Notes LP

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1 (05/08/19) What are programming languages?

Programming languages are turing complete. Html is not a programming language. Assembly is. The formal definition is:

- Syntax
- Semantics
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Words are easier to remember than numbers.

1.1 Fortran

IBM. It brought two news:

- There are variables
- Control structures (loops, conditionals).

Parsing: read a chain of characters and transform it into a data structure (a tree).

1.2 Lisp

Paretheses.
Based on mathematical functions and lists.
News: no need for parsing, built on linked lists.

1.3 ALGOL

Two news:

- Type notation
- Begin and end

1.4 COBOL

Grace Hopper.
Looks like a natural language.

1.5 How many are there?

O'Reilly says that there are 2500, wikipedia says 650. Java is the most popular (portability).

1.5.1 Different purposes

- Fortan: scientific calculus
- Lisp: computer theory
- COBOL: comercial applications
- Algol: academic languages

1.6 C

Denis Reed
It was made to finish UNIX.
It's popular because the compiler already came with UNIX.

1.7 PHP

Recursive name.
Useful for web servers.
Came to supply the need for Pearl.
Came with Apache, not efficient.

2 (07/08/19) Types of languages

State = memory
Parsing = produce derivation trees for some chain of characters.
A program in x86 is a set of instructions.
Prolog isn't a patternized language.

2.1 Imperatives (state)

- C
- Cpp
- Java
- Python
- C#

2.2 Declaratives (stateless)

There are no steps.

2.2.1 Functionals

Lambda calculus.

- ML
- Haskell
- Erlang
- Elixir
- Scala

2.2.2 Logicals

Horn clause.

- Prolog
- Datalog

2.3 Grammars

- Tokens (terminals)
- Non-terminals
- Production rules
- Start symbol

2.3.1 Types

- Regulars: super fast.
- Context-free: can only have a symbol on the left side of production.
- Context-sensitive: many symbols (right side is bigger or equal to left side).
- Irrestricted grammar: Turing Machines.