CS 61A Lecture 10

Friday, February 13

Announcements

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- Guerrilla Section 2 is on Monday 2/16

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    - RSVP on Piazza if you want to come!

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  - Homework Party on Tuesday 2/17 5pm-6:30pm in 2050 VLSB

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- Optional Hog Contest due Wednesday 2/18 @ 11:59pm

Sequences

The Sequence Abstraction

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red, orange, yellow, green, blue, indigo, violet.

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Length. A sequence has a finite length.

Element selection. A sequence has an element corresponding to any non-negative integer index less than its length, starting at 0.

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There is built-in syntax associated with this behavior, or we can use functions.

A list is a kind of built-in sequence

Lists

```
['Demo']
```

Lists are Sequences

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```
>>> digits = [1, 8, 2, 8]
```

Lists are Sequences

```
>>> digits = [1, 8, 2, 8]
>>> len(digits)
4
```

Lists are Sequences

```
>>> digits = [1, 8, 2, 8]
>>> len(digits)
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>>> digits[3]
8
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```
>>> [2, 7] + digits * 2
[2, 7, 1, 8, 2, 8, 1, 8, 2, 8]
```

Lists are Sequences

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>>> digits = [1, 8, 2, 8]
>>> len(digits)
4
>>> digits[3]
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>>> [2, 7] + digits * 2
[2, 7, 1, 8, 2, 8, 1, 8, 2, 8]

>>> pairs = [[10, 20], [30, 40]]
```

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>>> len(digits)
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>>> [2, 7] + digits * 2
[2, 7, 1, 8, 2, 8, 1, 8, 2, 8]

>>> pairs = [[10, 20], [30, 40]]
>>> pairs[1]
[30, 40]
```

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>>> digits = [1, 8, 2, 8]
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[2, 7, 1, 8, 2, 8, 1, 8, 2, 8]

>>> pairs = [[10, 20], [30, 40]]
>>> pairs[1]
[30, 40]
>>> pairs[1][0]
30
```

For Statements

(Demo)

Sequence Iteration

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```
def count(s, value):
    total = 0
    for element in s:





        if element == value:
            total = total + 1
    return total
```

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Name bound in the first frame
of the current environment
(not a new frame)

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for <name> in <expression>:
    <suite>
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   A. Bind <name> to that element in the current frame

   B. Execute the <suite>

Sequence Unpacking in For Statements

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```
>>> pairs = [[1, 2], [2, 2], [3, 2], [4, 4]]

>>> same_count = 0
```

Sequence Unpacking in For Statements

A sequence of
fixed-length sequences

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>>> pairs = [[1, 2], [2, 2], [3, 2], [4, 4]]

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```

```
>>> for x, y in pairs:
...     if x == y:
...         same_count = same_count + 1

>>> same_count
2
```

Sequence Unpacking in For Statements

A sequence of
fixed-length sequences

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>>> pairs = [[1, 2], [2, 2], [3, 2], [4, 4]]

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A name for each element in a
fixed-length sequence

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>>> for x, y in pairs:
...     if x == y:
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Sequence Unpacking in For Statements

A sequence of fixed-length sequences

```
>>> pairs = [[1, 2], [2, 2], [3, 2], [4, 4]]

>>> same_count = 0
```

A name for each element in a fixed-length sequence

Each name is bound to a value, as in multiple assignment

```
>>> for x, y in pairs:
...     if x == y:
...         same_count = same_count + 1

>>> same_count
2
```

Ranges

The Range Type

A range is a sequence of consecutive integers.*

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..., -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, ...

