Performance Evaluation of Computer Systems

Dr. Ahmad Khonsari

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Teaching Staff

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Course Goals

- Measurement techniques and tools
- Review the principles of probability
  - Review probability theory
  - Laplace and Z transform
  - Bounds (Union Bound,...)
  - Inequalities: Chebyshev, Chernoff, …
  - Limit law
  - Sequence of random variables
  - Discrete time Markov Chain
  - Continuous time Markov Chain
  - Poisson process, PASTA
- Queuing Theory
  - Little law
  - M/M/1 Queueing system
  - M/G/1 Queueing systems
- Learn the simulation basics and techniques

Course Format

- **Self-read Lectures**
- **Homework Assignments**
  - All Exercises **must** be typed with LaTex.
  - Upload tex files + PDF version.
- **Computer Assignments**
  - Short reports are required, written via Latex.
  - Use a **Jupyter Notebook** (Microsoft Azure Notebook) to show your python, R codes and also your reports.
- **Quiz(zes) and Exam(s)**
- **Final Project**

Grading Plan

- 20% for Homework Assignments
- 30% for Computer Assignments and Projects
- 50% Exams and Quizzes

Submission Rules

- All assignments have a hard deadline for submission.
- For every day of late submission, a penalty of 5% will be applied to the total points of assignment, up to a maximum penalty of 50%.
- Late submissions are not accepted after the maximum penalty has been applied.
- Students who submit all assignments without any late submissions throughout the course may be eligible for bonus points, subject to instructor discretion.
- Copying is not acceptable. Any detected fraud leads to a ZERO point.
- You can only object to your grades within 2 days of receiving them. We do not consider objections after that.
- All course reports must be written in the Student Latex Template.

Course Material

- **Textbook:**
  - Introduction to Probability, by Dimitri Bertsekas and John Tsitsiklis, 2nd Edition.

- **Further reading**
  - Simulation Modeling and Analysis, by Averill M. Law.
  - Performance Modeling and Design of Computer Systems: Queueing Theory in Action, by Harchol-Balter.
  - System Modeling and Analysis: Foundations of System Performance Evaluation, by Kobayashi.
  - The Art of Computer Systems Performance Analysis: Techniques for Experimental Design, Measurement, Simulation, and Modeling, by Jain.