Part 2.1: Introduction to Python

Printing, Variables and String Slices

Dana L Carper and Travis J Lawrence

Quantitative and Systems Biology

University of California, Merced

Objectives: Second Half

- Learn Python3

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  - Programming logic applies to all languages

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  - Each programming language has pros and cons
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  - Free
  - Easy to learn
  - Runs on almost anything
  - Well documented

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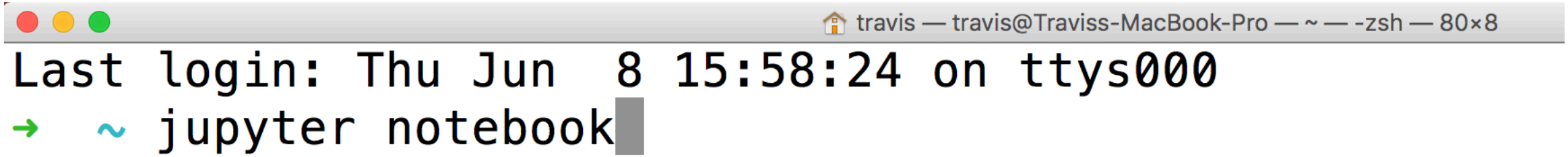
  - Programming logic applies to all languages
  - Each programming language has pros and cons
- Why Python3?
  - Free
  - Easy to learn
  - Runs on almost anything
  - Well documented
  - Increased use among scientists

Objectives: 2.1

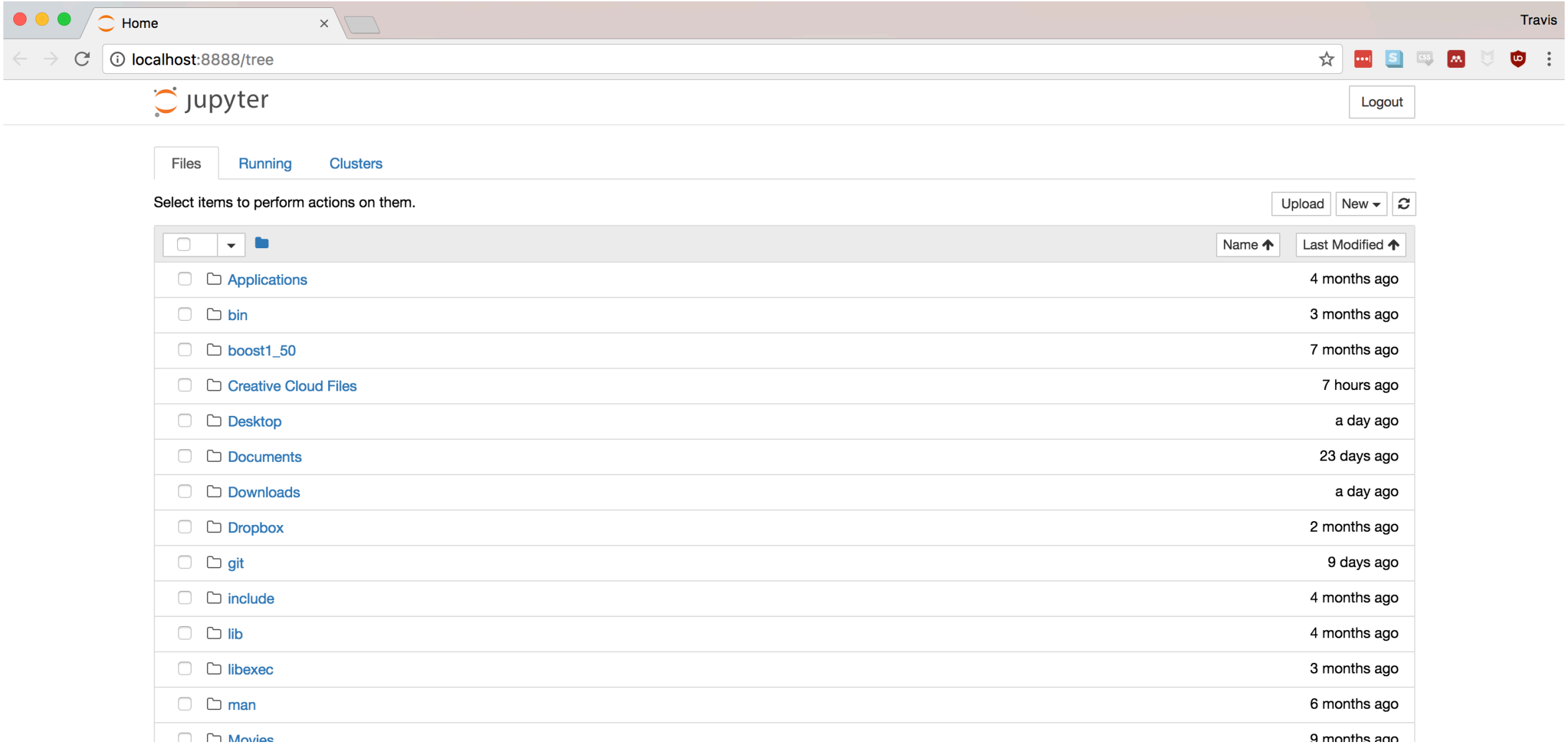
1. Assigning values to variables
2. Printing to terminal
3. Perform operations on variables
4. Indexing and slice strings

