Sign in with your name

Nobody has responded yet.

Hang tight! Responses are coming in.

Start the presentation to see live content. For screen share software, share the entire screen. Get help at **pollev.com/app**

J233
Coding for Journalists

LECTURER
Soo Oh

PROMPTS

Sign in to
https://pollev.com/soooh

start Zoom recording

Agenda

Announcements

Homework review

Functions

- Review
- Tests with `assert`
- Lambda functions

BREAK

Data structures

Homework

Announcements

Next week is a Zoom lecture! Zoom link will be put in Slack channel.

Homework Review

Answers

Code style

ChatGPT

```
# Write a function that takes in a number and returns
# the negative of that number.

def negative(n):
    return -n


# Write a function in Python that converts degrees
# Fahrenheit to degrees Celsius. (To convert
# temperatures in degrees Fahrenheit to Celsius,
# subtract 32 and multiply by 5/9.)

def f_to_c(f):
    return (f - 32) * 5/9
```

Homework Review

Answers

Code style

ChatGPT

Don’t put spaces after definitions (style thing).

```
def negative (n):
    return n * -1


# This is better
def negative(n):
    return n * -1
```

don’t need this space

Homework Review

Answers

Code style

ChatGPT

You don't always need so many parentheses (but it's not a bad thing).

```
# This is unnecessary!
def f_to_c(f):
    return (((f - 32) * 5)/9)


# This is fine
def f_to_c(f):
    return (f - 32) * 5/9
```

Homework Review

Answers

Code style

ChatGPT

Markdown

You got credit for using Markdown blocks. For future notebooks, include:

- Assignment name in title
- Your name somewhere at the top
- *Some* formatting for the questions, preferably using header styles

Homework Review

Answers

Code style

ChatGPT

You can create a simple Python function to return the negative of a given number like this:

python Copy code

```python
def get_negative(number):
    return -number

# Example usage:
num = 5
negative_num = get_negative(num)
print(negative_num)  # Output will be -5
```

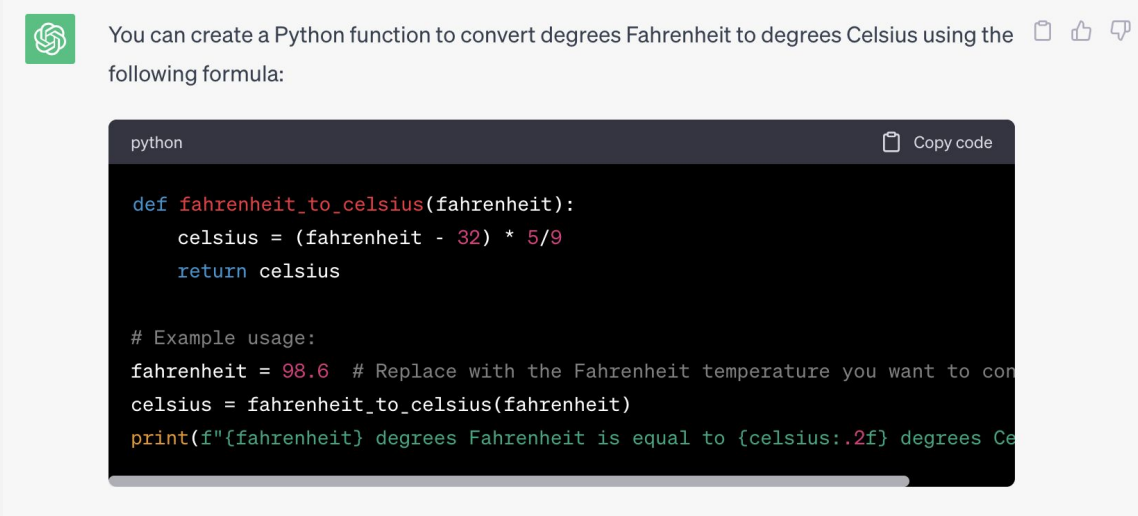
In this function, `get_negative` takes a single argument `number` and returns its negation by simply multiplying it by -1.

Homework Review

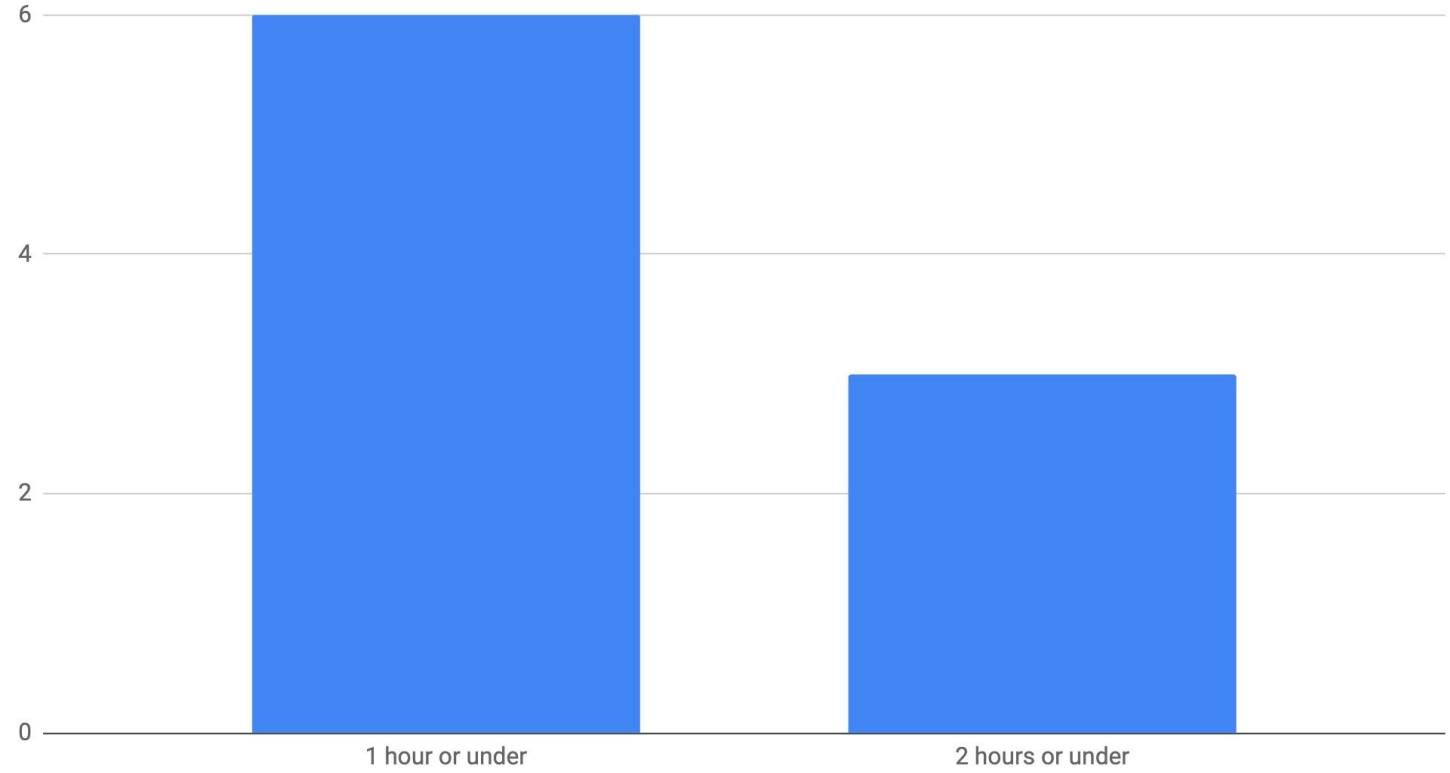
Answers

Code style

ChatGPT



Week of 0911: students grouped by time spent outside of lecture and office hours



What questions do you have?

Functions and tests

Review

Tests with assert

Lambda functions

Anatomy of a function with no arguments

```
def print_something():
    print('something')

print_something()
Out[]: 'something'

x = print_something()
Out[]: 'something'

print(x)
Out[]: None
```

We'll learn this later today!

