



MONASH University
Information Technology

FIT3013
Formal specification for software engineering

Unit Guide

Semester 2, 2012

The information contained in this unit guide is correct at time of publication. The University has the right to change any of the elements contained in this document at any time.

Last updated: 12 Jul 2012

Table of Contents

<u>FIT3013 Formal specification for software engineering - Semester 2, 2012</u>	1
<u>Mode of Delivery</u>	1
<u>Contact Hours</u>	1
<u>Workload</u>	1
<u>Unit Relationships</u>	1
<u>Prohibitions</u>	1
<u>Prerequisites</u>	1
<u>Chief Examiner</u>	1
<u>Campus Lecturer</u>	1
<u>Clayton</u>	1
<u>Academic Overview</u>	2
<u>Outcomes</u>	2
<u>Graduate Attributes</u>	2
<u>Assessment Summary</u>	2
<u>Teaching Approach</u>	3
<u>Feedback</u>	3
<u>Our feedback to You</u>	3
<u>Your feedback to Us</u>	3
<u>Previous Student Evaluations of this unit</u>	3
<u>Required Resources</u>	3
<u>Unit Schedule</u>	5
<u>Assessment Requirements</u>	6
<u>Assessment Policy</u>	6
<u>Assessment Tasks</u>	6
<u>Participation</u>	6
<u>Examinations</u>	7
<u>Examination 1</u>	7
<u>Assignment submission</u>	7
<u>Online submission</u>	7
<u>Extensions and penalties</u>	8
<u>Returning assignments</u>	8
<u>Other Information</u>	9
<u>Policies</u>	9
<u>Student services</u>	9

FIT3013 Formal specification for software engineering - Semester 2, 2012

Review of set theory, the predicate calculus, relations, relational algebra and formal specification concepts; algebraic and model based specifications; the role of formal specifications in software engineering. The Event-B notation, data and algorithm design; data and operation refinement; proofs of correctness; proof obligations.

Mode of Delivery

Clayton (Day)

Contact Hours

2 hrs lectures/wk, 1 hr tutorial/wk

Workload

Students will be expected to spend a total of 12 hours per week during semester on this unit as follows:

- 2 hours in lectures
- 1 hour in tutorials
- 3 hours of study material revision
- 6 hours practising with the verification tools (details to be advised), and developing assignment solutions.

Unit Relationships

Prohibitions

CSE4213

Prerequisites

FIT2004 and one of MAT1830, MTH1112 or MAT1077

Chief Examiner

Dr Yuan-Fang Li

Campus Lecturer

Clayton

Yuan-Fang Li

Academic Overview

Outcomes

At the completion of this unit students will have -
A knowledge and understanding of:

- fundamentals of the Event-B Method;
- applications of the Event-B Method;
- Event-B specifications;
- software Testing in the discrete domain;
- the role of proof obligations and consistent specifications;
- determination of Proof Obligation;
- the role of refinement in developing formal specifications.

Developed attitudes that enable them to:

- have an appreciation of the professional need to establish formal properties of software;
- have a belief that formal specifications can improve the quality of software.

Developed the skills to:

- use the Event-B notation to develop and prove software specifications;
- install a Event-B Toolkit on a Unix/Linux/Windows platform;
- write basic Event-B specifications;
- refine and extend more advanced Event-B specifications.

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): 50%; In-semester assessment: 50%

Assessment Task	Value	Due Date
Assignment 1 - Event-B Specification and Proof Discharge	20% (Parts 1 and 2 = 10% each)	Week 7, Friday

Academic Overview

Assignment 2 - Model Checking	20%	Week 11, Friday
Tutorial Exercises	10%	Weekly
Examination 1	50%	To be advised

Teaching Approach

Lecture and tutorials or problem classes

This teaching and learning approach provides facilitated learning, practical exploration and peer learning.

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 without comments

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

The main concerns expressed with the unit last year relate to the organisation of lectures. Accordingly, it is planned to have the lecture slides reorganised to make them flow more coherently.

If you wish to view how previous students rated this unit, please go to

<https://emuapps.monash.edu.au/unitevaluations/index.jsp>

Required Resources

Please check with your lecturer before purchasing any Required Resources. Limited copies of prescribed texts are available for you to borrow in the library, and prescribed software is available in student labs.

The following software will be required in this unit. They can be downloaded for free from various sources and are available for all major operating systems.