Jupyter Notebook

- Interactive environment for writing and running code.
  - We installed it early with pip3
- Runs in your browser
- Starting Jupyter Notebook



Jupyter Server



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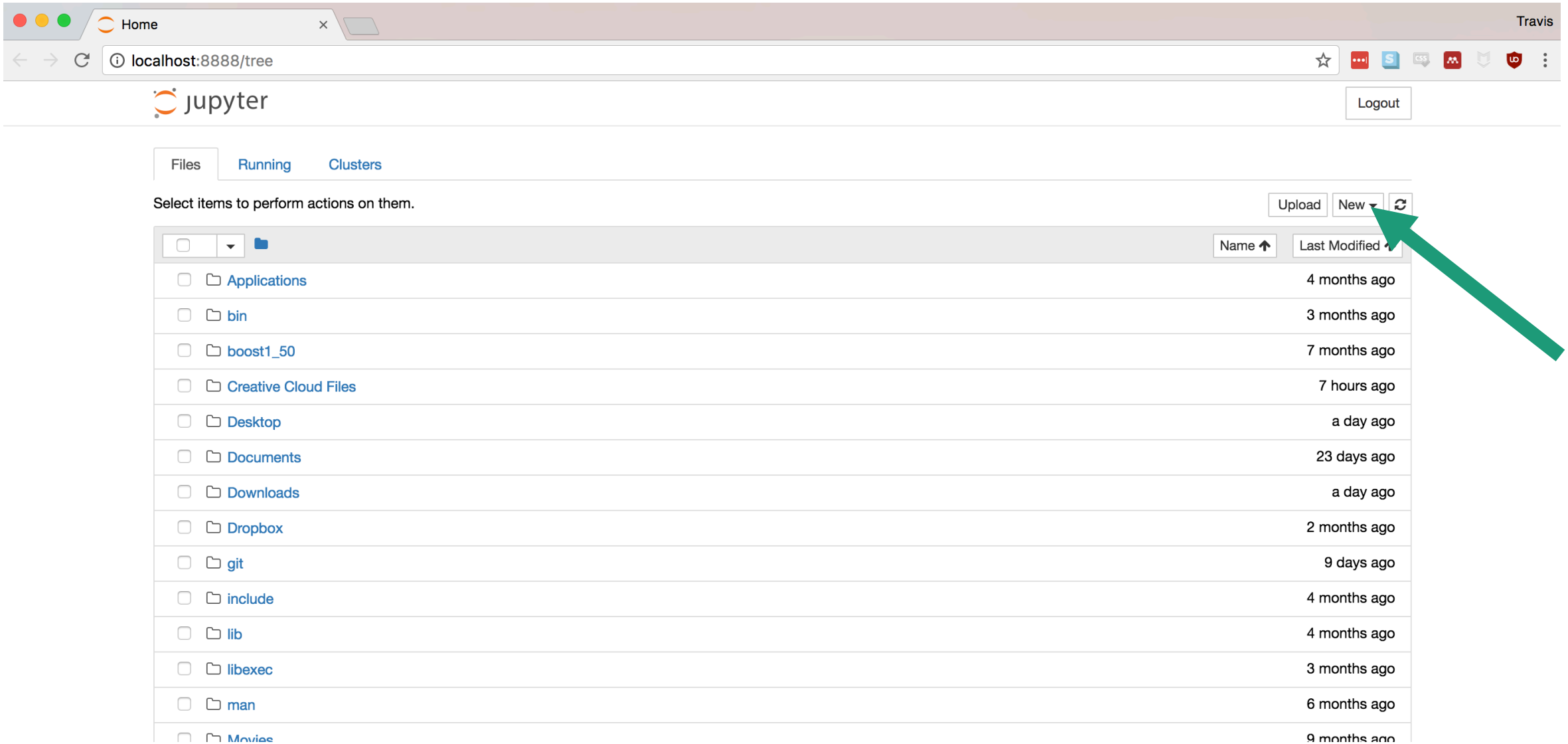

