FIT2070
Operating systems

Unit Guide

Semester 1, 2014

Last updated: 21 Feb 2014

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FIT2070 Operating systems - Semester 1, 2014

This unit covers software organisation of multi-user and multi-tasking computers. The principles of operating systems are covered with reference to the underlying hardware requirements and are illustrated by case studies. Topics include operating system structure and services, multi-programming processes, CPU scheduling, memory management, device management, synchronisation, deadlocks, virtual memory and file systems.

Mode of Delivery

Malaysia (Day)

Workload Requirements

Minimum total expected workload equals 12 hours per week comprising:

(a.) Contact hours for on-campus students:

- 2 hours of lectures
- One 3-hour laboratory or one 1-hour tutorial (alternating weekly)

(b.) Additional requirements (all students):

- A minimum of 7-9 hours independent study per week for completing lab and project work, private study and revision.

Unit Relationships

Prohibitions

CSE2302, FIT2022

Prerequisites

(FIT1031 or FIT1001) and (FIT1008 or FIT1015)

Chief Examiner

Professor Bala Srinivasan

Campus Lecturer

Malaysia

Simon Egerton

Consultation hours: Monday 12 - 5pm

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 the Student Evaluation of Teaching and Units (SETU) survey. 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, see:

www.monash.edu.au/about/monash-directions/ and on student evaluations, see: www.policy.monash.edu/policy-bank/academic/education/quality/student-evaluation-policy.html

Previous Student Evaluations of this Unit

Previous student feedback has asked for more practical assignments and less lecture slides. Both suggestions will be incorporated in this offering.

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

Academic Overview

Learning Outcomes

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

- operating systems as resource managers for CPU context switching, process scheduling and job scheduling;
- memory management and virtual memory systems; I/O device drivers and management;
- file subsystems;
- resource allocation strategies;
- asynchronous and synchronous communication mechanisms and their use in operating systems;
- the philosophy and implementation of inter-process communication and its use in distributed computer systems.

Developed the skills to:

- program OS components, such as job and process schedulers, page replacement algorithms, and file management subsystems, as well as programming interrupt handlers and contact switching.

Unit Schedule

Week	Activities	Assessment
0	Enroll for the lab and tutorial classes	No formal assessment or activities are undertaken in week 0
1	Computer Systems Overview	
2	Operating Systems Overview	
3	Process Description and Control	
4	Threads	
5	Concurrency: Mutual Exclusion and Synchronization	
6	Concurrency: Deadlock and Starvation	Part A of Assignment due
7	Memory Management	
8	Virtual Memory	Part B of Assignment due
9	Uniprocessor Scheduling	
10	I/O Management, Disk Scheduling	Part C of Assignment due
11	File Management	
12	Security, Networking and Summary	Part D of Assignment due
	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 learning system.

Teaching Approach

Lecture and tutorials or problem classes

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

- The lectures define the formal content of the unit, and will be used as the initial point of reference for unit knowledge outcomes. This knowledge will be built upon by the tutorials and laboratories in order to address the higher level objectives relating to skills and application.
- The tutorials are designed to reinforce lecture materials, and to prepare the student to apply these understandings towards building the skills required to complete the laboratory sessions. Tutorials will provide the opportunity to explore further the concepts discussed in the class as well as look at some specific cases or examples.
- The laboratories are designed to give the student hands-on experience of operating system functions and parameters. Each lab is offered as a partially developed set of programming exercises. The students need to understand the workings of the program and develop extensions to meet the requirements. The lab work is a required part of the assessment component although they are not marked. Students can interact with others in the lab as a means of peer learning.

