CS 265 - Computer Theory

Lecture 1

chapter 1 - discrete math review

- graph theory
- set theory

chapter 2 - Deterministic finite Automata (DFA)

- feed machine an input string, it gives back an output string
- accept state (double circle)
- if im not there, the machine rejects the input string

applications

- represent gates
- lexical analysis

chapter 3 - regular expressions

- strings that expand to a set of strings
- operators: or |, concatenation . , star *
- a | b --> {a, b}
- a . b --> {ab}
- a* --> {empty string, a, aa, aaa, ...}

chapter 4

chapter 5 - context free grammars

e is the empty string (length 0)

- S --> AB
- A --> Aa | e
- B --> Bb | e
- start symbol
- parse string
- production rules

- S --> AB --> ABb --> Bb --> b
- accepts any string such that you can derive the string from the start symbol
- used in parser

chapter 6 - pushdown automata

- finite state machine with a stack
- transition states based on input and store memory

chapter 7 - turing machines

’hardware’

- tape
- input string on tape
- infinite tape
- read/write head

’software’

- transition function
- set of rules i have to follow to move across this tape
- transition function gets complex (can represent any algo)