

EE614 – Service-Oriented Computing

Fall 2017

Instructor: Prof. Chan-Hyun Youn

Class Hours: Every Tue, Thr (10: 30 ~ 11: 45 AM)

Prerequisites: Programming skills on C, C++ or Java, Network programming, Distributed System

Classroom: E3-2 Bldg, Rm3228

Office Hours: Every Tue, Thr (2:00 ~ 3:00 PM)

Assistant: Seong-Hwan Kim (s.h_kim@kaist.ac.kr)

Assistant's Office Hours: Every Wed. (2:00 ~ 4:00 PM)

Text: Required Textbook

- UNIX Network Programming, Socket Networking API, R. Stevens, Addison Wesley, 2004
- UNIX Network Programming, Interprocess Communication, Richard Stevens, Prentice Hall, 1999
- Distributed Systems Concepts and Design, G. Coulouris, Addison-Wesley, 2001

Reference:

- Lecture Notes on Distributed Computing System, KAIST EE
- Middleware for Communication, Edited by Q.H. Mahmoud, John Wiley and Sons(2004)
- T. White. Hadoop: The Definitive Guide. O'Reilly, 2009

Grading Policy:

Index	Mid-term	Lab and Reports	Final Exam/ Term Project	Assignments		Attendance	Total
				Homework	Quiz		
Rate	20%	30%	20%	15%	10%	5%	100%

Objective:

Service oriented computing became an important platform for web-scale application development. This course introduces key concepts and techniques underlying the design and engineering of service-oriented computing systems, even for the service-oriented framework to build cloud applications. Through this course, students are expected to gain the capability of implementing service-oriented computing system. As for the service-oriented computing, this course also will offer practical labs in the course of lessons.

Course Schedule

Fall 2017

Week	Contents	Remark
1 st week	<ul style="list-style-type: none"> – Introduction to Service-Oriented Computing (SOC) – Review of UNIX Process (Lab 1. Process Control and Signal Handling) – Review of Inter-Process Communication (Lab 2. Inter-Process Communication - PIPE/ FIFO/MQ/Shared Memory) 	– Lab Reports
2 nd week	<ul style="list-style-type: none"> – Review of Socket Programming (Lab 3. TCP Socket Programming) – Review of Concurrent Server Programming (Lab 4. Concurrent Server Programming – Muti-Process / Multi-Thread / I/O Multiplexing) 	<ul style="list-style-type: none"> – Lab Reports – HW #1. Performance Analysis under Concurrent Server Environments
3 rd week	<ul style="list-style-type: none"> – Server-Client Model and RPC (Lab 5. JAVA RPC Programming / gRPC Programming) – Introduction to Web Service – Web Service Computing – SOAP (Lab 6. SOAP based Web Service Programming) 	– Lab Reports
4 th week	<ul style="list-style-type: none"> – Web Service Computing - RESTful (Lab 7. RESTful based Web Service Programming) – (Lab 8. Performance Analysis on Web Services using Apache Benchmark) 	<ul style="list-style-type: none"> – Lab Reports – HW #2. RPC Packet Analysis using Wireshark
5 th week	<ul style="list-style-type: none"> – Challenges in Building Large Scale Web Services – Build up Media Streaming Service (Lab 9. Build up DASH Server and monitor service quality) – How to Build a Large Scale Web Service (Lab 10. Build up Large Scale DASH Server using Cache and Load-balancer) 	– Lab Reports
6 th week	<ul style="list-style-type: none"> – Technical Issues in Distributed Computing and Message Oriented Middleware (Lab 11. MOM-based Image Transfer) – Object Oriented Middleware (Lab 12. Transaction Processing using Java RMI) 	<ul style="list-style-type: none"> – Lab Reports – HW #3. Discussion on Building up Large Scale Web Service (Include Reading Assignment)
7 th week	Midterm Exam	

8 th week	<ul style="list-style-type: none"> – HPC: MPI Applications (Lab 13. Problem solving with MPI) – Workflow computing and Service Scheduling – (Lab 14. Scientific Workflow Scheduling) 	– Lab Reports
9 th week	<ul style="list-style-type: none"> – Introduction to Cloud Computing (Lab 15. VM Management with KVM Hypervisor) – (Lab 16. Building Cloud with OpenStack) 	<ul style="list-style-type: none"> – Lab Reports – HW #4. OpenStack Management with RESTful API
10 th week	<ul style="list-style-type: none"> – Cloud Broker Engineering and Resource Management – (Lab 17. Study on Cloud Science Gateway) 	– Lab Reports
11 th week	<ul style="list-style-type: none"> – BigData Processing: Hadoop MapReduce and Hadoop Distributed File System (Lab 18. Programming with Hadoop) – (Lab 19. Analysis on Distributed File System) 	<ul style="list-style-type: none"> – Lab Reports – HW #5. Resource Management in Cloud Service Broker (e.g. Science Gateway)
12 th week	<ul style="list-style-type: none"> – Media computing and stream services in Cloud – (Lab 20. QoS Management in streaming service) 	– Lab Reports
13 th week	– Future of Service-Oriented Computing	
14 th week	– Term Project presentation	
15 th week	Final Exam	