Assessment Summary

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

Assessment Task	Value	Due Date
Assignment (Programming)	40%	Weeks 6, 8, 10 and 12 for each part respectively
Examination 1	60%	To be advised

Assessment Requirements

Assessment Policy

Faculty Policy - Unit Assessment Hurdles
(http://intranet.monash.edu.au/infotech/resources/staff/edgov/policies/assessment-examinations/assessment-hurd

Academic Integrity - Please see resources and tutorials at
http://www.monash.edu/library/skills/resources/tutorials/academic-integrity/

Assessment Tasks

Participation

- **Assessment task 1**

  Title:
  > Assignment (Programming)

  Description:
  > The assignment has 4 parts. All the parts require development of programs (either in Java, C, Pythin or Unix Shell) to implement user interfaces, concurrent execution of pthreads, and memory management simulator.
  >
  > The objectives of this assignment are to:
  >
  > - Understand how different components of operating systems work
  > - Develop concurrent programs
  > - Learn a programming language to use (Java, C, Python, Shell, etc.)
  > - Demonstrate that you have understood the principles and components of OS

  Weighting:
  > 40%

  Criteria for assessment:
  > Completion of a working program, together with a reflection on the efficiency of the code.

  Due date:
  > Weeks 6, 8, 10 and 12 for each part respectively

Examinations

- **Examination 1**

  Weighting:
  > 60%

  Length:
  > 3 hours

  Type (open/closed book):
  > Closed book

  Electronic devices allowed in the exam:
  > None

Learning resources

Monash Library Unit Reading List (if applicable to the unit)
http://readinglists.lib.monash.edu/index.html

Faculty of Information Technology Style Guide

Feedback to you

Examination/other end-of-semester assessment feedback may take the form of feedback classes, provision of sample answers or other group feedback after official results have been published. Please check with your lecturer on the feedback provided and take advantage of this prior to requesting individual consultations with staff. If your unit has an examination, you may request to view your examination script booklet, see
http://intranet.monash.edu.au/infotech/resources/students/procedures/request-to-view-exam-scripts.html

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

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.monash.edu.au/exams/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.

Assignment submission

It is a University requirement
(http://www.policy.monash.edu/policy-bank/academic/education/conduct/student-academic-integrity-managing-pla
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). Please note that it is your responsibility to retain copies of your assessments.

Online submission

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

Prescribed text(s)

Limited copies of prescribed texts are available for you to borrow in the library.

William Stallings. (2011). *Operating Systems: Internals and Design Principles.* (7th Edition) Prentice Hall.

Recommended Resources

SSH client to access the server from outside the Monash network.

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:
www.policy.monash.edu.au/policy-bank/academic/education/index.html

Key educational policies include:

- Student Academic Integrity Policy and Student Academic Integrity: Managing Plagiarism and Collusion Procedures ;
  http://www.policy.monash.edu/policy-bank/academic/education/conduct/student-academic-integrity-policy.h
- Assessment in Coursework Programs;
  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.ht
- 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/dates/
- Orientation and Transition; http://intranet.monash.edu.au/infotech/resources/students/orientation/
- Academic and Administrative Complaints and Grievances Policy;
  http://www.policy.monash.edu/policy-bank/academic/education/management/complaints-grievance-policy.h

Faculty resources and policies

Important student resources including Faculty policies are located at
http://intranet.monash.edu.au/infotech/resources/students/

Graduate Attributes Policy

http://www.policy.monash.edu/policy-bank/academic/education/management/monash-graduate-attributes-policy.h

Student Charter

www.opq.monash.edu.au/ep/student-charter/monash-university-student-charter.html

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 http://www.monash.edu.au/students. For Malaysia see http://www.monash.edu.my/Student-services, and for South Africa see http://www.monash.ac.za/current/.

Monash University Library

The Monash University Library provides a range of services, resources and programs that enable you to save time and be more effective in your learning and research. Go to www.lib.monash.edu.au or the library tab in my.monash portal for more information. At Malaysia, visit the Library and Learning Commons at http://www.lib.monash.edu.my/. At South Africa visit http://www.lib.monash.ac.za/.

Disability Liaison Unit

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://www.monash.edu/equity-diversity/disability/index.html
- Telephone: 03 9905 5704 to book an appointment with a DLO; or contact the Student Advisor, Student Commuity Services at 03 55146018 at Malaysia
- Email: dlu@monash.edu
- Drop In: Equity and Diversity Centre, Level 1, Building 55, Clayton Campus, or Student Community Services Department, Level 2, Building 2, Monash University, Malaysia Campus