COMP6105

Distributed Systems

Session 1, In person-scheduled-weekday, North Ryde 2022

School of Computing

Contents

General Information

Unit convenor and teaching staff
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Credit points
10

Prerequisites
Admission to MInfoTechCyberSec

Corequisites

Co-badged status
COMP3100

Unit description
A distributed system traditionally refers to a group of networked computers; however, it should be today understood in a much wider sense including applications consisting of multiple processes. This unit studies the fundamentals of distributed systems from both hardware perspective and software perspective. The unit also gives some hands-on experience. Topics include distributed systems principles (concurrency and scheduling), paradigms (cloud computing, mobile computing and Internet of Things), architectures (client-server model, peer-to-peer model and distributed file systems) and techniques (shared memory and message-passing).

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes

On successful completion of this unit, you will be able to:

ULO1: Describe the complexities of distributed system development and approaches to solve those complexities.

ULO2: Apply theoretical principles and models to design distributed systems.

ULO3: Explain important issues in modern distributed systems.

ULO4: Identify applicability of technologies that support distributed applications.

ULO5: Analyze and design distributed systems.

General Assessment Information

The University's academic honesty policy will be enforced. You may assist your fellow students with general concepts, pointers to resources and useful tools or commands that are publicly available. You may **not** become involved in any way in helping a fellow student to find the solution to their particular task, nor may you share with them any aspect of the solution of your particular task. If you decide to develop or modify a tool (including software tools, procedures or methods) to assist you in solving your programming task, you may not provide that tool to your fellow students, nor may you publish it.

Each assessment task must be the sole work of the student turning it in. Any cheating will be handled under the University's Academic Honesty Policy.

Late submissions

Late submissions **will be accepted but will incur a penalty** unless there is an approved Special Consideration request. A 12-hour grace period will be given after which the following deductions will be applied to the awarded assessment mark: 12 to 24 hours late = 10% deduction; for each day thereafter, an additional 10% per day or part thereof will be applied until five days beyond the due date. After this time, a mark of zero (0) will be given. For example, an assessment worth 20% is due 5 pm on 1 January. Student A submits the assessment at 1 pm, 3 January. The assessment received a mark of 15/20. A 20% deduction is then applied to the mark of 15, resulting in the loss of three (3) marks. Student A is then awarded a final mark of 12/20.

Note that late submissions will not be accepted for online quizzes, in-class activities and exam.

Special Consideration

If you experience serious and unavoidable difficulties that affect your ability to meet the due dates for the closing date of an assessment task, you may apply for special consideration as explained at https://students.mq.edu.au/study/my-study-program/special-consideration. If the request is accepted, the action may be to grant an extension of the relevant due date(s), or it may be to require you to submit an alternative assessment item.

Assessment Tasks

Name	Weighting	Hurdle	Due
Quizzes	10%	No	Weekly
Practical tasks	20%	Yes	Weekly
Major Assignment	40%	No	Weeks 7 and 13 (TBC)

Name	Weighting	Hurdle	Due
Final Exam	30%	No	Exam period

Quizzes

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 10 hours
Due: **Weekly**
Weighting: **10%**

Quizzes assess students' knowledge and understanding on distributed systems fundamentals including architectures, paradigms, principles and models of distributed systems.

On successful completion you will be able to:

- Describe the complexities of distributed system development and approaches to solve those complexities.
- Explain important issues in modern distributed systems.
- Identify applicability of technologies that support distributed applications.

Practical tasks

Assessment Type [1]: Participatory task
Indicative Time on Task [2]: 20 hours
Due: **Weekly**
Weighting: **20%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

Practical tasks help guide students to learn practical skills on distributed systems. In particular, they consist of preparatory steps and milestones for the assignments.

The practical tasks are a **hurdle** in this unit. You must achieve at least 8 marks out of 20 in order to pass the unit.

On successful completion you will be able to:

- Describe the complexities of distributed system development and approaches to solve those complexities.
- Apply theoretical principles and models to design distributed systems.

- Identify applicability of technologies that support distributed applications.
- Analyze and design distributed systems.

Major Assignment

Assessment Type [1]: Programming Task
Indicative Time on Task [2]: 40 hours
Due: **Weeks 7 and 13 (TBC)**
Weighting: **40%**

There are two major assignments in which students are required to design and implement parallel and distributed software systems. Specific steps are designed as either milestones/ stages or practical tasks.

