FIT3022
Intelligent decision support systems

Unit guide

Semester 1, 2009

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Unit leader :

Mark Wallace

Lecturer(s) :

Clayton

- Mark Wallace

Tutors(s) :

Clayton

- Yee Ling Boo Weeks 1-7
- Mauro Bampo Weeks 8-13

Introduction

Welcome to FIT3022 Intelligent Decision Support Systems for semester 1, 2009. This 6 point unit is core to the Batchelor of Business Information Systems degree at the third year level.

Decision making spans all the areas of a modern business enterprise. The Business IT graduate is very likely to encounter the need for effective decision support as they enter the workforce. This unit equips BBIS graduates with the skills that will prove to be immediately useful.

Unit synopsis

ASCED Discipline Group Classification: 020307 Decision Support Systems.

This unit will give the students an opportunity to solve some concrete decision-making problems, such as resource allocation and strategic planning, using different intelligent reasoning techniques: constraint reasoning and refinement search; inference; search by local change; and decision trees. The students will be introduced to a high level programming system which they will use to model problems in simple logic and solve them using the different techniques

Learning outcomes

(a) To acquire **Knowledge and Understanding** of:

- The role of intelligent decision support in organisations
- Decision support paradigms and applications
- Methods for handling certain and uncertain knowledge
- Issues in the design and construction of intelligent decision support systems
- Correctness, precision and scalability

(b) To develop the following **Attitudes, Values and Beliefs**:

- Recognition of the value of intelligent decision support within an organisation
- Adoption of a critical approach to the choice of decision support method
- Appreciation of the impact of data quality, and business constraints on the behaviour of a decision support system
- Appreciation of the limitations of formal decision models and the handling of uncertainty

(c) To develop the following **Practical Skills**:

- Choose appropriate decision support methods
- Separate modelling from solving
- Implement simple decision support tools on a constraint programming platform
- Combine methods to meet application requirements
- Assess the limitations in scalability and precision of a solution

(d) In addition, it is expected that the following **Relationships, Communication and Team Work** skills will be developed and enhanced:

- Document and communicate an intelligent decision support model
- Work in a team during model design and implementation stages
- Present a justification for choosing or combining decision support methods

Workload

The weekly workload commitments are:

- a 2-hour lecture

- a one-hour tutorial

- a minimum of 2-3 hours of personal study per one hour of contact time to satisfy reading and assignment expectations

- You will need to allocate up to 5 hours per week in some weeks, for use of a computer, including time for newsgroups/discussion groups.

Unit relationships

Prerequisites

Before attempting this unit you must have satisfactorily completed FIT1006 (BUS1100) or ETC1000 AND 24 points at first year, or equivalent.

Relationships

FIT3022 is a core unit in the third year of the Decision Support Systems stream of the Bachelor of Business Information Systems.

Before attempting this unit you must have satisfactorily completed

FIT1006 (BUS1100) or ETC1000 AND 24 points at first year

Continuous improvement

Monash is committed to 'Excellence in education' (Monash Directions 2025 - http://www.monash.edu.au/about/monash-directions/directions.html) and strives for the highest possible quality in teaching and learning.

To monitor how successful we are in providing quality teaching and learning Monash regularly seeks feedback from students, employers and staff. One of the key formal ways students have to provide feedback is through Unit Evaluation Surveys. The University's Unit Evaluation policy (http://www.policy.monash.edu/policy-bank/academic/education/quality/unit-evaluation-policy.html) requires that every unit offered is evaluated each year. Students are strongly encouraged to complete the surveys as they are an important avenue for students to "have their say". The feedback is anonymous and provides the Faculty with evidence of aspects that students are satisfied and areas for improvement.

Faculties have the option of administering the Unit Evaluation survey online through the my.monash portal or in class. Lecturers will inform students of the method being used for this unit towards the end of the semester.

Student Evaluations

If you wish to view how previous students rated this unit, please go to http://www.adm.monash.edu.au/cheq/evaluations/unit-evaluations/

Improvements to this unit

The unit enables and encourages students to think about problems in a new way.