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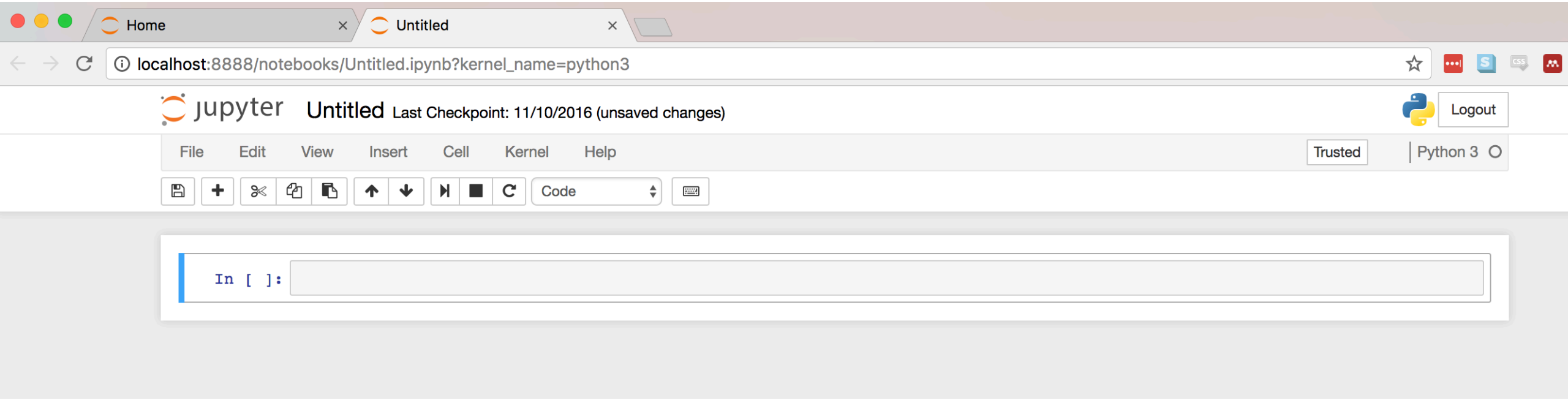