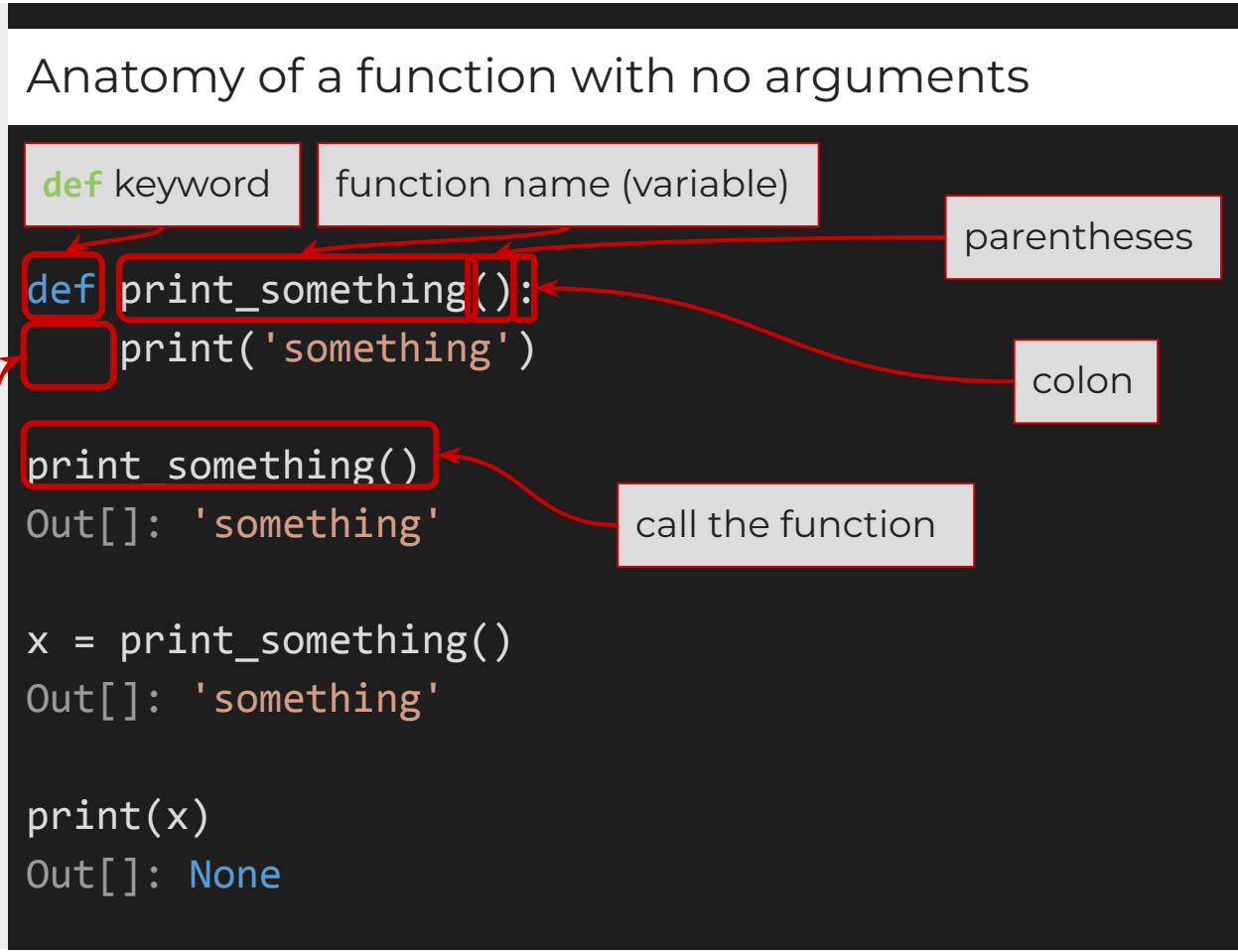
Functions and tests

Review

Tests with assert

Lambda functions

Anatomy of a function with no arguments



Functions and tests

Review

Tests with assert

Lambda functions

Anatomy of a function with parameters

```
def even_number(num):
    return num % 2 == 0



is_two_even = even_number(2)
is_two_even
Out[]: True
```

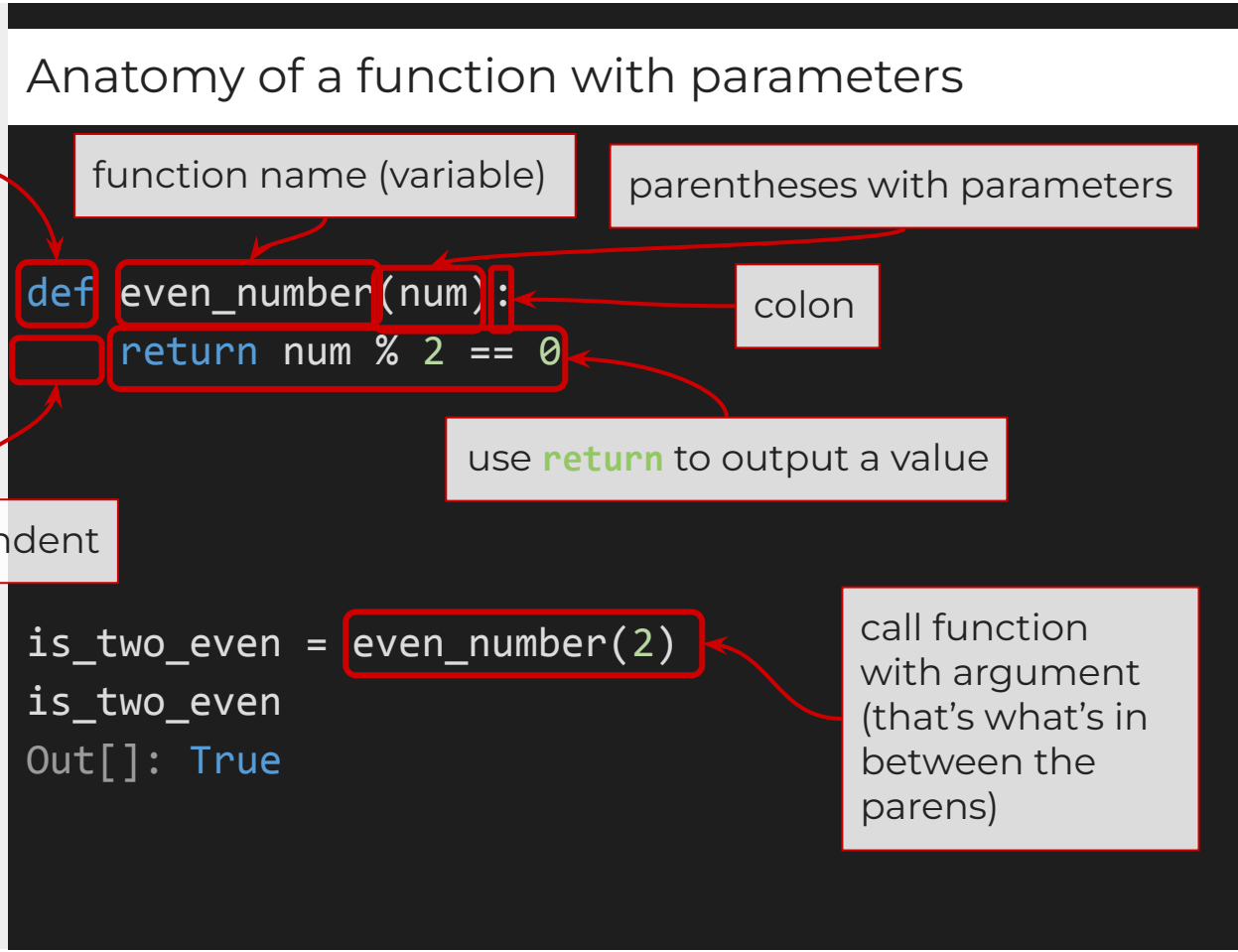
Functions and tests

Review

Tests with assert

Lambda functions

Anatomy of a function with parameters



Let’s work on an example

Create a notebook for this lecture

What'd you name your notebook? Where did you place it?

Nobody has responded yet.

Hang tight! Responses are coming in.

Start the presentation to see live content. For screen share software, share the entire screen. Get help at **pollev.com/app**

Write a function that calculates the total sales price of an item with tax (10.25%).

Nobody has responded yet.

Hang tight! Responses are coming in.

Start the presentation to see live content. For screen share software, share the entire screen. Get help at **pollev.com/app**

Functions and tests

Review

Tests with assert

Lambda functions

```
# Write a function that calculates the total sales
# price of an item with tax (10.25%)

def total_price(subtotal):
    return subtotal * 1.1025
```

Functions and tests

Review

Tests with assert

Lambda functions

```
# Write a function that calculates the total sales
# price of an item with tax (10.25%)

def total_price(subtotal):
    return subtotal * 1.1025


assert total_price(10) == 11.025
# In JupyterLab, there is no output
```

Functions and tests

Review

Tests with assert

Lambda functions

```
# Write a function that calculates the total sales
# price of an item with tax (10.25%)

def total_price(subtotal):
    return subtotal * 1.1025


assert total_price(10) == 11.025
# In JupyterLab, there is no output

# In a new cell, test a different assertion
assert total_price(10) == 11
Out[]:
```

Functions and tests

Review

Tests with assert

Lambda functions

```
# Write a function that calculates the total sales
# price of an item with tax (10.25%)

def total_price(subtotal):
    return subtotal * 1.1025


assert total_price(10) == 11.025
# In JupyterLab, there is no output

# In a new cell, test a different assertion
assert total_price(10) == 11
Out[]: Error
```

Functions and tests

Review

Tests with `assert`

Lambda functions

Lambda functions are also known as **anonymous functions**.

You don't have to `def` a lambda function, but you must write it all in one line (can be limiting).

