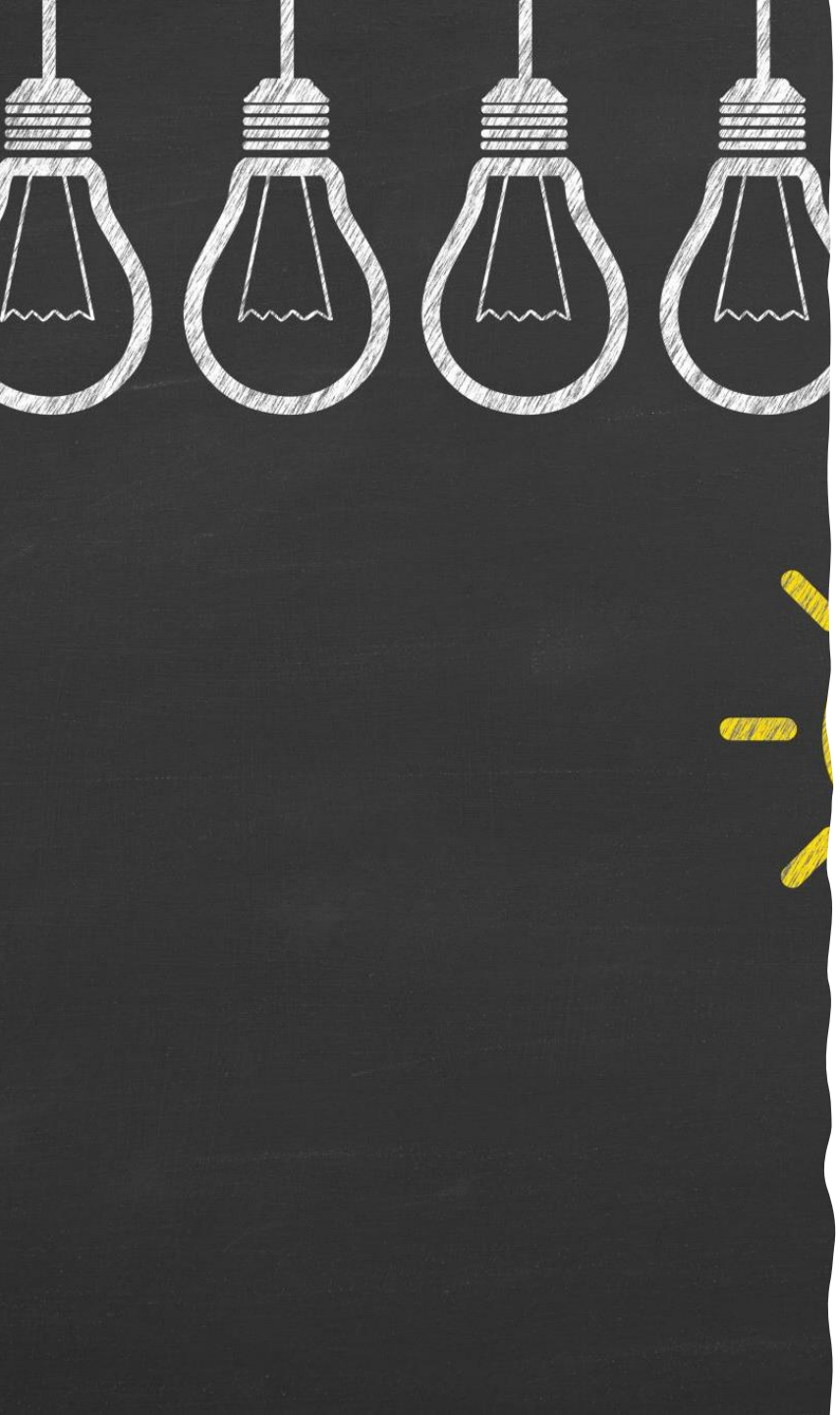


CMSC 105 Elementary Programming

Acknowledgement: These slides are adapted from slides provided with “Introduction to Programming Using Python, Liang (Pearson 2013)” and slides shared by Dr. Jory Denny

