

COMP2521 25T3

Course Review and Exam

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course review
final exam
course evaluation

Course Review

COMP1511

- gets you thinking like a *programmer*
- solve problems by developing programs
- express your ideas in the C language

COMP2521

- gets you thinking like a *computer scientist*
- know a set of fundamental techniques/structures
- able to reason about their applicability/effectiveness

- data structures: trees, graphs, hash tables, heaps, tries
- data structure/algorithm analysis: time/space complexity
- sorting and searching techniques
- graph algorithms

By the end of this course, you should be able to:

- Implement solutions to a wider range of problems
- Analyse performance characteristics of algorithms
- Analyse performance characteristics of data structures
- Make decisions about appropriate data structures and algorithms

For each specific data type, we considered:

- implementation in C (data structures, functions)
- operations (e.g., insert, search, delete, traverse)
- analysis of efficiency of operations
- applications of the data type

Recursion

Analysis of algorithms

- empirical analysis
- theoretical analysis
- time complexity and big-O

Sorting algorithms

- properties
 - time/space complexity
 - stability
 - adaptability
- elementary sorts
 - selection sort
 - bubble sort
 - insertion sort
- divide and conquer sorts
 - merge sort
 - quick sort
- non-comparison-based sorts
 - radix sort

ADTs

- interface vs. implementation
- defining ADTs in C
- stacks
- queues
- sets

Trees

- tree terminology
- tree properties
- binary search trees
- balancing binary search trees
- avl trees

Graphs

- graph terminology/properties
- graph representations
- graph traversal
 - bfs/dfs
- graph problems
 - cycle checking
 - connected components
 - hamiltonian/eulerian paths/circuits
- warshall's algorithm
- dijkstra's algorithm
- minimum spanning trees
 - kruskal's algorithm
 - prim's algorithm

Hash tables

- hash functions
- collision resolution
 - separate chaining
 - linear probing
 - double hashing
- applications

Priority queues and heaps

- implementations
- binary heaps
- heap sort

Tries

- implementations
- applications

Assessments:

- 15% labs
- 10% quizzes
- 15% assignment 1
- 15% assignment 2
- 45% final exam

To pass **COMP2521**, you must:

- score at least 50/100 overall
- pass the exam hurdle (see next section)

Final Exam

- 3-hour in-person exam
 - 10 minutes reading time
 - 3 hours working time
- Tuesday 2nd December
- Invigilated and held in CSE labs
- Closed book - no materials allowed
 - Code/pseudocode for main data structures and algorithms will be available
 - C quick-reference will be available

- Two sessions: morning and afternoon
 - You have been asked to indicate a preference via email
 - Exam organisers will allocate you to your preferred session if possible
 - You will receive an email with your allocation early Week 11
 - Students with a clash will be pre-allocated to appropriate session
 - To prevent communication between students in morning and afternoon sessions:
 - Students in morning session cannot leave early
 - Students in afternoon session will be corralled before the end of the morning session
 - Students in afternoon session are not allowed to be late

- UNSW policy is that you may be required to take two exams in one day
- Students with clashes will be automatically allocated to a non-clashing session by the CSE Exams team

- UNSW on-campus exam rules apply
 - see <https://www.student.unsw.edu.au/exam/rules>
- Items/materials:
 - You must bring your UNSW student ID card
 - Must not be expired
 - You may bring a clear water bottle
 - You may bring a clear pencil case (or plastic sleeve) with pens/pencils
 - You may not bring your own keyboard/mouse or other hardware
 - All other items must be placed in your bag
 - Phone, smart watch, other electronic devices must be *switched off* and placed in your bag
- Deliberate violation of exam conditions will be treated as serious misconduct and may be referred to the SCIU

- Restricted environment - **not** your CSE account
- No access to Internet
 - Uh oh, no ChatGPT!
- No access to any of your files
- Available editors: gedit, VSCode, vim
 - All come with syntax highlighting
 - VSCode comes with clangd extension - provides IntelliSense
- Standard CSE lab machine commands available
 - make, clang, gdb, valgrind, man
- Calculator app available
- You get a chance to try out the exam environment during in-person Week 10 labs

- Marked out of 100
- Two sections:
 - Practical: Programming questions, worth 60 marks
 - Theory: Short-answer questions, worth 40 marks
- Each question answered in a separate file
- Submit answers using the `give` command
 - Submit as you complete each question
 - Check what you have submitted using the `give` command

- Tests your problem solving and programming ability
- Each question will ask you to implement one function
- Questions will include examples
- Questions will provide sample test cases
 - Passing these test cases means your solution mostly works
- Your solution must attempt to solve the problem generally
 - Solutions that just hardcode return values for provided tests will receive zero
- Each question will specify a file to implement your solution in
 - Starter version of file will be provided
 - Makefile and main program will be provided
 - If solution requires ADT(s), they will be provided

- Helper functions allowed
- Defining your own `#defines`, structs, enums allowed
- Using any functions provided by `#included` libraries allowed
- Global/static variables **strictly forbidden**
- Inefficient solutions (within reason) allowed unless specified
- Questions may specify additional constraints
 - E.g., no while loops, for loops, or goto
 - E.g., time complexity must not be worse than $O(n)$
 - Your solution must abide by these constraints or you may receive fewer marks (or zero) for the question

