Computation

Chapter 4

Our Goals

1. Define a problem as a language
2. Define program/machine which accepts a string as input & determines if the string is in the language

Three Computational Issues

1. Decision procedures
2. Nondeterminism
3. Functions on functions and programs

1. Decision Procedures

- Decision Problem
  - Yes or No solution
- Algorithm
  - Detailed process/procedure that accomplishes some task
- Decision Procedure
  - An algorithm that provides a Yes or No solution to a decision problem

2. Nondeterminism

- Deterministic Program
  - Given a single input, all executions of the program compute the same solution
  - I.E. We can DETERMINE with certainty what the solution will be.
- Nondeterministic Program
  - Given a single input, different executions of the program may produce different solutions.

3. Functions on Languages

- Given a language, perform some function on the language to create a new language
  - Concatenation, Repetition, Union, Intersection
  - Can define many others
    - E.G. Chop = all odd strings of a language with the middle character “chopped” out