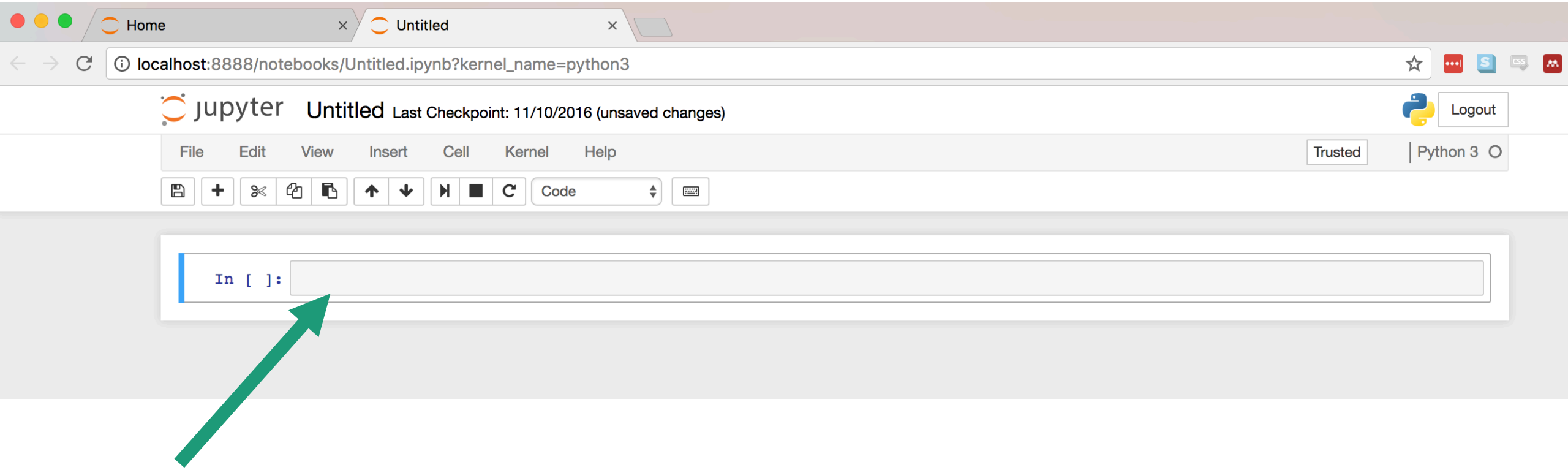
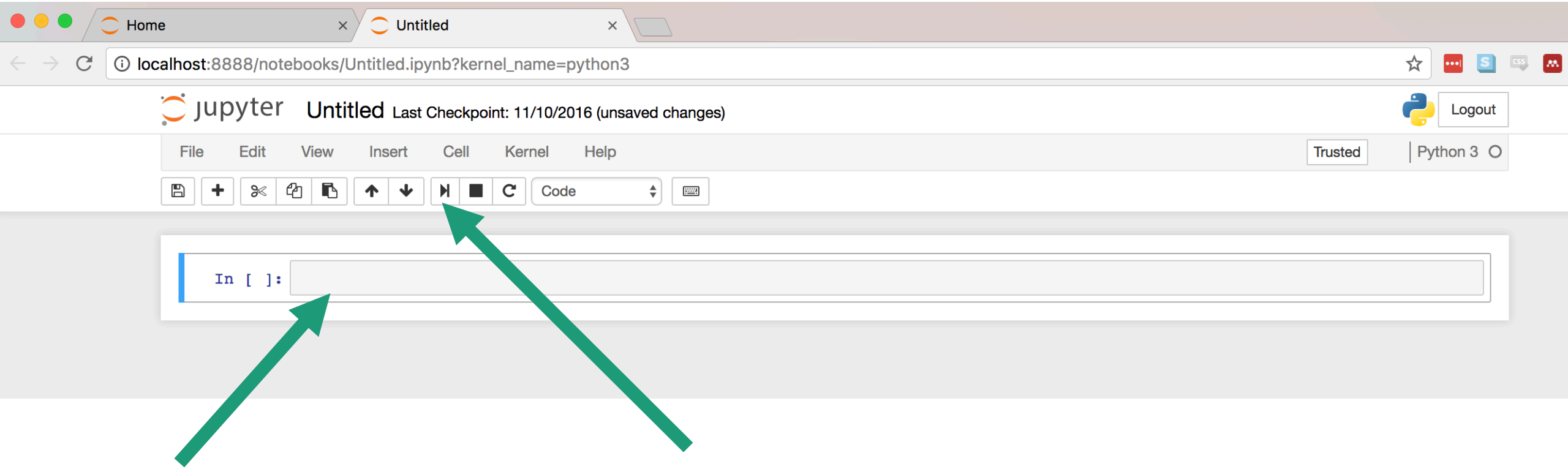


