Intro to Coding with Python– Dictionaries

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Slides based off slides courtesy of Jordan Crouser (https://jcrouser.github.io/)

Friday

- No class this Friday – review material

Plan for Today

- Dictionaries
  - motivation
  - defining a dictionary
  - converting multiple lists ←→ dictionaries

Recap: 15-minute exercise

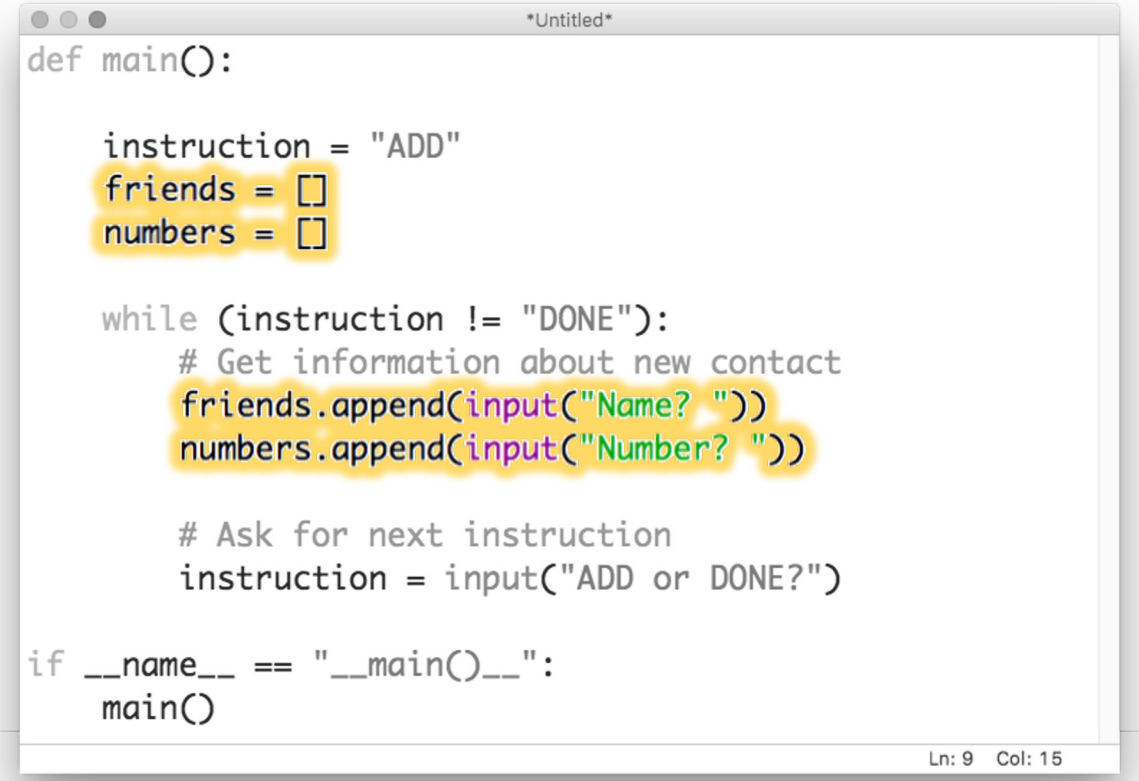
Write a program that:

- asks the user to **`input()`** names one at a time
- adds each new name to a list called **`friends`**
- and after each new name is added prints the list in alphabetical order

The program should loop until the user types "**`DONE`**"