Functions and tests

Review

Tests with `assert`

Lambda functions

```
def squared(n):
    return n ** 2
squared(4)
Out[]:
```

Functions and tests

Review

Tests with `assert`

Lambda functions

```
def squared(n):
    return n ** 2
squared(4)
Out[]: 16
```

Functions and tests

Review

Tests with assert

Lambda functions

```
def squared(n):
    return n ** 2
squared(4)
Out[]: 16

# lambdas (a.k.a. anonymous) functions can only be
# written in one line (not multi-line like defined
# functions)


squared = lambda n: n**2
squared(4)
Out[]:
```

Functions and tests

Review

Tests with assert

Lambda functions

```
def squared(n):
    return n ** 2
squared(4)
Out[]: 16

# lambdas (a.k.a. anonymous) functions can only be
# written in one line (not multi-line like defined
# functions)


squared = lambda n: n**2
squared(4)
Out[]: 16
```

Functions and tests

Review

Tests with assert

Lambda functions

```
def squared(n):
    return n ** 2
squared(4)
Out[]: 16

# lambdas (a.k.a. anonymous) functions can only be
# written in one line (not multi-line like defined
# functions)


squared = lambda n: n**2
squared(4)
Out[]: 16

exponents = lambda n, p: n**p
```

Functions and tests

Review

Tests with assert

Lambda functions

```
def squared(n):
    return n ** 2
squared(4)
Out[]: 16

# lambdas (a.k.a. anonymous) functions can only be
# written in one line (not multi-line like defined
# functions)


squared = lambda n: n**2
squared(4)
Out[]: 16

exponents = lambda n, p: n**p
exponents(4, 3)
Out[]:
```

Functions and tests

Review

Tests with assert

Lambda functions

```
def squared(n):
    return n ** 2
squared(4)
Out[]: 16

# lambdas (a.k.a. anonymous) functions can only be
# written in one line (not multi-line like defined
# functions)


squared = lambda n: n**2
squared(4)
Out[]: 16

exponents = lambda n, p: n**p
exponents(4, 3)
Out[]: 64
```

Functions and tests

Review

Tests with `assert`

Lambda functions

Anatomy of a lambda function with parameters

```
squared = lambda n: n**2


exponents = lambda n, p: n**p
```

Functions and tests

Review

Tests with assert

Lambda functions

Anatomy of a lambda function with parameters

```
squared = lambda n: n**2

exponents = lambda n, p: n**p
```

These lambda functions are named, but in the future, you will not always need to name them!

Functions and tests

Review

Tests with `assert`

Lambda functions

Anatomy of a lambda function with parameters

```
squared = lambda n: n**2

exponents = lambda n, p: n**p
```

keyword `lambda`

Functions and tests

Review

Tests with assert

Lambda functions

Anatomy of a lambda function with parameters

```
squared = lambda n: n**2


exponents = lambda n, p: n**p
```

parameters, separated by a comma if you have more than one

Functions and tests

Review

Tests with assert

Lambda functions

Anatomy of a lambda function with parameters

```
squared = lambda n: n**2

exponents = lambda n, p: n**p
```

colon

Functions and tests

Review

Tests with assert

Lambda functions

Anatomy of a lambda function with parameters

```
squared = lambda n: n**2

exponents = lambda n, p: n**p
```

what the function returns, without using the `return` keyword

Rewrite the sales tax function you wrote earlier as a lambda function.

Nobody has responded yet.

Hang tight! Responses are coming in.

Start the presentation to see live content. For screen share software, share the entire screen. Get help at **pollev.com/app**

Functions and tests

Review

Tests with assert

Lambda functions

```
# Rewrite the sales tax function as a lambda
total_price_2 = lambda subtotal: subtotal * 1.1025
```

What questions do you have?

Data structures

`string` indexing

`list`

`set`

`dict`

methods

↬ `None`

↬ mutable vs. immutable

tuples

loops

Data structures are... structures to hold data.

Data structures

- `string` indexing
- `list`
- `set`
- `dict`
- methods
  - ↬ `None`
  - ↬ mutable vs. immutable
- tuples
- loops

```
university = 'Berkeley'
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
university = 'Berkeley'

len(university)
Out[]:
```

Data structures

- `string` indexing
- `list`
- `set`
- `dict`
- methods
  - ↬ `None`
  - ↬ mutable vs. immutable
- tuples
- loops

```
university = 'Berkeley'

len(university)
Out[]: 8
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
university = 'Berkeley'

len(university)
Out[]: 8

university[0]
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
university = 'Berkeley'

len(university)
Out[]: 8

university[0]
Out[]: 'B'
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
university = 'Berkeley'

len(university)
Out[]: 8

university[0]
Out[]: 'B'

university[8]
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
university = 'Berkeley'

len(university)
Out[]: 8

university[0]
Out[]: 'B'

university[8]
Out[]: Error
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
university = 'Berkeley'

len(university)
Out[]: 8

university[0]
Out[]: 'B'

university[8]
Out[]: Error

university[-1]
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
university = 'Berkeley'

len(university)
Out[]: 8

university[0]
Out[]: 'B'

university[8]
Out[]: Error

university[-1]
Out[]: 'y'
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
university = 'Berkeley'

len(university)
Out[]: 8

university[0]
Out[]: 'B'

university[8]
Out[]: Error

university[-1]
Out[]: 'y'

university[:2]
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
university = 'Berkeley'

len(university)
Out[]: 8

university[0]
Out[]: 'B'

university[8]
Out[]: Error

university[-1]
Out[]: 'y'

university[:2]
Out[]: 'Be'
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
university = 'Berkeley'

university[5:]
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
university = 'Berkeley'

university[5:]
Out[]: 'ley'
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
university = 'Berkeley'

university[5:]
Out[]: 'ley'

university[:-2]
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
university = 'Berkeley'

university[5:]
Out[]: 'ley'

university[:-2]
Out[]: 'Berkel'
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
university = 'Berkeley'

university[5:]
Out[]: 'ley'

university[:-2]
Out[]: 'Berkel'

university[2:4]
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
university = 'Berkeley'

university[5:]
Out[]: 'ley'

university[:-2]
Out[]: 'Berkel'

university[2:4]
Out[]: 'rk'
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
# just like int() and float(),
# we also have str()
# converts elements into strings

str(432)
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
# just like int() and float(),
# we also have str()
# converts elements into strings

str(432)
Out[]: '432'
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
# just like int() and float(),
# we also have str()
# converts elements into strings

str(432)
Out[]: '432'

str(432.0)
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
# just like int() and float(),
# we also have str()
# converts elements into strings

str(432)
Out[]: '432'

str(432.0)
Out[]: '432.0'
```

What questions do you have?

Break

Meet back in 15 minutes.

7:15 pm

Screenshare and start Zoom recording

Data structures

- `string` indexing
- `list`
- `set`
- `dict`
- methods
  - ↬ `None`
  - ↬ mutable vs. immutable
- tuples
- loops

A `list` is an ordered collection of elements.

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
j233 = ['Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey']
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
j233 = ['Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey']

len(j233)
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
j233 = ['Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey']

len(j233)
Out[]: 9
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
j233 = ['Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey']

len(j233)
Out[]: 9

j233[0]
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
j233 = ['Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey']

len(j233)
Out[]: 9

j233[0]
Out[]: 'Saumya'
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
j233 = ['Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey']

len(j233)
Out[]: 9

j233[0]
Out[]: 'Saumya'

j233[9]
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
j233 = ['Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey']

len(j233)
Out[]: 9

j233[0]
Out[]: 'Saumya'

j233[9]
Out[]: Error
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
j233 = ['Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey']

j233[-1]
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
j233 = ['Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey']

j233[-1]
Out[]: 'Hailey'
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
j233 = ['Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey']

j233[-1]
Out[]: 'Hailey'

j233[2:6]
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
j233 = ['Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey']

j233[-1]
Out[]: 'Hailey'

j233[2:6]
Out[]: ['Nadia', 'Wendy', 'Mitzi', 'Iris']
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
j233 = ['Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey']

j233[-1]
Out[]: 'Hailey'

j233[2:6]
Out[]: ['Nadia', 'Wendy', 'Mitzi', 'Iris']

# list method: list.sort()
j233.sort()
j233
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
j233 = ['Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey']

j233[-1]
Out[]: 'Hailey'

j233[2:6]
Out[]: ['Nadia', 'Wendy', 'Mitzi', 'Iris']

# list method: list.sort()
j233.sort()
j233
Out[]: ['Hailey',  'Iris',  'Jeremiah',  'Melanie',
'Mitzi',  'Nadia',  'Saumya',  'Simmerdeep',
'Wendy']
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
j233 = ['Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey']

# list method: in
'Soo' in j233
Out[]:
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
j233 = ['Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey']

# list method: in
'Soo' in j233
Out[]: False
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
j233 = ['Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey']

# list method: in
'Soo' in j233
Out[]: False

# list method: not in
'Soo' not in j233
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
j233 = ['Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey']

