COMP8110

Distributed Systems

Session 2, In person-scheduled-weekday, North Ryde 2024

School of Computing

Contents

General Information

Unit convenor and teaching staff
Young Lee
young.lee@mq.edu.au

James Zheng
james.zheng@mq.edu.au

TA
Jayden King
jayden.king@mq.edu.au

TA
Ferdous Sharifi
ferdous.sharifi@mq.edu.au

TA
Yuzhe Tian
yuzhe.tian@mq.edu.au

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

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.

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.

Requirements to Pass this Unit

To pass this unit you must:

- Attempt all assessments, and
- Achieve a total mark equal to or greater than 50%, and
- Participate in weekly practicals, and achieve a minimum of 4 of the 10 marks

Hurdle assessment (Practical tasks)

This unit has weekly practical classes and you must demonstrate your progress in developing and communicating knowledge and skills and achieve a minimum of 4 marks of the 10 marks

allocated, i.e., 40%. Failure to meet this requirement may result in a **fail** grade for the unit. In the case of missing your designated practical class or failing to show your progress, another opportunity might be given if a Special Consideration is approved (see below).

Late Assessment Submission Penalty

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark of the task) will be applied for each day a written report or presentation 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. The submission time for all uploaded assessments is 11:55 pm. A 1-hour grace period will be 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, please apply for Special Consideration. For example, if the assignment is worth 8 marks (of the entire unit) and your submission is late by 19 hours (or 23 hours 59 minutes 59 seconds), 0.4 marks (5% of 8 marks) will be deducted. If your submission is late by 24 hours (or 47 hours 59 minutes 59 seconds), 0.8 marks (10% of 8 marks) will be deducted, and so on.

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

- Technology Report – YES, with Standard Late Penalty applying
- Individual distributed systems development project – YES, with Standard Late Penalty applying
- Weekly quizzes – NO, unless Special Consideration is granted
- Practice-based tasks – NO, unless Special Consideration is granted
- Examination – NO, unless Special Consideration is granted

Special Consideration

The Special Consideration Policy aims to support students who have been impacted by short-term circumstances or events that are serious, unavoidable and significantly disruptive, and which may affect their performance in assessment. If you experience circumstances or events that affect your ability to complete the assessments in this unit on time, please inform the convenor and submit a Special Consideration request through ask.mq.edu.au.

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
Technology Report	20%	No	Sunday 23:55 1st Sep (Week 7)
Examination	40%	No	Exam period
Individual distributed systems development project	20%	No	Sunday 23:55 27th Oct (Week 13)
Practice-based tasks	10%	Yes	Weekly
Weekly quizzes	10%	No	Weekly

Technology Report

Assessment Type [1]: Report
Indicative Time on Task [2]: 37 hours
Due: **Sunday 23:55 1st Sep (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

Examination

Assessment Type [1]: Examination
Indicative Time on Task [2]: 2 hours
Due: **Exam period**
Weighting: **40%**

Final examination in the exam period.

On successful completion you will be able to:

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Individual distributed systems development project

Assessment Type [1]: Project
Indicative Time on Task [2]: 37 hours
Due: **Sunday 23:55 27th Oct (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.

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Practice-based tasks

Assessment Type [1]: Practice-based 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.

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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:

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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

Lectures and workshops start in Week 1. 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 small group teaching activity-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.

Methods of Communication

We will communicate with you via your university email and through announcements on iLearn. Queries to convenors can either be placed on the iLearn discussion board or sent to the unit convenor via the contact email on iLearn. In particular, for any adminstrative matters, you should contact the unit convenor (young.lee@mq.edu.au). For matters regarding lectures and workshops, you should the corresponding teaching staff member. You may expect emails from the teaching team of the unit.

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.

COVID Information

For the latest information on the University's response to COVID-19, please refer to the Coronavirus infection page on the Macquarie website: https://www.mq.edu.au/about/coronavirus-faqs. Remember to check this page regularly in case the information and requirements change during semester. If there are any changes to this unit in relation to COVID, these will be communicated via iLearn.

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 systems 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). 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 Advocacy provides independent advice on MQ policies, procedures, and processes

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.

Unit information based on version 2024.02 of the Handbook