School of Computing and Information Systems

Unit Outline

KXC151 Programming and Problem Solving

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Hangzhou, China

Unit Coordinator

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UNIT 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.

Prerequisites

None

Unit Weight

12.5% of one academic year

Teaching Pattern

Lectures: 3 hr/wk
Tutorials: 1 hr/wk

Please note that the amount of face-to-face teaching per week will vary. During the semester the UTas lecturer in charge will visit for two weeks. During this visit the amount of face-to-face teaching will be approximately 21 hours of lectures and 7 hours of tutorials.
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.

Prior Knowledge and/or Skills

This unit does not have any formal prerequisites. However, students need to navigate the web site for the unit and use a keyboard to write their programs. Students who do not have the basic skills required to "surf" the web or to use a computer keyboard (at about the level required to use a simple word processor) will need to spend extra time early in the semester learning these (simple) skills.

Learning Outcomes

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 the unit during the semester and is a suitable aide memoire for use in the formal examination.

Generic graduate attributes

The university has defined a set of generic graduate attributes expected in its graduates. 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.

Social Responsibility: Students come to understand that assessment tasks that require individual work, must be completed without copying from other students (or other sources).

UNIT ASSESSMENT

Assessment Pattern

Internal (30%), Exam (70%)

Assessment Summary

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignment 1</td>
<td>12%</td>
<td>End of Week 7 (3pm Friday 31st October)</td>
</tr>
<tr>
<td>Assignment 2</td>
<td>18%</td>
<td>End of Week 13 (3pm Friday 12th December)</td>
</tr>
<tr>
<td>Final Exam</td>
<td>70%</td>
<td>University Examination Period</td>
</tr>
</tbody>
</table>

Assessment Items

Item 1

Title: Assignment 1
Type: In-Semester - individual assignment
Task Length: not applicable
Weighting: 12%
Links to Learning Outcomes: 1, 2, 3, 4
Due: End of Week 7 (3pm Friday 31st October)
Description:

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 2

Title: Assignment 2
Type: In-Semester - individual assignment
Task Length: not applicable
Weighting: 18%
Links to Learning Outcomes: 1, 2, 3, 4
Due: End of Week 13 (3pm Friday 12th December)
Description:

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

Item 3

**Title:** Final Exam  
**Type:** Formal Examination  
**Task Length:** 3 hours  
**Weighting:** 70%  
**Links to Learning Outcomes:** 1, 2, 3, 4  
**Due:** University Examination Period  
**Description:**

This will consist of 2 sections.

- Section A - Carries 1/6 of the marks and consists of multiple choice questions.
- Section B - Carries 5/6 of the marks. Students will be required to answer 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.

**How your Final Grade will be determined**

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 45% of the total mark for in-semester assessment items
2. at least 45% of the mark for the formal examination
3. at least 50% of the overall mark

**UNIT RESOURCES**

**Unit Web Site**

This unit is Web Dependent: content. This means that you will need to use the Web for this unit. The unit website contains unit information and resources. The unit website is accessed from http://www.utas.edu.au/coursesonline/. You will need to use your University of Tasmania email pop account username and password to log on to the MyLO system. Once authenticated by the system your personalised MyLO Learning Online area will be displayed. It contains links to the websites that you have permission to access - including the website for this unit. If you are not able to access the unit website, please contact the technical staff at ZUT.

**Prescribed Text**


Note: The text book is optional. It is recommended that students obtain a copy of the text book and refer to it during the unit. Students should however be able to study this unit by referring to just the content provided by the lecturer.

**Readings**

Students are not required (and are unlikely to need) to use any resources other than those provided in 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 computing labs. If you intend to use software on other computers please check that the versions are compatible. Students will be provided with the necessary files and documentation to install the correct version of Java (and associated resources) on their own machines.

**GENERAL RESOURCES**

**School Website**
Faculty Website

Information and Resources for Faculty of Science, Engineering and Technology students are available on the faculty website at: http://www.utas.edu.au/scieng

University Website

Information and Resources for 'Current Students' are available on the university website at: http://www.utas.edu.au/students/

School Help Desk

Contact technical staff at ZUT for information about accessing and using the Computer labs.

University Services and Support

If you are experiencing difficulties with your studies or assignments, have personal or life planning issues, disability or illness which may affect your course of study, you are advised to raise these with your lecturer in the first instance.

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/

GENERAL ASSESSMENT

Approach to Learning

The University is committed to high standards of professional conduct in all activities, and holds its commitment and responsibilities to its students as being of paramount importance. Likewise, it holds expectations about the responsibilities students have as they pursue their studies within the special environment the University offers.

The University's Code of Conduct for Teaching and Learning states:

Students are expected to participate actively and positively in the teaching/learning environment. They must attend classes when and as required, strive to maintain steady progress within the subject or unit framework, comply with workload expectations, and submit required work on time.

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 teaching sessions, unless otherwise notified by the unit coordinator
- prepare for, and actively participate in all scheduled teaching sessions
- 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.utas.edu.au/policy/code_conduct.pdf

It is expected that students will familiarise themselves with access and use of the MyLO system operated by the University for the electronic delivery of course materials, and for various forms of communication.

It is expected that students will consult email sent to their University email address at least twice a week for notices relating to the administration of the unit, and for notification of the results of assignments.