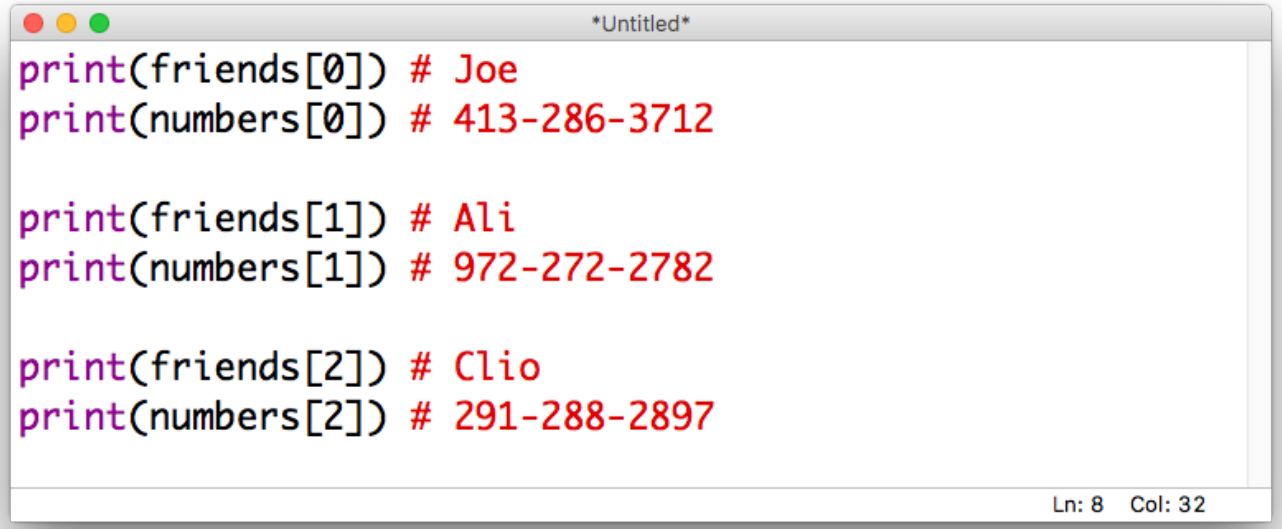
Motivation

- Imagine we want to use the previous exercise to create a contact list. Could do it with **multiple lists**:

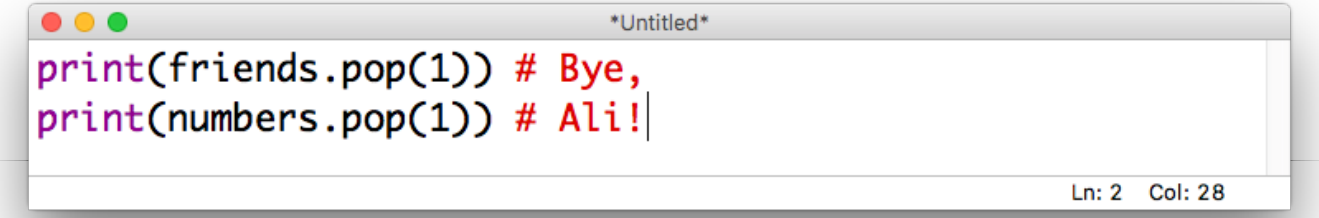


Motivation

- If we want to access the data later:



- Or worse, modify it…



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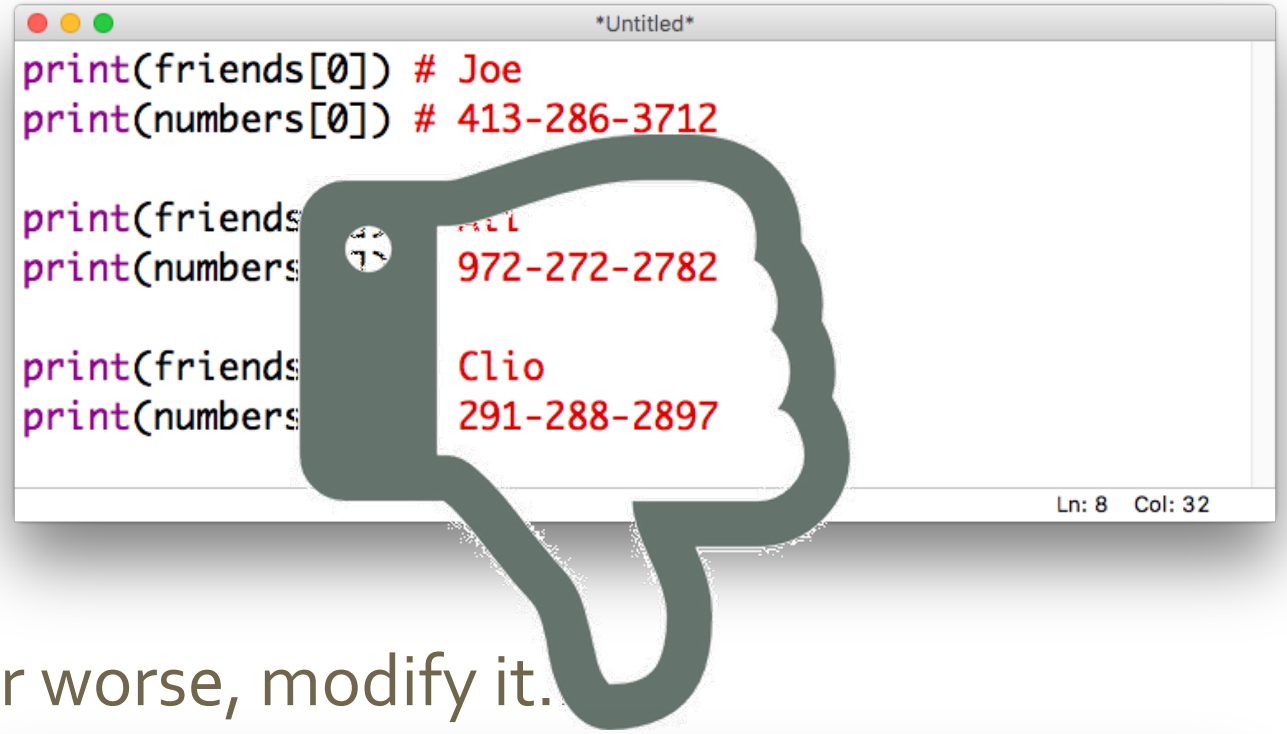

