COMP8110

Distributed Systems

Session 2, Special circumstance 2020

Department of Computing

Contents

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Notice

As part of Phase 3 of our return to campus plan, most units will now run tutorials, seminars and other small group learning activities on campus for the second half-year, while keeping an online version available for those students unable to return or those who choose to continue their studies online.

To check the availability of face-to-face and online activities for your unit, please go to timetable viewer. To check detailed information on unit assessments visit your unit's iLearn space or consult your unit convenor.

General Information

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

Xi Zheng
james.zheng@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

Weekly Problem Set

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.

Hurdle assessment (Weekly problem set)

The weekly problem set is a **hurdle** assessment task (see assessment policy for more information on hurdle assessment tasks)

Late Submission

No extensions will be granted without an approved application for Special Consideration. There will be a deduction of 10% of the total available marks made from the total awarded mark for each 24 hour period or part thereof that the submission is late. For example, 25 hours late in submission for an assignment worth 10 marks – 20% penalty or 2 marks deducted from the total. No submission will be accepted after solutions have been posted.

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 a programming 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. Extensions, if granted, are managed through the automated assessment system that you access via the lab command.

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	Week 7
Weekly problem set	10%	Yes	Weekly
Individual distributed systems development project	20%	No	Week 13
Examination	50%	No	TBD

Technology Report

Assessment Type [1]: Report
Indicative Time on Task [2]: 50 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:

- 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

Weekly problem set

Assessment Type [1]: Problem set
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)

Students will complete a weekly problem set submitted online.

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

Individual distributed systems development project

Assessment Type [1]: Project
Indicative Time on Task [2]: 49 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]: 3 hours
Due: **TBD**
Weighting: **50%**

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

[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 three-hour online class** tentatively consisting of 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 in a **weekly problem set**.

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.

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 real-world distributed systems, such as virtualisation, cloud computing and Internet of Things (IoT).

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central). 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
- Grade Appeal Policy
- Complaint Management Procedure for Students and Members of the Public

- Special Consideration Policy *(**Note:** The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.)*

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

If you would like to see all the policies relevant to Learning and Teaching visit Policy Central (https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/study/getting-started/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

Student Support

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

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to help you improve your marks and take control of your study.

- Getting help with your assignment
- Workshops
- StudyWise
- 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

Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

If you are a Global MBA student contact globalmba.support@mq.edu.au

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

Lectures are online as a result of COVID-19 impact.

A hurdle assessment requirement (Weekly Problem Set) has been introduced.