

UNIVERSITY *of* WISCONSIN
LA CROSSE
COMPUTER SCIENCE

CS 224 Introduction to Python

Variables, Expressions, and Statements

1

Variables

- When creating a variable in Python, no type is provided
 - `x = 20`
 - `s = 'You think youve lost your love'`
 - `pi = 3.14159`
- So what happens if I do this (after the statements above)?
 - `x = pi`
 - Answer: `x` has the value `3.14159`

2

Types

- Python has types – what determines the type of an object?
- Duck typing
 - if it walks like a duck and quacks like a duck...
- So on previous slide, `x` was an `int` until we reassigned it. Then it became a `float`.
- `type(x)` reports the type of variable `x`

3

Built-in types

- boolean
 - values `True` and `False` (note capitalization)
- Numeric types: `int`, `long`, `float`, `complex`
- Sequence types: `str`, `list`, `tuple`
- `set`
- `dict`

4

Truth values

- Any object can be used in a Boolean expression
- The following evaluate to False
 - None
 - False
 - 0
 - empty sequences: '', [], ()
 - empty dictionary: {}

5

Type Casting

- Syntax: `new_type(object)`

```
x = 3.14159
```

```
y = 20
```

```
s = '20'
```

<code>int(x)</code>	→	3
<code>float(y)</code>	→	20.0
<code>str(x)</code>	→	'3.14159'

6

Type Casting continued

```
x = 3.14159
```

```
y = 20
```

```
s = '20'
```

```
t = '111'
```

<code>int(s)</code>	→	20
<code>int(y)</code>	→	error
<code>str(x)</code>	→	'3.14159'
<code>int(t, 2)</code>	→	7
<code>int(t, 8)</code>	→	73

7

Operators

- Mostly standard: +, -, *, /, %, **
- Many other functions live in the math module (import math)
- One thing to be careful of
 - Python 3:
 - / is real division even if both operands are ints
 - // is int division
 - Python 2:
 - / is int division if both operands are ints
 - / is real division if at least one operand is a float

8

Operator Precedence

- No surprises
 - parentheses
 - exponentiation
 - multiplication/division
 - addition/subtraction
- “I don’t work very hard to remember rules for other operators. If I can’t tell by looking at the expression, I use parentheses to make it obvious.”

9

String Operators

- We will see string methods later. Here are a couple of useful operators.
- **+ string concatenation**
 - `s1 = 'This is '`
 - `s2 = 'a test.'`
 - `print s1 + s2`
- *** string repeat**
 - `s = 'spam '`
 - `print s * 4 + 'eggs, bacon, and spam'`

10