- Solutions will be automarked
- All solutions will be manually inspected
 - To ensure constraints have been followed
- No marks awarded for style
 - But a human marker needs to be able to deduce the behaviour of your program
- Solutions receiving less than 50% from automarking may receive partial marks for making substantial progress towards a correct solution
 - Resulting mark will not be greater than 50%
- Marks awarded for code only - pseudocode or English description is not worth marks

- Theory questions
- Tests your knowledge, understanding, critical thinking
 - Proofs not required
- Most questions will require explanation/justification
 - If question does not ask for explanation, then no need
- Questions may have sub-questions
- Each question will specify a file to write your answers in
 - Starter version of file will be provided
 - Each file will clearly indicate where to write answers for each sub-question

To pass the exam hurdle, you must:

- score at least 40% on the final exam
- score at least 25% (15/60) on the practical section
- score at least 25% (10/40) on the theory section

- Scaling depends on mark distribution
- We manually inspect the work of students just below the pass threshold
 - If we see many students who've sufficiently shown competency with basic course material but have not passed, exam mark may be scaled up

- Students with extra exam time approved by ELS will be given extra time
 - Handled by CSE Exams team
- Exam paper shows the standard time limit (3 hours), any extra time is additional to it
- Email us if you have any concerns regarding ELS conditions

- The exam is covered by UNSW's fit-to-sit policy
- By starting the exam:
 - You are saying "I am well enough to finish the exam"
 - You cannot apply for Special Consideration for issues that existed prior to the exam
- If you are unwell before the exam:
 - Do not attend the exam
 - See a doctor and get a medical certificate ASAP
 - Apply for Special Consideration
- If you become unwell during the exam: **talk to an exam supervisor ASAP**

- If you miss the original exam due to illness/misadventure
 - Apply for special consideration - you may be eligible for a supplementary exam
- Supplementary exams will take place between **Monday 5th January** and **Friday 9th January**, and will be in person, just like the final exam

How to revise?

- Re-read lecture slides
- Review tutorial questions, lab exercises, quizzes
 - Redo them without looking at answers/solutions
- Do extra lab exercises and practice exercises
- Try to understand/reproduce lecture code
 - Programming is a skill that improves with practice
- Attempt sample exam and past exams (multiple past papers available)

- ① Make sure you get a good night's sleep.
 - If you are well rested, you will think more clearly, remember more and be able to solve problems creatively. Don't pull an all-nighter; being alert is your greatest asset.
- ② Pack your bag the night before.
- ③ Be familiar with your exam location.
- ④ Arrive ahead of time.
- ⑤ Avoid panic talk.
- ⑥ Fuel yourself.

- ① Make sure you get a good night's sleep.
- ② Pack your bag the night before.
 - Be sure to check what materials you're expected to bring and include extra stationary in case you need it. Neatly organise your materials, especially notes for open-book exams.
- ③ Be familiar with your exam location.
- ④ Arrive ahead of time.
- ⑤ Avoid panic talk.
- ⑥ Fuel yourself.

- ① Make sure you get a good night's sleep.
- ② Pack your bag the night before.
- ③ Be familiar with your exam location.
 - Make sure you know how to get to the exam with minimum stress well ahead of time. You can visit the exam venue a few days before to establish how you'll get there.
- ④ Arrive ahead of time.
- ⑤ Avoid panic talk.
- ⑥ Fuel yourself.

- ① Make sure you get a good night's sleep.
- ② Pack your bag the night before.
- ③ Be familiar with your exam location.
- ④ Arrive ahead of time.
 - Plan to get there at least 30 minutes before the exam start time. This will ensure you aren't stressed and leave some buffer room for unexpected delays.
- ⑤ Avoid panic talk.
- ⑥ Fuel yourself.

- ① Make sure you get a good night's sleep.
- ② Pack your bag the night before.
- ③ Be familiar with your exam location.
- ④ Arrive ahead of time.
- ⑤ Avoid panic talk.
 - You don't want other people's nervousness or stress to rub off on you before an exam. Stand apart from the main scrum of students and keep calm.
- ⑥ Fuel yourself.

- ① Make sure you get a good night's sleep.
- ② Pack your bag the night before.
- ③ Be familiar with your exam location.
- ④ Arrive ahead of time.
- ⑤ Avoid panic talk.
- ⑥ Fuel yourself.
 - Easily digestible, solid foods like rice, break, savoury biscuits or bananas are best. Keep coffee and sugar to a minimum as these will only give a short boost.

Course Evaluation

Course evaluation via myExperience:

- How did we do?
- What did you like?
- What could be improved?
- Let us know!
 - <https://myexperience.unsw.edu.au>
- Please give your tutors feedback - myExperience is the best way to give them feedback, and it will more likely than not make their day.
- Please give *specific* feedback
 - Specific feedback is more actionable

Incentive for myExperience completion:

- At the 60% response rate, and for every 10% after:
 - We will add a hint to one randomly chosen exam (programming) question
 - Hints will be added to questions at 60%, 70%, 80%, ...

A big thank you to:

- Our lovely teaching staff
 - Admins
 - Tutors and lab assistants
 - Forum staff
 - Help session staff
- All of you!
 - For engaging with the course and giving it your all!

Good luck!



We hope what you've learned in this course will be useful.

We hope you get the mark you're aiming for!



Good luck with the exam, and with your future studies!