

# CompSci 190: Python & Tables

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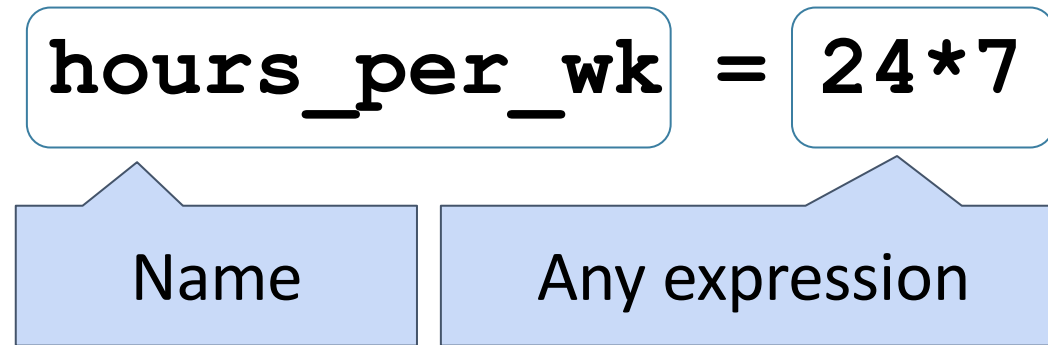
# Plan For The Day (PFTD)

- Review the key concepts from Lab 0 & Chapter 3 about Python expressions
- Be able to view data from files in *tables*

# Programming Languages

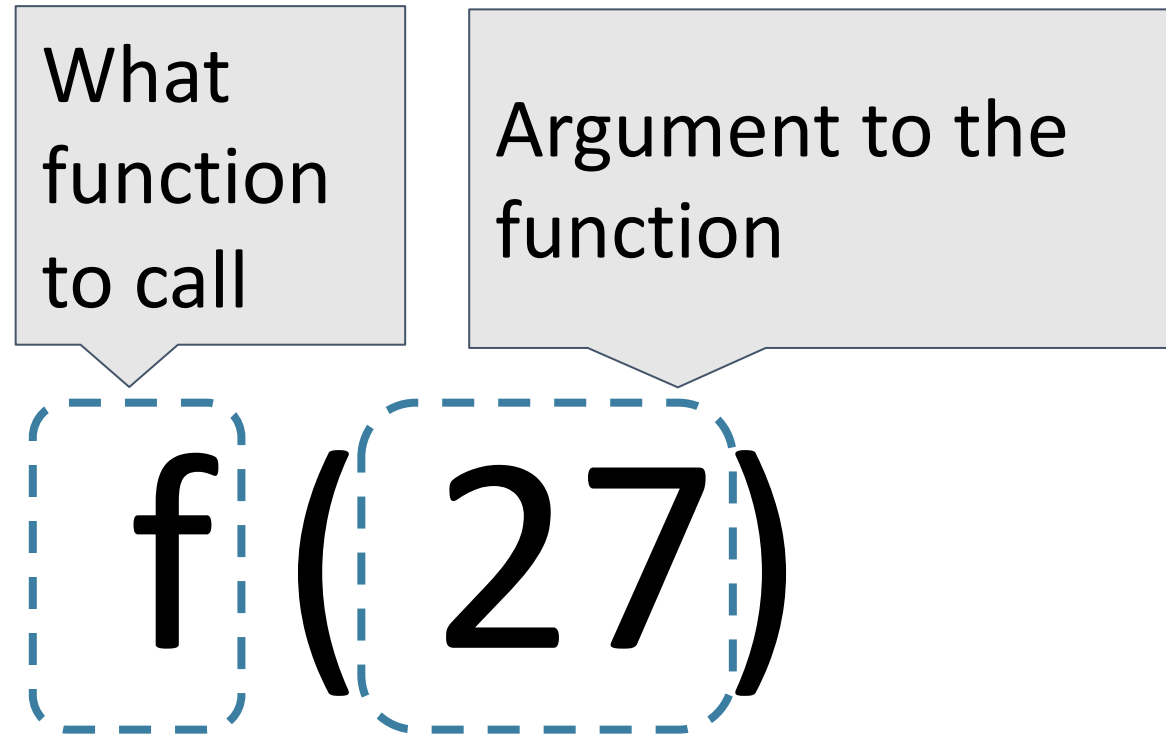
- Python is popular both for data science & general software development
- Mastering the language fundamentals is critical
- Learn through practice, not by reading or listening
- Follow along in Jupyter notebook

