



COMP8110

Distributed Systems

Session 2, In person-scheduled-weekday, North Ryde 2022

School of Computing

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General Information

Unit convenor and teaching staff

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Credit points

10

Prerequisites

ITEC647 or COMP6250

Corequisites

Co-badged status

Unit description

This unit covers both fundamental issues and recent trends in distributed computing. We examine the complexities of distributed communications systems such as partial failures, shared memory, scheduling problems and multiple clocks. Networking protocols and other industry standards are discussed. Lectures will mostly be expository and conceptual and aim to provide a solid understanding of distributed systems and related enduring issues.

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:** Distinguish the goals and architectures of 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

Weekly quizzes

Short online quizzes will be provided in iLearn relevant to the content of each of weeks 1-12. The quizzes are intended to help you assess your progress in learning and highlight areas that you need to study further. Each quiz will be available for one week. You may attempt a quiz multiple times. The quizzes contribute up to 10% of your final mark, based on a maximum value of 1% for each quiz. You can achieve full marks for the quizzes by earning a total of at least 10 marks in the quizzes. The sum of quiz marks will be capped at 10, i.e., the maximum marks will be 10 even if the actual total is over 10.

Hurdle assessment (Practical tasks)

Practical tasks are a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

Late Assessment Submission Penalty

From 1 July 2022, Students enrolled in Session based units with written assessments will have the following late penalty applied. Please see <https://students.mq.edu.au/study/assessment-exams/assessments> for more information.

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark) will be applied each day a written assessment is not submitted, up until the 7th day (including weekends). After the 7th day, a grade of '0' will be awarded even if the assessment is submitted. Submission time for all written assessments is set at **11:55 pm**. A 1-hour grace period is provided to students who experience a technical concern.

For any late submission of time-sensitive tasks, such as scheduled tests/exams, performance assessments/presentations, and/or scheduled practical assessments/labs, students need to submit an application for [Special Consideration](#).

Assessments where Late Submissions will be accepted

In this unit, late submissions will be accepted as follows:

- Practical tasks – NO, unless Special Consideration is granted
- Weekly quizzes – NO, unless Special Consideration is granted
- Technology Report – YES, Standard Late Penalty applies
- Individual distributed systems development project – YES, Standard Late Penalty applies

Special Consideration

If you experience serious and unavoidable difficulties that affect your ability to meet the due dates for progress or 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>

eration. 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.

If you apply for special consideration, please note:

- Apply promptly. Late applications may make it impossible to sensibly offer an extension, and you may risk having to complete a different assessment task which would mean starting from scratch. For example, if you are ill for two days just before the due date, an extension of two days would be reasonable, but that extension cannot be granted more than two days after the due date since the extension end date would have already passed!
- Email the convenor and unit lecturer to let us know what is happening. This will make it easier for us to respond in a timely manner.
 - During weeks 1-6, email james.zheng@mq.edu.au and also the convenor young.lee@mq.edu.au
 - During weeks 7-13, email young.lee@mq.edu.au

Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Practical tasks</u>	10%	Yes	Weekly
<u>Weekly quizzes</u>	10%	No	Weekly
<u>Technology Report</u>	20%	No	Week 7
<u>Individual distributed systems development project</u>	20%	No	Week 13
<u>Examination</u>	40%	No	Examination period

Practical tasks

Assessment Type ¹: Participatory task

Indicative Time on Task ²: 12 hours

Due: **Weekly**

Weighting: **10%**

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 assignments.

On successful completion you will be able to:

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

Weekly quizzes

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 12 hours

Due: **Weekly**

Weighting: **10%**

Quizzes assess students' knowledge and understanding of 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
- Distinguish the goals and architectures of distributed systems
- Explain important issues in modern distributed systems
- Identify applicability of technologies that support distributed applications
- Analyze and design distributed systems

Technology Report

Assessment Type ¹: Report

Indicative Time on Task ²: 44 hours

Due: **Week 7**

Weighting: **20%**

A report on a chosen state-of-the-art or state-of-the-practice distributed system technology

On successful completion you will be able to:

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

Individual distributed systems development project

Assessment Type ¹: Project

Indicative Time on Task ²: 44 hours

Due: **Week 13**

Weighting: **20%**

This assessment asks you to implement a prototype distributed system application using some of the technologies covered in the unit. The requirements will be made available but implementation details are up to the students to develop.

On successful completion you will be able to:

- Describe the complexities of distributed system development and approaches to solve those complexities
- Distinguish the goals and architectures of distributed systems
- Identify applicability of technologies that support distributed applications
- Analyze and design distributed systems

Examination

Assessment Type ¹: Examination

Indicative Time on Task ²: 2 hours

Due: **Examination period**

Weighting: **40%**

Final examination in the exam period.

On successful completion you will be able to:

- Describe the complexities of distributed system development and approaches to solve those complexities
 - Distinguish the goals and architectures of 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

Classes

Each week you should attend a two-hour lecture and a one-hour workshop. Lectures are a core learning experience where we will discuss the theoretical underpinnings and concepts that are essential to this unit. Key ideas for assessment tasks (technical report and individual distributed systems development project in particular) will be discussed from time to time in lectures. Lecture recordings will be provided on echo360.

Workshops provide an opportunity for you to ensure your understanding of the key concepts of the unit and develop skills to apply these concepts to practical distributed systems. Workshops combine tutorial-style discussion with practical programming experience, particularly in the later weeks of session. Each week you should start to prepare your solutions to questions for an online quiz.

iLearn Web Site

All learning materials will be published on iLearn including lecture slides and assessment details.

You are required to check the iLearn website at least once a week to ensure that you are aware of the latest materials available there.

Unit Forum

A forum for unit discussions is provided on iLearn. Students are free to post questions, comments or hints in relation to any aspect of the unit, except that you should avoid posting any questions, hints, comments or solutions that could be interpreted as cheating.

Textbook*

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.

** A soft copy of each of these three books is freely available online through publisher's websites.*

Unit Schedule

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

Week 1-6: Key distributed concepts, such as System models, Architectures, Communications, Synchronisation and Fault tolerance.

Weeks 7-12: Applied distributed computing models and emerging distributed systems, such as virtualisation, cloud computing and the Internet of Things (IoT).

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://policies.mq.edu.au\)](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 \(https://students.mq.edu.au/support/study/policies\)](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 \(https://policies.mq.edu.au\)](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.