# list method: in
'Soo' in j233
Out[]: False

# list method: not in
'Soo' not in j233
Out[]: True
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
random_numbers = [3, 0, 10, -2, 10, 7, -2]
random_numbers.sort()
random_numbers
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
random_numbers = [3, 0, 10, -2, 10, 7, -2]
random_numbers.sort()
random_numbers
Out[]: [-2, -2, 0, 3, 7, 10, 10]
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
random_numbers = [3, 0, 10, -2, 10, 7, -2]
random_numbers.sort()
random_numbers
Out[]: [-2, -2, 0, 3, 7, 10, 10]


# a list can be made of different types
# but it's not ideal
random_numbers_plus_bear = [3, 0, 10, -2, 10, 7,
-2, 'bear']
random_numbers_plus_bear.sort()
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
random_numbers = [3, 0, 10, -2, 10, 7, -2]
random_numbers.sort()
random_numbers
Out[]: [-2, -2, 0, 3, 7, 10, 10]


# a list can be made of different types
# but it's not ideal
random_numbers_plus_bear = [3, 0, 10, -2, 10, 7,
-2, 'bear']
random_numbers_plus_bear.sort()
Out[]: Error
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
j233 = ['Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey',
'Soo']
lecturers = ['Soo', 'Yoli']
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
j233 = ['Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey',
'Soo']
lecturers = ['Soo', 'Yoli']


# combine 2 lists
everyone = j233 + lecturers
everyone
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
j233 = ['Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey',
'Soo']
lecturers = ['Soo', 'Yoli']


# combine 2 lists
everyone = j233 + lecturers
everyone
Out[]: ['Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey',
'Soo', 'Soo', 'Yoli']
# 'Soo' is repeated
```

What questions do you have?

Data structures

- `string` indexing
- `list`
- `set`
- `dict`
- methods
  - ↬ `None`
  - ↬ mutable vs. immutable
- tuples
- loops

A `set` is an unordered collection with no duplicate elements.

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
everyone
Out[]: ['Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey',
'Soo', 'Soo', 'Yoli']
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
everyone
Out[]: ['Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey',
'Soo', 'Soo', 'Yoli']


# new function: set()
everyone_set = set(everyone)
everyone_set
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
everyone
Out[]: ['Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey',
'Soo', 'Soo', 'Yoli']


# new function: set()
everyone_set = set(everyone)
everyone_set
Out[]: {'Hailey', 'Iris', 'Jeremiah', 'Melanie',
'Mitzi', 'Nadia', 'Saumya', 'Simmerdeep', 'Soo',
'Wendy', 'Yoli'}
```

How is set different from list? (No limit to responses)

Nobody has responded yet.

Hang tight! Responses are coming in.

Start the presentation to see live content. For screen share software, share the entire screen. Get help at **pollev.com/app**

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
everyone
Out[]: ['Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey',
'Soo', 'Soo', 'Yoli']


# new function: set()
everyone_set = set(everyone)
everyone_set
Out[]: {'Hailey', 'Iris', 'Jeremiah', 'Melanie',
'Mitzi', 'Nadia', 'Saumya', 'Simmerdeep', 'Soo',
'Wendy', 'Yoli'}
```

curly braces

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
everyone
Out[]: ['Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey',
'Soo', 'Soo', 'Yoli']


# new function: set()
everyone_set = set(everyone)
everyone_set
Out[]: {'Hailey', 'Iris', 'Jeremiah', 'Melanie',
'Mitzi', 'Nadia', 'Saumya', 'Simmerdeep', 'Soo',
'Wendy', 'Yoli'}
# 'Soo' doesn't repeat
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
random_set = set([5, 3, 43343, -3, 443, 94, -93])
random_set
Out[]: {-93, -3, 3, 5, 94, 443, 43343}
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
random_set = set([5, 3, 43343, -3, 443, 94, -93])
random_set
Out[]: {-93, -3, 3, 5, 94, 443, 43343}
# note that it doesn't actually sort!
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
random_set = set([5, 3, 43343, -3, 443, 94, -93])
random_set
Out[]: {-93, -3, 3, 5, 94, 443, 43343}
# note that it doesn't actually sort!

random_set[0]
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
random_set = set([5, 3, 43343, -3, 443, 94, -93])
random_set
Out[]: {-93, -3, 3, 5, 94, 443, 43343}
# note that it doesn't actually sort!

random_set[0]
Out[]: Error
# Can't be indexed because it's not ordered
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
random_set = set([5, 3, 43343, -3, 443, 94, -93])
random_set
Out[]: {-93, -3, 3, 5, 94, 443, 43343}
# note that it doesn't actually sort!

random_set[0]
Out[]: Error
# Can't be indexed because it's not ordered

set([5, 3, 43343, -3, 443, 94, -93, 'dog'])
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
random_set = set([5, 3, 43343, -3, 443, 94, -93])
random_set
Out[]: {-93, -3, 3, 5, 94, 443, 43343}
# note that it doesn't actually sort!

random_set[0]
Out[]: Error
# Can't be indexed because it's not ordered

set([5, 3, 43343, -3, 443, 94, -93, 'dog'])
Out[]: {-3, -93, 3, 43343, 443, 5, 94, 'dog'}
# This mixed 'sorted' set will print alpha
# Remember: it's not actually sorted
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
j233 = {'Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey',
'Soo'}
lecturers = {'Soo', 'Yoli'}
```

Set operations

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
j233 = {'Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey',
'Soo'}
lecturers = {'Soo', 'Yoli'}
```

& (intersection)

```
# What exists in both sets?

j233 & lecturers
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
j233 = {'Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey',
'Soo'}
lecturers = {'Soo', 'Yoli'}
```

& (intersection)

```
# What exists in both sets?

j233 & lecturers
Out[]: {'Soo'}
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
j233 = {'Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey',
'Soo'}
lecturers = {'Soo', 'Yoli'}
```

| (union)

```
# What's the combination of the set?

j233 | lecturers
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
j233 = {'Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey',
'Soo'}
lecturers = {'Soo', 'Yoli'}
```

| (union)

```
# What's the combination of the set?

j233 | lecturers
Out[]: {'Hailey', 'Iris', 'Jeremiah', 'Melanie',
'Mitzi', 'Nadia', 'Saumya', 'Simmerdeep', 'Soo',
'Wendy', 'Yoli'}
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
j233 = {'Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey',
'Soo'}
lecturers = {'Soo', 'Yoli'}
```

\- (difference)

```
# What's unique to lecturers
lecturers - j233
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
j233 = {'Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey',
'Soo'}
lecturers = {'Soo', 'Yoli'}
```

\- (difference)

```
# What's unique to lecturers
lecturers - j233
Out[]: {'Yoli'}
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
j233 = {'Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey',
'Soo'}
lecturers = {'Soo', 'Yoli'}
```

\- (difference)

```
# What's unique to lecturers
lecturers - j233
Out[]: {'Yoli'}

# What's unique to j233
j233 - lecturers
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
j233 = {'Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey',
'Soo'}
lecturers = {'Soo', 'Yoli'}
```

\- (difference)

```
# What's unique to lecturers
lecturers - j233
Out[]: {'Yoli'}

# What's unique to j233
j233 - lecturers
Out[]: {'Hailey', 'Iris', 'Jeremiah', 'Melanie',
'Mitzi', 'Nadia', 'Saumya', 'Simmerdeep', 'Wendy'}
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
j233 = {'Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey',
'Soo'}
lecturers = {'Soo', 'Yoli'}
```

^ (symmetric difference)

```
# What exists uniquely in each set?

j233 ^ lecturers
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
j233 = {'Saumya', 'Simmerdeep', 'Nadia', 'Wendy',
'Mitzi', 'Iris', 'Jeremiah', 'Melanie', 'Hailey',
'Soo'}
lecturers = {'Soo', 'Yoli'}
```

^ (symmetric difference)

```
# What exists uniquely in each set?

