CSCI 334: Principles of Programming Languages

Lecture 3: What is a language anyway?

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Topics

What is a language?

Turing equivalence

WCMA activity

Your to-dos

1. Lab 1, due Sunday 2/13 (partner lab)

2. Reading response, due Wednesday 2/16.

What is a language?

In this class, we concern ourselves with a specific formulation of "language," called a **formal language**.

A **formal language** is the set of words whose letters are taken from some **alphabet** and whose construction follows some **rules**.

Example:

L = {a, aa, b, bb, ab, ba} Σ = {a, b} <expr> ::= <letter> | <letter><letter>
<letter> ::= a | b



Breph machine

A simple Turing equivalent language with pointers.



Breph machine

How do I know that Breph is Turing equivalent?

You could mechanically transform ("reduce") a program for a Turing machine into a program for a Breph machine, and it would do the same thing; also the converse.





General purpose languages are usually Turing equivalent.

Domain specific languages

A **domain-specific language** (DSL) is a computer language specialized to a particular application domain. DSLs are **intentionally** not Turing equivalent, **for simplicity**.