Unit staff - contact details

Unit leader

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Professor
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Lecturer(s) :

Professor Mark Wallace
Professor
Phone +61 3 990 51367 +61 3 990 34276
Contact hours : Monday 10am-12pm, 12-1pm, Tuesday 10-11am

Tutor(s) :

Mauro Bampo Weeks 8-13
Yee Ling Boo Weeks 1-7

Teaching and learning method

Monash aims to provide a learning environment in which students receive a range of ongoing feedback throughout their studies. You will receive feedback on your work and progress in this unit. This may take the form of group feedback, individual feedback, peer feedback, self-comparison, verbal and written feedback, discussions (on line and in class) as well as more formal feedback related to assignment marks and grades. You are encouraged to draw on a variety of feedback to enhance your learning.

It is essential that you take action immediately if you realise that you have a problem that is affecting your study. Semesters are short, so we can help you best if you let us know as soon as problems arise. Regardless of whether the problem is related directly to your progress in the unit, if it is likely to interfere with your progress you should discuss it with your lecturer or a Community Service counsellor as soon as possible.

Tutorial allocation

On-campus students should register for tutorials/laboratories using Allocate+.

Communication, participation and feedback

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Unit Schedule

Week	Topic	Study guide	Key dates
1	Introduction and motivation for Intelligent Decision Support		
2	Modelling and yes/no choices		
3	Modelling and multiple choices		
4	Solving by inference		
5	Solving and optimisation by search		
6	Handling uncertainty		
	Mid semester break		
7	Intelligent Decision Support System Techniques	Chapter 12 and 13 (Turban)	Assignment 1 due April 21st
8	Business Intelligence and modelling problems in a spreadsheet	Chapter 3 Ragsdale and Chapter S Turban	
9	Goal Programming and Multiple Objective Optimisation	Chapter 7 Ragsdale	
10	Non Linear Programming and Evolutionary Optimisation	Chapter 8 Ragsdale	
11	Developing Intelligent Decision Support Systems	Chaper 15 Turban	
12	Internet Opportunities and Trends	Chapter 14 and 16 Turban	Assignment 2 due 8th June
13	Summary and Review		

Unit Resources

Prescribed text(s) and readings

Turban, Aronson, Liang, Sharda, Decision Support and Business Intelligent Systems, 8th Edition, Pearson International, 2007, 0-13-158017-5.

Text books are available from the <u>Monash University Book Shops</u>. Availability from other suppliers cannot be assured. The Bookshop orders texts in specifically for this unit. You are advised to purchase your text book early.

Recommended text(s) and readings

- MiniZinc: Towards a standard CP modelling language. Christian Bessière, editor, Thirteenth International Conference on Principles and Practice of Constraint Programming, Providence, RI, USA, volume 4741 of Lecture Notes in Computer Science, pages 529-543. Springer-Verlag, September, 2007. This paper presents the modelling language that we will use during the first half of the unit.
- MiniZinc Tutorial. Ralph Becket, 2007. Held with FIT3022 unit resources in Moodle.
- Specification of Zinc and Minizinc. Nethercote, Marriott, Rafeh, Wallace, de la Banda, 2007. This paper specifies the syntax of MiniZinc, and is held with the FIT3022 unit resources in Moodle.
- Model Building in Mathematical programming. 4th Edition. H.P.Williams, Wiley, 1999. ISBN 0 471 94111
- Search Methodologies: Introductory tutorials in Optimization and Decision Support Techniques. Ed Burke and Kendall. Springer, 2005, ISBN 0-387-23460-8
- Constraint Logic Programming using ECLiPSe. K. Apt and M. Wallace. Cambridge University Press, 2007. ISBN 0-521-86628-6. Describes the language platform used for writing and solving models in the tutorials.
- Spreadsheet Modelling & Decision Analysis 5e, C T Ragsdale, Thomson South-Western, 2007.

Required software and/or hardware

ECLiPSE constraint programming system. (download from www.eclipse-clp.org)

MiniZinc modelling langugae (download from www.g12.cs.mu.oz.au/minizinc/download.html)

Microsoft Excel 2003/2007

Equipment and consumables required or provided

On-campus students, and those studying at supported study locations may use the facilities available in the computing labs. Information about computer use for students is available from the ITS Student Resource Guide in the Monash University Handbook. Please ensure you allocate sufficient time per week for the use of a computer, including time for newsgroups/discussion groups.