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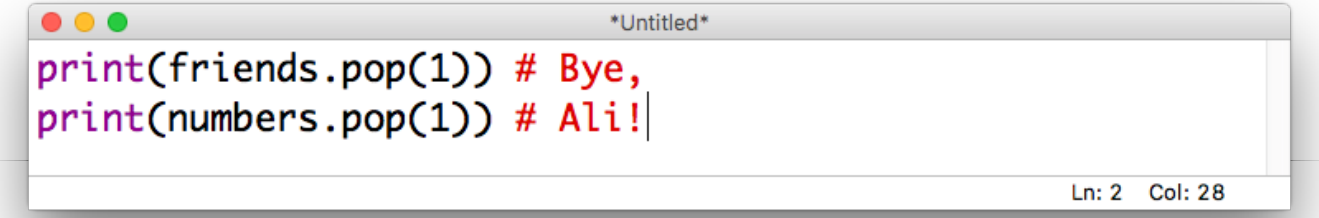

What we really want

- Each name should “map” to the corresponding number:

```
“Joe” → “413-286-3712”
“Ali” → “972-272-2782”
“Clio” → “291-288-2897”
```

- That way, we could access the **number** using the **name**:

```
contacts[“Joe”] # “413-286-3712”
```

Introducing: `dictionaries`

- **`lists`** were **ordered** sets of objects, and we accessed their contents via position (index)
- **`dictionaries`** are **unordered** sets, and we can access their contents via **`keys`**
- We declare them using `{…}` ← "curly braces" like this:

```
contacts = {}
```

Contacts: take 2

Untitled

```
def main():

    instruction = "ADD"
    contacts = {}

    while (instruction != "DONE"):
        # Get information about new contact
        new_friend = input("Name? ")
        new_number = input("Number? ")

        # Add contact to dictionary
        contacts[new_friend] = new_number

        # Ask for next instruction
        instruction = input("ADD or DONE?")

if __name__ == "__main()__":
    main()
```

Ln: 18 Col: 10

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Untitled

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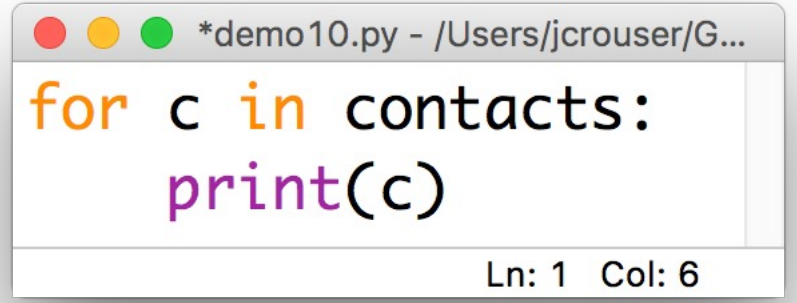
Interesting dilemma

What happens when we **iterate** over a **dictionary**?