Jupyter Notebook



This is a code cell. You enter code to run in this cell type.

Jupyter Notebook



This is a code cell. You enter code to run in this cell type.

This button runs the code in the active cell. Any output is placed in an output cell.

Variables: Assigment

```
In [1]: number_of_samples = 46
        average_sequence_length = 5.98
        sample_name = "Penstemon azureus"
```

```
In [ ]:
```

- A variable is just a label for a value
- Variables are created using the **=** symbol
- Python variables must start with a letter
- Variables are case sensitive

Variables: Printing

In [6]:
```
print(number_of_samples)
print(average_sequence_length)
print(sample_name)
print("An interesting plant is", sample_name)
print("We have", number_of_samples, "samples with an average length of",
      average_sequence_length, "from", sample_name)
```

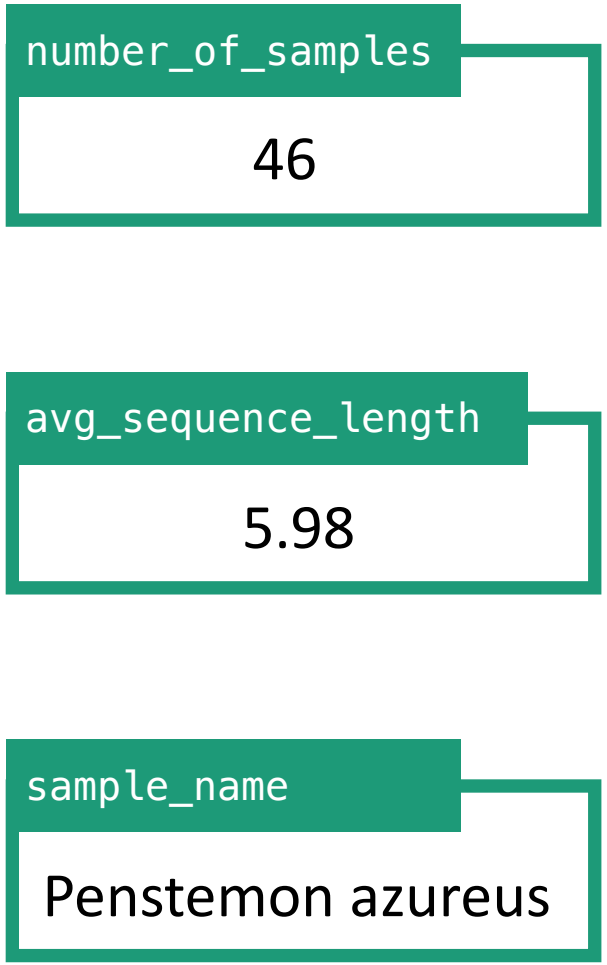
```
46
5.98
Penstemon azureus
An interesting plant is Penstemon azureus
We have 46 samples with an average length of 5.98 from Penstemon azureus
```

- Variables can be printed to the screen using the Python3 print function
- The print function's input is always surrounded by parenthesis
- A newline character is added to the output of the print function
- Multiple variables can be printed if separated by commas

Variables

- Think about variables as labeled boxes

```
number_of_samples = 46
avg_sequence_length = 5.98
sample_name = "Penstemon"
```



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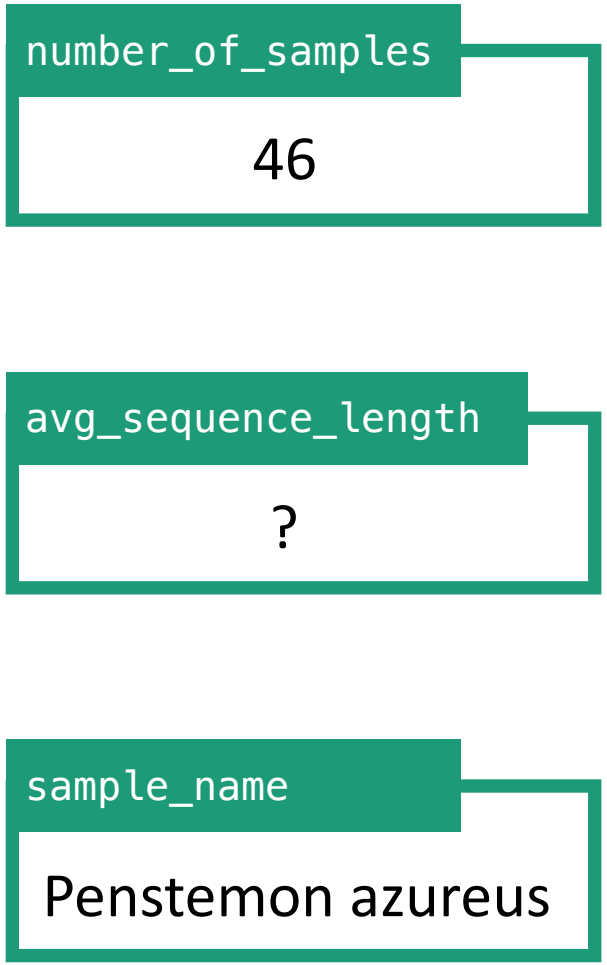
- Reassigning values

```
avg_sequence_length = number_of_samples
```