On successful completion you will be able to:

- Apply theoretical principles and models to design distributed systems.
- Identify applicability of technologies that support distributed applications.
- Analyze and design distributed systems.

Final Exam

Assessment Type [1]: Examination
Indicative Time on Task [2]: 30 hours
Due: **Exam period**
Weighting: **30%**

The final examination will assess your understanding of the unit content and your ability to integrate concepts learned throughout the unit to solve problems.

On successful completion you will be able to:

- Describe the complexities of distributed system development and approaches to solve those complexities.
- Apply theoretical principles and models to design distributed systems.
- Explain important issues in modern distributed systems.
- Identify applicability of technologies that support distributed applications.

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[1] If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the Writing Centre for academic skills support.

[2] Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

Textbooks

1. “Distributed Systems: Principles and Paradigms” by Maarten van Steen and Andrew Tanenbaum, 3rd (3.01) edition. 2. “Distributed Systems: Concepts and Design” by George Coulouris, Jean Dollimore, and Tim Kindberg, Addison Wesley, 5th edition. 3. “Distributed and Cloud Computing: From Parallel Processing to the Internet of Things” by Geoffrey C. Fox, Jack Dongarra, and Kai Hwang, 1st edition.

The soft copy of the first two books is “freely” available online.

iLearn Unit Home Page

COMP6105 will make extensive use of the iLearn course management system, including for the delivery of class materials, discussion boards, submission of work and access to marks and feedback. Students should check the iLearn site (https://ilearn.mq.edu.au) regularly for unit updates.

Questions and general queries regarding the content of this unit, its lectures or practical classes, or its assessments should be posted to the discussion boards on the COMP6105 iLearn site. In particular, any questions which are of interest to all students in this unit should be posted to one of these discussion boards, so that everyone can benefit from the answers. Questions of a private nature should be directed to the unit teaching staff.

Lectures

Lectures are a core learning experience where we will discuss the theoretical underpinnings and concepts that are essential to this unit. Attendance at lectures is highly recommended. Lecture recordings will be available in echo360 accessible from the unit iLearn site.

Workshops (Practicals)

Practical classes commence in Week 1. Each week has two hours of practical class. Each week you should actively participate in practical class and complete tasks associated with the class. You should attend your enrolled practical class. The practical assessment item is a hurdle in this unit. You must achieve at least 8 marks out of 20, and a total of at least 50 overall marks, in order to pass the unit.

Unit Schedule

The detailed unit schedule will be available on iLearn. The unit is organised into two 6-week periods, with topics broadly as follows.

Weeks 1-6: Foundations of distributed systems, such as system models, communications, synchronisation and fault tolerance.

Weeks 7-12: Real-world and emerging distributed systems, such as cloud data centres, Internet of Things (IoT) and edge computing.

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- Academic Appeals Policy
- Academic Integrity Policy
- Academic Progression Policy
- Assessment Policy
- Fitness to Practice Procedure
- Assessment Procedure
- Complaints Resolution Procedure for Students and Members of the Public
- Special Consideration Policy

Students seeking more policy resources can visit Student Policies (https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit Policy Central (https://policies.mq.edu.au) and use the search tool.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/admin/other-resources/student-conduct

Results

Results published on platform other than eStudent, (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit ask.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe academic integrity – honesty, respect, trust, responsibility, fairness and

courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free online writing and maths support, academic skills development and wellbeing consultations.

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

The Writing Centre

The Writing Centre provides resources to develop your English language proficiency, academic writing, and communication skills.

- Workshops
- Chat with a WriteWISE peer writing leader
- Access StudyWISE
- Upload an assignment to Studiosity
- Complete the Academic Integrity Module

The Library provides online and face to face support to help you find and use relevant information resources.

- Subject and Research Guides
- Ask a Librarian

Student Services and Support

Macquarie University offers a range of Student Support Services including:

- IT Support
- Accessibility and disability support with study
- Mental health support
- Safety support to respond to bullying, harassment, sexual harassment and sexual assault
- Social support including information about finances, tenancy and legal issues

Student Enquiries

Got a question? Ask us via AskMQ, or contact Service Connect.

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy.

The policy applies to all who connect to the MQ network including students.

Changes from Previous Offering

Both assignments are set as individual work. Code plagiarism check tools are used.