[301] Variables and Expressions

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Learning Objectives

Variables:

- Purpose
- Naming

Assignment:

- Syntax
- Reassignment

Types of errors:

- syntax, runtime, semantic

Documentation:

- comments

Please read Chapter 2

Today's Outline

Review

- Operator Precedence

Expressions, Variables, and Assignments

Demos

Bugs

Demos

Naming variables

Demos

Unordered

What is it?	Python Operator
comparison	==, !=, <, <=, >, >=
signs	+x, -x
AND	and
add/subtract	+, -
exponents	**
NOT	not
OR	or
multiply/divide	*, /, //, %

Ordered by Precedence

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		simplify first
		simplify last

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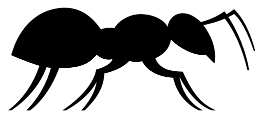
Bugs 

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Expressions

Expressions are a mix of operators and operands. For example:

```
5 + 5

(8/2) ** 2 * 3.14

3 * 3 > 4 + 4

3 % 2 == 0 or 3 % 2 == 1
```

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How do variables get associated with a value?

Assignment

An assignment computes an expression (maybe a simple one) and puts the result in a variable:

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Assignment

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total = x + y

area = (diameter/2) ** 2 * pi

is_bigger = value1 * value1 > value2 + value2

is_even_or_odd = num % 2 == 0 or num % 2 == 1
```

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Variable **Expression**

Assignment Operator

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Categories of Errors

Syntax Error

- What you typed never makes sense in any context, so Python doesn't run
- 5 = x

Runtime Error

- What you typed looks like it could make sense, but when you get to running it, it actually doesn't work
- Appears with different names (TypeError, ZeroDivisionError, etc)
- x = 5 / 0

Semantic Error

- What you did actually runs, but produces the wrong answer
- square_area = square_side * 2

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Which kind of bugs do you think scare programmers the most?

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Python Naming Rules

Variable naming rules have actually become fairly complex:

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- Only use letters (upper and lower), numbers, and underscores
- Don’t start with a number
- Don’t use Python keywords (e.g., “and”)

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GOOD:	**BAD:**
cs301	**301class**
CS301	**and**
cs_301	**pi3.14**
_cs301	**x!**

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