School of Computing and Information Systems

Unit Outline

KXO151 Programming and Problem Solving

February - June 2012
Shanghai, China

Unit Coordinator
Dean Steer
E-Mail: Dean.Steer@utas.edu.au
Phone: (03) 6324 3693
Room: V169, Newnham Campus, Launceston

Lecturing Staff
Ms Shirley Wang
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, conceptual 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.

Prerequisites

None

Unit Weight

12.5% of one academic year

Teaching Pattern

Teaching is grouped into 13 modules which include: 26 lectures, 12 tutorials, and 8 directed learning activities.

Unit Content

Introduction:
- unit introduction
- programming tools & terms
- 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

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

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

Revision:
- OO Concepts summarised
- practical skills
For more information see the section titled 'Content' on the unit website.

**Prior Knowledge and/or Skills**

It is assumed that students studying this unit have sufficient mathematical and logical skills and knowledge to understand the logic of computer programming, and to be able to design, implement and verify basic computer programs.

**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.

**Generic graduate attributes**

The university has defined a set of generic graduate attributes expected in its graduates. [http://www.utas.edu.au/__data/assets/pdf_file/0003/214662/Generic-Attributes-of-Graduates.pdf](http://www.utas.edu.au/__data/assets/pdf_file/0003/214662/Generic-Attributes-of-Graduates.pdf) 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 (40%), Exam (60%)

Assessment Summary

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignment 1</td>
<td>15%</td>
<td>9:00pm (Shanghai time) Friday of specified modules</td>
</tr>
<tr>
<td>Assignment 2</td>
<td>5%</td>
<td>10:00pm (Shanghai time) Friday 13th April, 2012</td>
</tr>
<tr>
<td>Assignment 3</td>
<td>20%</td>
<td>10:00pm (Shanghai time) Tuesday 8th May, 2012</td>
</tr>
<tr>
<td>Final Exam</td>
<td>60%</td>
<td>University Examination Period</td>
</tr>
</tbody>
</table>

Assessment Items

Item 1  
Title: Assignment 1  
Type: In-Semester - learning tasks  
Task Length: not applicable  
Weighting: 15%  
Links to Learning Outcomes: 2, 3  
Due: 9:00pm (Shanghai time) Friday of specified modules  
Description: This is an individual assignment that requires students to log onto MyLO to complete a series of True / False and Multiple-choice questions that relate to material covered by the textbook chapter each module. This allows students to demonstrate their knowledge of the topics covered in the corresponding module, and to familiarise themselves with Java concepts, terms, syntax, and semantics.

Item 2  
Title: Assignment 2  
Type: In-Semester - individual assignment  
Task Length: not applicable  
Weighting: 5%  
Links to Learning Outcomes: 1 - 4  
Due: 10:00pm (Shanghai time) Friday 13th April, 2012  
Description: Develop additional functionality for an existing Java language application by revising a class to extend the base Java language code provided.

Item 3  
Title: Assignment 3  
Type: In-Semester - group assignment  
Task Length: not applicable  
Weighting: 20%  
Links to Learning Outcomes: 1 - 4  
Due: 10:00pm (Shanghai time) Tuesday 8th May, 2012  
Description: Develop a Java language application by writing classes to provided the required functionality

Item 4  
Title: Final Exam  
Type: Formal Examination  
Task Length: 2 hours  
Weighting: 60%  
Links to Learning Outcomes: 2, 3  
Due: University Examination Period  
Description: This is a closed book exam. No study material will be permitted to be taken into the exam.

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

Attendance Requirements

It is a requirement of your Chinese university that you attend all classes. UTAS supports this principle. It is our belief that attendance in class leads to better engagement with the subject matter and therefore to better results. Please attend all classes.
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 SOU.

Prescribed Text


Readings

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 confusion rather than decrease it.

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.

The programming language for this unit is Java 2 (version JDK 1.6.0).

- Current version of Java SE Development Kit (JDK) is available free: http://www.oracle.com/technetwork/java/javase/downloads/index.html

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.

- Current version of JGRASP is available free: http://www.jgrasp.org/

**NOTE:** All work that is submitted for assessment must be on (and work correctly on) the platform provided by the AIEN-SOU Institute.
GENERAL RESOURCES

School Website
School of Computing and Information Systems - Faculty of Science, Engineering, and Technology.
http://www.utas.edu.au/cis

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/
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'.


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/__data/assets/pdf_file/0006/23991/ord91.pdf](http://www.utas.edu.au/__data/assets/pdf_file/0006/23991/ord91.pdf).

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://utas.libguides.com/referencing](http://utas.libguides.com/referencing)

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.utas.edu.au/computing-information-systems/resources.

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.utas.edu.au/__data/assets/pdf_file/0003/231960/ExtensionPolicy.pdf (PDF - 100KB).

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/university-council/university-governance/rules and http://www.studentcentre.utas.edu.au/examinations_and_results/results/result_review_results.htm.

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 SOU, Shanghai, 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.