

Introduction

Fall 2014

Administration

- Syllabus
- Webpage
- Piazza
- Worksheets (for each topic)
- Quiz (every Monday mostly)
 - Quiz: Wednesday, September 3
- Homework (due every Wednesday mostly)
- Two evening midterms [dates to be announced]
- Class attendance (and slides)
- Academic integrity

Topics (tentative)

- The Foundations: Logic, Proofs, Numbers, Circuits
- Basic Structures: Sets, Functions, Sequences, Sums
- Number Theory and Cryptography
- Mathematical Induction
- Counting
- Relations

What is Discrete Mathematics?

Definition

Discrete mathematics is the branch of mathematics dealing with objects that can only assume distinct, separated values. [Wolfram Mathworld]

In contrast: *Continuous mathematics*

Discrete vs. Continuous Math: Examples

Discrete Mathematics

- Number theory (integers)
- Logic
- Combinatorics
- Graph theory
- Theory of computation

Continuous mathematics

- Calculus (real numbers)
- Topology

You can't have one without the other.

Some Types of Knowledge

- Directly applied
Circuits to do addition
- Good to know
Cannot store the digits of $\sqrt{2}$ on a computer
- Interesting
The number of primes is infinite

Why learn this material?

- Mathematical foundations of computer science
- Useful for later courses
- Useful for computer programming
- Useful to get a job
- Useful on the job