FIT2071
Foundations of C++

Unit Guide

Semester 1, 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: 07 Feb 2012
FIT2071 Foundations of C++ - Semester 1, 2012

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

Prerequisites

FIT1002

Chief Examiner

Dr Matthew Butler

Campus Lecturer

Caulfield

Matthew Butler

Elliott Wilson
Tutors

Caulfield

Matthew Butler

Elliott Wilson
Academic Overview

Outcomes

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%

<table>
<thead>
<tr>
<th>Assessment Task</th>
<th>Value</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab Portfolio Submission 1</td>
<td>10%</td>
<td>Wednesday, 4 April 2012</td>
</tr>
<tr>
<td>Lab Portfolio Submission 2</td>
<td>10%</td>
<td>Wednesday, 2 May 2012</td>
</tr>
<tr>
<td>Major Programming Assignment</td>
<td>20%</td>
<td>Wednesday, 23 May 2012</td>
</tr>
<tr>
<td>Examination 1</td>
<td>60%</td>
<td>To be advised</td>
</tr>
</tbody>
</table>

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.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

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

<table>
<thead>
<tr>
<th>Week</th>
<th>Activities</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>No formal assessment or activities are undertaken in week 0</td>
</tr>
<tr>
<td>1</td>
<td>C++ Building Blocks 1: Main, Input/Output, Variables, and Simple Objects</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>C++ Building Blocks 2: Decisions, Loops, Functions, and Debugging</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>C++ Building Blocks 3: Arrays, Vectors and the STL</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Classes and Objects 1: Declaring, Accessing, Constructors, and Destructors</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>References and an Introduction to Pointers</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Pointers continued and Memory Management</td>
<td>Lab Portfolio Submission 1 due: Wednesday, 4 April 2012</td>
</tr>
<tr>
<td>7</td>
<td>Classes and Objects 2: Inheritance and Polymorphism</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Classes and Objects 3: Heap data members, Friends, Overloading, and Structs</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Recursion and Miscellaneous C++ Concepts</td>
<td>Lab Portfolio Submission 2 due: Wednesday, 2 May 2012</td>
</tr>
<tr>
<td>10</td>
<td>Data Structures and the STL Revisited</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Algorithms</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Case Study and Revision</td>
<td>Major Assignment due: Wednesday, 23 May 2012</td>
</tr>
<tr>
<td></td>
<td>SWOT VAC</td>
<td>No formal assessment is undertaken SWOT VAC</td>
</tr>
</tbody>
</table>

*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-hurdles.html)

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 3-5.

  Weighting:
  10%

  Criteria for assessment:
  Explicit assessment criteria will be provided in the assignment brief, however students will be assessed on the following broad criteria:

  ♦ Meeting functional requirements as described in the assignment description
  ♦ Demonstrating a solid understanding of C++ concepts, including good practice
  ♦ Demonstrating an understanding of specific C++ concepts relating to the assignment tasks, including control structures, object design and implementation, and the standard template library
  ♦ Following the unit Programming Style Guide
  ♦ Creating solutions that are as efficient and extensible as possible

  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, 4 April 2012

• 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 6-8.

**Weighting:**

10%

**Criteria for assessment:**

Explicit assessment criteria will be provided in the assignment brief, however students will be assessed on the following broad criteria:

- Meeting functional requirements as described in the assignment description
- Demonstrating a solid understanding of C++ concepts, including good practice
- Demonstrating an understanding of specific C++ concepts relating to the assignment tasks, including advanced object design and implementation, and pointers and memory management
- Following the unit Programming Style Guide
- Creating solutions that are as efficient and extensible as possible

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, 2 May 2012

• **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:**

Explicit assessment criteria will be provided in the assignment brief, however students will be assessed on the following broad criteria:

- Meeting functional requirements as described in the assignment description
- Demonstrating a solid understanding of C++ concepts, including good practice
- Demonstrating the ability to apply the C++ concepts covered in the unit to a large scale practical example
- Following the unit Programming Style Guide
- Creating solutions that are as efficient and extensible as possible

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, 23 May 2012
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

It is a University requirement 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:

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.
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)
- Special Consideration (http://www.policy.monash.edu/policy-bank/academic/education/assessment/special-consideration-policy.html)
- 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

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 Commmuity Services at 03 55146018 at Sunway