# Assignment Statements



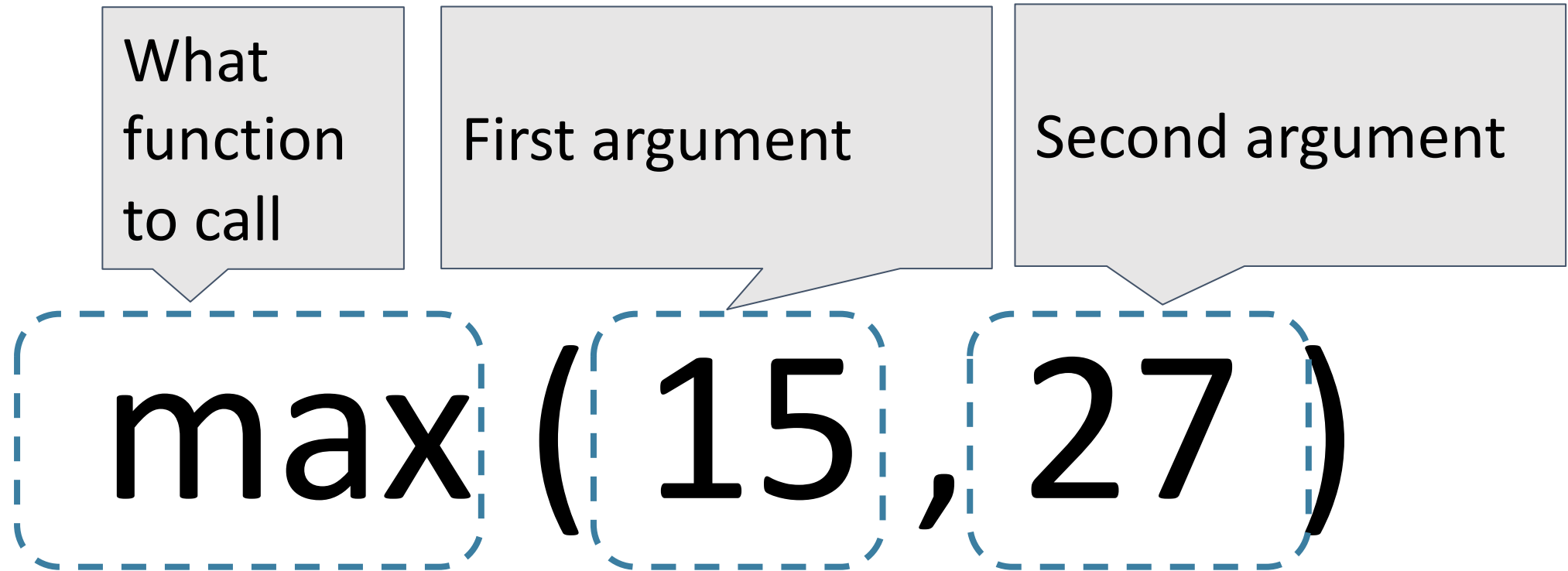
- Statements don't have a value; they perform an action
- An assignment statement changes the meaning of the name to the left of the `=` symbol
- The name is bound to a value (not an equation)

# Anatomy of a Call Expression



“Call f on 27.”

# Anatomy of a Call Expression



<http://bit.ly/FoDS-f18-0903-1>

# Documenting Code

- Why?
  - Communicate the algorithm to a human
- Write a Markdown cell
- Write *comments*
- Use *informative names*
  - Use nouns
  - Abstraction: What does your code do?
  - Implementation: How does it do it?

# Table Structure

- We organize our data in tables
- A Table is a sequence of labeled columns
- Data within a column should be of the same "type"

The diagram illustrates the structure of a table with three columns: Name, Code, and Area (mi²). The first row contains the column headers. The second and third rows contain data for North Carolina and South Carolina, respectively. Annotations include a 'Label' box pointing to the 'Code' header, a 'Row' box pointing to the 'South Carolina' row, and a 'Column' box pointing to the 'Code' column. A blue rounded rectangle highlights the 'Code' column data for the first two data rows, and another blue rounded rectangle highlights the 'South Carolina' row data.

