Compsci 101
Dictionaries
Part 1 of 2

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October 8, 2020

\[ d = \{ 'a': 10, 'b': 100 \} \]

O is for …

- Open Source
  - Copyright meets the Creative Commons
- Object Oriented
  - Using classes and more in programming
- Occam’s Razor
  - Not just compsci. Simple is good

PFTD

- Dictionaries

How the Dictionary is made

- Using a dictionary is reasonably straight-forward
  - We will be clients, not implementers
  - Efficiency not a large concern in 101
  - Our goal is to just get stuff done 😊
What is a Dictionary?

- A collection of (key, value) pairs (abstract view)
  - Look up key, find the value
- Very, very fast: essentially index by key
  - For list \( a[3] \) takes same time as \( a[3000] \)
- For Dictionary: \( d["cake"] \)
  - Finding the value associated with "cake"

Dictionaries/Maps

- Dictionaries/maps are another way of organizing data
- Keys and Values
  - Each key maps to a value
  - Some keys can map to the same value
  - Can change the value a key maps to

Example

- Each student could be mapped to their favorite ice cream flavor

```
<table>
<thead>
<tr>
<th>Students</th>
<th>Ice Cream Flavors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Astrachan</td>
<td>Chocolate</td>
</tr>
<tr>
<td>Sun</td>
<td>Chocolate Chip</td>
</tr>
<tr>
<td>Rodger</td>
<td>Strawberry</td>
</tr>
<tr>
<td>Forbes</td>
<td></td>
</tr>
</tbody>
</table>
```

How is dictionary different than a list?

- List – have to search for name first
- Dictionary – each key maps to a value
- getting name (or key) is automatic! Fast!
Implementing a Dictionary/Map
Keys map to values

- Create Empty dictionary
  somemap = {}
- Put in a key and its value
  somemap[“Forbes”] = “Strawberry”
- Get a value for a dictionary
  value = somemap[“Forbes”]
- Change a value for a dictionary
  somemap[“Forbes’] = “Chocolate”

Change Astrachan’s value
somemap[“Astrachan”] = Coffee Mocha

Value could be a set or list

Change Astrachan’s value
somemap[“Astrachan”] = Coffee Mocha
The Tech Twins

- Troy and Travis Nunnally
- Between them: 2 master’s and 1 doctorate from Georgia Tech
- Cofounders of Brain Rain Solutions
  - Augmented-reality
  - Internet-of-things
- Applied machine learning

https://www.wired.com/story/what-atlanta-can-teach-tech-about-cultivating-black-talent/

How to use a Dictionary

- Create: d = {}
  - d = {'a': 10, 'b': 100}
  - d = dict([('a', 10), ('b', 100)])
- Insert: d[KEY] = VALUE
- Update/Reassign: d[KEY] = VALUE
- Get a value (like list indexing): d[KEY]
- Key membership (not values): KEY in d
- No membership check for values

How to use a Dictionary

- Let’s see some examples in the Python Console
How to use a Dictionary

- Like lists, but with keys
- KEY – immutable type, unique within dictionary
- VALUE – any type, not unique within dictionary
- Unordered collection of (KEY, VALUE) pairs