

COMP598 Lecture 1

Overview

Instructor: Xue Liu

Welcome to COMP598

- Readings of Innovative Ideas in System and Networking
- About COMP598
 - Dabble into different interesting topics
 - Good research
 - Creative is not enough!
 - Creative but also need to have practical values
- Course outline
- Info on class project and your participation
- A review of learning skills that will help you get ahead and prepare for better learning experience

Class Web Site – (1)

- Class web site:
 - <http://www.cs.mcgill.ca/~xueliu/COMP598.html/> and WebCT
- If you cannot log in, contact Weihuan --TA (primary)
 - Please be patient for the first two weeks ☺
- Instructor: Xue Liu
 - [Email: xueliu@cs.mcgill.edu](mailto:xueliu@cs.mcgill.edu)
 - Office: 324 McConnell Engineering
 - Office Hours: Tu/Th 10:30-11:30
- TA: Weihuan Shu
 - [Email: weihuan.shu@mail.mcgill.ca](mailto:weihuan.shu@mail.mcgill.ca)
 - Office hours: Mondays 4:40-6:00PM
- Extra Office Hour: Send e-mail to instructor/TA to use extra office hour.

Class Web Site – (2)

- **Academic Integrity:** *“McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism, and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see www.mcgill.ca/integrity for more information).”*
- **Course evaluation:**
 - Class participations/presentations: 40%
 - Project and final report: 60%
 - Optional project: 10%
 - **Total 110%**
 - **Yes, NO exams !**

Course Outline (1)

- How to study/research and launch a successful career (week 1)
- Real-time and embedded computing concepts and basics (week 2-4)
Materials: periodic task models, Rate Monotonic Scheduling, EDF scheduling, resource contention and priority inversion.
- Industry trend: Web 2.0, social network, and Facebook Platform (week 5)
- Project topic selection – Phase 0 (week 5)
- Autonomic computing (week 6-8)
Materials: feedback control basics, model identification basics, feedback control of computing systems, queueing system basics.
- Project progress presentation — Phase I (week 8)

Course Outline (2)

- TCP congestion control and resource allocation framework (week 9-10)
Materials: TCP/IP protocol, Congestion control protocols, modeling and analysis of congestion control.
- Google's PageRank and link analysis (week 11)
- Project progress presentations/initial demo – Phase II (week 11)
- Google infrastructures (week 12)
Materials: 3 major papers by Google, i.e. Google File System, MapReduce, BigTable
- Network coding and its applications, (week 13)
- Project report due/final demo (week 13)
- Optional topics: Firewall and Skype, Routing and Secure Routing, P2P networking and distributed hash table,
Materials: Internet routing basics, Onion Routing and applications etc.

Project

- Two intermediate (milestone) presentations are needed for your final project.
 - Week 8 (Phase I)
 - Week 11 (Phase II)
 - Discuss with me on project selection and progress
 - These presentations/demos are expected to receive proper feedbacks on your project.
 - These milestone presentations/demos could help you pace the project for timely completion.
 - Every final project must have a final report (and other associated materials, such as software programs) submitted for final grading.
 - Start early
- Graduate student: Research oriented preferred
 - Very flexible, can be practical implementation, modeling, analysis, ...
- Undergraduate student
 - Also flexible, for example, develop a Facebook application

Project Team

- For large project, organize yourself into teams (2 people)
- For small project, individual person
- Discuss your idea(s) and form team during the first 4 weeks.
- Vote: When the final demo/presentation for your project should be scheduled?

Class Participation / Presentations

- Actively participate discussions on the topics taught, and the papers presented
- Present in one or two classes, and lead the discussions
 - Sign up with me before the end of the 3rd week
 - FCFS!
 - Assign the reading list on the topic one week before your presentation
 - Prepare discussion questions for the topic you presented
 - Ask another student as the scribe if needed (may be your project team partner).
 - Send me the slides and notes scribed to be posted.

Textbooks and References

- **Textbooks:**
 - Due to the nature of this course, no single book can cover all the topics we will study. Hence there is no required textbook. Instead, we will use many papers or materials available from the Internet.
 - **Example:**
 - L. Sha, R. Rajkumar, and J. P. Lehoczky, "Priority Inheritance Protocols: An Approach to Real-Time Synchronization." vol. 39: IEEE Computer Society, 1990, pp. 1175-1185.
 - J. Dean and S. Ghemawat, "MapReduce: Simplified Data Processing on Large Clusters," in OSDI'04: Sixth Symposium on Operating System Design and Implementation, San Francisco, CA, 2004.
- **Reference texts:**
 - Larry Paterson and Bruce Davie, *Computer Networks: A Systems Approach, 4th Edition*, Morgan Kaufman, 2007.
 - James Kurose and Keith Ross, *Computer Networking: A Top-Down Approach Featuring the Internet, 3rd Edition*, Addison-Wesley.
 - Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, *Operating System Concepts, 7th Edition*, John Wiley & Sons, Inc. 2004

Class Website

- Read the class website often
 - announcements, slides, other important updates
- Read the course syllabus for other policies such as late project policy
- Your feedbacks are always welcome!

Introduce Yourself

- Your name
- Your department
- Undergrad, Master, or Ph.D
- Your expectation from the class
- Your experiences
 - How did you spend your summer?

The Most Important Skill

COMP 598 is an important and fun (hopefully 😊) course. However, learning how to learn effectively is the most important skill that you can acquire during college years:

- In engineering and science, new technologies and new knowledge are generated rapidly. Every 3-5 years, we need to significantly revise our course material to reflect the changes.
- You must become an effective and efficient learner to get ahead and build a successful career.

Cone of Learning (Edgar Dale)

After 2 weeks, we tend to remember:

Passive learning

- 10% of what we read
 - 20% of what we hear
 - 30% of what we see (pictures)
 - 50% of what we hear and see
-

Active learning

- 70% of what we say
- 90% of what we say and do

Usually, the more energy that you put into a subject, the more you can remember. (L. Sha) Hence proactively participate!

Levels of Educational Objectives (B. S. Bloom)

- Level 6: **Evaluation**: judge, select, decide, critique, verify, debate, assess
- Level 5: **Synthesis**: create, predict, construct, design, imagine, improve, produce and propose
- Level 4: **Analysis**: Classify, categorize, derive, model
- Level 3: **Application**: Calculate, solve, determine, apply
- Level 2: **Comprehension**: Explain, paraphrase
- Level 1: **Knowledge**: Memorize, recite

Ways to Become an Active Learner

- recall prior material
- answer a question
- guess the solution first (even guessing wrong will help you to remember the right approach)
- work out the next step before you have to read on
- think of an application
- imagine that you were the professor and think about how you would give a test on the subject material so that key concepts and results will be checked.
- summarize a lecture, a set of home work or a lab in your own words concisely
- question on the assumptions the authors made
- design/derive a better solution

Example: Making Yourself an Active Learner Team Project

- Many great things have been said about team works. And team work is to be encouraged.
- However, everything has its dis-advantages. Sometimes, you can become passive in a team sitting and watching how other team members do, instead of actively participate in the work.
- Make sure that you are not only doing your part in the project, but also understand the other parts that your partners do.

Summary

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 - Dabble into different interesting topics
 - Good research
 - Creative is not enough!
 - Creative but also need to have practical applications
- Course outline
- Project and your participation in the class
- A review of learning skills that will help you get ahead and prepare for better learning experience
- Next Lecture: Elements of Research (or How to become successful)
 - based on the lecture of Prof. Lui Sha