j233 ^ lecturers
Out[]: {'Hailey', 'Iris', 'Jeremiah', 'Melanie',
'Mitzi', 'Nadia', 'Saumya', 'Simmerdeep', 'Wendy',
'Yoli'}
```

What questions do you have?

Data structures

- `string` indexing
- `list`
- `set`
- `dict`
- methods
  - ↬ `None`
  - ↬ mutable vs. immutable
- tuples
- loops

A `dict` (dictionary) is kind of like a `set` with
`key: value` pairs.

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

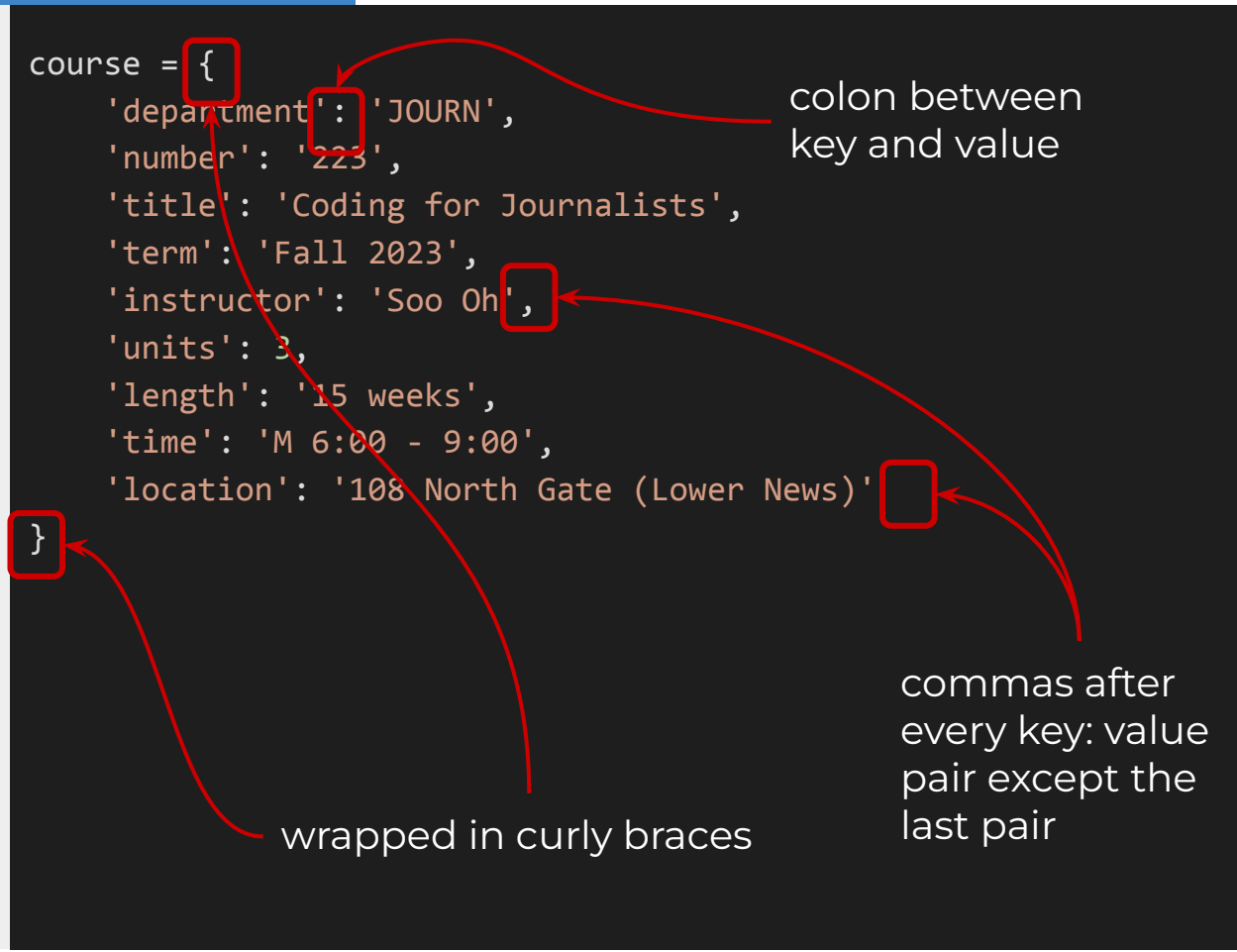
tuples

loops

```
course = {
    'department': 'JOURN',
    'number': '223',
    'title': 'Coding for Journalists',
    'term': 'Fall 2023',
    'instructor': 'Soo Oh',
    'units': 3,
    'length': '15 weeks',
    'time': 'M 6:00 - 9:00',
    'location': '108 North Gate (Lower News)'
}
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops



Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
course = {
    'department': 'JOURN',
    'number': '223',
    'title': 'Coding for Journalists',
    'term': 'Fall 2023',
    'instructor': 'Soo Oh',
    'units': 3,
    'units': 5,
    'length': '15 weeks',
    'time': 'M 6:00 - 9:00',
    'location': '108 North Gate (Lower News)'
}
```

Think of dict as a set (using curly braces) with attributes. For example, you can't have two of the same attributes.

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
course = {
    'department': 'JOURN',
    'number': '223',
    'title': 'Coding for Journalists',
    'term': 'Fall 2023',
    'instructor': 'Soo Oh',
    'units': 3,
    'length': '15 weeks',
    'time': 'M 6:00 - 9:00',
    'location': '108 North Gate (Lower News)'
}

course['department']
Out[]:
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
course = {
    'department': 'JOURN',
    'number': '223',
    'title': 'Coding for Journalists',
    'term': 'Fall 2023',
    'instructor': 'Soo Oh',
    'units': 3,
    'length': '15 weeks',
    'time': 'M 6:00 - 9:00',
    'location': '108 North Gate (Lower News)'
}

course['department']
Out[]: 'JOURN'
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
course = {
    'department': 'JOURN',
    'number': '223',
    'title': 'Coding for Journalists',
    'term': 'Fall 2023',
    'instructor': 'Soo Oh',
    'units': 3,
    'length': '15 weeks',
    'time': 'M 6:00 - 9:00',
    'location': '108 North Gate (Lower News)'
}

course['department']
Out[]: 'JOURN'

course['instructor']
Out[]:
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
course = {
    'department': 'JOURN',
    'number': '223',
    'title': 'Coding for Journalists',
    'term': 'Fall 2023',
    'instructor': 'Soo Oh',
    'units': 3,
    'length': '15 weeks',
    'time': 'M 6:00 - 9:00',
    'location': '108 North Gate (Lower News)'
}

course['department']
Out[]: 'JOURN'

course['instructor']
Out[]: 'Soo Oh'
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
course = {
    'department': 'JOURN',
    'number': '223',
    'title': 'Coding for Journalists',
    'term': 'Fall 2023',
    'instructor': 'Soo Oh',
    'units': 3,
    'length': '15 weeks',
    'time': 'M 6:00 - 9:00',
    'location': '108 North Gate (Lower News)'
}

list(course)
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
course = {
    'department': 'JOURN',
    'number': '223',
    'title': 'Coding for Journalists',
    'term': 'Fall 2023',
    'instructor': 'Soo Oh',
    'units': 3,
    'length': '15 weeks',
    'time': 'M 6:00 - 9:00',
    'location': '108 North Gate (Lower News)'
}

list(course)
Out[]: ['department', 'number', 'title', 'term', 'instructor',
'units', 'length', 'time', 'location']
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
course = {
    'department': 'JOURN',
    'number': '223',
    'title': 'Coding for Journalists',
    'term': 'Fall 2023',
    'instructor': 'Soo Oh',
    'units': 3,
    'length': '15 weeks',
    'time': 'M 6:00 - 9:00',
    'location': '108 North Gate (Lower News)'
}

'department' in course
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
course = {
    'department': 'JOURN',
    'number': '223',
    'title': 'Coding for Journalists',
    'term': 'Fall 2023',
    'instructor': 'Soo Oh',
    'units': 3,
    'length': '15 weeks',
    'time': 'M 6:00 - 9:00',
    'location': '108 North Gate (Lower News)'
}

'department' in course
Out[]: True
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
course = {
    'department': 'JOURN',
    'number': '223',
    'title': 'Coding for Journalists',
    'term': 'Fall 2023',
    'instructor': 'Soo Oh',
    'units': 3,
    'length': '15 weeks',
    'time': 'M 6:00 - 9:00',
    'location': '108 North Gate (Lower News)'
}

'department' in course
Out[]: True

'section' in course
Out[]:
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
course = {
    'department': 'JOURN',
    'number': '223',
    'title': 'Coding for Journalists',
    'term': 'Fall 2023',
    'instructor': 'Soo Oh',
    'units': 3,
    'length': '15 weeks',
    'time': 'M 6:00 - 9:00',
    'location': '108 North Gate (Lower News)'
}

'department' in course
Out[]: True

'section' in course
Out[]: False
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
course = {
    'department': 'JOURN',
    'number': '223',
    'title': 'Coding for Journalists',
    'term': 'Fall 2023',
    'instructor': 'Soo Oh',
    'units': 3,
    'length': '15 weeks',
    'time': 'M 6:00 - 9:00',
    'location': '108 North Gate (Lower News)'
}

course['location']
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
course = {
    'department': 'JOURN',
    'number': '223',
    'title': 'Coding for Journalists',
    'term': 'Fall 2023',
    'instructor': 'Soo Oh',
    'units': 3,
    'length': '15 weeks',
    'time': 'M 6:00 - 9:00',
    'location': '108 North Gate (Lower News)'
}

course['location']
Out[]: '108 North Gate (Lower News)'
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
course = {
    'department': 'JOURN',
    'number': '223',
    'title': 'Coding for Journalists',
    'term': 'Fall 2023',
    'instructor': 'Soo Oh',
    'units': 3,
    'length': '15 weeks',
    'time': 'M 6:00 - 9:00',
    'location': '108 North Gate (Lower News)'
}

course['location']
Out[]: '108 North Gate (Lower News)'

# Change the value of 'location' to 'Online via Zoom'
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
course = {
    'department': 'JOURN',
    'number': '223',
    'title': 'Coding for Journalists',
    'term': 'Fall 2023',
    'instructor': 'Soo Oh',
    'units': 3,
    'length': '15 weeks',
    'time': 'M 6:00 - 9:00',
    'location': '108 North Gate (Lower News)'
}

course['location']
Out[]: '108 North Gate (Lower News)'

# Change the value of 'location' to 'Online via Zoom'
course['location'] = 'Online via Zoom'
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
course
Out[]:
{
    'department': 'JOURN',
    'number': '223',
    'title': 'Coding for Journalists',
    'term': 'Fall 2023',
    'instructor': 'Soo Oh',
    'units': 3,
    'length': '15 weeks',
    'time': 'M 6:00 - 9:00',
    'location': 'Online via Zoom'
}
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
course
Out[]:
{
    'department': 'JOURN',
    'number': '223',
    'title': 'Coding for Journalists',
    'term': 'Fall 2023',
    'instructor': 'Soo Oh',
    'units': 3,
    'length': '15 weeks',
    'time': 'M 6:00 - 9:00',
    'location': 'Online via Zoom'
}

# Add a new key:value pair  ('section': '001')
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
course
Out[]:
{
    'department': 'JOURN',
    'number': '223',
    'title': 'Coding for Journalists',
    'term': 'Fall 2023',
    'instructor': 'Soo Oh',
    'units': 3,
    'length': '15 weeks',
    'time': 'M 6:00 - 9:00',
    'location': 'Online via Zoom'
}

# Add a new key:value pair  ('section': '001')
course['section'] = '001'
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
course
Out[]:
{
    'department': 'JOURN',
    'number': '223',
    'title': 'Coding for Journalists',
    'term': 'Fall 2023',
    'instructor': 'Soo Oh',
    'units': 3,
    'length': '15 weeks',
    'time': 'M 6:00 - 9:00',
    'location': 'Online via Zoom',
    'section': '001'
}
```

