


CSE 312: Foundations of Computer Science, II

**- Instructor**  
Anna R. Karlin ([karlin@cs.washington.edu](mailto:karlin@cs.washington.edu))

**- TAs**  
Sonja Khan  
Noah Siegel  
Akshay Srinivasan  
Dylan Swiggett

**- Course website**  
<http://courses.cs.washington.edu/312/>




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**- Probability and statistics**


**- Books (all online or optional)**  
**Introduction to Probability** (2<sup>nd</sup> ed.)  
Bertekas and Tsitsiklis  
**Mathematics for Computer Science**  
Lehman, Leighton and Meyer  
**Discrete Mathematics and its Applications**  
Rosen [optional]  
**OpenIntro Statistics**  
Dietz, Barr and Cetinkaya-Rundel

**- Homeworks**  
Weekly (Out Friday, due next Friday)  
Daily problems



why this course is important

- Reasoning under uncertainty
- Understanding massive data
- Learning patterns
- Exposing liars and idiots
- Making \$\$\$ without coding



syllabus

**- Probability**  
Counting  
Basic probability  
Conditional probability  
Random variables  
Discrete and continuous distributions  
Expectation and variance  
Tail bounds and the central limit theorem

**- Statistics**  
Maximum-likelihood estimation  
Bayesian estimation  
Hypothesis testing

**- Applications...**


**Applications**

- Machine learning/AI
- Simulation
- Cryptography
- Systems and Queueing Theory
- Big Data
- Data compression
- Communications and error-correcting codes
- Quantum computing

syllabus

**- Probability**

**Counting** -----  
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**- Statistics**  
Maximum-likelihood estimation  
Bayesian estimation  
Hypothesis testing  
Machine learning

overload forms

