# COMP9024 Data Structures and Algorithms

Session 2 2010

## Course Introduction

## 1. Course Aims

The aims of this course are,

- to introduce the basic data structures and algorithms, and
- to develop skills in the design and analysis of algorithms and data structures.

## 2. Student Learning Outcomes

After completing this course, students should be able to

- design, program, document and test Java programs that accurately comply with a given specification.
- understand the basic data structures and algorithms
- analyze the complexities of software; and
- select appropriate data structures and algorithms for applications.

Questions in the Mid-Session test, the Assignment and the Final Exam will test knowledge and skills you have acquired throughout the session, and also challenge your understanding of all the above four topics.

## 3. Teaching, Learning and Assessment

At university, the focus is on the self-directed search for knowledge. Lectures, textbooks and recommended reading, practical exercises and exams are all provided as a service to assist you in this endeavour. It is your choice as to how much work you do in this course, whether it be preparation for classes, practical exercises, study for exams or seeking assistance or extra work to extend and clarify your understanding. You must choose the approach that best suits your learning style and goals in this course. Note that the University expects you to do about 180 hours work for this course—including lectures, practical exercises, and time spent on preparing for exams. Of course this will vary according to your aims. The course is designed in such a way that passing the course will require a good understanding of the fundamental notions as well as good practical skills. This can only be achieved through regular and consistent work. If your aim is to obtain a high distinction then you will need to invest more time on this course.

### Lectures

The aim of the lectures is to facilitate learning and understanding of the important concepts within course syllabus. They will provide the main source of course material delivered. There will be one 3-hour lecture every week.

In the lectures, we will

- explain and critically discuss each topic
- demonstrate the principles in each topic with examples
- evaluate and discuss the relevance of the topic to solving practical real world problems

You are invited to ask questions at the end of the class, or at any time if you think the question and answer is relevant to everyone else.

> Discussion with the person next to you in class is *not acceptable,* as it creates a level of noise that inevitably impacts on the rights of others who are trying to listen and learn.

### Lecture Schedule

The proposed lecture schedule is:

| Week | Topic |
|---|---|
| Week 1: | Course introduction<br>Java Programming |
| Week 2: | Object-Oriented Design |
| Week 3: | Arrays, Lists, Recursion<br>Analysis of Algorithms |
| Week 4: | Stacks/Queues, Lists and Iterators<br>Trees |
| Week 5: | Search Trees<br>Mid-Session Test-1 |
| Week 6: | Search Trees |

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|---|---|
| Week 7: | Graphs |
| *Break* | |
| Week 8: | Graphs |
| Week 9: | Maps and Dictionaries |
| Week 10: | Priority Queues |
| Week 11: | Sorting and Sets |
| Week 12: | Revision |

Please note that the above schedule is **subject to change**. There is a one week break after week 7.

### Consultation

Each week, starting from Week 2, the lecturer will be available to discuss with you, on a one-on-one basis, any aspect of the course that you are having problems with. This is the most personalised form of teaching for this course, and you should take every advantage of it, particularly if you are experiencing difficulties.

Please **check the class web page for current consultation time**s (see "Consultations" in the left panel of the class web page).

Every effort will be made to see as many students as possible. Please come prepared in order to maximise the time that's available to you.

### Assignment/Exercises

Each week you will be given some exercises based on the lecture material. You need to **solve these exercises in order to prepare for your Mid-Session test and Final exam**. Please note that many exam questions will be based on these exercises.

There will be **one assignment** in the course. The Assignment-1 will be due in week 11 (requirements should be available in week 7).

Assignment and Exercises are to be completed in your own time. To maximise the learning benefits from doing exercises, it is essential that you start work on exercises early. Do not leave your exercises until the last minute.  If you submit an assignment late, the maximum available mark is reduced by an amount (usually 20%) per day that it is late.

## Examinations

**Mid-Session Test-1** will be held in Week 5 during your scheduled lecture time.

The **Final examination** will be held during the examination period. It will examine all material covered in the course.

#### Supplementary Exams

The document *Important Advice for Students* states the supplementary assessment policy for the School of CSE. The following criteria will be used when considering a student for a supplementary exam:

- has the student submitted a fully documented request for Special Consideration within 3 days of the exam;
- was there medical or other evidence to support the claim that the student's performance was seriously affected? Minor ailments like a cold; a headache--unless chronic, or severe enough to require prescribed medication; feeling "unwell", *etc* do not excuse a poor result;
- assignment and laboratory marks may not carry much weight in determining whether further assessment is warranted; and
- the student did not attend the exam, or attended the exam but was forced to leave through illness.

The document can be found on-line at:

http://www.cse.unsw.edu.au/~studentoffice/policies/yellowform.html

Please take the time to read it carefully. If you are granted a Supplementary examination, then it will be held on the date specified in the above document. If you think that you may be eligible for a supplementary exam, then make sure you are available on that day. It is your responsibility to check at the School Office for details of Supplementary examinations. Please note that there will be NO further supplementary dates for this course. In other words we will NOT be able to offer you supplementary examination at any other time.

