

## CPSC 2010 Lecture 1

What is computer science

- The science that studies computation
- Computation: the manipulation or transformation of information/data
- Algorithm: how to manipulate the data

When Computers were Human; Hidden Figures

Are humans computers? Are cells computers?

Computational x: what are the computational mechanisms by which something happens

What is the science of computation?

Computation (real world)-->Mathematical model (the Turing machine) (science)--> Predictions & New knowledge (science)-->experiments to test & applications (real world)

- What is computation?
- What is an algorithm?
- What computational problems have algorithms for solving them? Are there any unsolvable problems?
- How can we build smt to do computation?
- What resources does computation require?
- How efficiently can a given problem possibly be solved?
- What makes a problem hard or easy to compute

Can put code here:

[cs2010help@cs.yale.edu](mailto:cs2010help@cs.yale.edu)

2 Midterms & a Final:

The midterms: Feb.24; Mar.31

What is computation:

What took until the 1930s to have answers to what is computation

1920s: Hilbert's 10th problem: Given a polynomial equation with integer coefficients, devise a process according to which it can be determined in a finite number of operations whether the equation has an integer solution.

Is there a finite, purely mechanical procedure that, given any formula of first-order logic, determines whether that formula is logically valid?

The answer to both questions is NO.

TO prove that, you have to understand what an algorithm is.

Led multiple people to investigate this problem:

- Lambda definable functions
- Turing machines
- Post re-writing systems

A lot of Turing's papers are just explaining why his intuition of what's computation is right.

Racket is a direct descendant of Church.

Lambda calculus.

Hw3: half of the proof