Course Outline Public

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Course Details

Course Code	COMP9024
Course Title	Data Structures and Algorithms
Convenor	Michael Thielscher (/users/z3343107)
Lectures	Monday 14:00-16:00 Mathews Theatre B (https://studentvip.com.au/unsw/kensington/maps/133153) Wednesday 14:00-16:00 Mathews Theatre B (https://studentvip.com.au/unsw/kensington/maps/133153)
Consultations	*Help Lab:* Friday 12:00-13:00 K17 Drum Lab (week 1-10) Monday 16:15-17:15 K17 401J (week 3-10) Friday 14:00-15:00 K17 401J (week 1-10)
Units of Credit	6
Course Website	http://www.cse.unsw.edu.au/~cs9024 (http://www.cse.unsw.edu.au/~cs9024)
Handbook Entry	http://www.handbook.unsw.edu.au/postgraduate/courses/current/COMP9024.html (http://www.handbook.unsw.edu.au/postgraduate/courses/current/COMP9024.html)

Course Summary

Data structures are about how data is stored inside a computer for effective and efficient use. An algorithm is a step-by-step process for solving a problem within a finite amount of space and time. Data structures and algorithms are not only important in software design, but also in hardware design. Being proficient in data structures and algorithms are essential for good software developers, hardware developers, and system architects.

The actual content is taken from a list of subjects that constitute the basis of the tool box of every serious practitioner of computing: data types and data structures, abstract data types, dynamic data structures, analysis of algorithms and a variety of fundamental algorithms for graphs, trees and text processing.

Assumed Knowledge

Before commencing this course, students should

- be able to design, implement and test programs written in a procedural language;
- know simple data types and how to represent data with lists, stacks and queues;
- be able to implement basic search techniques and sorting algorithms.

These are assumed to have been acquired in the course COMP9021.

Student Learning Outcomes

After successfully completing this course, students will know fundamental data structures and algorithms, and they will be able to reason about their applicability, effectiveness and efficiency.

This course contributes to the development of the following graduate capabilities:

Graduate Capability	**Acquired in**
scholarship: understanding of their discipline in its interdisciplinary context	lectures
scholarship: capable of independent and collaborative enquiry	problem sets, assignments, in-class quizzes
scholarship: rigorous in their analysis, critique, and reflection	in-class exercises, problem sets, assignments
scholarship: able to apply their knowledge and skills to solving problems	problem sets and assignments
scholarship: capable of effective communication	forum
scholarship: information literate	lectures, problem sets, assignments
scholarship: digitally literate	lectures, problem sets, assignments
professionalism: capable of independent, self-directed practice	problem sets and assignments
professionalism: capable of operating within an agreed Code of Practice	all course-work, by doing it yourself
global citizens: culturally aware and capable of respecting diversity and acting in socially just/responsible ways	interaction with your fellow students

Teaching Strategies

- **Lectures** introduce concepts and show examples
- **Problem sets** reinforce concepts, provide additional examples and allow students to solve problems

- **Assignments** further reinforce concepts and allow students to solve larger problems

Teaching Rationale

Lectures will include exercises where we examine the practice of formulating and proving mathematical properties of relevance to Computer Science. Problem sets aim to deepen analysis and understanding via additional examples and problems. The assignments give you the chance to practice what you have learnt on a larger problem.

Student Conduct

The **Student Code of Conduct** (Information (https://student.unsw.edu.au/conduct) , Policy (https://www.gs.unsw.edu.au/policy/documents/studentcodepolicy.pdf)) sets out what the University expects from students as members of the UNSW community. As well as the learning, teaching and research environment, the University aims to provide an environment that enables students to achieve their full potential and to provide an experience consistent with the University's values and guiding principles. A condition of enrolment is that students *inform themselves* of the University's rules and policies affecting them, and conduct themselves accordingly.

In particular, students have the responsibility to observe standards of equity and respect in dealing with every member of the University community. This applies to all activities on UNSW premises and all external activities related to study and research. This includes behaviour in person as well as behaviour on social media, for example Facebook groups set up for the purpose of discussing UNSW courses or course work. Behaviour that is considered in breach of the Student Code Policy as discriminatory, sexually inappropriate, bullying, harassing, invading another one's privacy or causing any person to fear for their personal safety is serious misconduct and can lead to severe penalties, including suspension or exclusion from UNSW.

If you have any concerns, you may raise them with your lecturer, or approach the School Ethics Officer (mailto:ethics-officer@cse.unsw.edu.au) , Grievance Officer (mailto:grievance-officer@cse.unsw.edu.au) , or one of the student representatives.

Academic Honesty and Plagiarism

Plagiarism is defined as using the words or ideas of others and presenting them as your own. UNSW and CSE treat plagiarism as academic misconduct, which means that it carries penalties as severe as being excluded from further study at UNSW. There are several on-line sources to help you understand what plagiarism is and how it is dealt with at UNSW:

- Plagiarism and Academic Integrity (https://student.unsw.edu.au/plagiarism)
- UNSW Plagiarism Procedure (https://www.gs.unsw.edu.au/policy/documents/plagiarismprocedure.pdf)

Make sure that you read and understand these. Ignorance is not accepted as an excuse for plagiarism. In particular, you are also responsible that your assignment files are not accessible by anyone but you by setting the correct permissions in your CSE directory and code repository, if using. Note also that plagiarism includes paying or asking another person to do a piece of work for you and then submitting it as your own work.

