University of Tasmania
School of Computing

KXA151 Programming and Problem Solving
Unit Outline
Semester 1, 2003

Prerequisites
None

Corequisites
None

Unit Weight
12.5

Unit Coordinator
Robyn Gibson
Room V121
(03) 6324 3461
R.Gibson@utas.edu.au

Scheduled Teaching Sessions

Campuses:
- Newnham, Launceston
- NW Centre, Burnie
- Sandy Bay, Hobart

Lectures: 3 hr/wk
Tutorials: 1 hr/wk (from week 2)

The Unit Timetable can be accessed from the Study Resources section of the School website. (http://www.comp.utas.edu.au/app/studyresources.jsp).

Most of the lectures for North West Centre students will be via video conference.

Unit Website

The unit website is accessed from http://webct.utas.edu.au:8900. You will need to use your email pop account username and password to log on to the WebCT system. Once authenticated by the system your personalised MyWebCT area will be displayed. It contains links to the websites that you have permission to access - including the website for this unit.

This unit is Web Dependent: communication. This means that you will need to use the Web for this unit. The unit website contains unit information and resources. Electronic versions of the printed material provided in classes are available on the unit website, as well as administrative information, lecture overheads, tutorial exercises and solutions, and other resources.

Audio recordings of Launceston and Hobart lectures and video recordings of Burnie lectures will be made available on-line where this is technically possible.

This unit is classified as 'Web dependent: communication' because students will be obliged to use the web site for the following things:
- Filling in and submitting participation reports
- Completing practical tests
- Viewing notices about the unit eg. administrative matters, assignment clarifications or hints

If you are not able to access the unit website, please contact the University IT help desk:
- Level 2 Morris Miller Library, Sandy Bay Campus; Level 0 Building A, Newnham Campus.
  Website: http://www.utas.edu.au/helpdesk
  Telephone: 6226 1818
  Fax: 6226 7669
  Email: HelpDesk@utas.edu.au

Prescribed Text
The 2nd edition of this book can still be used in 2003.

Provider
School of Computing - Faculty of Science, Engineering, and Technology. http://www.comp.utas.edu.au

Useful University Web Links
Information and Resources for 'Current Students' are available on the university website at: http://www.utas.edu.au/students/ It includes useful links such as:
OVERVIEW

Introduction

Students learn to use a high level language such as Java to write programs which solve problems defined by a program specification. They master fundamental concepts relating to imperative, object-based programming and are introduced to concepts relating to graphical user interfaces and event driven programs. Students are required to demonstrate syntactic, logical and strategic knowledge of the programming constructs introduced in the unit. They are expected to use systematic processes to plan, document, debug and test their programs. Programming exercises are introduced in the context of small problems.

Warning on Over-confidence: Some students who have done a considerable amount of home or school computing may think that they are already expert computer programmers. This is extremely unlikely, as most self-taught or uncorrected programmers have picked up bad habits which are inappropriate in professional programming, and may have major gaps in their understanding of concepts. Please bear in mind that practising computing at a professional level is very different from practising it as a hobby. Experience has shown that very few students who have studied computing at school are so good that they can treat programming units lightly.

Objectives

On successful completion of this unit, you will be able to:

1. Write, compile, and run Java programs that contain statements of the types introduced in the unit (see unit content). This demonstrates syntactic knowledge of programming constructs.
2. Understand the effect of Java statements of the types introduced in the unit (see unit content). This demonstrates conceptual knowledge of programming constructs.
3. Analyse a problem specification and plan and produce a program which is a solution to the problem and uses Java statements of the types introduced in the unit (see unit content). This demonstrates strategic knowledge of programming constructs.
4. Use standard techniques to document work. This will include:
   - Appropriate documentation of the programs written during the semester.
   - Formal recording of aspects of activities throughout the process of software development.
   - Production of a record book which documents the activities undertaken in this unit during the semester and is a suitable aide memoire for use in the formal examination.

