

## 61A Lecture 26

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## Announcements

# Programming Languages

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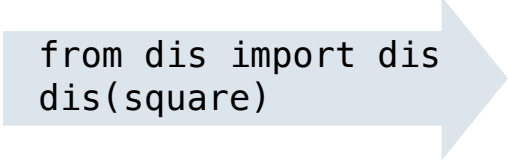
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from dis import dis  
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- **Specification:** A document describe the precise syntax and semantics of the language
- **Canonical Implementation:** An interpreter or compiler for the language

Parsing



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## Parsing

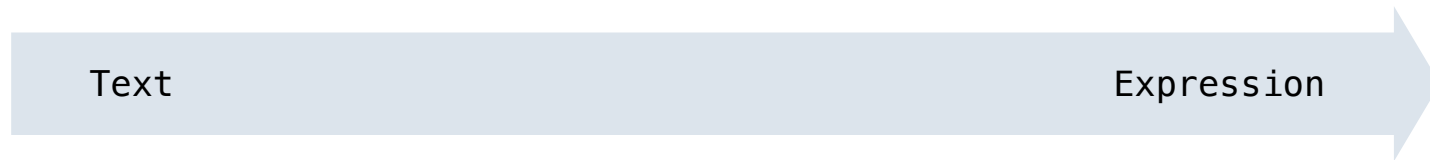
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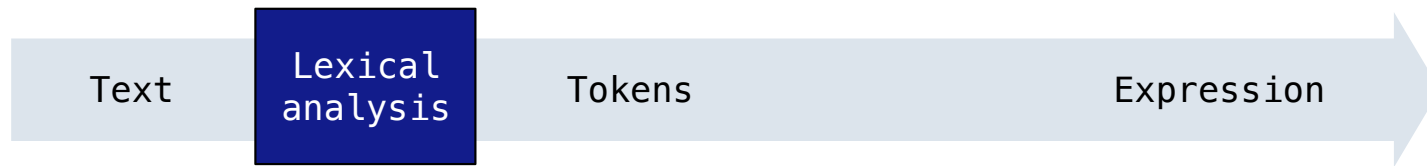
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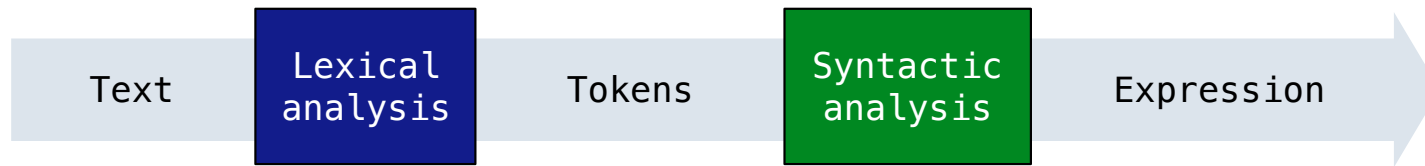




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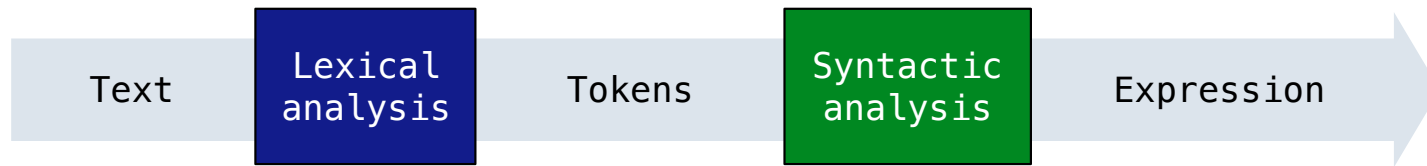


