

National University of Singapore
DEPARTMENT OF COMPUTER SCIENCE
CS5239 Computer System Performance Analysis
2006/2007 - Semester II
<http://www.comp.nus.edu.sg/~teoym/cs5239-07/>

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Lecture: **Friday, 6.30pm, SR1**; Consultation hours: **Friday, 9-11am**

Description

The objective of this course is to provide students a working knowledge of computer performance evaluation and capacity planning. It covers the three fundamental techniques that can be used to evaluate the performance of computer systems: measurement, simulation and mathematical modeling. The module is divided into four parts: introduction to performance analysis and capacity planning, measurement techniques and tools, analytic modeling techniques and case studies.

Topics include: performance analysis overview; measurement techniques and tools including workload characterization, instrumentation; computer simulation; analytical modeling techniques including operational analysis, stochastic queuing network analysis, performance of client-server architectures, principles of scalable performance.

Main Textbooks

- *The Art of Computer Systems Performance Analysis: Techniques for Experimental Design, Measurement, Simulation and Modeling*, R. Jain, John-Wiley, 1991 [Jain91].
- *Quantitative System Performance*, E.D. Lazowska et al., Prentice-Hall, 1984, out of print but available at <http://www.cs.washington.edu/homes/lazowska/qsp/> [Lazowska84].

Reference Books

- *Capacity Planning and Performance Modeling - From Mainframes to Client-Server Systems*, Daniel A. Menasce, et al., Prentice-Hall, 1994 [Menasce94].
- *Capacity Planning for Web Performance – Metrics, Models & Methods*, D.A. Menasce, et al., Prentice-Hall, 1998 [Menasce98]
- *Simulation Modeling and Analysis*, A.M. Law and W.D. Kelton, McGraw Hill, 3rd edition, 2000. [Law00]
- *Introduction to Parallel Computing*, A. Grama, et al., Addison-Wesley, 2nd Edition, 2003. [Grama03]

Module Assessment:

- continuous assessment - 60%
- final examination - 40% (open book exam)

Course Schedule:

Week	Date	Lecture	Others
1	12 Jan	L00 - Overview L01 - Introduction	· Course Description · Topics Detail (tentative)
2	19 Jan	L02 - Capacity Planning	
<i>Measurement Techniques & Tools</i>			
3	26 Jan	L03 - Selection, Characterization & Forecasting of Workload	Supplementary Slides L03S - Input Data Modeling
4	2 Feb	L04 - Instrumentation & Representation of Measurement Data	· conference leave, make up class ?
<i>Simulation</i>			
5	9 Feb	L05 - Basics of Computer Simulation	
<i>Analytic Modeling Techniques</i>			
6	16 Feb	L06 - Introduction to Queuing Theory	
17-25 Feb, Mid-Semester Break			
7	2 Mar	L07 - Operational Analysis	
8	9 Mar	L08 - Analysis of a Single Queue	
9	16 Mar	L09 - Analysis of Queuing Networks	Supplementary Slides L09S - Analysis of Queuing Networks (Multiple Job Classes)
10	23 Mar	L10 - Principles of Scalable Performance	
<i>Case Studies</i>			
11	30 Mar	L11 - Performance of Client-Server Architectures	· conference leave, make up class?
12	6 Apr	L12 - Web Performance Modeling	
13	13 Apr	Conclusion & Revision	· Table of Contents

Remarks

If you have any questions or suggestions, please feel free to approach me.