What questions do you have?

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
# Creating empty structures

empty_list = []
# is the same as
empty_list = list()
```

Data structures

string indexing

list

set

dict

methods

- None
- mutable vs. immutable

tuples

loops

```
# Creating empty structures

empty_list = []
# is the same as
empty_list = list()

empty_dict = {}
# is the same as
empty_dict = dict()
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
# Creating empty structures

empty_list = []
# is the same as
empty_list = list()

empty_dict = {}
# is the same as
empty_dict = dict()

empty_set = set()
# only one way :(
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
colors_set = {'green', 'blue', 'red', 'yellow'}
```

Data structures

string indexing

list

set

dict

methods

- None
- mutable vs. immutable

tuples

loops

```
colors_set = {'green', 'blue', 'red', 'yellow'}

# earlier we learned about set(list) and list(dict)
colors_list = list(colors_set)
colors_list
Out[]:
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
colors_set = {'green', 'blue', 'red', 'yellow'}

# earlier we learned about set(list) and list(dict)
colors_list = list(colors_set)
colors_list
Out[]: ['blue', 'yellow', 'red', 'green']
```

Data structures

string indexing

list

set

dict

methods

- None
- mutable vs. immutable

tuples

loops

```
colors_set = {'green', 'blue', 'red', 'yellow'}

# earlier we learned about set(list) and list(dict)
colors_list = list(colors_set)
colors_list
Out[]: ['blue', 'yellow', 'red', 'green']

colors_list.remove('red')
colors_list
Out[]:
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
colors_set = {'green', 'blue', 'red', 'yellow'}

# earlier we learned about set(list) and list(dict)
colors_list = list(colors_set)
colors_list
Out[]: ['blue', 'yellow', 'red', 'green']

colors_list.remove('red')
colors_list
Out[]: ['blue', 'yellow', 'green']
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
colors_set = {'green', 'blue', 'red', 'yellow'}

# earlier we learned about set(list) and list(dict)
colors_list = list(colors_set)
colors_list
Out[]: ['blue', 'yellow', 'red', 'green']

colors_list.remove('red')
colors_list
Out[]: ['blue', 'yellow', 'green']

colors_set_redux = set(colors_list)
colors_set_redux
Out[]:
```

Data structures

string indexing

list

set

dict

methods

- None
- mutable vs. immutable

tuples

loops

```
colors_set = {'green', 'blue', 'red', 'yellow'}

# earlier we learned about set(list) and list(dict)
colors_list = list(colors_set)
colors_list
Out[]: ['blue', 'yellow', 'red', 'green']

colors_list.remove('red')
colors_list
Out[]: ['blue', 'yellow', 'green']

colors_set_redux = set(colors_list)
colors_set_redux
Out[]: {'blue', 'green', 'yellow'}
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
colors_set = {'green', 'blue', 'red', 'yellow'}

# earlier we learned about set(list) and list(dict)
colors_list = list(colors_set)
colors_list
Out[]: ['blue', 'yellow', 'red', 'green']

colors_list.remove('red')
colors_list
Out[]: ['blue', 'yellow', 'green']

colors_set_redux = set(colors_list)
colors_set_redux
Out[]: {'blue', 'green', 'yellow'}

colors_set
Out[]:
```

Data structures

string indexing

list

set

dict

methods

- None
- mutable vs. immutable

tuples

loops

```
colors_set = {'green', 'blue', 'red', 'yellow'}

# earlier we learned about set(list) and list(dict)
colors_list = list(colors_set)
colors_list
Out[]: ['blue', 'yellow', 'red', 'green']

colors_list.remove('red')
colors_list
Out[]: ['blue', 'yellow', 'green']

colors_set_redux = set(colors_list)
colors_set_redux
Out[]: {'blue', 'green', 'yellow'}

colors_set
Out[]: {'blue', 'green', 'red', 'yellow'}
```

What questions do you have?

Data structures

`string` indexing

`list`

`set`

`dict`

methods

↬ None

↬ mutable vs. immutable

tuples

loops

A brief detour into None

How do you represent nothing?

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

A brief detour into None

How do you represent nothing?

store	apples	bananas	kiwis
Store A	52	9	27
Store B	2		100
Store C	0	53	4

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

A brief detour into None

How do you represent nothing?

store	apples	bananas	kiwis
Store A	52	9	27
Store B	2		100
Store C	0	53	4

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
store_b =  {
    'store': 'Store B',
    'apples': 2,
    'bananas': None,
    'kiwis': 100
}
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
store_b =  {
    'store': 'Store B',
    'apples': 2,
    'bananas': None,
    'kiwis': 100
}

store_b['store']
Out[]:
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
store_b =  {
    'store': 'Store B',
    'apples': 2,
    'bananas': None,
    'kiwis': 100
}

store_b['store']
Out[]: 'Store B'
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
store_b =  {
    'store': 'Store B',
    'apples': 2,
    'bananas': None,
    'kiwis': 100
}

store_b['store']
Out[]: 'Store B'

store_b['apples']
Out[]:
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
store_b =  {
    'store': 'Store B',
    'apples': 2,
    'bananas': None,
    'kiwis': 100
}

store_b['store']
Out[]: 'Store B'

store_b['apples']
Out[]: 2
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
store_b =  {
    'store': 'Store B',
    'apples': 2,
    'bananas': None,
    'kiwis': 100
}

store_b['store']
Out[]: 'Store B'

store_b['apples']
Out[]: 2

store_b['bananas']
Out[]:
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
store_b =  {
    'store': 'Store B',
    'apples': 2,
    'bananas': None,
    'kiwis': 100
}

store_b['store']
Out[]: 'Store B'

store_b['apples']
Out[]: 2

store_b['bananas']
Out[]: # nothing
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
store_b =  {
    'store': 'Store B',
    'apples': 2,
    'bananas': None,
    'kiwis': 100
}

store_b['store']
Out[]: 'Store B'

store_b['apples']
Out[]: 2

store_b['bananas']
Out[]: # nothing

type(store_b['bananas'])
Out[]:
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
store_b =  {
    'store': 'Store B',
    'apples': 2,
    'bananas': None,
    'kiwis': 100
}

store_b['store']
Out[]: 'Store B'

store_b['apples']
Out[]: 2

store_b['bananas']
Out[]: # nothing

type(store_b['bananas'])
Out[]: NoneType
```

Data structures

string indexing

list

set

dict

methods

- None
- mutable vs. immutable

tuples

loops

```
random_list = [2, 34, 3]
random_list.extend([-4, 35, 16])
random_list
Out[]:
```

Data structures

string indexing

list

set

dict

methods

- None
- mutable vs. immutable

tuples

loops

```
random_list = [2, 34, 3]
random_list.extend([-4, 35, 16])
random_list
Out[]: [2, 34, 3, -4, 35, 16]
```

