MONASH University
Information Technology

FIT3022
Intelligent decision support systems

Unit Guide

Semester 1, 2011

Last updated: 27 Feb 2011

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FIT3022 Intelligent decision support systems - Semester 1, 2011

This unit will give the students an opportunity to solve some concrete decision-making problems, such as resource allocation and investment planning, using different ways of modelling and solving decision support problems of different size and complexity; strategic, tactical and operational problems; problems involving discrete alternatives and problems involving continuous variables; problems whose constraints and goals are precise and problems which need to be further pinned down. The students will be introduced to a high level problem modelling and solving platform which is supported by a variety of solvers. They will use the platform to model and solve some quite complex decision support problems and experiment with different solvers, and search methods.

Mode of Delivery

Clayton (Day)

Contact Hours

2 hrs lectures/wk, 2 hrs laboratories/wk

Workload

The weekly workload commitments are:

- a 2-hour lecture
- a 2-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

FIT1006, BUS1100 or ETC1000 and 24 points at level 1

Chief Examiner

Mark Wallace

Campus Lecturer

Clayton

Mark Wallace

Contact hours: Thursday 1pm-3pm

Joachim Schimpf

Contact hours: Thursday 1pm-5pm

Tutors

Clayton

Joachim Schimpf

Contact hours: Thursday 1-5pm

Mauro Bampo

Contact hours: Thursday 1-5pm

Learning Objectives

At the completion of this unit students will have -
A 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;

Developed attitudes that enable them to:

- recognise the value of intelligent decision support within an organisation;
- adopt a critical approach to the choice of decision support method;
- appreciate the impact of data quality, and business constraints on the behaviour of a decision support system;
- appreciate the limitations of formal decision models and the handling of uncertainty.

Developed the skills to:

- choose appropriate decision support methods;
- separate modelling from solving;
- implement simple decision support tools on a high-level software platform;
- combine methods to meet application requirements;
- assess the limitations in scalability and precision of a solution.

Demonstrated the communication and teamwork skills necessary to:

- 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.

Graduate Attributes

Monash prepares its graduates to be:

1. responsible and effective global citizens who:

a. engage in an internationalised world
b. exhibit cross-cultural competence
c. demonstrate ethical values

critical and creative scholars who:

a. produce innovative solutions to problems
b. apply research skills to a range of challenges
c. communicate perceptively and effectively

Assessment Summary

Examination (2 hours): 60%; In-semester assessment: 40%

Assessment Task	Value	Due Date
Assignment 1	20%	18 April 2011
Assignment 2	20%	16 May 2011
Examination 1	60%	To be advised

Teaching Approach

Lecture and tutorials or problem classes

The approach to teaching and learning include a weekly two-hour lecture and a two-hour (tutorial/laboratory). Additionally, each student should spend a minimum of 8 to 12 hours for personal study every week and should allocate up to 5 hours per week in some weeks for use of a computer, including time for newsgroup and discussion.

Feedback

Our feedback to You

Types of feedback you can expect to receive in this unit are:

- Informal feedback on progress in labs/tutes
- Graded assignments with comments

- Solutions to tutes, labs and assignments

Your feedback to Us

Monash is committed to excellence in education and regularly seeks feedback from students, employers and staff. One of the key formal ways students have to provide feedback is through SETU, Student Evaluation of Teacher and Unit. The University's student evaluation policy requires that every unit is evaluated each year. Students are strongly encouraged to complete the surveys. The feedback is anonymous and provides the Faculty with evidence of aspects that students are satisfied and areas for improvement.

For more information on Monash's educational strategy, and on student evaluations, see:
http://www.monash.edu.au/about/monash-directions/directions.html
http://www.policy.monash.edu/policy-bank/academic/education/quality/student-evaluation-policy.html

Previous Student Evaluations of this unit

If you wish to view how previous students rated this unit, please go to
https://emuapps.monash.edu.au/unitevaluations/index.jsp

Required Resources

MiniZinc modelling language
(download from http:/www.g12.csse.unimelb.edu.au/minizinc/download.html)

CP_Viz
(www.g12.csse.unimelb.edu.au/minizinc/downloads/doc-latest/mzn-viz.pdf)

Unit Schedule

Week	Date*	Activities	Assessment
0	21/02/11		No formal assessment or activities are undertaken in week 0
1	28/02/11	Introduction and motivation for Intelligent Decision Support	
2	07/03/11	Modelling and yes/no choices	
3	14/03/11	Modelling and multiple choices	
4	21/03/11	Problem Qualification	
5	28/03/11	Problem Classes	
6	04/04/11	Problem Solvers	
7	11/04/11	Solving by Inference	
8	18/04/11	Solving by Search	Assignment 1 due 18 April 2011
Mid semester break			
9	02/05/11	Optimisation	
10	09/05/11	Intelligent Decision Support in Transportation	
11	16/05/11	Network algorithms and developing decision support systems	

			Assignment 2 due 16 May 2011
12	23/05/11	Uncertainty	
	30/05/11	SWOT VAC	No formal assessment is undertaken SWOT VAC

*Please note that these dates may only apply to Australian campuses of Monash University. Off-shore students need to check the dates with their unit leader.

