CE7490: ADVANCED TOPICS IN DISTRIBUTED SYSTEMS  
(Started in AY 2008-2009, Semester 2)

Lecturers:
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- Assoc Prof. Tang Xueyan

Aims and objectives
This subject introduces graduate students to the advanced topics in distributed computing models, algorithms, and software systems. It deals with design issues, implementation techniques, and software tools and environments to support the implementation of distributed systems, and aims to prepare graduate students to carry out research in distributed systems. A selection of topics from the following list will be covered:

- Fundamentals of Distributed Systems
- Internet and Web technologies and applications
- Distributed simulation
- Grid computing
- P2P systems
- Online Social Networks
- Distributed Interactive Computing
- Cloud Computing

Case studies on real distributed systems will be conducted, and the recent research literature in the subject area will be reviewed.

Syllabus

Fundamentals of Distributed Systems
- Basic concepts and models
- Distributed algorithms: time and global states, coordination and agreement, replication and fault-tolerance

Parallel and Distributed Simulation
- Fundamentals: discrete-event simulation, synchronization, interoperability, reusability, and scalability
- Time management: conservative and optimistic synchronization
- HLA and distributed/federated simulation: basic concepts, HLA/RTI management areas, HLA time management, data distribution management

Grid Computing and P2P systems
- Grid computing
- Semantic web
- Structured overlays e.g., Distributed Hash Tables (DHT)
- Application Layer Multicasting
- Security issues in peer-to-peer and distributed systems
- P2P file sharing technologies
- Architectures and measurement studies of real deployed systems (like BitTorrent, Skype, ...)
- Peer-to-Peer Storage Systems

Online Social Networks
• Distributed social network data storage
• Influence diffusion and maximization
• Rumor blocking
• Information source detection

**Distributed Interactive Computing**
• Discrete and continuous interactive applications
• Consistency maintenance
• Interactivity enhancement
• Cloud gaming

**Cloud Computing**
• Virtualization and virtual machine
• Scheduling and resource allocation
• Data center networks and traffic management
• Energy management and green computing

**Assessment**
This course is graded. Continuous assessments (no final exam) based on two project assignments and reading/presenting research papers and quizzes. (Note: Good programming skills will be necessary for the projects, however you can use whichever programming language you wish to use.)

**Time and Venue**
Tuesdays 2:30-5:30pm, Venue: TBD