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```
range(-2, 2)
```

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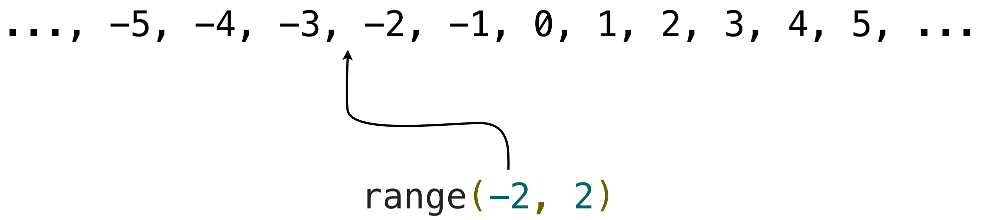

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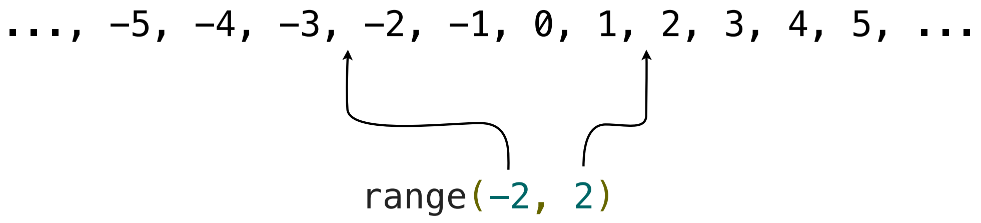

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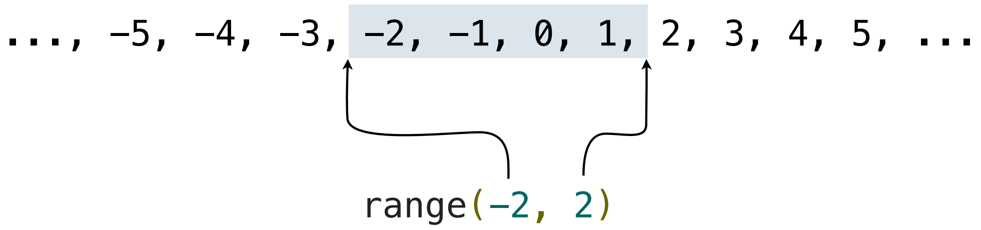

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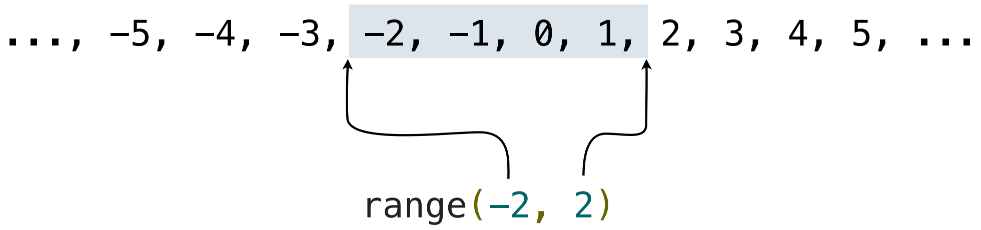

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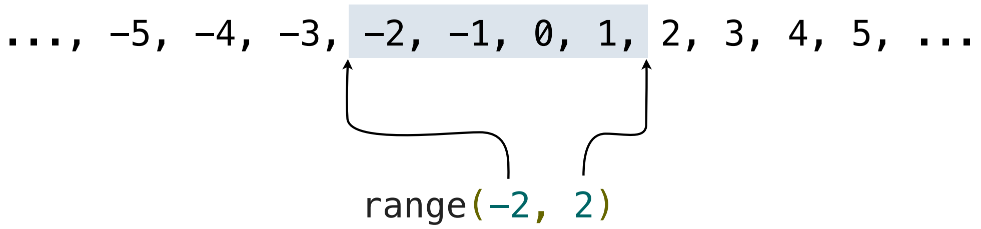

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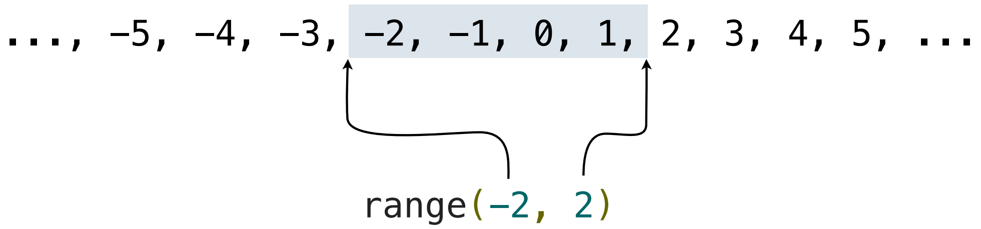

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```
>>> list(range(-2, 2))
[-2, -1, 0, 1]

>>> list(range(4))
[0, 1, 2, 3]
```