Data structures

string indexing

list

set

dict

methods

- None
- mutable vs. immutable

tuples

loops

```
random_list = [2, 34, 3]
random_list.extend([-4, 35, 16])
random_list
Out[]: [2, 34, 3, -4, 35, 16]

sorted(random_list)
Out[]:
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
random_list = [2, 34, 3]
random_list.extend([-4, 35, 16])
random_list
Out[]: [2, 34, 3, -4, 35, 16]

sorted(random_list)
Out[]: [-4, 2, 3, 16, 34, 35]
# sorted() doesn't change random_list
```

Data structures

string indexing

list

set

dict

methods

- None
- mutable vs. immutable

tuples

loops

```
random_list = [2, 34, 3]
random_list.extend([-4, 35, 16])
random_list
Out[]: [2, 34, 3, -4, 35, 16]

sorted(random_list)
Out[]: [-4, 2, 3, 16, 34, 35]
# sorted() doesn't change random_list

random_list
Out[]:
```

Data structures

string indexing

list

set

dict

methods

- None
- mutable vs. immutable

tuples

loops

```
random_list = [2, 34, 3]
random_list.extend([-4, 35, 16])
random_list
Out[]: [2, 34, 3, -4, 35, 16]

sorted(random_list)
Out[]: [-4, 2, 3, 16, 34, 35]
# sorted() doesn't change random_list

random_list
Out[]: [2, 34, 3, -4, 35, 16]
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
random_list = [2, 34, 3]
random_list.extend([-4, 35, 16])
random_list
Out[]: [2, 34, 3, -4, 35, 16]

sorted(random_list)
Out[]: [-4, 2, 3, 16, 34, 35]
# sorted() doesn't change random_list

random_list
Out[]: [2, 34, 3, -4, 35, 16]

# .sort() does change random_list
# but returns None
sorted_random_list = random_list.sort()
type(sorted_random_list)
Out[]: NoneType
```

Data structures

string indexing

list

set

dict

methods

- None
- mutable vs. immutable

tuples

loops

```
random_list = [2, 34, 3]
random_list.extend([-4, 35, 16])
random_list
Out[]: [2, 34, 3, -4, 35, 16]

sorted(random_list)
Out[]: [-4, 2, 3, 16, 34, 35]
# sorted() doesn't change random_list

random_list
Out[]: [2, 34, 3, -4, 35, 16]

# .sort() does change random_list
# but returns None
sorted_random_list = random_list.sort()
type(sorted_random_list)
Out[]: NoneType

# to store new list, create new variable with sorted()
sorted_random_list = sorted(random_list)
```

Data structures

`string` indexing

`list`

`set`

`dict`

methods

↬ `None`

↬ mutable vs. immutable

tuples

loops

From the Python documentation:

"You might have noticed that methods like `insert`, `remove` or `sort` that only modify the list have no return value printed – they return the default `None`. This is a design principle for all **mutable** data structures in Python."

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
# strings are immutable
my_name = 'Soo'

my_name[0]
Out[]:
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
# strings are immutable
my_name = 'Soo'

my_name[0]
Out[]: 'S'
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
# strings are immutable
my_name = 'Soo'

my_name[0]
Out[]: 'S'

my_name[0] = 's'
Out[]:
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
# strings are immutable
my_name = 'Soo'

my_name[0]
Out[]: 'S'

my_name[0] = 's'
Out[]: Error
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
# strings are immutable
my_name = 'Soo'

my_name[0]
Out[]: 'S'

my_name[0] = 's'
Out[]: Error

# But you can change the variable
my_name = 'Oh'
my_name
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
# strings are immutable
my_name = 'Soo'

my_name[0]
Out[]: 'S'

my_name[0] = 's'
Out[]: Error

# But you can change the variable
my_name = 'Oh'
my_name
Out[]: 'Oh'
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
# strings are immutable
my_name = 'Soo'

my_name[0]
Out[]: 'S'

my_name[0] = 's'
Out[]: Error

# But you can change the variable
my_name = 'Oh'
my_name
Out[]: 'Oh'

# lists are mutable
my_names = ['Soo', 'Oh']
my_names[0] = 'soo'
my_names
Out[]:
```

Data structures

string indexing

list

set

dict

methods

- None
- mutable vs. immutable

tuples

loops

```
# strings are immutable
my_name = 'Soo'

my_name[0]
Out[]: 'S'

my_name[0] = 's'
Out[]: Error

# But you can change the variable
my_name = 'Oh'
my_name
Out[]: 'Oh'

# lists are mutable
my_names = ['Soo', 'Oh']
my_names[0] = 'soo'
my_names
Out[]: ['soo', 'Oh']
```

Data structures

string indexing

list

set

dict

methods

- None
- mutable vs. immutable

tuples

loops

```
store_a = {'store': 'Store A', 'apples': 52, 'bananas': 9, 'kiwis': 27}
store_b = {'store': 'Store B', 'apples': 2, 'bananas': None, 'kiwis': 100}
store_c = {'store': 'Store C', 'apples': 0, 'bananas': 53, 'kiwis': 4}


inventory = [store_a, store_b]


# New method: .append()
inventory.append(store_c)
inventory
Out[]:
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
store_a = {'store': 'Store A', 'apples': 52, 'bananas': 9, 'kiwis': 27}
store_b = {'store': 'Store B', 'apples': 2, 'bananas': None, 'kiwis': 100}
store_c = {'store': 'Store C', 'apples': 0, 'bananas': 53, 'kiwis': 4}


inventory = [store_a, store_b]


# New method: .append()
inventory.append(store_c)
inventory
Out[]:
[
    {'store': 'Store A', 'apples': 52, 'bananas': 9, 'kiwis': 27},
    {'store': 'Store B', 'apples': 2, 'bananas': None, 'kiwis': 100},
    {'store': 'Store C', 'apples': 0, 'bananas': 53, 'kiwis': 4}
]
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
store_a = {'store': 'Store A', 'apples': 52, 'bananas': 9, 'kiwis': 27}
store_b = {'store': 'Store B', 'apples': 2, 'bananas': None, 'kiwis': 100}
store_c = {'store': 'Store C', 'apples': 0, 'bananas': 53, 'kiwis': 4}

inventory_a_b = [store_a, store_b]
inventory_all_stores = inventory_a_b + [ store_c ]
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
store_a = {'store': 'Store A', 'apples': 52, 'bananas': 9, 'kiwis': 27}
store_b = {'store': 'Store B', 'apples': 2, 'bananas': None, 'kiwis': 100}
store_c = {'store': 'Store C', 'apples': 0, 'bananas': 53, 'kiwis': 4}

inventory_a_b = [store_a, store_b]
inventory_all_stores = inventory_a_b + [ store_c ]

inventory_a_b
Out[]:
```

Data structures

string indexing

list

set

dict

methods

- None
- mutable vs. immutable

tuples

loops

```
store_a = {'store': 'Store A', 'apples': 52, 'bananas': 9, 'kiwis': 27}
store_b = {'store': 'Store B', 'apples': 2, 'bananas': None, 'kiwis': 100}
store_c = {'store': 'Store C', 'apples': 0, 'bananas': 53, 'kiwis': 4}

inventory_a_b = [store_a, store_b]
inventory_all_stores = inventory_a_b + [ store_c ]

inventory_a_b
Out[]:
[
    {'store': 'Store A', 'apples': 52, 'bananas': 9, 'kiwis': 27},
    {'store': 'Store B', 'apples': 2, 'bananas': None, 'kiwis': 100}
]
```

Data structures

string indexing

list

set

dict

methods

- None
- mutable vs. immutable

tuples

loops

```
store_a = {'store': 'Store A', 'apples': 52, 'bananas': 9, 'kiwis': 27}
store_b = {'store': 'Store B', 'apples': 2, 'bananas': None, 'kiwis': 100}
store_c = {'store': 'Store C', 'apples': 0, 'bananas': 53, 'kiwis': 4}

inventory_a_b = [store_a, store_b]
inventory_all_stores = inventory_a_b + [ store_c ]

inventory_a_b
Out[]:
[
    {'store': 'Store A', 'apples': 52, 'bananas': 9, 'kiwis': 27},
    {'store': 'Store B', 'apples': 2, 'bananas': None, 'kiwis': 100}
]

inventory_all_stores
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
store_a = {'store': 'Store A', 'apples': 52, 'bananas': 9, 'kiwis': 27}
store_b = {'store': 'Store B', 'apples': 2, 'bananas': None, 'kiwis': 100}
store_c = {'store': 'Store C', 'apples': 0, 'bananas': 53, 'kiwis': 4}

inventory_a_b = [store_a, store_b]
inventory_all_stores = inventory_a_b + [ store_c ]

inventory_a_b
Out[]:
[
    {'store': 'Store A', 'apples': 52, 'bananas': 9, 'kiwis': 27},
    {'store': 'Store B', 'apples': 2, 'bananas': None, 'kiwis': 100}
]