It is expected that students will read the background material specified in the course curriculum, will actively attend and participate in tutorials, and be prepared to discuss relevant issues arising with tutors, lecturers and fellow students.

Student Expectations of the Unit
Students enrolled in this Unit may reasonably expect the following:

1. To be able to contact a lecturer or tutor by electronic mail, to raise issues arising in the unit, either relating to content or student performance within the unit.
2. Subject to availability, to be able to discuss such issues in person with the lecturer or tutor.
3. That assignments will be marked and the marks will normally be returned within 3 weeks of due dates.
4. That all relevant notices regarding the administration of the unit, including any necessary changes, will be communicated to all students enrolled in the unit via email.

*These expectations are in addition to those specified in relevant University regulations.*

**Plagiarism**

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.

While students are encouraged to discuss the assignments in this unit and to engage in active learning from each other, it is important that they are also aware of the University’s policy on plagiarism. Plagiarism is taking and using someone else’s thoughts, writings or inventions and representing them as your own; for example, downloading an essay wholly or in part from the internet, 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 taking and using someone else's thoughts, writings or inventions and representing them as your own; for example, using an author's words without putting them in quotation marks and citing the source, using an author's ideas without proper acknowledgment and citation, copying another student's work.

If you have any doubts about how to refer to the work of others in your assignments, please consult your lecturer or tutor for relevant referencing guidelines, and the academic integrity resources on the web at [http://www.academicintegrity.utas.edu.au](http://www.academicintegrity.utas.edu.au).

The intentional copying of someone else’s work as one’s own is a serious offence punishable by penalties that may range from a fine or deduction/cancellation of marks and, in the most serious of cases, to exclusion from a unit, a course or the University. Details of penalties that can be imposed are available in the Ordinance of Student Discipline – Part 3 Academic Misconduct, see [http://www.utas.edu.au/universitycouncil/legislation/](http://www.utas.edu.au/universitycouncil/legislation/).

**The University and any persons authorised by the University may submit your assessable works to a plagiarism checking service, to obtain a report on possible instances of plagiarism. Assessable works may also be included in a reference database. It is a condition of this arrangement that the original author’s permission is required before a work within the database can be viewed.**"

It is important that you understand this statement on plagiarism. Should you require clarification please see your unit coordinator or lecturer. Useful resources on academic integrity, including what it is and how to maintain it, are also available at: [http://www.academicintegrity.utas.edu.au](http://www.academicintegrity.utas.edu.au)

**Referencing**

The preferred text referencing systems for the School is the Harvard system (also referred to as the author-date system). In your written work you will need to support your ideas by referring to scholarly literature, works of art and/or inventions. For information on presentation of assignments, including referencing styles: [http://www.utas.edu.au/library/assist/gpoa/gpoa.html](http://www.utas.edu.au/library/assist/gpoa/gpoa.html)

It is important that you understand how to correctly refer to the work of others and maintain academic integrity. Failure to appropriately acknowledge the ideas of others constitutes academic dishonesty (plagiarism), a matter considered by the University of Tasmania as a serious offence. The university document on plagiarism contains information about referencing the work or ideas of others (see [http://www.utas.edu.au/plagiarism/](http://www.utas.edu.au/plagiarism/)).

**Submissions**

The details of the submission method (paper, electronic or other) for each assignment will be supplied in a separate assignment specification sheet. 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 on the School's web site [http://www.cis.utas.edu.au/cisview/resources.jsp](http://www.cis.utas.edu.au/cisview/resources.jsp).

**Extensions**


**Review of Assessment and Appeals**
1. It is expected that students will adhere to the following policy for review of any piece of continuous assessment.
   a. Within 5 days of the release of the assessment result, the student should request an appointment with the Lecturer. The student should be prepared to discuss specifically which section of the marking criteria they are disputing and why they consider the mark is inappropriate.
   b. Following this discussion, students may request a formal remark of the original submission (in accordance with Rule of Academic Assessment 111, clause 22.1). This remark will be undertaken, where practicable, by an alternative assessor.
2. Students may also request a review of the final result in a unit. The request and payment must be made within 10 days from the date of the result notification. Students are referred to Rule of Academic Assessment 111, clause 23 at http://www.utas.edu.au/universitycouncil/legislation/rule111.pdf and http://www.admin.utas.edu.au/ac_serv/flowchart_review_assesment.pdf.

Complaints Procedure

It is expected that students will adhere to the following policy for making any complaint or grievance directly related to a Unit:
   a. In the first instance, students are to approach the Lecturer or Unit Coordinator concerned and arrange a time to speak with them about their concern.
   b. If an issue remains unresolved, the student should approach the Head of School and arrange a time to speak with them about their concern.

If the School’s internal policy of complaints is unable to resolve an issue, students should consult Ordinance 8 Student Complaints for further direction, see http://acserv.admin.utas.edu.au/complaints_info.html

Formal Examination

The formal examination will be held at ZUT, Hangzhou, and is conducted by the University Registrar.

Final Grade

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

In order to comply with the benchmarks set by the Faculty of Science, Engineering & Technology for distribution of grades in units, both the in-semester and examination marks that students obtain may be adjusted either upwards or downwards. See http://fcms.its.utas.edu.au/scieng/scieng/policies.asp for details of the Faculty Assessment Guidelines.