Lecture 00



Mathematical Foundations of Computer Science

CS 13: Mathematical Foundations of Computer Science

Introduction: **A** Review Hello Wor name Alam.

Outline

1 Motivation

2 Administrivia

Outline

1 Motivation



The Plan

Overview

We're going to work our way through mathematical topics with a lens on how they're useful to computer science. Every topic will culminate in one or more applications of the math that we've been studying!

Difficulty

Our intention is to start around the difficulty of Ma1a and end around the difficulty of CS 21. If we are missing the mark, please do let us know.

Goals

- Improve your proof-writing skills
- Justify why you need math as a computer scientist
- Play with some cool applications!

Outline



2 Administrivia

• You can program at the level of CS 1

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You know what a proof is

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You're interested in improving your skills at writing proofs to get ready for future courses

Your Expectations

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Course staff will hold an obscene number of office hours

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Prof. Blank's door is always open

Grading Breakdown

- written = 30%
- applications = 30%

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- final = 10%

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- We will give you 70 drop points which will be added to your total score at the end of the course.

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Fine Print

- You must score at least 20% on all-but-one written/application assignment to pass the course.
- We will give you 70 drop points which will be added to your total score at the end of the course.
- You must typeset your solutions using LATEX with the template we provide.

To maintain consistency, all regrade requests should go directly to a Head TA (Yakov or Nico) via e-mail. Do not attempt to contact other TAs about grading questions.

Some Changes From CS 2/3...

Office Hours!

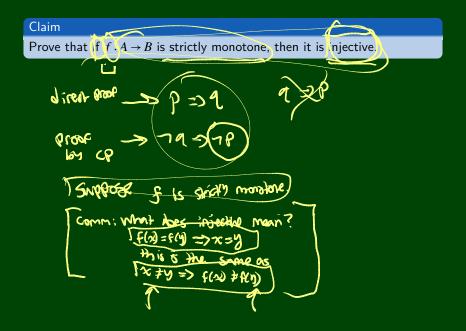
- OH are now in ANB 106 (which is called (CS)² for Computer Science Collaboration Support).
- OH The schedule has also changed a bit-we've removed office hours from days that were unpopulated and started them earlier at 3pm!
- (CS)² is a new dedicated space for undergraduates taking CS courses! If it's not in use for a course, you can just walk in and use it as a collaboration space! It has power, monitors to connect to, chargers, and dry-erase tables!

Lecturcises! tl;dr: Some of the exercises in lecture will now be turned in (later in the week). See syllabus for full details. Claim

Prove that for all sets X and Y, $\mathcal{P}(X) \cup \mathcal{P}(Y) \cup \mathcal{P}(X \cap Y) \subseteq \mathcal{P}(X \cup Y)$.

R

Functions



Induction

Claim

For all $n \in \mathbb{N}$ and $x \in \mathbb{R}$ where x > -1, $(1+x)^n \ge 1 + nx$