inventory_all_stores
Out[]:
[
    {'store': 'Store A', 'apples': 52, 'bananas': 9, 'kiwis': 27},
    {'store': 'Store B', 'apples': 2, 'bananas': None, 'kiwis': 100},
    {'store': 'Store C', 'apples': 0, 'bananas': 53, 'kiwis': 4}
]
```

Data structures

- `string` indexing
- `list`
- `set`
- `dict`
- methods
  - ↬ `None`
  - ↬ mutable vs. immutable
- tuples
- loops

There are many built-in methods for variable types (including strings) and data structures:

- Optional reading: https://docs.python.org/3/library/stdtypes.html

Data structures

- `string` indexing
- `list`
- `set`
- `dict`
- methods
  - ↬ `None`
  - ↬ mutable vs. immutable
- tuples
- loops

Tuples are similar to lists but they're **immutable**.

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
grades = ('A', 'B', 'C', 'D', 'F')
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
grades = ('A', 'B', 'C', 'D', 'F')

# tuples operate like lists; many of the
# same methods apply
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
grades = ('A', 'B', 'C', 'D', 'F')

# tuples operate like lists; many of the
# same methods apply
grades[0]
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
grades = ('A', 'B', 'C', 'D', 'F')

# tuples operate like lists; many of the
# same methods apply
grades[0]
Out[]: 'A'
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
grades = ('A', 'B', 'C', 'D', 'F')

# tuples operate like lists; many of the
# same methods apply
grades[0]
Out[]: 'A'

grades[1]
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
grades = ('A', 'B', 'C', 'D', 'F')

# tuples operate like lists; many of the
# same methods apply
grades[0]
Out[]: 'A'

grades[1]
Out[]: 'B'
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - None
  - mutable vs. immutable
- tuples
- loops

```
grades = ('A', 'B', 'C', 'D', 'F')

# tuples operate like lists; many of the
# same methods apply
grades[0]
Out[]: 'A'

grades[1]
Out[]: 'B'

len(grades)
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
grades = ('A', 'B', 'C', 'D', 'F')

# tuples operate like lists; many of the
# same methods apply
grades[0]
Out[]: 'A'

grades[1]
Out[]: 'B'

len(grades)
Out[]: 5
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
grades = ('A', 'B', 'C', 'D', 'F')

# But elements inside tuples cannot change
# so methods like .extend() or .append() will not work
grades[0] = 'A+'
Out[]:
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
grades = ('A', 'B', 'C', 'D', 'F')

# But elements inside tuples cannot change
# so methods like .extend() or .append() will not work
grades[0] = 'A+'
Out[]: Error
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
grades = ('A', 'B', 'C', 'D', 'F')

# But elements inside tuples cannot change
# so methods like .extend() or .append() will not work
grades[0] = 'A+'
Out[]: Error

# You can redefine the whole variable though
grades = ['A', 'B', 'C', 'D', 'F']
print(grades)
Out[]: ['A', 'B', 'C', 'D', 'F']
```

Data structures

- `string` indexing
- `list`
- `set`
- `dict`
- methods
  - ↬ `None`
  - ↬ mutable vs. immutable
- tuples
- loops

A brief intro to loops...

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
# loop through a list
for n in range(0, 5):
    print(n, end=' ')
Out[]:
```

`range()` is a built-in Python function

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
# loop through a list
for n in range(0, 5):
    print(n, end=' ')
Out[]: 0 1 2 3 4
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
# loop through a list
for n in range(0, 5):
    print(n, end=' ')
Out[]: 0 1 2 3 4

vegetables = ['asparagus', 'onion', 'salad greens', 'radishes']
for vegetable in vegetables:
    print(vegetable, end=' ')
Out[]:
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
# loop through a list
for n in range(0, 5):
    print(n, end=' ')
Out[]: 0 1 2 3 4

vegetables = ['asparagus', 'onion', 'salad greens', 'radishes']
for vegetable in vegetables:
    print(vegetable, end=' ')
Out[]: asparagus onion salad greens radishes
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
# loop through a list
for n in range(0, 5):
    print(n, end=' ')
Out[]: 0 1 2 3 4

vegetables = ['asparagus', 'onion', 'salad greens', 'radishes']
for vegetable in vegetables:
    print(vegetable, end=' ')
Out[]: asparagus onion salad greens radishes

for vegetable in vegetables:
    index = vegetables.index(vegetable)
    print(f'{index} {vegetable}')
Out[]:
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
# loop through a list
for n in range(0, 5):
    print(n, end=' ')
Out[]: 0 1 2 3 4

vegetables = ['asparagus', 'onion', 'salad greens', 'radishes']
for vegetable in vegetables:
    print(vegetable, end=' ')
Out[]: asparagus onion salad greens radishes

for vegetable in vegetables:
    index = vegetables.index(vegetable)
    print(f'{index} {vegetable}')
Out[]:
0 asparagus
1 onion
2 salad greens
3 radishes

# does the same thing as
for index, vegetable in enumerate(vegetables):
    print(f'{index} {vegetable}')
# (and you get to save a line!)
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
# loop through a list
for n in range(0, 5):
    print(n, end=' ')
Out[]: 0 1 2 3 4

vegetables = ['asparagus', 'onion', 'salad greens', 'radishes']
for vegetable in vegetables:
    print(vegetable, end=' ')
Out[]: asparagus onion salad greens radishes

for vegetable in vegetables:
    index = vegetables.index(vegetable)
    print(f'{index} {vegetable}')
Out[]:
0 asparagus
1 onion
2 salad greens
3 radishes

# does the same thing as
for index, vegetable in enumerate(vegetables):
    print(f'{index} {vegetable}')
# (and you get to save a line!)
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
# loop through a list
for n in range(0, 5):
    print(n, end=' ')
Out[]: 0 1 2 3 4

vegetables = ['asparagus', 'onion', 'salad greens', 'radishes']
for vegetable in vegetables:
    print(vegetable, end=' ')
Out[]: asparagus onion salad greens radishes

for vegetable in vegetables:
    index = vegetables.index(vegetable)
    print(f'{index} {vegetable}')
Out[]:
0 asparagus
1 onion
2 salad greens
3 radishes

# does the same thing as
for index, vegetable in enumerate(vegetables):
    print(f'{index} {vegetable}')
# (and you get to save a line!)
```

doesn't print with quote marks in notebooks

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
# loop through a set the same way
grocery_list = {'bread', 'cheese', 'tomatoes', 'bread'}
grocery_list
Out[]:
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
# loop through a set the same way
grocery_list = {'bread', 'cheese', 'tomatoes', 'bread'}
grocery_list
Out[]: {'bread', 'cheese', 'tomatoes'}
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
# loop through a set the same way
grocery_list = {'bread', 'cheese', 'tomatoes', 'bread'}
grocery_list
Out[]: {'bread', 'cheese', 'tomatoes'}

for item in grocery_list:
    print(item)
Out[]:
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
# loop through a set the same way
grocery_list = {'bread', 'cheese', 'tomatoes', 'bread'}
grocery_list
Out[]: {'bread', 'cheese', 'tomatoes'}

for item in grocery_list:
    print(item)
Out[]:
tomatoes
cheese
bread
```

Data structures

- string indexing
- list
- set
- dict
- methods
  - ↬ None
  - ↬ mutable vs. immutable
- tuples
- loops

```
# loop through a dict
store_a = {'store': 'Store A', 'apples': 52, 'bananas': 9,
'kiwis': 27}
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
# loop through a dict
store_a = {'store': 'Store A', 'apples': 52, 'bananas': 9,
'kiwis': 27}

for key, value in store_a.items():
    print(f'{ key } --- { value }')
Out[]:
```

Data structures

string indexing

list

set

dict

methods

↬ None

↬ mutable vs. immutable

tuples

loops

```
# loop through a dict
store_a = {'store': 'Store A', 'apples': 52, 'bananas': 9,
'kiwis': 27}

for key, value in store_a.items():
    print(f'{ key } --- { value }')
Out[]:
store --- Store A
apples --- 52
bananas --- 9
kiwis --- 27
```

Data structures

- `string` indexing
- `list`
- `set`
- `dict`
- methods
  - ↬ `None`
  - ↬ mutable vs. immutable
- tuples
- loops

Let's practice writing a `for` loop.

Write a `for` loop that goes through every number in the list `[1, 2, 3, 4, 5]` and prints out the square of each number.

Data structures

- `string` indexing
- `list`
- `set`
- `dict`
- methods
  - ↬ `None`
  - ↬ mutable vs. immutable
- tuples
- loops

Let's practice writing a `for` loop.

Write a `for` loop that goes through every number in the list `[1, 2, 3, 4, 5]` and prints out the square of each number.

Write the previous `for` loop as a function that takes in any list of numbers and prints out each number's square.

Data structures

- `string` indexing
- `list`
- `set`
- `dict`
- methods
  - ↬ `None`
  - ↬ mutable vs. immutable
- tuples
- loops

Let's practice writing a `for` loop.

Write a `for` loop that goes through every number in the list `[1, 2, 3, 4, 5]` and prints out the square of each number.

Write the previous `for` loop as a function that takes in any list of numbers and prints out each number's square.

Write the previous `for` loop function that does the same thing, but this time, it should also take in an exponent.

Homework

https://journ233.github.io