YaleNUSCollege

YSC2239 Lecture 02

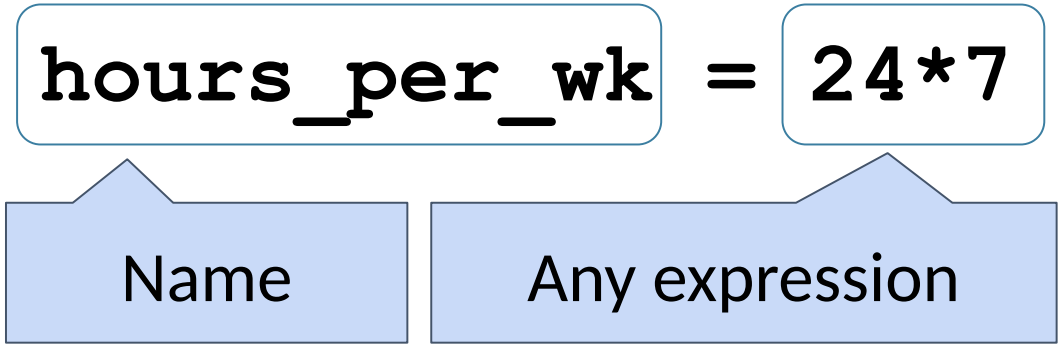
Today’s class

- Python basics
- Tables
- Data types

- Reading: Chapter 3, 4, 5

Names

Assignment Statements

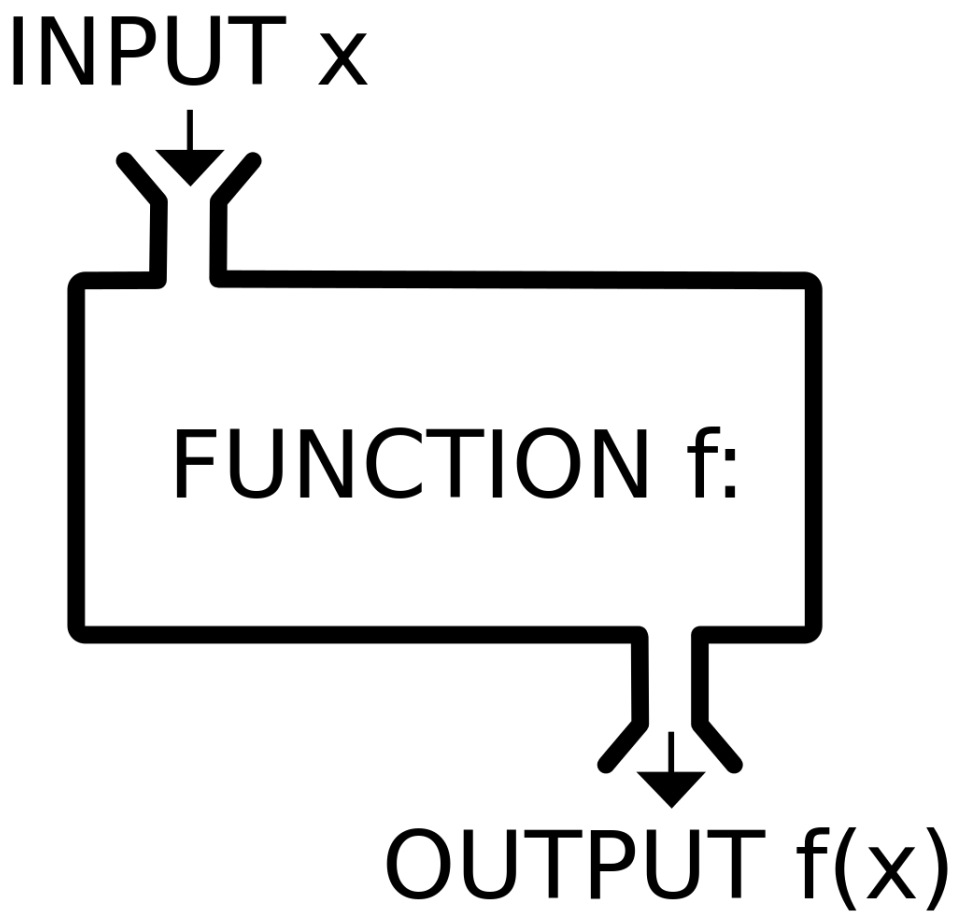


- Statements don't have a value; they perform an action
- An assignment statement changes the meaning of the name to the left of the = symbol
- The name is bound to a value (not an equation)

(Demo)

Functions

Functions



Anatomy of a Call Expression

What function to call

Argument/parameter/input to the function

f(27)

"Call f on 27."

Anatomy of a Call Expression

What function to call

First argument/parameter

Second argument/parameter

min(15, 27)

(Demo)

Tables

Table Structure

- A Table is a sequence of labeled columns
- Each row represents one individual
- Data within a column represents one attribute of the individuals

Label

Name	Code	Area (m2)
California	CA	163696
Nevada	NV	110567

Row

Column

(Demo)

Some Table Operations

- `t.select(label)` - constructs a new table with just the specified columns
- `t.drop(label)` - constructs a new table in which the specified columns are omitted
- `t.sort(label)` - constructs a new table with rows sorted by the specified column
- `t.where(label, condition)` - constructs a new table with just the rows that match the condition

Numbers

(Demo)

Ints and Floats

Python has two real number types

- **`int`**: an integer of any size
- **`float`**: a number with an optional fractional part

An **`int`** never has a decimal point; a **float** always does

A **`float`** might be printed using scientific notation

Three limitations of float values:

- They have limited size (but the limit is huge)
- They have limited precision of 15-16 decimal places
- After arithmetic, the final few decimal places can be wrong

Strings

(Demo)

Text and Strings

A string value is a snippet of text of any length

- `'a'`
- `'word'`
- `"there can be 2 sentences. Here's the second!"`

Strings consisting of numbers can be converted to numbers

- `int('12')`
- `float('1.2')`

Any value can be converted to a string

- `str(5)`

Discussion Question

Assume you have run the following statements:

```
x = 3
y = '4'
z = '5.6'
```

What's the source of the error in each example?

```
A.x + y
B.x + int(y + z)
C.str(x) + int(y)
D.y + float(z)
```

Types

(Demo)

Every value has a type

We’ve seen 5 types so far:

- `int: 2`
- `float: 2.2`
- `str: 'Red fish, blue fish'`
- `builtin_function_or_method: abs`
- `Table`

The `type` function can tell you the type of a value

- `type(2)`
- `type(2 + 2)`

An expression’s “type” is based on its value, not how it looks

- `x = 2`
- `type(x)`

Conversions

Strings that contain numbers can be converted to numbers

- `int('12')`
- `float('1.2')`
- ~~`float('one point two')`~~ `# Not a good idea!`

Any value can be converted to a string

- `str(5)`

Numbers can be converted to other numeric types

- `float(1)`
- `int(1.2) # DANGER: loses information!`

To do

- Lab 1