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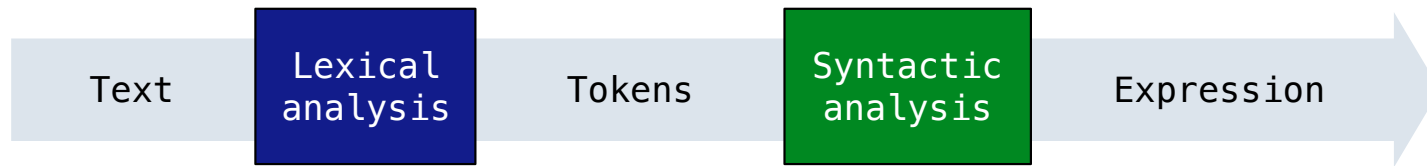
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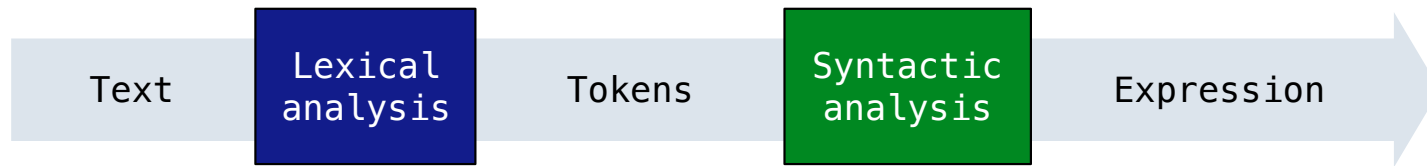
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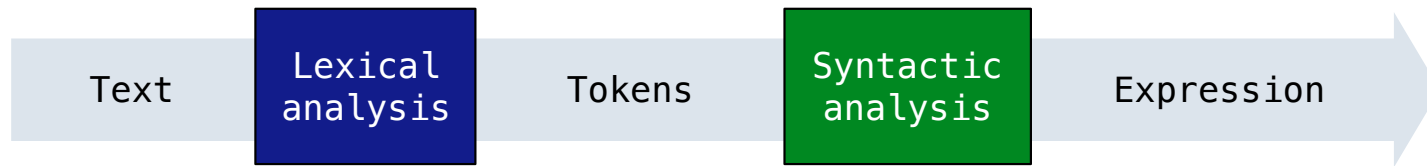