Study resources

Study resources we will provide for your study are:

- Weekly lecture PowerPoint slides
- Weekly laboratory tasks and exercises with sample solutions provided one to two weeks later;
- Assignment specifications and sample solution;

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- Discussion groups;
- Relevant papers, and software on FIT3022 Moodle web site.
- This Unit Guide outlining the administrative information for the unit;
- The FIT3022 web site on Moodle, where resources outlined above will be made available.

Library access

The Monash University Library site contains details about borrowing rights and catalogue searching. To learn more about the library and the various resources available, please go to http://www.lib.monash.edu.au.

The Educational Library and Media Resources (LMR) is also a very resourceful place to visit at http://www.education.monash.edu.au/library/

Monash University Studies Online (MUSO)

All unit and lecture materials are available through MUSO (Monash University Studies Online). Blackboard is the primary application used to deliver your unit resources. Some units will be piloted in Moodle. If your unit is piloted in Moodle, you will see a link from your Blackboard unit to Moodle (http://moodle.monash.edu.au) and can bookmark this link to access directly. In Moodle, from the Faculty of Information Technology category, click on the link for your unit.

You can access MUSO and Blackboard via the portal: http://my.monash.edu.au

Click on the Study and enrolment tab, then Blackboard under the MUSO learning systems.

In order for your Blackboard unit(s) to function correctly, your computer needs to be correctly configured.

For example:

- Blackboard supported browser
- Supported Java runtime environment

For more information, please visit: http://www.monash.edu.au/muso/support/students/downloadables-student.html

You can contact the MUSO Support by phone : (+61 3) 9903 1268

For further contact information including operational hours, please visit:
http://www.monash.edu.au/muso/support/students/contact.html

Further information can be obtained from the MUSO support site:
http://www.monash.edu.au/muso/support/index.html

Assessment

Unit assessment policy

To pass a unit which includes an examination as part of the assessment a student must obtain:

- 40% or more in the unit's examination
  and
- 40% or more in the unit's **total non-examination** assessment
  and

  • an overall unit mark of 50% or more

If a student does not achieve 40% or more in the unit examination or the unit non-examination total assessment, and the total mark for the unit is greater than 44% then a mark of 44-N will be recorded for the unit.

Assignment tasks

  • **Assignment Task**

    Title : Assignment 1

    Description :

    Model and solve a decision support problem using MiniZinc in ECLiPSe, in two ways: using finite domains and an integer/linear model. The finite domain model (5%) must be accompanied by a written report on the model (5%), and the integer/linear model (5%) must be accompanied by another report describing this model (5%)

    Weighting : 20%

    Criteria for assessment :

    Correctness of model; runtime performance of model solving new instances; clear description of solution, highlighting choices, features of the model and its limitations.
    Due date : April 21st
  • **Assignment Task**

    Title : Assignment 2

    Description :

    a) Modelling and solving a problem in a spreadsheet (10%) and b) a written report on one of the following topics on intelligent decision support systems (IDSSs) (10%):

    1. Intelligent Agents and their role in Internet-based IDSSs;

    2. IDSS development;

    3. Applying evolutionary computational techniques to IDSS.

    Weighting : 20%

    Criteria for assessment :

    a) Quantitative problem solved using Excel - correctness of model and solution.

    b) Demonstration of understanding of topics; evidence of literature review in chosen topic; illustrations and/or demonstration of techniques in report; analysis of readings and referencing of articles/papers related to topic.

    Due date : June 8th

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Examinations

- **Examination 1**

  Weighting : 60%

  Length : 2 hours

  Type (open/closed book) : Closed book

Assignment submission

Assignments will be submitted by **electronic** submission to http://wfsubmit.cc.monash.edu.au/

Assignment coversheets

Assignment coversheets can be found via the "Student assignment coversheets" (http://infotech.monash.edu.au/resources/student/assignments/) page on the faculty website

University and Faculty policy on assessment

Due dates and extensions

The due dates for the submission of assignments are given in the previous section. Please make every effort to submit work by the due dates. It is your responsibility to structure your study program around assignment deadlines, family, work and other commitments. Factors such as normal work pressures, vacations, etc. are seldom regarded as appropriate reasons for granting extensions. Students are advised to NOT assume that granting of an extension is a matter of course.

