



DATA TYPES FOR DATA SCIENCE

# Using dictionaries

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# Creating and looping through dictionaries

- Hold data in key/value pairs
- Nestable (use a dictionary as the value of a key within a dictionary)
- Iterable
- Created by `dict()` or `{}`

```
In [1]: art_galleries = {}
```

```
In [2]: for name, zip_code in galleries:  
...:     art_galleries[name] = zip_code
```

```
In [3]: for name in art_galleries:  
...:     print(name)
```

```
Zwirner David Gallery
```

```
Zwirner & Wirth
```

```
Zito Studio Gallery
```

```
Zetterquist Galleries
```

```
Zarre Andre Gallery
```



# Safely finding by key

```
In [4]: art_galleries['Louvre']
-----
KeyError                                Traceback (most recent call last)
<ipython-input-1-4f51c265f287> in <module>()
----> 1 art_galleries['Louvre']

KeyError: 'Louvre'
```

- Getting a value from a dictionary is done using the key as an index
- If you ask for a key that does not exist that will stop your program from running in a `KeyError`

# Safely finding by key (cont.)

- `.get()` method allows you to safely access a key without error or exception handling
- If a key is not in the dictionary, `.get()` returns `None` by default or you can supply a value to return

```
In [5]: art_galleries.get('Louvre', 'Not Found')  
Out[5]: 'Not Found'
```

```
In [6]: art_galleries.get('Zarre Andre Gallery')  
Out[6]: '10011'
```

# Working with nested data

```
In [1]: art_galleries.keys()
Out[1]: dict_keys(['10021', '10013', '10001', '10009', '10011', '10022',
...: '10027', '10019', '11106', '10128'])

In [2]: print(art_galleries['10027'])
{"Paige's Art Gallery": '(212) 531-1577',
'Triple Candie': '(212) 865-0783',
'Africart Motherland Inc': '(212) 368-6802',
'Inner City Art Gallery Inc': '(212) 368-4941'}

In [3]: art_galleries['10027']['Inner City Art Gallery Inc']
Out[3]: '(212) 368-4941'
```

- The `.keys()` method shows the keys for a given dictionary
- Common way to deal with repeating data structures
- Can be accessed using multiple indices or the `.get()` method



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**Let's practice!**



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# Altering dictionaries

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# Adding and extending dictionaries

- Assignment to add a new key/value to a dictionary
- `.update()` method to update a dictionary from another dictionary, tuples or keywords

```
In [1]: print(galleries_10007)
{'Nyabinghi Africian Gift Shop': '(212) 566-3336'}

In [2]: art_galleries['10007'] = galleries_10007

In [3]: galleries_11234 = [('A J ARTS LTD', '(718) 763-5473'),
...:                       ('Doug Meyer Fine Art', '(718) 375-8006'),
...:                       ('Portrait Gallery', '(718) 377-8762')]

In [4]: art_galleries['11234'].update(galleries_11234)

In [5]: print(art_galleries['11234'])
{'Portrait Gallery': '(718) 377-8762', 'A J ARTS LTD': '(718) 763-5473',
'Doug Meyer Fine Art': '(718) 375-8006'}
```



# Popping and deleting from dictionaries

- `del` instruction deletes a key/value
- `.pop()` method safely removes a key/value from a dictionary.

```
In [1]: del art_galleries['11234']  
  
In [2]: galleries_10310 = art_galleries.pop('10310')  
  
In [3]: print(galleries_10310)  
{'New Dorp Village Antiques Ltd': '(718) 815-2526'}
```



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**Let's practice!**



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# **Pythonically using dictionaries**

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# Working with dictionaries more pythonically

- `.items()` method returns an object we can iterate over

```
In [1]: for gallery, phone_num in art_galleries.items():
...:     print(gallery)
...:     print(phone_num)
'Miakey Art Gallery'
'(718) 686-0788'
'Morning Star Gallery Ltd'
'(212) 334-9330'
'New York Art Expo Inc'
'(212) 363-8280'
```

# Checking dictionaries for data

- `.get()` does a lot of work to check for a key
- `in` operator is much more efficient and clearer

```
In [1]: '11234' in art_galleries
Out[1]: False
```

```
In [2]: if '10010' in art_galleries:
...:     print('I found: %s' % art_galleries['10010'])
...: else:
...:     print('No galleries found.')
I found: {'Nyabinghi Africian Gift Shop': '(212) 566-3336'}
```



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**Let's practice!**