Dictionaries

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Dic$onaries vs lists

In certain cases, downside of lists: need **numeric index** to access data:

```python
students = ['Paul', 'Joel', 'Kim', 'Rose', 'Victoria']
grades = [99, 93, 88, 80, 95]

# Get Kim's grade
grades[2]  # Not intuitive! Want: grades['Kim']
```

• A dictionary (also called an **associative array** or **map**) works like a list, but you don't access data with an index. It works more like a address book (or dictionary!).

• Using the dictionary metaphor: We look up a definition using a word.

• Another way to say this: We look up definition/data (**value**) with a **key** (word).
Creating dictionaries

New dictionary:

myDictionary = {}
Creating dictionaries with data

Initialize dictionaries with some keys and values, separating each key-value pair with a colon and multiple pairs with a comma (just like lists)

students = ['Paul', 'Joel', 'Kim', 'Rose', 'Victoria']
grades = [99, 93, 88, 80, 95]
myDictionary = {'Paul': 99,
                'Joel': 93,
                'Kim': 88,
                'Rose': 80,
                'Victoria': 95}
myDictionary['Kim']  # 88
Values in dictionaries can be any data

myDictionary = {'shapes': ['Square', 'Circle'], 'gpa': 4.0, 'name': 'bob'}

• Keys should be strings, values can be any type of data.
Accessing/modifying data in dictionaries

Access data with square brackets, with a key of course:

```python
>>> myDictionary['shapes']
['Square', 'Circle']
```

Modify data with square brackets associated with a key:

```python
>>> myDictionary['gpa'] = 3.8
```

Adding new key-value pair to dictionary:

```python
>>> myDictionary['favorite color'] = 'blue'
```
Keys can be variables

```python
myDict = {}
names = ['Bill', 'Carol', 'Ben']
colors = ['Blue', 'Magenta', 'Purple']
for i in range(len(names)):
    myDict[names[i]] = colors[i]
    # 'Bill' -> 'Blue'
    # 'Carol' -> 'Magenta'
    # 'Ben' -> 'Purple'
```
Checking membership and printing a dictionary

Similar to lists:

def check_membership_and_print(dictionary):
    key = 'favorite color'
    if key in dictionary:
        print('My favorite color is', dictionary[key])

# Example usage
myDictionary = {'color': 'red', 'size': 'medium'}
check_membership_and_print(myDictionary)