Academic Overview

- LaTeX, available in different packages for different operating systems. Links will be provided by the lecturer during the semester.
- Rodin, available from <http://www.event-b.org/>

Unit Schedule

Week	Activities	Assessment
0		No formal assessment or activities are undertaken in week 0
1	Administrivia & introduction to basic mathematical background knowledge	Weekly assessed tutorials commence (10% of unit marks)
2	Introduction to B & Event-B	
3	Abstract machines in B	
4	Abstract machines through an example	
5	Event-B Semantics	
6	Proof obligations and discharge using Rodin	
7	Structuring specifications	Assignment 1 due Week 7, Friday
8	Introduction to automata	
9	Introduction to model checking (1)	
10	Introduction to model checking (2)	
11	LTL model checking (1)	Assignment 2 due Week 11, Friday
12	LTL model checking (2)	
	SWOT VAC	No formal assessment is undertaken in SWOT VAC
	Examination period	LINK to Assessment Policy: http://policy.monash.edu.au/policy-bank/academic/education/assessment/assessment-in-coursework-policy.html

*Unit Schedule details will be maintained and communicated to you via your MUSO (Blackboard or Moodle) learning system.

Assessment Requirements

Assessment Policy

Faculty Policy - Unit Assessment Hurdles

(<http://www.infotech.monash.edu.au/resources/staff/edgov/policies/assessment-examinations/unit-assessment-hu>)

Academic Integrity - Please see the Demystifying Citing and Referencing tutorial at <http://lib.monash.edu/tutorials/citing/>

Assessment Tasks

Participation

• Assessment task 1

Title:

Assignment 1 - Event-B Specification and Proof Discharge

Description:

A proof-discharged Event-B specification of a problem (exact problem to be advised).

This assignment is administered in two parts. Part 1 is about defining the various parameters of the specification (in fact, a requirements analysis), and Part 2 is about coding the Event-B specification in Rodin and LaTeX. The two parts will be offered separately, so that feedback may be returned on Part 1, before students complete Part 2.

Assignment release date Week 2.

Weighting:

20% (Parts 1 and 2 = 10% each)

Criteria for assessment:

Correctness and completeness of specification.

Discharge of all proof obligations (mechanically or manually).

Declarative style of specification.

Due date:

Week 7, Friday

• Assessment task 2

Title:

Assignment 2 - Model Checking

Description:

A specification will be given, which is to be developed in a model in linear temporal logic.

A number of properties will also need to be expressed in LTL and verified by a model checker.

Assignment release date Week 7.

Weighting:

20%

Criteria for assessment:

Assessment Requirements

Correctness and completeness of specification and properties.

Declarative style of specification.

Due date:

Week 11, Friday

• **Assessment task 3**

Title:

Tutorial Exercises

Description:

Students will be given exercise questions during each tutorial and asked to provide solutions for them.

Weighting:

10%

Criteria for assessment:

Student attendance and completion of exercises.

Quality or correctness of solutions to questions, demonstrating understanding of the learning materials.

Due date:

Weekly

Examinations

• **Examination 1**

Weighting:

50%

Length:

2 hours

Type (open/closed book):

Closed book

Electronic devices allowed in the exam:

None

Remarks:

Sample papers will be available on the unit website.

Assignment submission

It is a University requirement

(<http://www.policy.monash.edu/policy-bank/academic/education/conduct/plagiarism-procedures.html>) for students to submit an assignment coversheet for each assessment item. Faculty Assignment coversheets can be found at <http://www.infotech.monash.edu.au/resources/student/forms/>. Please check with your Lecturer on the submission method for your assignment coversheet (e.g. attach a file to the online assignment submission, hand-in a hard copy, or use an online quiz).

Online submission

If Electronic Submission has been approved for your unit, please submit your work via the VLE site for this unit, which you can access via links in the my.monash portal.

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.

Other Information

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-p>)
- 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>)
- Codes of Practice for Teaching and Learning
(<http://www.policy.monash.edu.au/policy-bank/academic/education/conduct/suppdocs/code-of-practice-tea>)

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. For Sunway see <http://www.monash.edu.my/Student-services>, and for South Africa see <http://www.monash.ac.za/current/>

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. At Sunway, visit the Library and Learning Commons at <http://www.lib.monash.edu.my/>. At South Africa visit <http://www.lib.monash.ac.za/>.

Academic support services may be available for students who have a disability or medical condition. Registration with the Disability Liaison Unit is required. Further information is available as follows:

- Website: <http://monash.edu/equity-diversity/disability/index.html>;
- Email: dlu@monash.edu
- Drop In: Equity and Diversity Centre, Level 1 Gallery Building (Building 55), Monash University, Clayton Campus, or Student Community Services Department, Level 2, Building 2, Monash University, Sunway Campus
- Telephone: 03 9905 5704, or contact the Student Advisor, Student Community Services at 03 55146018 at Sunway