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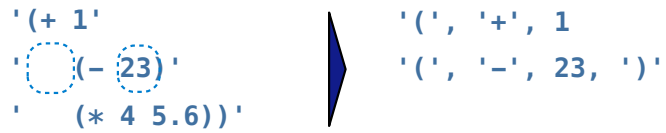
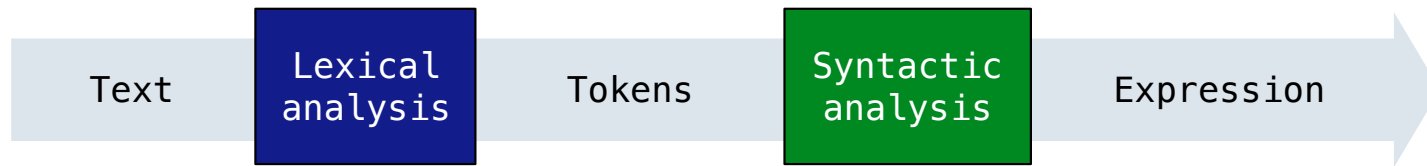
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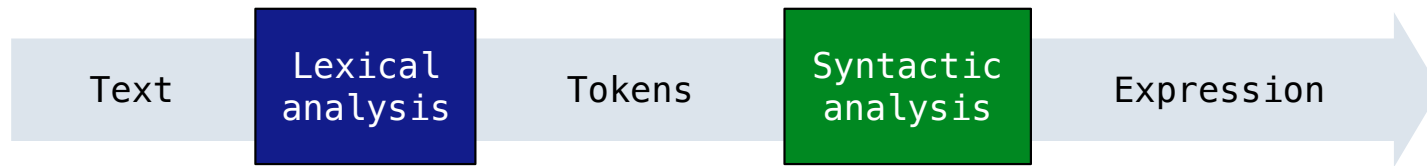
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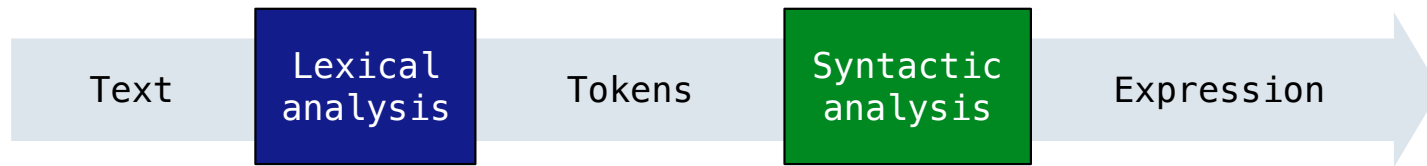
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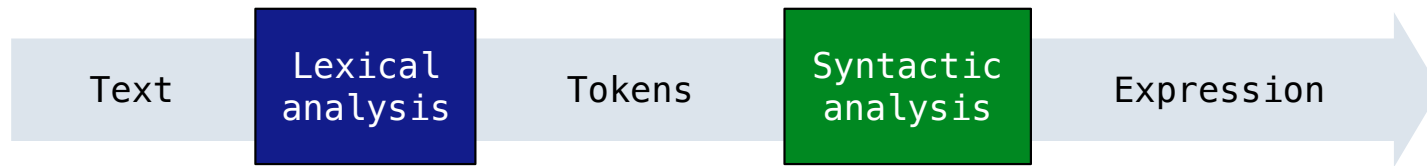
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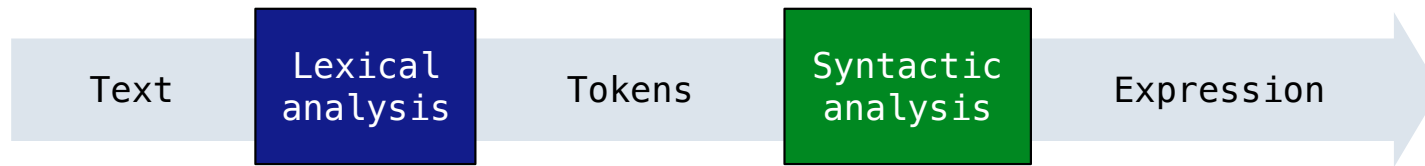
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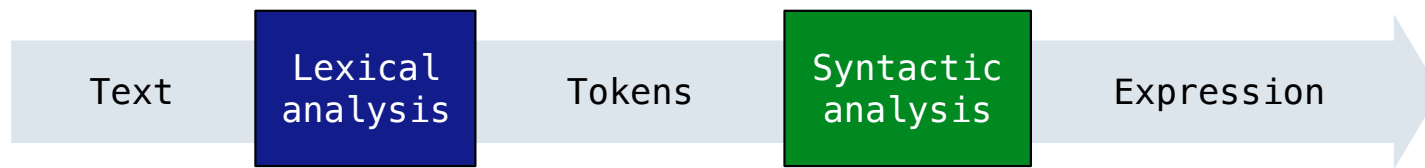
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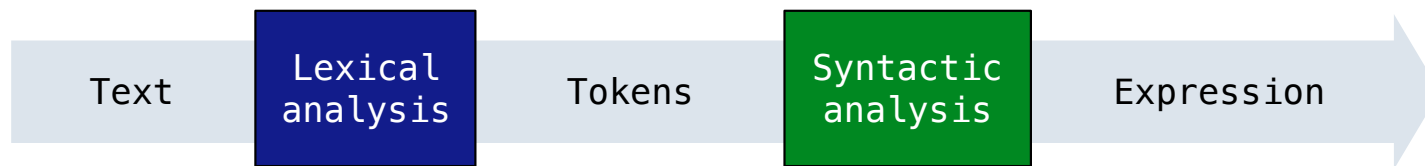
