CPSC 121: Models of Computation

REVIEW

Course Learning Outcomes

- You should be able to:
  - model important problems so that they are easier to discuss, reason about, solve, and test
  - learn new modeling formalisms more easily
  - communicate clearly and unambiguously with other CS experts on complex topics
  - characterize algorithms (CS problem solutions), by proving their correctness or efficiency
  - critically read proofs: justifying why each step is correct and judging what the proof means
  - prove statements that require only simple insights beyond strategic choices or for which the insight is given/hinted
  - explain how computers work

Modeling

- We have seen a number of models with different power:
  - propositional logic
  - predicate logic
  - combinational circuits
  - DFA's
  - NFA's
  - regular expressions
  - sequential circuits

Problem Solving

- We have seen how to model problems in each of these models so that
  - the problem is more precise
  - we understand it better
  - we can reason about it
  - provide solution (if possible)

Validating Solutions

- We've learnt how to prove arguments so we can support our solutions
- We have seen all proof techniques:
  - constructive/non-constructive proofs of existence
  - generalizing from the generic particular
  - antecedent assumption
  - proof by cases
  - proof by contrapositive or other equivalent
  - proof by contradiction
  - induction

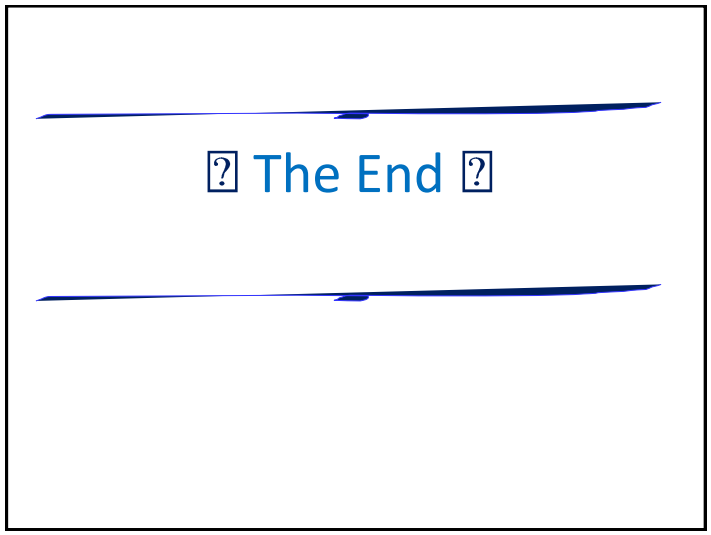
Reasoning about Algorithms

- We've acquired enough knowledge to be able to reason about simple algorithms (solutions)
  - we can prove that are correct for certain inputs
  - we can prove how efficient they are
  - we can compare them

And that is what Computer Science is about!

CPSC Courses after 121

- CPSC 210 : Software Construction
  - learn how to understand and design programs larger than those you've seen in 110
- CPSC 213: Introduction to Computer Systems
  - learn how high level languages(Racket, Java, C++) are implemented using simple machine instructions
- CPSC 221: Basic Algorithms and Data Structures
  - learn how to design important algorithms and data structures which used by many programs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