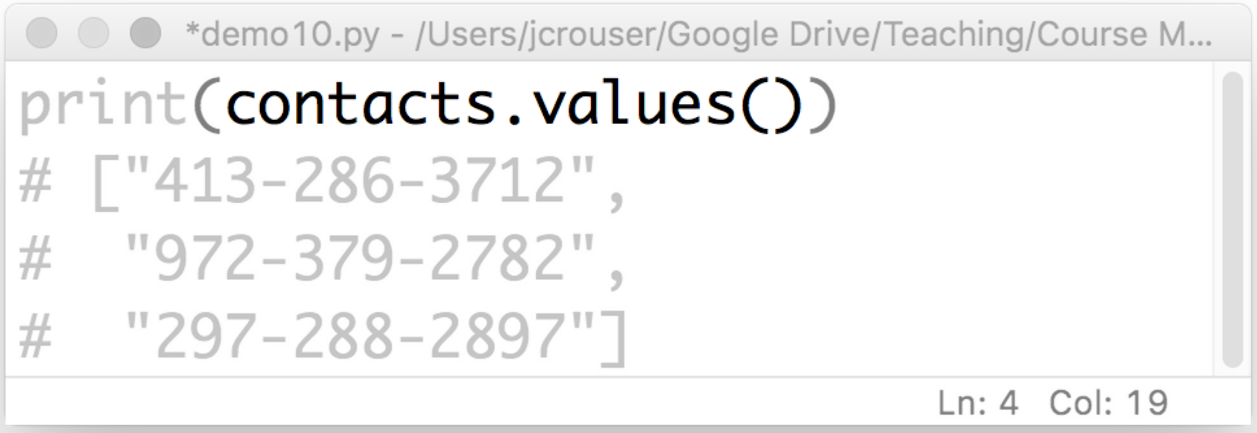


`dictionary` methods: `.keys()`

- If you want to get a list of the **`keys`** in a **`dictionary`**

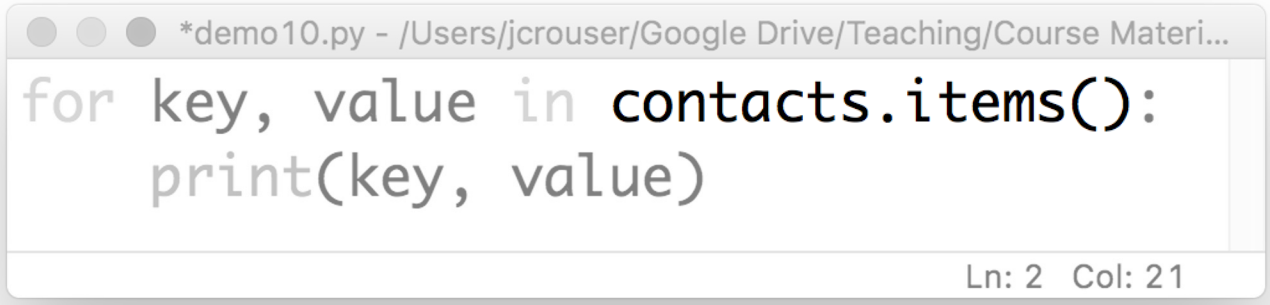
`dictionary` methods: `.values()`

- If you want a **`list`** of the **`values`** in a **`dictionary`**



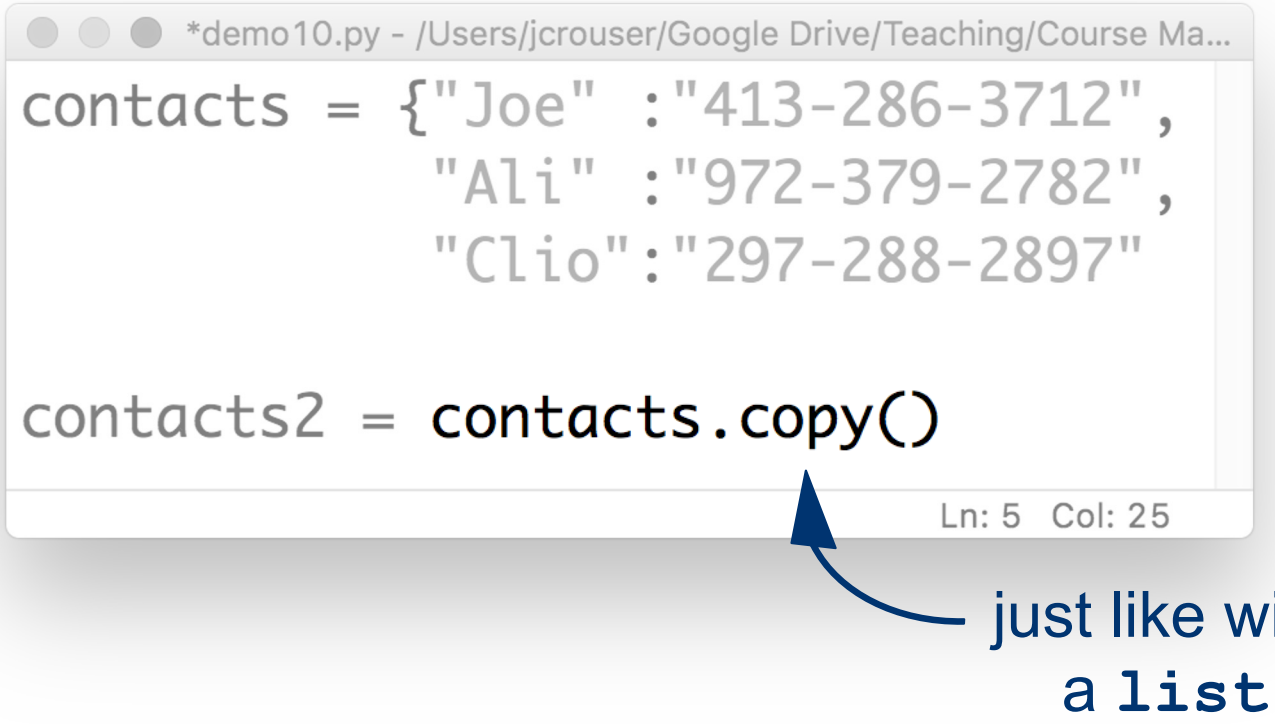
dictionary methods: **.items()**

- If you want a **list** of the **key,value** pairs in a **dictionary**



`dictionary` methods: `.copy()`

- If you want to **copy** the **`dictionary`** :



The `zip(...)` function

- If you want to combine two **`lists`** into one **`dictionary`**, use a comprehension and the **`zip(...)`** function:

Untitled

```
names = ["Joe", "Ali", "Clio"]

numbers = ["413-286-3712",