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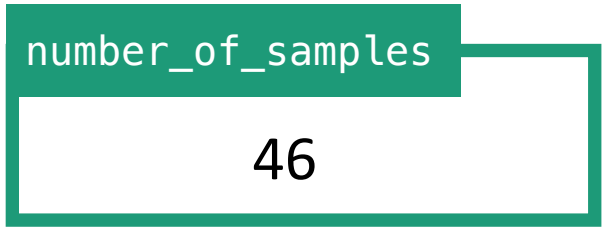

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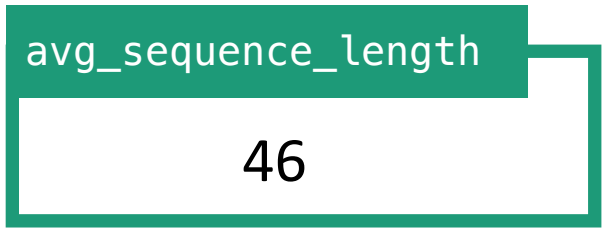

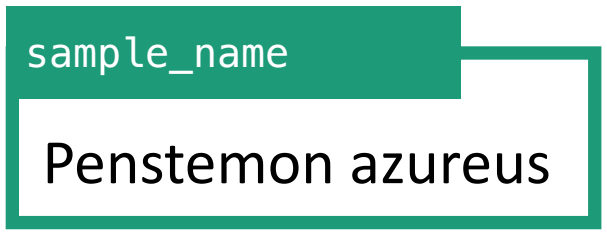

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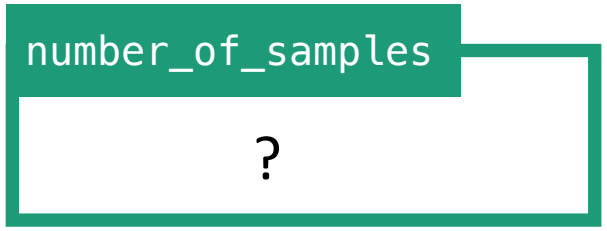

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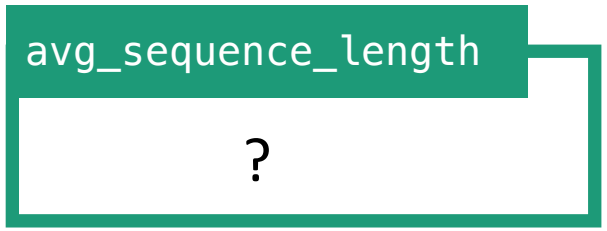
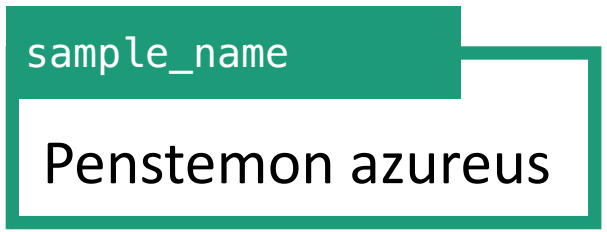



```
number_of_samples = 57
```



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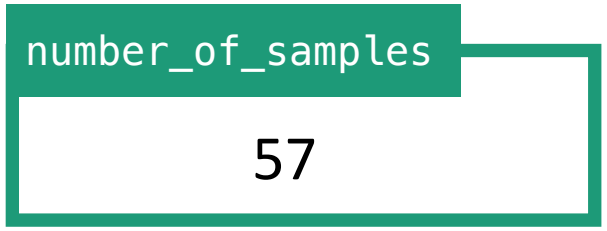