Unit Content

Introduction:
- unit introduction
- programming terms & tools
- computing tools & terms
- solving problems with computers

Data Storage:
- primitive types
- objects

Objects of prewritten classes:
- object methods
- class methods

Flow of control:
- branches
- planning and implementing branches
- multiway branching
- loops
- implementing loop algorithms
- nesting flow of control

Extending existing classes:
- writing methods
- testing methods
- method parameters and return values
- drawing a GUI

Creating new classes:
- planning
- implementation

Documenting programs:
- purpose of documentation
- internal and external documentation

Structured data - arrays:
- declaring & filling arrays
- using arrays
- arrays - sorting algorithms
- arrays searching algorithms

Graphical User Interfaces (GUI):
- adding components to a GUI
- making a GUI respond to events

Types of errors in programs:
- run time errors - exceptions
- handling exceptions
Recursion:

• concepts
• implementation

Revision:

• OO Concepts summarised
• practical skills
• exam techniques

For more information see the section titled 'Content' on the unit website.

Generic Skills

The university has defined a set of generic graduate attributes expected in its graduates. http://www.admin.utas.edu.au/academic/acservices/meetings/Senate/Appendix/3_01D1.doc Your course is designed to enable you to develop generic skills that are valued in, and expected of, graduates. These are skills that you will need to develop over time. Hence you are encouraged to look for opportunities, as you study each unit, to reflect on and improve these skills.

In this unit these skills are specifically targeted:
Knowledge: Students will have the opportunity to begin the acquisition of the knowledge and understanding of computer programming which is a fundamental requirement for all professionals in information technology.
Problem-solving skills: Students learn and practise the fundamental skills needed when attempting to write a computer program that correctly solves a problem that has been set.

LEARNING AND TEACHING

Approach to Learning

You are expected to spend about 130 hrs studying in this unit - this includes attendance at scheduled teaching sessions. (For a 13 week semester this is, on average, 10 hr/wk.) This is the amount of study time that the 'typical' student will need to reach the level of competence and understanding required to fulfil the unit objectives.

You are expected to:

• attend all scheduled lectures and tutorials, unless otherwise notified by the unit coordinator
• prepare for, and actively participate in lectures and tutorials
• complete the assigned learning tasks
• review what has been learnt
• complete assessment items and submit them on time
• access and be familiar with the information and resources available on the unit website
• seek help from teaching staff if you have any questions or difficulties in studying this unit

You are encouraged to read the university's Code of Conduct for Teaching and Learning. Part A describes the 'Responsibility of the University to Students' and part B describes the 'Responsibilities of Students to the University'. http://www.admin.utas.edu.au/HANDBOOKS/UTASHANDBOOKS/RULES/CTEA.html

Schedule

See the 'Schedule' section on the unit website for the timetable and associated resources.

Teaching Staff

Unit Coordinator:

Lecturer: Robyn Gibson
E-Mail: R.Gibson@utas.edu.au
Phone: (03) 6324 3461
Room: V121

Lecturing Staff

Newnham, Launceston: Robyn Gibson
NW Centre, Burnie: Robyn Gibson
Sandy Bay, Hobart: Dr. Julian Dermoudy

School Help Desk

Contact the School Help Desk if you have any queries or problems with accessing, using, or printing from the computers in the School of Computing labs.

• Hobart: the Help Desk is located near the School's reception desk and is open in the morning from 9-11, and in the afternoon from 12-1 and 2-4, Monday-Friday. The phone number is 6226 2960.
• Launceston: the Help Desk is located near the entrance to the computing labs and is open in the morning from 10-12, and in the afternoon from 2-4:30, Monday-Thursday. On Fridays it is open from 10-12 in the morning and 2-4 in the afternoon. The phone number is 6324 3654.
• Burnie: the computer labs at the NWC are maintained by ITS. Please contact the University Help Desk for assistance. The 6 Macs are maintained by the School of Computing. If you have a query or problem that is
specific to the School of Computing please phone the School of Computing Help Desk in Launceston.

University Services and Support

The University has staff available to assist you, such as the:

- Learning Development Advisor
- Student Counselor
- Careers Advisor
- Disability Officer

For more information and contact details see the Services and Support section on the University 'Current Students' web page. [http://www.utas.edu.au/students/](http://www.utas.edu.au/students/)

Resources

Unit Website

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Prescribed Text

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Readings

Printed copies of the powerpoint slides and the programs discussed in lectures will be available from:

- The School of Computing Help Desk (Launceston)
- The School of Computing Office (Hobart)
- Reception area North West Study Centre (Burnie)

A charge is made for these notes to recover the costs of printing. The same material will be available on the unit website.

