CSCI 754: Performance Evaluation of Computing Systems
Spring 2002

Instructor: Prof. Evgenia Smirni, esmirni@cs.vm.edu
Office: M-S Hall 103, Phone: 1-3580
Time/Place: MW 10:00-11:20, M-S Hall 104
Office hours: MW 11:30-13:30, by appointment, or whenever you can find me
Textbook: Notes from in class presentations

Synopsis/Purpose

This class introduces analytical modeling techniques and their application to computer system performance modeling and prediction. The objective of the course is to prepare students for advanced graduate research in the area of performance modeling, and to provide them with the necessary background for working as system performance analysts in high-tech industries. The first part of the course will cover analytical modeling techniques and queueing networks. The second part of the course will concentrate on the application of the various techniques to Internet systems, web server analysis, resource allocation, multimedia computing, parallel systems, and hardware/software design. The course provides the students with hands-on experience in performance evaluation through a project.

Prerequisites

A first course in operating systems is a prerequisite as well as some knowledge of probability and statistics.

Course Syllabus

The following topics will be covered in varying levels of detail:

- Stochastic Processes, Markov Processes
- M/G/1 Processes and their use for Internet Modeling
- Data analysis
- Closed Systems, Open Systems
- Single Class Models, Multiple Class Models
- Product Form Networks
- Mean Value Analysis, Convolution
- Non-product Form Networks
- Approximations
- Applications
- Measurements, Model Calibration

Coursework/Grading Policy

Final grades will be computed as follows:

Exam 1 15%
Exam 2 15%
Homeworks 20%
Presentations 25%
Project 25%
Projects and Class Presentations

Each student will select a research project that is close to her/his research interests. An ideal project would have an analytic and an experimental component. Ideally, you should come up with a proposal for a research project close to your research interests. I will have to approve your proposal. Alternatively, you can select one of the research projects I will propose in class. Each student will collect relevant papers to her/his topic from the current literature, distribute one or two key papers to the class, and make a presentation during one class period. The presentation should have two parts: a theoretical part where an analytic technique is outlined, and an experimental/application part where the applicability of the analytic technique is illustrated. The project will be an application and/or extension of the work presented in class.

Important Dates/Deadlines/Milestones

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<thead>
<tr>
<th>Event</th>
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<tbody>
<tr>
<td>Exam 1</td>
<td>February 27</td>
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<tr>
<td>Research Project selection</td>
<td>March 11</td>
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<tr>
<td>Exam 2</td>
<td>TBD</td>
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<td>Final Project Report</td>
<td>April 30</td>
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References

11. Proceedings of the ACM Sigmetrics Conference

Honor Code

All work is to be done on an individual basis.

Students with disabilities

If you have a disability that may affect your participation in this course and wish to discuss academic accommodations, please contact me as soon as possible.