Digital World (2018)

Week 5, S1: Dictionaries; Modularity

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Refresher: from **lists to dictionaries**

- a list maps indices to values

- a dictionary maps (immutable) keys to values

d =

‘Rowan Atkinson’	→	*‘+44 1356 345867’*
‘John Cleese’	→	*‘+44 1904 534534’*
‘Cersei Lannister’	→	*‘+353 112 112’*
‘Chris Poskitt’	→	*‘+65 8888 8888’*

d[‘key’] = value   d.keys()   d.values()   d.items()

d.copy()   copy.deepcopy(d)   x in d.keys()   x not in d.values()

Refresher: **lists** vs. **dictionaries**

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Which of the following **is** a difference between lists and dictionaries?

- A. List elements cannot be mutable, but dictionary values can be mutable
- B. Assigning to an index that does not exist in a list is an error, but assigning a value to a key that does not exist in a dictionary is not
- C. A list can contain a dictionary as one of its elements, but a dictionary cannot contain a list as one of its values
- D. There is a `dict` constructor that creates a dictionary from a suitable object, but there is no `list` constructor that similarly creates lists

Dictionaries: **get** function

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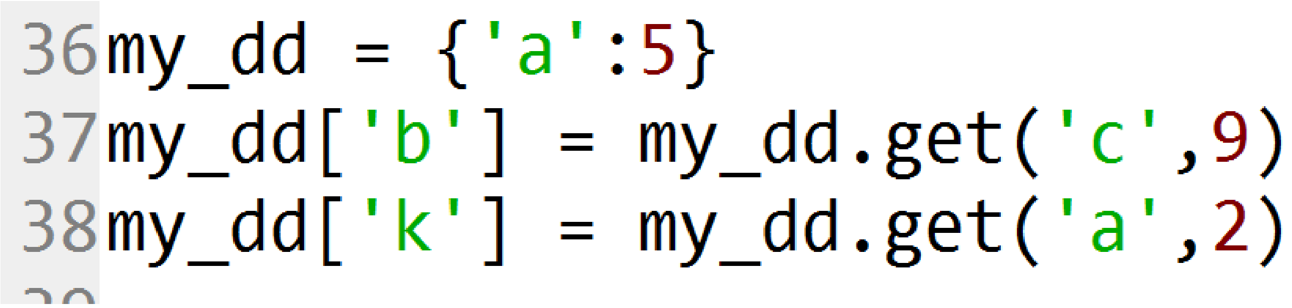

```
my_dd = {'a':5}
my_dd['b'] = my_dd.get('c',9)
my_dd['k'] = my_dd.get('a',2)
```

After this code, my_dd is

A. {'a': 5, 'b': 9, 'k': 2}
B. {'a': 5, 'b': 9, 'k': 5}
C. {'a': 5, 'b': 5, 'k': 2}
D. {'a': 5, 'b': 5, 'k': 5}
E. Error

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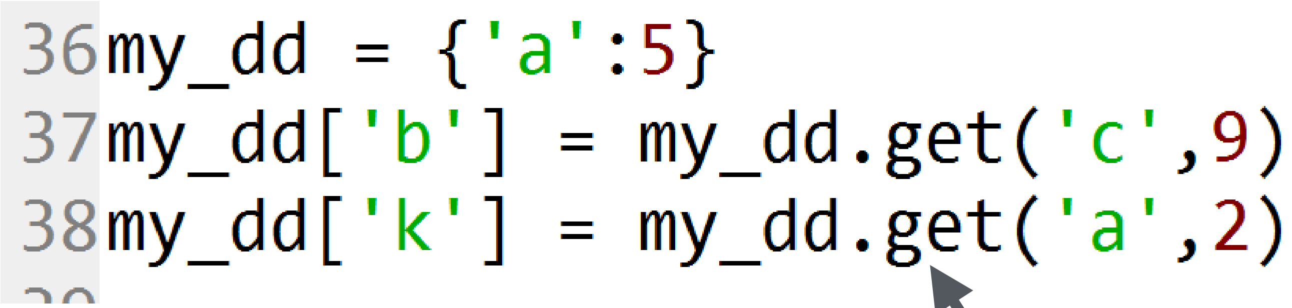

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if there is an "a" key, return its value; if not, return 2

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C. {'a': 5, 'b': 5, 'k': 2}
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      [0, 0, 0, 0, 0],
      [0, 0, 0, 3, 0] ]
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M[row_idx][col_idx]
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$(0, 3) \longrightarrow 1$

$(2, 1) \longrightarrow 2$

$(4, 3) \longrightarrow 3$

```
M.get((row_idx, col_idx), 0)
```

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⚠ modularity: degree by which complex program can be separated and recombined

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⚠ *you can write your own*

```
import yourlib
```

Question CS1, aka *SUTDCraps*

- in round one, roll two standard dice

  => if the sum is 2, 3, or 12 (“craps”), you lose
  => if the sum is 7 or 11 (“natural”), you win
  => if the sum is another value X, you get X points; next round

- in every subsequent round, roll two standard dice

  => if the sum is 7, you lose
  => if the sum is equal to your X points, you win
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! *make life easier now*: "factor out" smaller tasks into separate functions
make life easier in the future: maximise re-use of those functions

Summary

- the get function can define a default value for when a dictionary key does not exist

- solve complex problems by dividing them into smaller tasks

- function composition leads to more readable code

  => *create separate functions for smaller, self-contained tasks*

- re-using functions leads to more maintainable code

  => *"updating* ***once*** *updates it* ***everywhere****"*