CSC165 fall 2017

Mathematical expression

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Using Course notes: Prologue, Mathematical Expression

Outline

what's CSC165?

a course about expression (communication):

- with and through programs
- with developers
- knowing what **you** mean
- understanding what **others** mean
- analyzing arguments, programs

CS needs math:

- graphics
- verification
- cryptography
- artificial intelligence
- complexity
- numerical analysis
- networking
- databases

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doing well in CSC165

Doing well has two aspects: one being recognized as doing well by being awarded credit (grades), another being able to retain concepts and tools for use later on. Here's how to do both:

- Read the course web page, and emails, regularly. Understand the course information sheet.
- Spend enough time. We assume an average of 8 hours/week — 4 in lecture/problem sessions, 4 reviewing preparing assignments
- Ask questions. Make your own annotations.

balance

- computers are precise — in identical environments they execute identical instructions identically
- humans are as precise as necessary, and different human audiences require different levels of precision
- The *really* difficult job is finding the right level of precision. Too much precision introduces unbearable tedium; too little introduces unfathomable ambiguity.
- Proofs are primarily works of literature: they communicate with humans, and the best proofs have suspense, pathos, humour and surprise. As a side-effect, proofs present a convincing argument for some fact.

building sets. . . in math

English prose

list elements

set comprehension

some standard sets

boolean operations on sets

operations that produce new sets

sets of sets...

size of sets

specify functions

- ordered pairs
- pictures
- rule

from/to, domain/range, arrow notation

one-to-one, onto, etc.

sums, products

manipulating sums and products

propositional logic

- statements, variables
- operators

not $\neg$, and $\wedge$

or $\vee$, implies $\Rightarrow$

Notes

annotated week 0