National Centre for Atmospheric Science
NATURAL ENVIRONMENT RESEARCH COUNCIL

Centre for Environmental Data Analysis
SCIENCE AND TECHNOLOGY FACILITIES COUNCIL
NATURAL ENVIRONMENT RESEARCH COUNCIL

Dictionaries

Extracted from material by:

What is a dictionary?

An unordered collection of key/value pairs

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No restrictions on values

What is a *dictionary?*

An unordered collection of key/value pairs

Keys are:

- Immutable – they *cannot* be changed

- Unique

- Not stored in any particular order

No restrictions on values

- Don't have to be immutable or unique

Create a dictionary by putting key:value pairs in {}

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```
>>> birthdays = {'Newton' : 1642, 'Darwin' : 1809}
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>>> birthdays = {'Newton' : 1642, 'Darwin' : 1809}
```

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```
>>> print birthdays['Newton']
1642
```

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>>> birthdays = {'Newton' : 1642, 'Darwin' : 1809}
```

Retrieve values by putting key in []

Just like indexing strings and lists

```
>>> print birthdays['Newton']
1642
```

Just like using a phonebook or dictionary

Add another value by assigning to it

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>>> birthdays['Turing'] = 1612 # that's not right
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Overwrite value by assigning to it as well

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```

Overwrite value by assigning to it as well

```
>>> birthdays['Turing'] = 1912
>>> print birthdays
{'Turing' : 1912, 'Newton' : 1642, 'Darwin' : 1809}
```

Note: entries are *not* in any particular order

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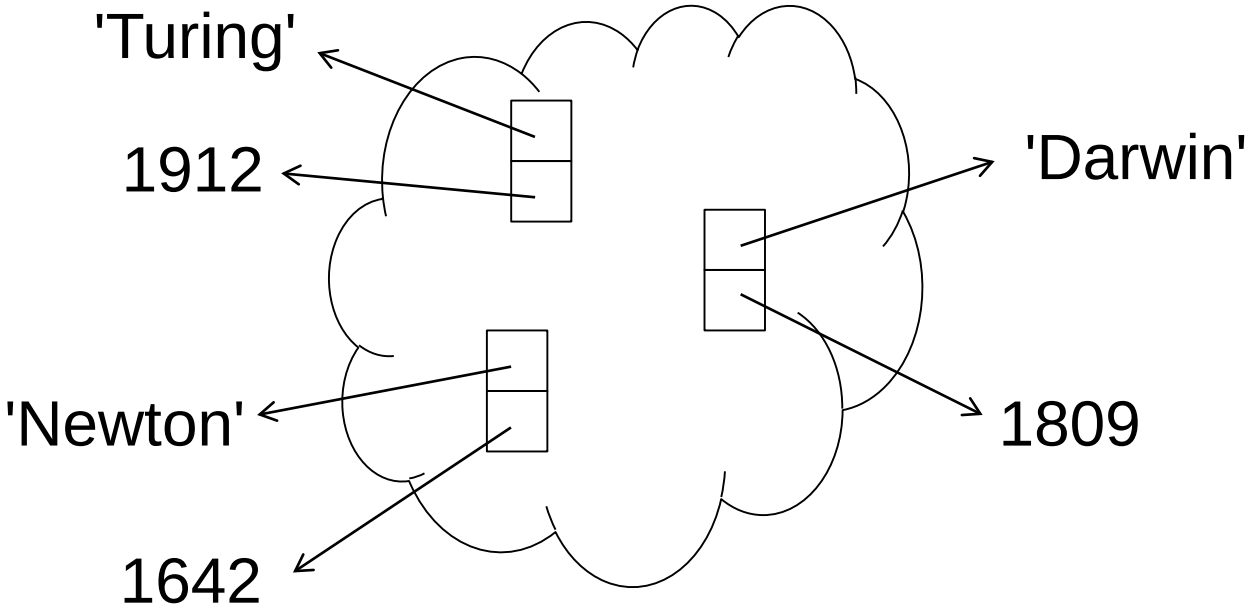

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>>> birthdays['Nightingale']
```

KeyError: 'Nightingale'

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Test whether key is present using in

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>>> birthdays['Nightingale']
KeyError: 'Nightingale'
```

Test whether key is present using in

```
>>> 'Nightingale' in birthdays
False
>>> 'Darwin' in birthdays
True
```

Use for to loop over keys

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Unlike lists, where for loops over values

Use for to loop over keys

Unlike lists, where for loops over values

```
>>> for name in birthdays:
...   print name, birthdays[name]
```

Turing 1912

Newton 1642

Darwin 1809

Useful methods on dictionaries

.keys(), .values(),.setdefault(<key>, <default>), .items()

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```
>>> person = {"name": "Sarah", "height": 2}
>>> person.keys()
['name', 'height']
>>> person.values()
['Sarah', 2]
```

Useful methods on dictionaries

.keys(), .values(),.setdefault(<key>, <default>), .items()

```
>>> person = {"name": "Sarah", "height": 2}
>>> person.keys()
['name', 'height']
>>> person.values()
['Sarah', 2]

>>> person.setdefault('profession', 'Astrophysicist')
'Astrophysicist'
>>> person
{'profession': 'Astrophysicist', 'name': 'Sarah',
'height': 2}
```

Useful methods on dictionaries:

.items() returns a list of tuples:

[(<key>, <value>), (<key>, <value>)]

```
>>> heights = {"Everest": 8848, "K2": 8611}
>>> heights.items()
[('K2', 8611), ('Everest', 8848)]

>>> for (mountain, height) in heights.items():
…         print "{0} is {1}m high".format(mountain, height)
...
K2 is 8611m high
Everest is 8848m high
```