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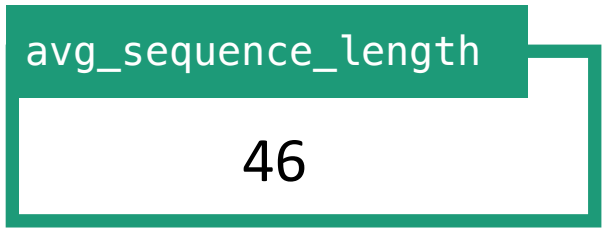


```
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```

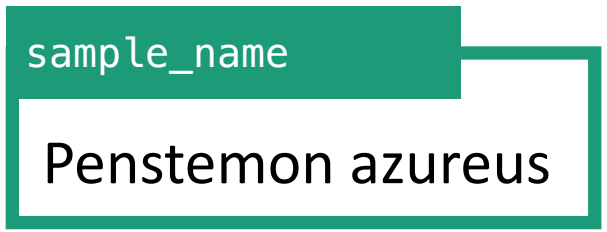

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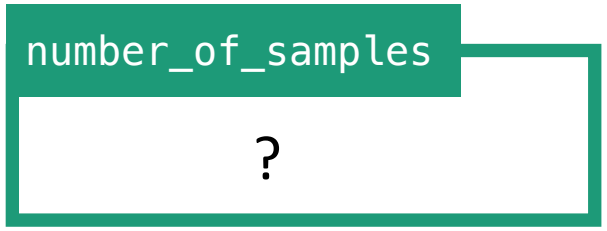

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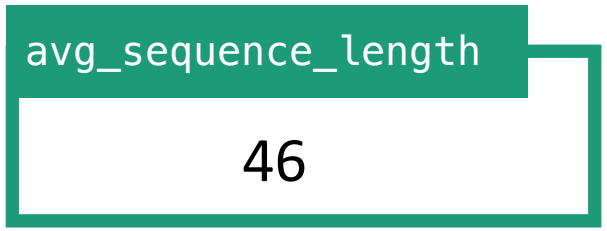
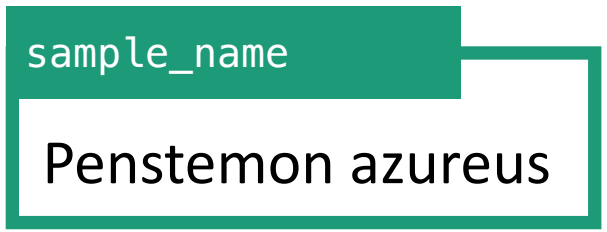



```
number_of_samples = 57
```

```
number_of_samples = number_of_samples + 1
```



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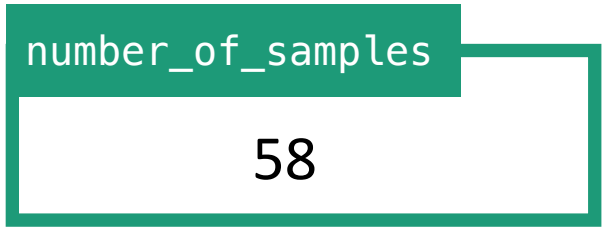

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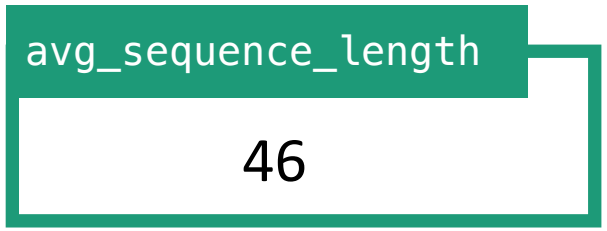


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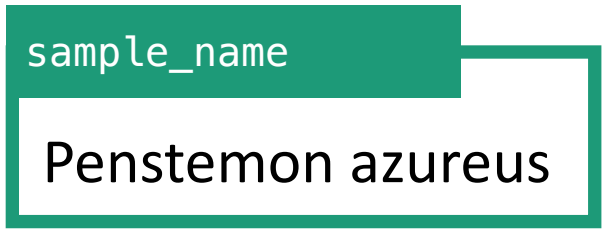

Variable Types

- Integer: This type of variable is used for whole numbers

```
x = 5
y = 4
z = 9
```

- Float: This type of variable is used for numbers with decimals

```
x = 5.1
y = 4.0
z = 9.5
```

- String: The type of variable is used for text data

```
x = "5.1"
y = "4.0"
z = "9"
```

Variables: Operators

- `+` Addition
- `–` Subtraction
- `*` Multiplication
- `/` Division
- `**` Exponent
- `%` Remainder

Strings: Indexing and Slicing

- Square brackets surround slicing indices

```
sample_name[begin:end:stride]
```

- Zero base indexing
  - This means the index starts at zero instead of one

```
sample_name = "Penstemon azureus"
sample_name[0:3]
```

- The ending index is not included

```
Pen
```