NOTE: These notes are intended as a resource to assist learning in lectures. They WILL NOT work as a substitute for attendance at lectures.

For Burnie students: learning by video conference is rather different from face to face teaching. The leaflet 'The student's guide to video conferencing' provides helpful hints. This is available at the North West Study Centre.

Students are not required (and are unlikely to need) to use any resources other than those provided in the text book and the unit materials. If students wish to read more about Program development using the Java Programming Language, there are many standard texts and freely available web sites with relevant information. Students using such resources should be aware that there are many approaches to introducing learners to programming in Java, it is possible that reading a book or web site that takes a different approach from the one used in this unit may increase rather than decrease confusion.

Software

The software that you will need to access the unit website and to study this unit, including general purpose software such as word processors, is provided on the computers in the School's computing labs. If you intend to use software on other computers please check that the versions are compatible.

The programming language for this unit is Java 2 (the version used is JDK 1.4.1).

Students who want to work at home will need (at a minimum) this version of Java, a simple text editor, and the files for the packages of Java classes provided especially for this unit. A CD is available (for a small cost) from the Help desk (Hobart and Launceston) which contains Java 1.4.1 and the Java packages required, along with information about how these can be installed on most types of home computer.
NOTE:

- Students are not required to have their own computer. There is 24 hour access to suitable computer on the Newnham and Sandy Bay campuses.
- The School of Computing is not able to provide any technical support for students working on their home computers.
- All work that is submitted for assessment must be on (and work correctly on) the platform provided.

Computing Facilities

The School has PC labs (Windows 2000 Professional), Mac labs (Mac OS-X 10.2), Unix labs (linux / X-windows), and Networking labs at the Newnham and Sandy Bay campuses. It also maintains 6 Macs (Mac OS-X 10.2) at the NW Centre.

If you have not used these facilities before please contact the School Help Desk to organise you account details. If you would like to access the facilities at the Newnham and Sandy Bay campuses after hours please contact the School Help Desk.

Please contact the School Help Desk if you have difficulty accessing or using these facilities.

All students enrolled in this unit will be issued an account to access the Java software and to store their programs.

The technical information about platforms is as follows:

- Hobart students will use PCs running Java 2 (JDK1.4.1)
- Launceston and Burnie students will use X-Terminals running Java 2 (JDK1.4.1 under a unix operating system)

There is 24 hour access to suitable machines on all campuses except Burnie.

Ethical Use of Facilities

Use of computing facilities provided by the School is subject to the School's Ethics Guidelines - http://www.comp.utas.edu.au/app/ethics.jsp. Copies of the guidelines are also available in all School labs. The School's facilities may only be used for study-related purposes, and may not be used for personal gain. The playing of games is strictly prohibited in all labs at all times. Before being granted access to the School's facilities, you will be required to sign a declaration that you have read and understand these guidelines, and that you will abide by them. Disciplinary action may be taken against students who violate the guidelines.

Occupational Health and Safety

The university is committed to providing a safe and secure teaching and learning environment. For more information see http://www.admin.utas.edu.au/hr/ohs/pol_proc/ohs.pdf

ASSESSMENT

Assessment Items

Item 1

Title: Participation reports
Type: In-Semester - learning tasks
Weighting: 0%
Due: During semester

There will be 6 reports (one associated with each set of tutorial exercises) to be submitted on-line in designated weeks during the semester (see unit schedule for more information). These reports carry no marks, but students who do not complete at least 4 of the 6 will NOT be permitted to sit the examination. These reports are instead of attendance requirements for the unit.

Item 2

Title: Pract Tests
Type: In-Semester - test
Weighting: 6%
Due: at specified times during semester

There will the 3 of these to be assessed during tutorial sessions in designated weeks (see unit schedule for more information). Each prac test will consist of:

- Multiple Choice Questions (MCQ): These will be completed in the tutorial session (a tutor will need to enter a password before the MCQ part of the test can be done).
- A small practical programming task. The program should be written before the tutorial. To mark the program a tutor will run the program, check the form of the code, and ask some
questions about the program and the student's record book.

