Abstract Syntax and Parsing

CS 350

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The Big Picture

Life of a program

- The Language Pipeline:

Source code	$\xrightarrow{\text{parsing}}$	Abstract syntax tree	$\xrightarrow{\textit{translation}}$	Core Syntax	$\xrightarrow{\textit{evaluation}}$	Result
text file	lexing / tokenizing first	data structure	desugaring / compilation	simpler AST / machine code	interpreter, execute on CPU	value, side effects

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- E.g. plait vs shplait

Describing Syntax

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  - Gives a process for generating valid strings in the language
  - String is valid if and only if it's generated by the grammar

Example

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  | "{" "*" <expr> <expr> "}"
  | number
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    - `-> { * {+ 5 100000} -3}`

Parsing and Abstract Syntax

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- A value of this type is called an *abstract syntax tree*
    - AST for short

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  - What if the string isn’t generated by the grammar?

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        - Does the hard work of figuring out nested brackets

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- Uses the `s-exp-match?` function
  - Don't need to memorize how it works, we'll give you the parsers for the most part