CS4237: Systems Modeling & Simulation (2006/07 Semester 1)

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Understanding and Studying System Performance - 3 Fundamental Techniques

◆ **Measurements** of actual systems

◆ **Simulations** using software models

◆ **Mathematical modeling** using such techniques as queuing analysis
Performance Evaluation

Low Complexity and Cost High

- Rules of Thumb
- Trend Analysis
- Performance Models
  - Analytical
  - Simulation
- Measurement

after-the-fact analysis

CS4237: Systems Modeling and Simulation
CS5233: Simulation and Modeling Techniques
CS5239: Computer System Performance Analysis
CS5271: Performance Analysis of Embedded Systems
Technical Attractions of Simulation*

- Ability to compress time, expand time
- Ability to control sources of variation
- Avoids errors in measurement
- Ability to stop and review
- Ability to restore system state
- Facilitates replication
- Modeler can control level of detail

Course Objective

covers the *methodology* and *techniques* in systems modeling and the design of computer simulation models
Course Coverage

Part I – Theory (2/3rd)
- Different Approaches to Study a System
- Modeling and Simulation Lifecycle
- Principles of Discrete-event Modeling & Simulation
- Statistical Models in Simulation
- Random Number and Random Variates
- Input Data Collection and Modeling
- Model Verification and Validation
- Analysis and Presentation of Results
- Comparison and Evaluation of System Design Alternatives

Part 2 – Practice (1/3rd)
- Simulation programming in Java
- Examples and hands-on in modeling and simulation of computer systems and simulation of computer networks
Books

Recommended Text


Others


Module Assessment

1. Continuous Assessment (60%)
   ◆ Recitation (10%)
   ◆ Test (20%)
   ◆ Assignment/project (30%)

2. Exam (40%)
Everything should be made as simple as possible, but no simpler – attributed to Albert Einstein
Problems

If you're not sure, don't guess... **ASK!**

Wrong guesses are **COSTLY!**

- consultation hours, email, catch me after lectures ....
approaching the questions

1. easy first, difficult last
2. don’t get carried away
3. never give up
Answering the Questions

1. Allocate your time wisely

2. Always read critically

3. Give the right amount of information

4. Plan for extra time – double-checking

5. If you find a question ambiguous, be sure to write down any assumptions you make. Be neat. If we can’t understand your answer, we can’t give you credit!
The Power of Thought

I can score “A”s 😊

- see yourself as an “A” student
- what would you do, if you were an “A” student?
The 4-minute mile

In 1954, Sir Roger Bannister overcame this supposed “impossibility”.

- Within one-year, 37 other did it, and in the following year, another 300 did it.

Breaking the barrier!