1. The powerset of a set  $S$  is the the set of all subsets of  $S$ .

- (a) Write a program that takes a set  $S$  as input and outputs the powerset of  $S$ . You should ensure that your program is well documented and any error cases are handled appropriately. Clearly state any assumptions.
- (b) Write an explanation of your C program. You should incorporate this explanation using detailed code comments and separate written explanations.

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2. The C programming language allows for us to easily work with files. In this question you will implement a command-line editor that is capable of creating, displaying and manipulating text files. You have a lot of freedom in how you do this but you will need to make informed design decisions and provide justifications for these choices as part of your documentation.

- (a) Write a C program that allows a user to perform each of the operations listed below on text files.

**FILE OPERATIONS:**

**Create File** - Create a new file with a specified name.

**Copy File** - Create a new file with a specified name and identical contents to an existing file.

**Delete File** - Delete an existing file with a specified name.

**Show File** - Display the contents of an existing file with a specified name.

**LINE OPERATIONS:**

**Append Line** - Create a new line of content at the end of a specified file.

**Delete Line** - Delete a line of content at a particular line number in a specified file.

**Insert Line** - Create a new line of content at a particular line number in a specified file.

**Show Line** - Display the contents of a file at a particular line number in a specified file.

**GENERAL OPERATIONS:**

**Show Change Log** - Display the sequence of operations performed on all files created by your program, including the number of lines following each operation.

**Show Number of Lines** - Show the number of lines in a specified file.

You must provide a command-line interface and operate on files in your current working directory but, apart from these requirements, you may implement the program in any way. You should document all design decisions not covered above, e.g., how a user specifies the operation they want to perform.

- (b) Implement two additional operations or extensions to the operations listed above. You should provide justifications for the usefulness of the functionalities you introduce.
- (c) Write an explanation of your C program. You should incorporate this explanation using detailed code comments and separate written explanations.

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