### Assessment

The assessable components of the course are:

| Component | Mark |
|---|---|

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|---|---|
| Mid-Session Test | 20% |
| Assignment-1 | 20% |
| Final Written Exam | 60% |

**Important**:

- you **cannot** pass this course unless you score at least 50% (30/60) in the final examination, regardless of how good your marks are in other parts of the course.

## 4. Course Resources: Textbooks, Reading Materials and useful Online Resources

### Textbook:

Data Structures and Algorithms in Java (5th edition) by Michael T. Goodrich and Roberto Tamassia.

**We will provide additional references on the class web page** to cover other many useful topics. It is your responsibility to study them, and in case you have any questions/problems, please contact your lecturer.

As discussed earlier, at university, the focus is on your self-directed search for knowledge. Lectures, recommended reading, exercises and exams are all provided as a service to assist you in this endeavour. It is your choice as to how much work you do in this course, whether it be preparation for classes, completion of assignments, study for exams or seeking assistance or extra work to extend and clarify your understanding. You must choose the approach that best suits your learning style and goals in this course.

## 5. Administration

### Units of Credits

6 units of credit

### Pre-requisites

COMP9021

### Course Web Page

**http://www.cse.unsw.edu.au/~cs9024**

### Staff

| Staff Name | Role | Email | Phone (ext) |
|---|---|---|---|
| Dr Ashesh Mahidadia | Lecturer-In-Charge (Week 1 to 6) | ashesh@cse.unsw.edu.au | 9385-6556 (ext 56556) |
| Roland Wen | Lecturer (Week 7 to 12) | rolandw@cse.unsw.edu.au | ... |

### Lecture Time

| Time | Location |
|---|---|
| Monday 18:00 - 21:00 | Old Main Building 145 (K-K15-145) |

### Getting Help

From time to time, various problems may arise in your study of this course. Below is a list of typical problems, with suggestions for where you might seek help with them:

| Problem | Solution |
|---|---|
| Help with problems unrelated to this course | CSE Web Help Page |
| Can't understand lecture material | Ask the lecturer after the lecture times, Or go to a consultation. |
| Stuck with assignments, weekly exercises | Ask the lecturer after the lecture times, Or go to a consultation. |
| Problems with lab workstations | CSE Help Desk |
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| Problems with your account | CSE Help Desk |

One final piece of **advice**. If you have a problem, **do not wait** until late in the session before you seek help. Problems that are dealt with early are usually quicker and easier to resolve than ones that are left to the last minute.

You may find the following links useful:

- CSE Help Desk: http://www.cse.unsw.edu.au/~helpdesk
- UNSW library: http://info.library.unsw.edu.au
- UNSW Learning center: http://www.lc.unsw.edu.au
- UNSW Communications unit: http://www.comms.unsw.edu.au
- Computer ergonomics: http://do.cse.unsw.edu.au/ergonomics/ergoadjust.html
- Occupational Health and Safety policies and expectations: www.riskman.unsw.edu.au/ohs/ohs.shtml
- Equity and Diversity issues: www.equity.unsw.edu.au/disabil.html

## 6. Plagiarism

All work submitted for assessment **must be your own work**. Lab exercises and assignments **must be completed individually**. We regard copying of assignments or lab exercises, in whole or part, as a very serious offence. **We use plagiarism detection software to search for multiply-submitted work, or work derived from other students or from other sources.** Be warned that:

- the submission of work derived from another person, or jointly written with someone else will, at the very least, result in zero marks for the assignment or lab exercise.
- allowing another student to copy from you will, at the very least, result in a reduction in the mark for your own assignment or lab exercises; and
- severe or second offences will result in automatic failure of the course, or even exclusion from the University.

Collaborative learning in the form of "think tanking" is encouraged, but students are not allowed to compose programming solutions together as a group during such discussions. Students are also warned not to send code fragments of the assignments or labs to each other in any form (e.g. as email or listings). In addition, copying/purchasing of code that is available on the web is also not permitted. Students who are singled out during our regular plagiarism sweep will be dealt with according to School Policy: http://www.cse.unsw.edu.au/~studentoffice/policies/yellowform.html.

The Learning Centre website is main repository for resources for staff and students on plagiarism and academic honesty. These resources can be located via:

> http://www.lc.unsw.edu.au/plagiarism

## 7. Continual course improvement

Student feedback on this course, and on the lecturing in this course, will be obtained via electronic survey at the end of session. Student feedback is taken seriously, and continual improvements are made to the course based in part on this feedback. Students are very strongly encouraged to let the lecturer in charge know of any problems, as soon as they arise. Suggestions (or even complaints!) will be listened to very openly, positively, constructively and thankfully, and every action will be taken to fix any issue or improve the students' learning experience.

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