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 50% then a mark of no greater than 49-N will be recorded for the unit

Assessment Tasks

Participation

- **Assessment task 1**

  Title:
  Assignment 1
  Description:
  Model and solve two variants of a decision support problem using MiniZinc: a basic problem and an extended one. The basic model (5%) must be accompanied by a written report on the model (5%), and the model of the extended problem (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:
  18 April 2011

- **Assessment task 2**

  Title:
  Assignment 2
  Description:
  Model a problem in MiniZinc (8%), writing a report on the model,
  its output on the two problem instances, and your choice of variables,

constraints and cost expression (4%).
The problem is the Travel Guide Allocation problem, whose specifiction is also under week 9 on Moodle.
The second part is to write a report describing and contrasting finite domain and linear solvers (8%).

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:
16 May 2011

Examinations

- **Examination 1**

Weighting:
60%

Length:
2 hours

Type (open/closed book):
Closed book

Electronic devices allowed in the exam:
None

Assignment submission

Assignment coversheets are available via "Student Forms" on the Faculty website: http://www.infotech.monash.edu.au/resources/student/forms/
You MUST submit a completed coversheet with all assignments, ensuring that the plagiarism declaration section is signed.

Extensions and penalties

Submission must be made by the due date otherwise penalties will be enforced.

You must negotiate any extensions formally with your campus unit leader via the in-semester special consideration process: http://www.infotech.monash.edu.au/resources/student/equity/special-consideration.html.

Returning assignments

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

Policies

Monash has educational policies, procedures and guidelines, which are designed to ensure that staff and students are aware of the University's academic standards, and to provide advice on how they might uphold them. You can find Monash's Education Policies at: http://policy.monash.edu.au/policy-bank/academic/education/index.html

Key educational policies include:

- Plagiarism (http://www.policy.monash.edu/policy-bank/academic/education/conduct/plagiarism-policy.html)
- Assessment (http://www.policy.monash.edu/policy-bank/academic/education/assessment/assessment-in-coursework-po
- Special Consideration (http://www.policy.monash.edu/policy-bank/academic/education/assessment/special-consideration-policy.h
- Grading Scale (http://www.policy.monash.edu/policy-bank/academic/education/assessment/grading-scale-policy.html)
- Discipline: Student Policy (http://www.policy.monash.edu/policy-bank/academic/education/conduct/student-discipline-policy.html)
- Academic Calendar and Semesters (http://www.monash.edu.au/students/key-dates/);
- Orientation and Transition (http://www.infotech.monash.edu.au/resources/student/orientation/); and
- Academic and Administrative Complaints and Grievances Policy (http://www.policy.monash.edu/policy-bank/academic/education/management/complaints-grievance-policy.

Student services

The University provides many different kinds of support services for you. Contact your tutor if you need advice and see the range of services available at www.monash.edu.au/students The Monash University Library provides a range of services and resources that enable you to save time and be more effective in your learning and research. Go to http://www.lib.monash.edu.au or the library tab in my.monash portal for more information. Students who have a disability or medical condition are welcome to contact the Disability Liaison Unit to discuss academic support services. Disability Liaison Officers (DLOs) visit all Victorian campuses on a regular basis

- Website: http://adm.monash.edu/sss/equity-diversity/disability-liaison/index.html;
- Telephone: 03 9905 5704 to book an appointment with a DLO;
- Email: dlu@monash.edu
- Drop In: Equity and Diversity Centre, Level 1 Gallery Building (Building 55), Monash University, Clayton Campus.

Reading List

- 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. http://www.g12.csse.unimelb.edu.au/minizinc/downloads/doc-1.3/minizinc-tute.pdf
- Specification of Zinc and Minizinc. http://www.g12.csse.unimelb.edu.au/minizinc/specifications.html

- 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
- Spreadsheet Modelling & Decision Analysis 5e, C T Ragsdale, Thomson South-Western, 2007.