Course Outline

CS70 is a course on "Discrete Mathematics for Computer Scientists". The purpose of the course is to teach you about:

- **Fundamental ideas in computer science:**
  - Boolean logic
  - Uncomputability and the halting problem
  - Modular arithmetic, error-correcting codes, secret sharing protocols
  - The power of randomization ("flipping coins") in computation

  Many of these concepts underlie the more advanced courses in computer science.

- **Precise, reliable, powerful thinking:**
  - Proofs of correctness. These are essential to analyzing algorithms and programs
  - Induction and recursion
  - Probability theory

- **Problem solving skills:**
  - These are emphasized in the discussion sections and homeworks.

Course outline (abbreviated).

- Propositions, propositional logic and proofs

- Mathematical induction, recursion

- The stable marriage problem

- Modular arithmetic

- Polynomials and their applications: error-correcting codes, secret sharing

- Diagonalization, self-reference, and uncomputability

- Probability and probabilistic algorithms: load balancing, hashing, expectation, variance, Chebyshev and Chernoff bounds, conditional probability, Bayesian inference, law of large numbers.