Department of Computer Science and Engineering
Faculty of Engineering, University of Moratuwa

CS5429 Distributed Computing

2018 Batch Semester 3 (Sep - Nov 2018)

Class LMS: https://online.mrt.ac.lk/course/view.php?id=10006

Schedule: Saturday between 8:00am - 10:30am at CSE Dept. (12 sessions)

Instructors: Dr. Dilum Bandara, Dilum.Bandara@uom.lk, 011 265 0152

Prerequisite(s): Good background in operating systems, networking, algorithms, data structures, and programming is essential.

Text:
- "Distributed Systems: Principles and Paradigms" by Andrew S. Tanenbaum and Maarten van Steen
- "Distributed and Cloud Computing: From Parallel Processing to the Internet of Things" by Kai Hwang, Geoffrey C. Fox, and Jack J. Dongarra
- Relevant research papers

Assessment: Distribution of marks is as follows:
- Project 40%
- Quizzes (2) 10% (5 × 2)
- Final Exam (2-hour, open book) 50%
- In a group of 2 or 4, students will do an approved project relevant to the material covered in the class. The details will be provided.

Course Objectives: To provide a broader understanding of distributed systems, their designs and characteristics, algorithmic techniques, and emerging techniques and trends.
At the end of the module, you will be able to explain the fundamental concepts in distributed systems, apply them to solve a constrained problem, understand its performance and limitations, and implement it. Required readings, labs, project, and discussions will enhance both the analytical and soft skills.

Syllabus: As distributed systems, this class is also going to be autonomous, asynchronous, scalable, fault tolerant, open, community driven, and will rely on resource collaboration. With this objective in mind, this class will discuss the following broader set of topics:

Date(s)	Topic
Sep 1	1. Distributed systems architectures and fundamental models
Sep 8 Sep 15	2. Topologies of distributed systems – Node-to-node communication with unstructured, structured, etc.
Sep 22	3. Communication in distributed systems – Sockets, RPC, RMI, and Web Services – Synchronous and asynchronous communication
Sep 29 Oct 6	4. Message and stream-oriented communication – Event queues, Pub/sub, MPI
Oct 13	5. Distributed systems applications – Name services, distributed object stores, SOA-based Systems
Oct 20	6. CAP theorem 7. Caching, replication, and CDN
Oct 27	8. Cloud computing 9. Big data on distributed systems
Oct 29	10. Time, synchronization, and global States – Physical and logical clocks
Nov 3	11. Coordination and agreement
Nov 10	12. Transactions and concurrency control

Class policies

- Topics to be discussed in each class will be posted on Moodle, along with relevant readings for each topic. You are expected to keep up with the readings as we go, as they will help provide the foundation for the homework, quizzes, and exam. Impromptu quizzes will be based on these assigned readings.
- All students are expected to actively participate in class and Moodle activities. Poor participation and/or poor performance in assigned course work can be grounds for failure in the course.
- University rule of 80% attendance will be strictly enforced.
- Discussing and exchanging ideas through study groups are encouraged, as this usually leads to a better depth of understanding. As part of the discussions, you may share ideas and thoughts, discuss the meaning of homework questions, or possible ways of approaching a solution. However, you must write homework solutions strictly. If one of your solutions is based on a key idea of someone else, you must acknowledge this in your homework, to avoid the perception of cheating. This form of collaboration is not an opportunity to copy answers from others.
- Group assignments are given to encourage teamwork and discussion/toleration of alternative ideas/views; hence, they need to be done as a group. A penalty will be enforced for doing group assignments individually.
- Plagiarism, copying another person's work, letting another person copy your work, giving or receiving aid during any test or examination is all strictly not allowed. Any student caught in any of these will receive a failing grade regardless of marks earned on other assessed work.
- Proper netiquette should be observed in using the Moodle.
- Each assigned work will have either a deadline for submission or a specific date for performance. For each day delayed beyond a deadline, 10% of marks will be deducted. Not performing (e.g., not doing a presentation) on an assigned date will result in 0 marks unless there is a valid reason and another student/group is arranged as a replacement. Details of submission will be given with each assignment. All assignments must be submitted via the Moodle.
- The dictionary meaning of deadline is "the latest time or date by which something should be completed". Thus, as you may already experience with clients, deadlines are supposed to be met.
- All quizzes and final exam are closed book and closed note exams. The final exam will be comprehensive, covering material from the entire course including in class and Moodle discussions.
- You may not use cell phones, mp3 players, etc., during the class. All laptops, smart phones, and tablets must be closed, unless you use it to take notes or search for additional contents relevant to the ongoing class discussion. The reason is to prevent distractions to other students, and to prevent the temptation to check email, Facebook, etc.