           "972-272-2782",
           "291-288-2897"]

contacts = {name:number for name, number in zip(names, numbers)}
```

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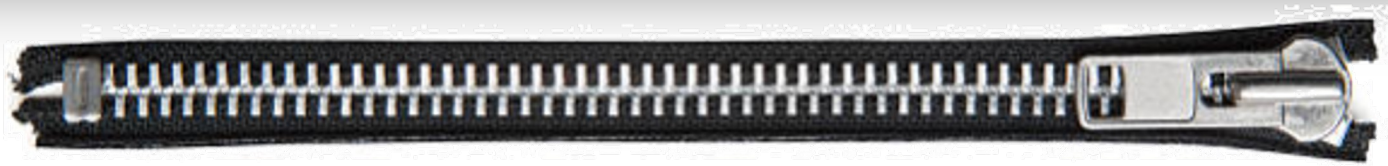

Recap

- **`strings`**: immutable ordered collections of characters
- **`lists`**: mutable ordered collections of objects
- **`dictionaries`**: mutable unordered collections of objects

15 minute exercise

- Write a program that …
  - Asks the user "ADD or DONE? "
  - If the user says ADD
    - Take user input to creates a contact book entry that includes (1) name, (2) number, and (3) address
    - Ask "ADD or DONE? " again
  - If the user says DONE
    - Quit and print "X's number is Y and they live at Z" for each entry in the contact book