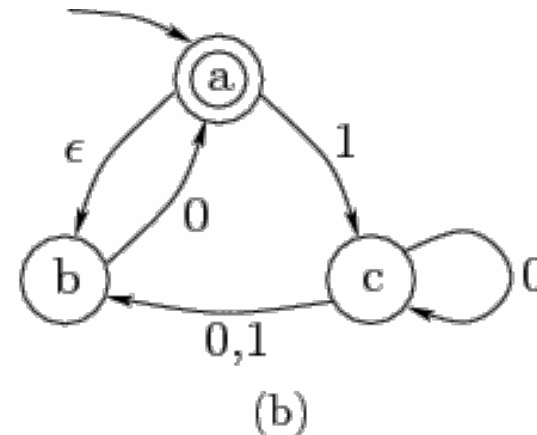
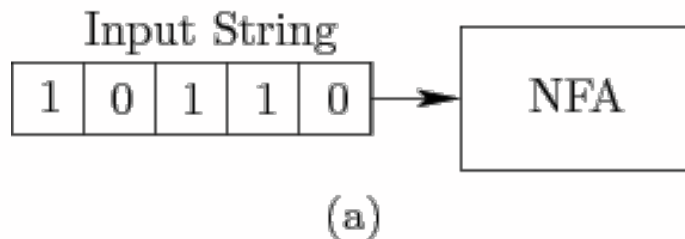


CS 321

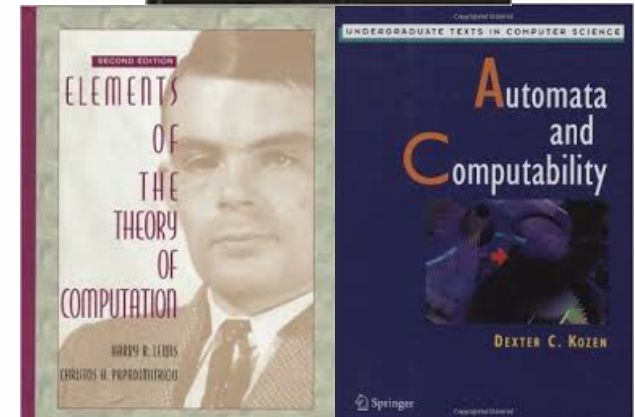
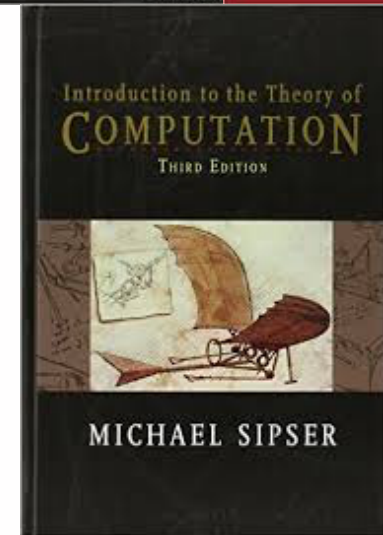
Theory of Computation



Instructor: Liang Huang

Logistics

- Instructor: Liang Huang
 - Office Hours: MW 4-5pm, 2069 KEC
- TAs: Kai Zhao and Mingbo Ma
 - Office Hours: TRF 4-5pm, 4130 KEC
- Textbooks:
 - Sipser, 3rd edi. (or 2nd edi.) -- main text
 - Linz, 5th edi. (or 4th) -- very helpful
 - Hopcroft, Motwani, & Ullman, 3rd edi.
 - Lewis & Papadimitriou, 2nd edi.
 - Kozen



Logistics (2)

- Grading
 - Weekly Quizzes ($5\% \times 9 = 45\%$) -- 1st quiz: Wed 9/30
 - Weekly Homework (10%) -- due in class on a quiz day
 - graded for completeness, but not correctness; no late submissions
 - Midterm (20%)
 - Final (25%)
- Questions/Discussions -- on Canvas
 - first check if a similar question has been asked on Canvas
 - if not, ask it there; we'll answer it
 - for non-technical questions email cs321-fall15-orst@googlegroups.com

What is Computer Science

Computer Science is no more about computers than astronomy is about telescopes.



— (Mis)attributed to Edsger Dijkstra, 1970.

Computer science is not really about computers -- and it's not about computers in the same sense that physics is not really about particle accelerators, and biology is not about microscopes and Petri dishes... and geometry isn't really about using surveying instruments... when some field is just getting started and you don't really understand it very well, it's very easy to confuse the essence of what you're doing with the tools that you use.

— Harry Abelson (1986), Intro to Computer Science Course, MIT

What is (Theoretical) Computer Science

- CS is the study of computation; but what's computation?
- this course (TCS) studies abstract models of computation
 - finite state machines and regular expressions
 - REs in Unix/Linux tools, FSMs model protocols & circuits
 - context-free grammars and pushdown automata
 - programming language syntax, XML DTDs, natural language syntax
 - Turing machines -- (roughly) as powerful as real computers

machine	language	grammar
finite-state	regular (RegExps)	regular
pushdown	context-free	context-free
Turing	recursively enumerable	unrestricted