

**FIT2071**  
**Algorithms and data structures with C++**

**Unit Guide**

**Semester 1, 2011**

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: 27 Feb 2011*

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# **FIT2071 Algorithms and data structures with C++ - Semester 1, 2011**

Following on from [FIT1002](#), this unit introduces the C++ language to students. The unit extends the [FIT1002](#) concepts into more advanced object-oriented programming topics such as inheritance and polymorphism. C++ streams, pointers and arrays, classes, templates and the STL, along with the I/O class hierarchy will be discussed at length. Interactive programming techniques will be used to solve various programming exercises. The unit will give students a deeper understanding of programming and data structures by introducing recursion and dynamic data structures.

## **Mode of Delivery**

Caulfield (Day)

## **Contact Hours**

2 hrs lectures/wk, 2 hrs tutorials/wk

## **Workload**

Concepts will be introduced and demonstrated in the lecture and will be discussed and put into practice during the laboratory time.

- Lecture: 2 hours per week
- Tutorial/laboratory: 2 hours per week

Additionally, each student should spend a minimum of 8 to 12 hours for personal study every week. This includes finishing laboratory exercises, undertaking further coding examples and completing assignment work.

## **Unit Relationships**

### **Prohibitions**

[FIT2004](#), [FIT2009](#)

### **Prerequisites**

[FIT1002](#)

## **Chief Examiner**

**Matt Butler**

## Campus Lecturer

### Caulfield

Matthew Butler

### Tutors

### Caulfield

Matthew Butler

Elliott Wilson

## Learning Objectives

At the completion of this unit students will:

- demonstrate an understanding of the history and concepts of the C++ language and how C++ relates to other commercial languages, especially Java;
- be able to write programs making use of the features and capabilities of C++, comprising: Streams, Pointers, arrays and vectors, Classes, inheritance and polymorphism, Templates and the Standard Template Library, The I/O class hierarchy;
- be able to write programs involving abstract and dynamic data structures, and implement algorithms for searching, insertion and deletion;
- be able to implement algorithms that utilise recursion;
- be able to use files for persistent storage of data.

## 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 (3 hours): 60%; In-semester assessment: 40%

Assessment Task	Value	Due Date
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Lab Portfolio Submission 1	10%	Wednesday, 6 April 2011
Lab Portfolio Submission 2	10%	Wednesday, 11 May 2011
Major Programming Assignment	20%	Wednesday, 25 May 2011
Examination 1	60%	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 with comments
- Interviews
- 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>

### Recommended Resources

This unit will require the use of a personal computer and a suitable IDE for C++ development. While Visual Studio for Windows will be used in the laboratory environment, any IDE is suitable for outside development. Copies of the Windows operating system and Visual Studio 2010 may be obtained free of charge from <http://msdnaa.monash.edu.au/fit>

## 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 to the unit and our first C++ program	
2	07/03/11	C++ Building Blocks 1: main, input/output, variables, objects	
3	14/03/11	C++ Building Blocks 2: decisions, loops, functions	
4	21/03/11	C++ Building Blocks 3: arrays, strings, and debugging	
5	28/03/11	Standard Template Library and References	
6	04/04/11	Classes and Objects 1: declaring, accessing, constructors, destructors	Lab Portfolio Submission 1 due: Wednesday, 6 April 2011
7	11/04/11	Pointers and Memory Management	
8	18/04/11	Classes and Objects 2: heap data members, friends, overloading, structs	
Mid semester break			
9	02/05/11	Classes and Objects 3: inheritance, polymorphism	
10	09/05/11	Abstract and Dynamic Data Structures	Lab Portfolio Submission 2 due: Wednesday, 11 May 2011
11	16/05/11	Algorithms	
12	23/05/11	File I/O and Exception Handling	Major Assignment due: Wednesday, 25 May 2011
	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:**

Lab Portfolio Submission 1

**Description:**

This task comprises the first submission of your laboratory portfolio.

Students will be required to compile a portfolio of major laboratory tasks for submission for assessment. Details of each portfolio component are clearly indicated in the laboratory tasks for each week.

This submission contains the weekly folio tasks for weeks 1-5.

**Weighting:**

10%

**Criteria for assessment:**

Specific criteria for assessment will be provided on the unit website. Feedback will be provided on your progress to facilitate for improvements in the second set of portfolio pieces.

Late assignments will incur a 5% penalty per late day (including weekends), and may be submitted up to a maximum of 7 days late. After this time submissions will not be accepted without prior arrangement with the unit leader.

**Due date:**

Wednesday, 6 April 2011

- **Assessment task 2**

**Title:**

Lab Portfolio Submission 2

**Description:**

This task comprises the second submission of your laboratory portfolio.

Students will be required to compile a portfolio of major laboratory tasks for submission for assessment. Details of each portfolio component are clearly indicated in the laboratory tasks for each week.

This submission contains the weekly folio tasks for weeks 6-9.

**Weighting:**

10%

**Criteria for assessment:**

Specific criteria for assessment will be provided on the unit website.

Late assignments will incur a 5% penalty per late day (including weekends), and may be submitted up to a maximum of 7 days late. After this time submissions will not be accepted without prior arrangement with the unit leader.

**Due date:**

Wednesday, 11 May 2011

- **Assessment task 3**

**Title:**

Major Programming Assignment

**Description:**

Students will be required to complete a major programming assignment, encompassing all concepts covered in the unit. The full assignment brief will be placed on the unit website.

**Weighting:**

20%

**Criteria for assessment:**

Specific criteria for assessment will be provided on the unit website.

Late assignments will incur a 5% penalty per late day (including weekends), and may be submitted up to a maximum of 7 days late. After this time submissions will not be accepted without prior arrangement with the unit leader.

**Due date:**

Wednesday, 25 May 2011

## Examinations

- **Examination 1**

**Weighting:**

60%

**Length:**

3 hours

**Type (open/closed book):**

Closed book

**Electronic devices allowed in the exam:**

None

**Remarks:**

As this is the first offering of the unit a sample exam will be made available a month before the examination. Full exam revision will be covered in Week 12.

## 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

## Resubmission of assignments

Students may not resubmit assignments after the due date has passed.

## 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>)

## 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](http://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](mailto:dlu@monash.edu)
- Drop In: Equity and Diversity Centre, Level 1 Gallery Building (Building 55), Monash University, Clayton Campus.