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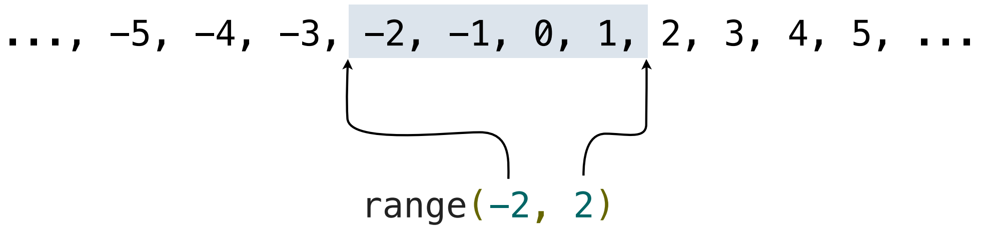

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List constructor

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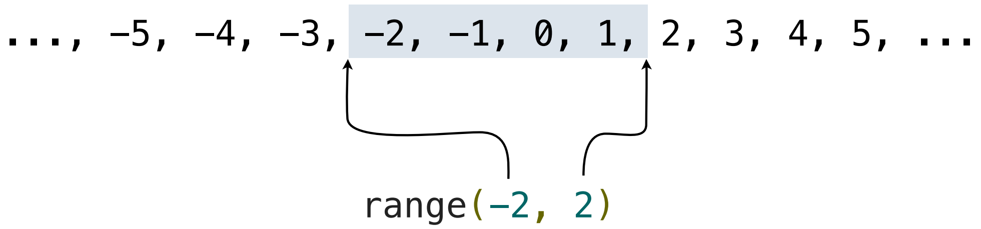

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Range with a 0 starting value

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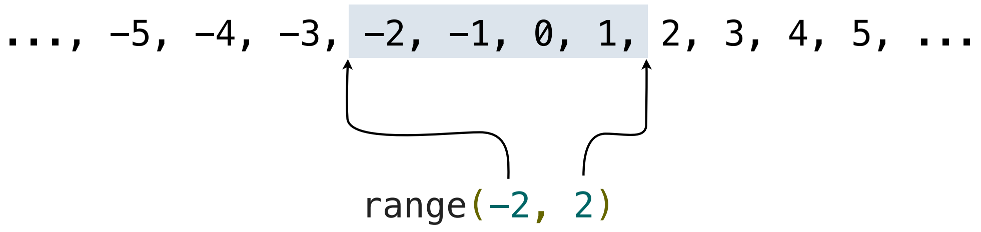

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(Demo)

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List constructor

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List Comprehensions

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```
>>> letters = ['a', 'b', 'c', 'd', 'e', 'f', 'm', 'n', 'o', 'p']
>>> [letters[i] for i in [3, 4, 6, 8]]
```

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```

```
['d', 'e', 'm', 'o']
```

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[<map exp> for <name> in <iter exp> if <filter exp>]
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   B. If <filter exp> evaluates to a true value, then add the value of <map exp> to the result list

Strings

Strings are an Abstraction

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Representing data:

```
'200'       '1.2e-5'       'False'       '(1, 2)'
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A local habitation and a name.
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'curry = lambda f: lambda x: lambda y: f(x, y)'
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(Demo)

String Literals Have Three Forms

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>>> 'I am string!'
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>>> "I've got an apostrophe"
"I've got an apostrophe"

>>> '您好'
'您好'
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Single-quoted and double-quoted strings are equivalent

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Read more: import this."""
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"Line feed" character represents a new line

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```
>>> city = 'Berkeley'
>>> len(city)
8
>>> city[3]
'k'
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Careful: An element of a string is itself a string, but with only one element!

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However, the "in" and "not in" operators match substrings

```
>>> 'here' in "Where's Waldo?"
True
>>> 234 in [1, 2, 3, 4, 5]
False
>>> [2, 3, 4] in [1, 2, 3, 4, 5]
False
```

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False
>>> [2, 3, 4] in [1, 2, 3, 4, 5]
False
```

When working with strings, we usually care about whole words more than letters

Dictionaries

```
{'Dem': 0}
```

Limitations on Dictionaries

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If you want to associate multiple values with a key, store them all in a sequence value