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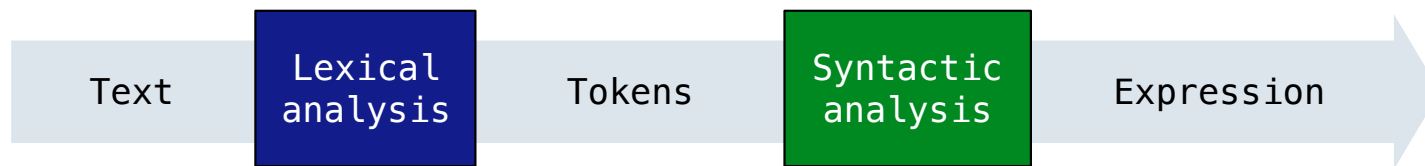
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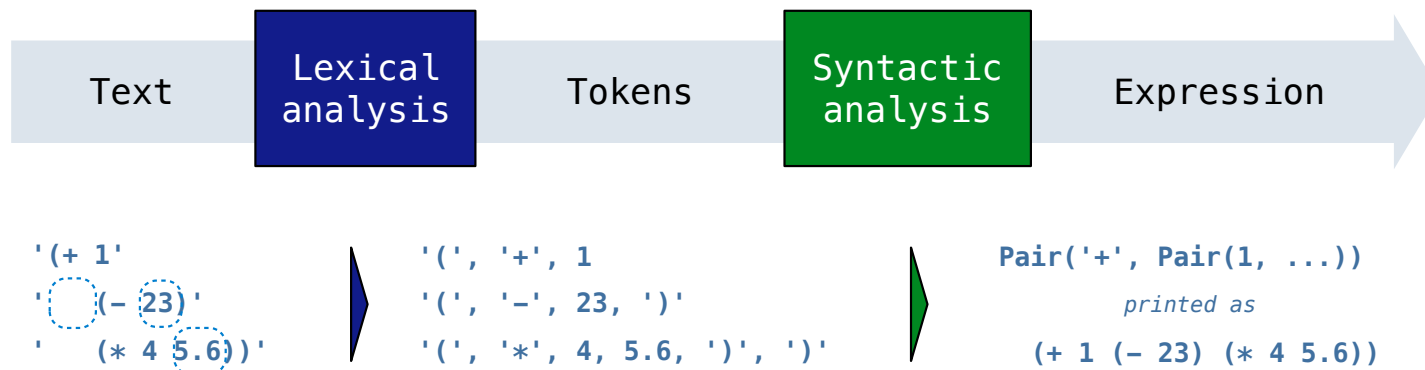
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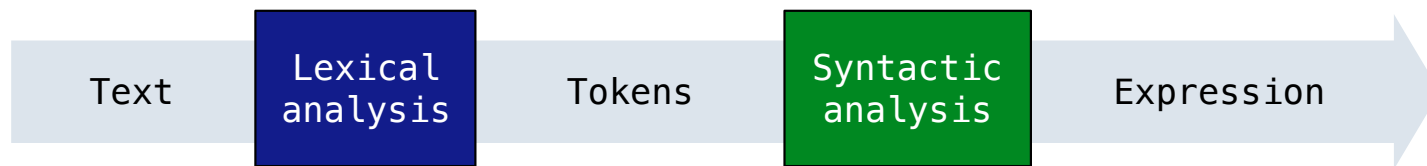
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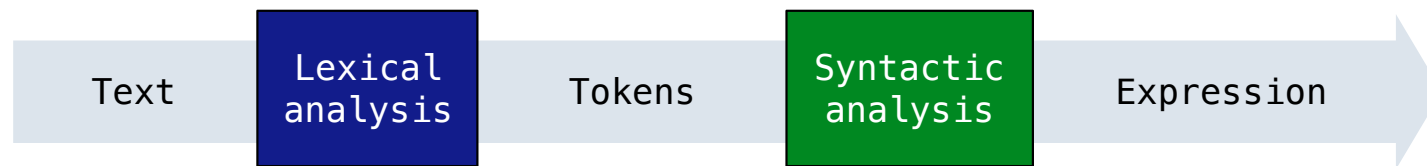
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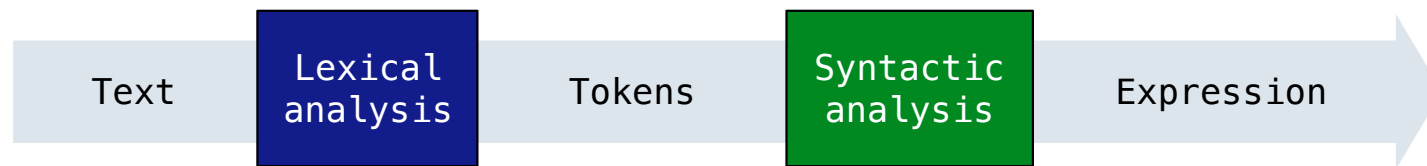
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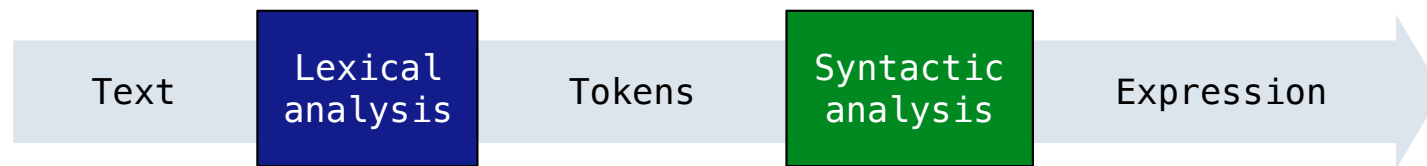
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(Demo)