Late assignment

Assignments received after the due date will be subject to a penalty of of 10% a day. Assignments received later than one week after the due date will not be accepted.

Return dates

Students can expect assignments to be returned within two weeks of the submission date or after receipt, whichever is later.

Assessment for the unit as a whole is in accordance with the provisions of the Monash University Education Policy at http://www.policy.monash.edu/policy-bank/academic/education/assessment/

Plagiarism, cheating and collusion

Plagiarism and cheating are regarded as very serious offences. In cases where cheating has been confirmed, students have been severely penalised, from losing all marks for an assignment, to facing disciplinary action at the Faculty level. While we would wish that all our students adhere to sound ethical conduct and honesty, I will ask you to acquaint yourself with the University Plagiarism policy and procedure (http://www.policy.monash.edu/policy-bank/academic/education/conduct/plagiarism-procedures.html) which

applies to students detected plagiarising.

In this University, cheating means seeking to obtain an unfair advantage in any examination or any other written or practical work to be submitted or completed by a student for assessment. It includes the use, or attempted use, of any means to gain an unfair advantage for any assessable work in the unit, where the means is contrary to the instructions for such work.

When you submit an individual assessment item, such as a program, a report, an essay, assignment or other piece of work, under your name you are understood to be stating that this is your own work. If a submission is identical with, or similar to, someone else's work, an assumption of cheating may arise. If you are planning on working with another student, it is acceptable to undertake research together, and discuss problems, but it is not acceptable to jointly develop or share solutions unless this is specified by your lecturer.

Intentionally providing students with your solutions to assignments is classified as "assisting to cheat" and students who do this may be subject to disciplinary action. You should take reasonable care that your solution is not accidentally or deliberately obtained by other students. For example, do not leave copies of your work in progress on the hard drives of shared computers, and do not show your work to other students. If you believe this may have happened, please be sure to contact your lecturer as soon as possible.

Cheating also includes taking into an examination any material contrary to the regulations, including any bilingual dictionary, whether or not with the intention of using it to obtain an advantage.

Plagiarism involves the false representation of another person's ideas, or findings, as your own by either copying material or paraphrasing without citing sources. It is both professional and ethical to reference clearly the ideas and information that you have used from another writer. If the source is not identified, then you have plagiarised work of the other author. Plagiarism is a form of dishonesty that is insulting to the reader and grossly unfair to your student colleagues.

Register of counselling about plagiarism

The university requires faculties to keep a simple and confidential register to record counselling to students about plagiarism (e.g. warnings). The register is accessible to Associate Deans Teaching (or nominees) and, where requested, students concerned have access to their own details in the register. The register is to serve as a record of counselling about the nature of plagiarism, not as a record of allegations; and no provision of appeals in relation to the register is necessary or applicable.

Non-discriminatory language

The Faculty of Information Technology is committed to the use of non-discriminatory language in all forms of communication. Discriminatory language is that which refers in abusive terms to gender, race, age, sexual orientation, citizenship or nationality, ethnic or language background, physical or mental ability, or political or religious views, or which stereotypes groups in an adverse manner. This is not meant to preclude or inhibit legitimate academic debate on any issue; however, the language used in such debate should be non-discriminatory and sensitive to these matters. It is important to avoid the use of discriminatory language in your communications and written work. The most common form of discriminatory language in academic work tends to be in the area of gender inclusiveness. You are, therefore, requested to check for this and to ensure your work and communications are non-discriminatory in all respects.

Students with disabilities

Students with disabilities that may disadvantage them in assessment should seek advice from one of the following before completing assessment tasks and examinations:

- Faculty of Information Technology Student Service staff, and / or
- your Unit Coordinator, or
- Disabilities Liaison Unit

Deferred assessment and special consideration

Deferred assessment (not to be confused with an extension for submission of an assignment) may be granted in cases of extenuating personal circumstances such as serious personal illness or bereavement. Information and forms for Special Consideration and deferred assessment applications are available at http://www.monash.edu.au/exams/special-consideration.html. Contact the Faculty's Student Services staff at your campus for further information and advice.