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW staff and students have a responsibility to adhere to this principle of academic integrity. Plagiarism undermines academic integrity and is not tolerated at UNSW. Plagiarism at UNSW is defined as using the words or ideas of others and passing them off as your own.

If you haven't done so yet, please take the time to read the full text of

- UNSW's policy regarding academic honesty and plagiarism (https://student.unsw.edu.au/plagiarism)

The pages below describe the policies and procedures in more detail:

- Student Code Policy (https://www.gs.unsw.edu.au/policy/documents/studentcodepolicy.pdf)
- UNSW Student Misconduct Procedure (https://www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf)
- UNSW Plagiarism Procedure (https://www.gs.unsw.edu.au/policy/documents/plagiarismprocedure.pdf)

You should also read the following page which describes your rights and responsibilities in the CSE context:

- Essential Advice for CSE Students (https://www.engineering.unsw.edu.au/computer-science-engineering/about-us/organisational-structure/student-services/policies/essential-advice-for-cse-students)

Assessment

Component	Maximum Mark
Assignment 1 (weekly; weeks 3-10)	8 × 2 = 16
Assignment 2 (Monday week 7)	12
Assignment 3 (due Tuesday week 10)	12
Final Exam (exam period)	60

Your final overall mark will be the sum of your marks for each component provided that you pass the final exam.

To pass the course, the sum of your marks must be 50 or higher **and** the mark for the final exam must be 25 or higher.

Course Schedule

Elementary data structures and algorithms in C	week 1
C Study Week	**week 2**
Analysis of algorithms	week 3
Dynamic data structures	week 4
Graph data structures and algorithms	week 5-6
Search tree data structures and algorithms	week 7-8
String algorithms, Approximation	week 9
Randomised algorithms, Course review	week 10

Resources for Students

The recommended textbooks associated with this course are

- Robert Sedgewick, *Algorithms in C, Parts 1–4* 3rd edition, Addison Wesley, 1998.
- Robert Sedgewick, *Algorithms in C, Part 5* 3rd edition, Addison Wesley, 2002.

The following introduction to the C programming language is recommended as a supplementary textbook:

- Alistair Moffat, *Programming, Problem Solving, and Abstraction with C* 5th edition, Pearson, 2003.

Course Evaluation and Development

This course is being continuously improved and we will conduct a survey through UNSW's myExperience process at the end of session to obtain feedback on the quality of the various course components. Your participation in the survey will be greatly appreciated. Students are also encouraged to provide informal feedback during the session, and to notify the lecturer-in-charge of any problems as soon as they arise. Student feedback from the previous offering indicated that students were very satisfied with the course, but suggested to incorporate a small weekly assessment component. We will do this in this offering.

Resource created 8 months ago (Tuesday 10 September 2019, 10:45:15 AM), last modified 8 months ago (Thursday 12 September 2019, 04:34:31 PM).

Comments

(/COMP9024/19T3/forums/search?forum_choice=resource/33189)

(/COMP9024/19T3/forums/resource/33189)



Anant Mahale (/users/z5277610) 5 months ago (Fri Nov 29 2019 19:49:51 GMT+1100 (Australian Eastern Daylight Time))

~12 hrs left !

All the best everyone :)

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Sen Zhang (/users/z5218829) 6 months ago (Thu Nov 14 2019 14:39:35 GMT+1100 (Australian Eastern Daylight Time))

Hi Michael,

Do we have a lec in monday on week11? According to Uni-Verse timetable we have, whereas the schedule did not plan for this lec.

Thank you.

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Michael Thielscher (/users/z3343107) 5 months ago (Thu Nov 14 2019 15:43:24 GMT+1100 (Australian Eastern Daylight Time))

No lecture in week 11 -- this will be study week.

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Chengkai Huang (/users/z5249859) 6 months ago (Sun Oct 20 2019 23:05:54 GMT+1100 (Australian Eastern Daylight Time))

Hi Michael,

Will Week 6's content be tested in the Mid term exam?

Thanks

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Chengkai Huang (/users/z5249859) 6 months ago (Mon Oct 21 2019 14:22:25 GMT+1100 (Australian Eastern Daylight Time))

Please disregard this question, I have got my answer from today's lecture. Thanks!

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Darren Rose (/users/z5152466) 7 months ago (Mon Sep 16 2019 19:29:17 GMT+1000 (Australian Eastern Standard Time))

Hi, just a quick question about the mid-term test in week 7. The lecture slides say that this is an online test. Does that mean that we will be able log-in remotely to access it or will we need to be present on campus to suffer this minor form of torture in all its effects?

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Michael Thielscher (/users/z3343107) 7 months ago (Tue Sep 17 2019 09:05:42 GMT+1000 (Australian Eastern Standard Time))

You can ~~subject yourself to this mild torture~~ enjoy the brain stimulation a.k.a. mid-term test from home or anywhere with a stable internet connection.

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Darren Rose (/users/z5152466) 7 months ago (Tue Sep 17 2019 18:53:46 GMT+1000 (Australian Eastern Standard Time)), last modified 7 months ago (Tue Sep 17 2019 18:53:59 GMT+1000 (Australian Eastern Standard Time))

Using the NBN would mean a ~~crime against humanity~~ stable internet connection may be difficult.

Cheers

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