# Scheme-Syntax Calculator

(Demo)

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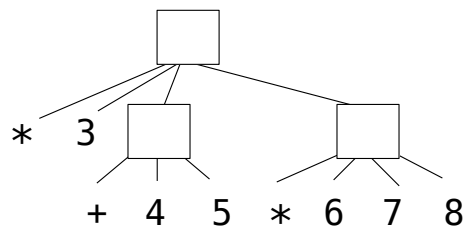
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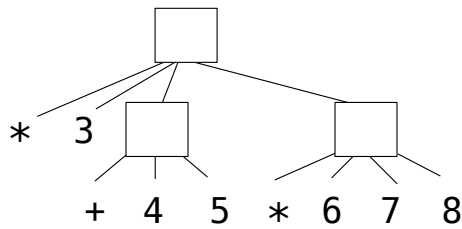
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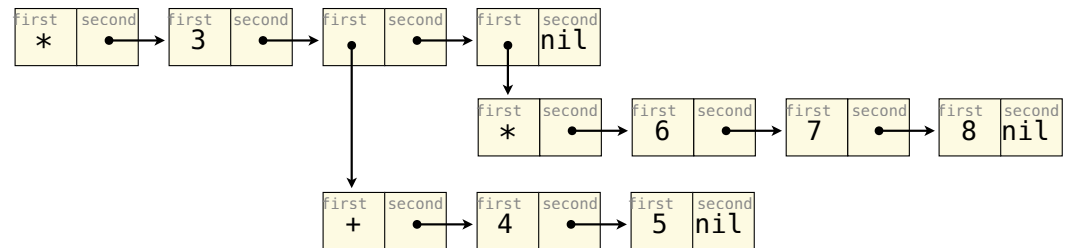
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### Representation as Pairs



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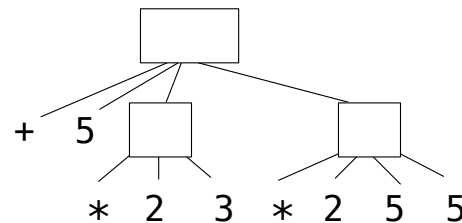
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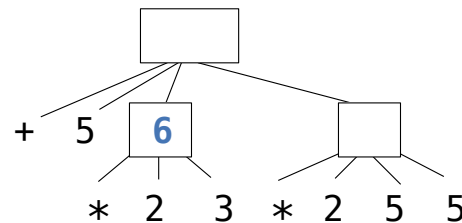
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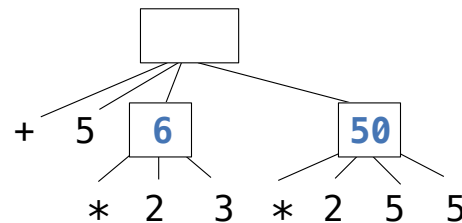
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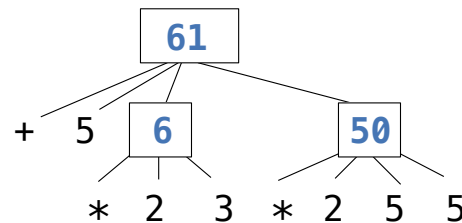
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# Evaluation

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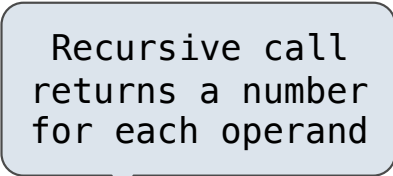
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A Scheme list  
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```
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    if operator == '+':
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    elif operator == '-':
        ...
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### Language Semantics

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-:
    ...
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(Demo)

## Interactive Interpreters

## Read-Eval-Print Loop

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(Demo)

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- **Eval:** An empty combination raises `TypeError("( ) is not a number or call expression")`

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- **Apply:** No arguments to – raises `TypeError("- requires at least 1 argument")`

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