Name	Code	Area (mi²)
North Carolina	NC	53,819.16
South Carolina	SC	32,020.49



# Table Operations

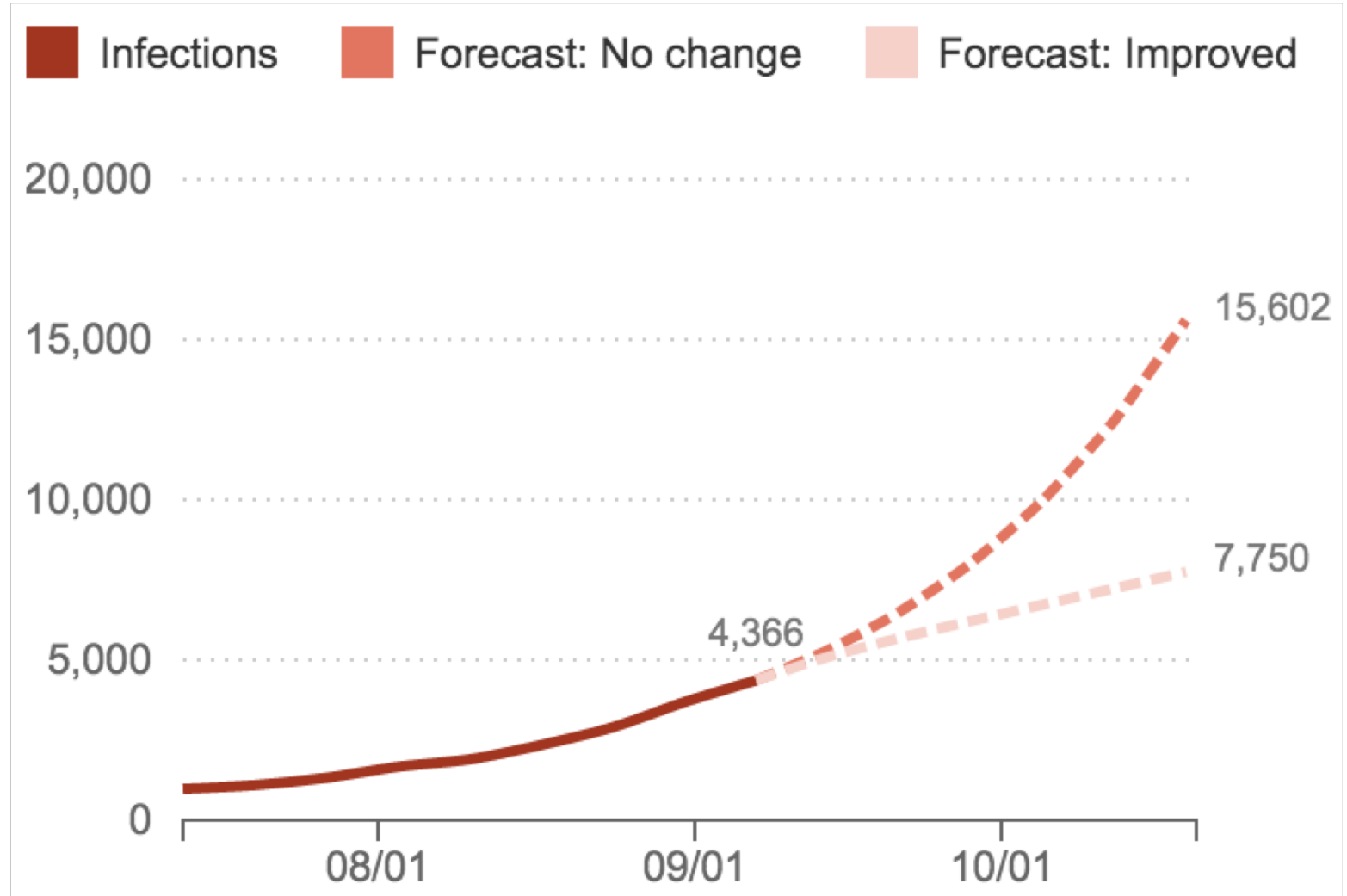
- `t.select(label)` - constructs a new table with just the specified columns
- `t.sort(label)` - constructs a new table, with rows sorted by the specified column
- `t.where(label, condition)` - constructs a new table with just the rows that match the condition

# Ebola Epidemic, Sept. 2014

## A Frightening Curve: How Fast Is The Ebola Outbreak Growing?

"It's spreading and growing *exponentially*," President Obama said.

"This is a disease outbreak that is advancing in an exponential fashion," said Dr. David Nabarro, who is heading the U.N.'s effort against Ebola.



# Growth Rate

- The rate of increase per unit time
- After one time unit, a quantity **x** growing at rate **g** will be

$$\mathbf{x} * (1 + \mathbf{g})$$

- After **t** time units, a quantity **x** growing at rate **g** will be

$$\mathbf{x} * (1 + \mathbf{g}) ** \mathbf{t}$$

- If **after** and **before** are measurements of the same quantity taken **t** time units apart, then the *growth rate* is

$$(\mathbf{after}/\mathbf{before}) ** (1/\mathbf{t}) - 1$$

(Demo)

# What's next?

- Read Chapter 4 of [\*Computational and Inferential Thinking\*](#)
- Come ready on Tuesday for Lab