Item 3

Title: Assignment 1
Type: In-Semester - individual assignment
Weighting: 9%
Due: Friday 4 April 2003 (end of week 6 of semester)

This will require students to:

- write a small Java program with a single class, all the code will be in the `main()` method.
- provide some specified items of documentation for the program and the process they followed in producing the program

Students can expect to have 2 - 3 weeks to complete this assignment.

Item 4

Title: Assignment 2
Type: In-Semester - individual assignment
Weighting: 15%
Due: Friday 23 May, 2003 (end of week 12 of semester)

This will require students to:

- Write code that will form part of a Java program which consists of several interacting classes. The code that student write will be expected to
  - perform correctly when integrated with prewritten code provided as part of the program specification.
  - consist of several methods
  - show good programming style
  - conform with the programming standards and naming conventions expected in this unit
- Provide some specified items of documentation for the program and the process they followed in producing the program

Students can expect to have approximately 6 weeks to complete this assignment.

Item 5

Title: Final Exam
Type: Formal Examination
Weighting: 70%
Due: University Examination Period

This will consist of 2 sections. Section A - Carries 1/3 of the marks and consists of multiple choice questions. Section B - Carries 2/3 of the marks. Students will be required to answer 3 out of 5 "long" questions. Each question will require the student to demonstrate their ability to complete some part of a programming and or problem solving exercise.

NOTE: The only materials that students will be permitted to take into the formal examination will be the Record book which they have produced during the course of the semester.

See the 'Assessment' section in unit website for more detailed information about assessment items.

In-Semester Assessment

Unless specifically stated in the specification of the assessment item provided on the unit website, it is required that:

- work submitted by a student is the work of that student alone OR
- where the assessment item is to be completed by a group of students, the work submitted by the group of students is the work of that group of students alone.

Plagiarism

Plagiarism is taking and using someone else's thoughts, writings, or inventions and representing them as your own; for example downloading an essay from a cheat site, copying another student's work, or using an author's words or ideas without citing the source. Plagiarism is a form of cheating. It is a University offence punishable by a range of penalties including a fine or deduction/cancellation of marks and, in the most serious of cases, exclusion from a unit, a course, or the University. When in doubt consult your lecturer or tutor. Details of penalties that can be imposed are available in the Ordinance of Student Discipline or at [http://www.utas.edu.au/](http://www.utas.edu.au/)
plagiarism.

Referencing

The university document on plagiarism contains information about referencing the work or ideas of others. The preferred text referencing systems for the School is the Harvard system (also referred to as the author-date system). For information on the Harvard system see [http://www.utas.edu.au/library/assist/gpoa/gpoa2.html](http://www.utas.edu.au/library/assist/gpoa/gpoa2.html).

Submissions

All in-semester assignment submissions (including electronic submissions) are to include an Assignment Cover Sheet which includes a statement confirming that the submission is your own work. If this undertaking is not signed, the assignment will not be marked. The Assignment Cover Sheet is available from the School Help Desk in Launceston and Hobart, and on the School's web site [http://www.comp.utas.edu.au/app/studyresources.jsp](http://www.comp.utas.edu.au/app/studyresources.jsp).

Extensions

Assessment items will not be accepted after the due date except under the conditions stated in the school policy on late assessment, [http://www.comp.utas.edu.au/app/late_assess.jsp](http://www.comp.utas.edu.au/app/late_assess.jsp).

Formal Examination

The formal examination is conducted by the University Registrar. The 'Current Students' section on the university website contains information about the the conduct of, and timetable for, formal examinations.

Final Grade

Overall assessment will be based on the student's performance throughout the semester as well as in a formal examination. In order to achieve a pass (or better) result, a student must obtain:

1. at least 40% of the total mark for in-semester assessment items
2. at least 40% of the mark for the formal examination
3. at least 50% of the overall mark

Passing grades will be awarded based on the AVCC guidelines:

- PP at least 50% of the overall mark but less than 60%
- CR at least 60% of the overall mark but less than 70%
- DN at least 70% of the overall mark but less than 80%
- HD at least 80% of the overall mark

The maximum mark awarded to a student who fails the unit will be 44.

For more information, including other grades such as Supplementary and Terminating grades, see the School of Computing's guidelines for assessment - available at: [http://www.comp.utas.edu.au/app/assess.jsp](http://www.comp.utas.edu.au/app/assess.jsp)