Outline

Dictionary Objects

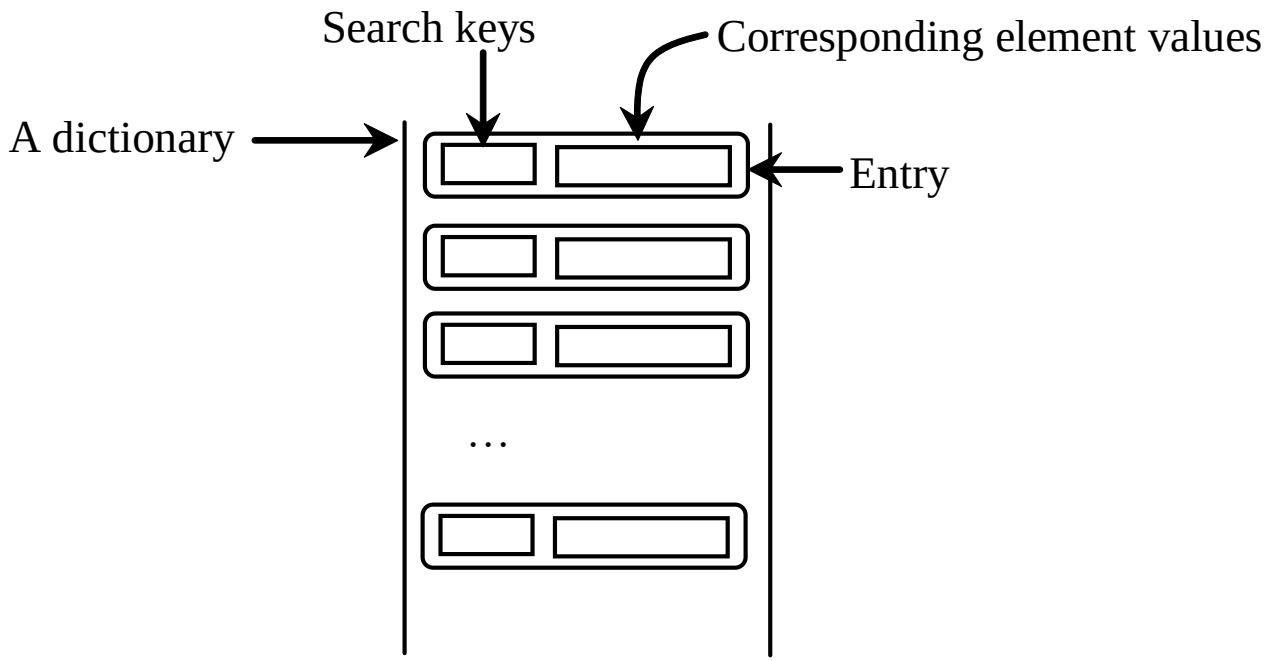
Practice Exercises

Motivation

- What if we wanted to store student records and access them by student ID?
  - We could maintain a list, but this will be inefficient
  - Here, we can use dictionaries
- What if we wanted to store the employer name along with the job application due date?
  - Here, we can use dictionaries

Dictionary

- A dictionary is a collection of key, value pairs. The key is like a name of the element that allows quick access to it.
  - From our motivating example of a student record – the key is a student ID and the entire student data is the value



Creating a Dictionary

- Again there are various ways to make a dictionary:
  - `d1 = {}` `# Create an empty dictionary`
  - `d2 = {"john":40, "peter":45}` `# Create a dictionary`
- When listing the elements, the first literal is a key and the second literal is the value (separated by a :)

Adding/Modifying Entries

- To add or modify an entry to a dictionary:
  - `dictionary[key] = value`
- For example:
  - `d2["susan"] = 50`

Deleting Entries

- To delete an entry from a dictionary:
  - `del dictionary[key]`
- For example:
  - `del d2["susan"]`

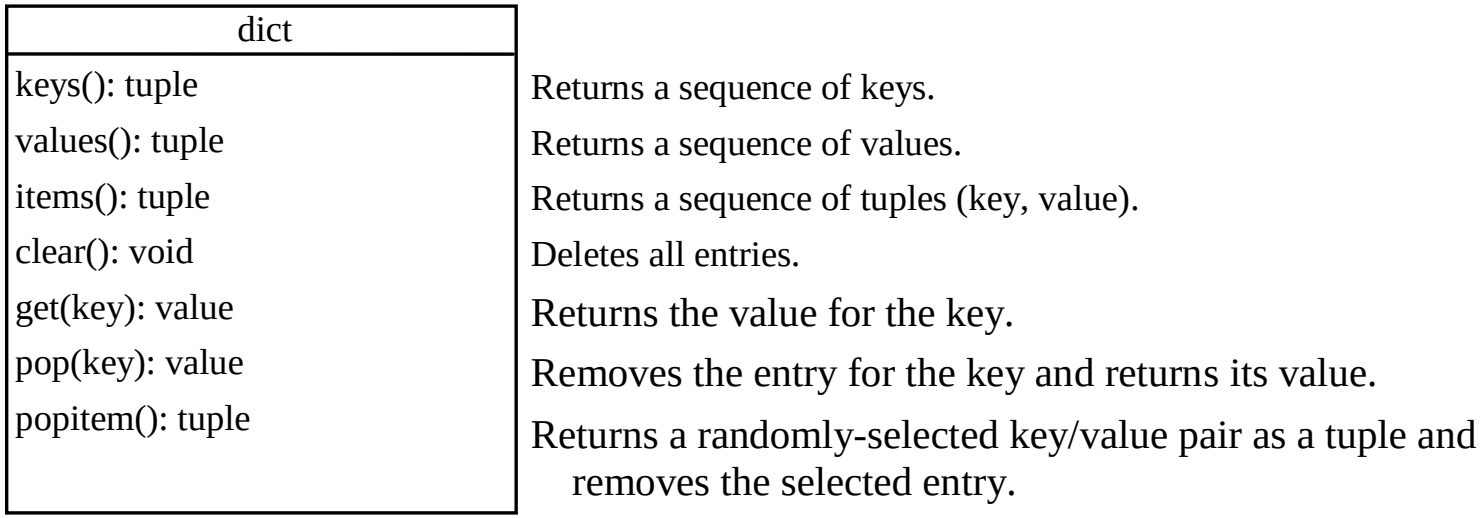
Looping over Entries

- A for loop over a dictionary will loop over its keys. As an example:

```
for key in dictionary:
    print(key + ":" + str(dictionary[key]))
```

Operations with dictionaries

- Similar operations exist for dictionaries as did other data structures
  - `len(dict)` counts the number of entries into the dictionary
  - `in`/`not in` tests existence of keys
- Other methods:



Practice with Dictionary Functions

```
>>> students={}

>>>students={101:"John",102:"Peter",103:"Mary",104:"Emily"}

>>> students[101]="John Smith"
>>> students
{101: 'John Smith', 102: 'Peter', 103: 'Mary', 104:
'Emily'}

>>> del students[102]
>>> students
{101: 'John Smith', 103: 'Mary', 104: 'Emily'}
```

Practice with Dictionary Functions

```
>>> for key in students:
    print(key,students[key])

101 John Smith
103 Mary
104 Emily
```

Practice with Dictionary Functions

```
>>> students.keys()
dict_keys([101, 103, 104])

>>> students.values()
dict_values(['John Smith', 'Mary', 'Emily’])

>>> students.items()
dict_items([(101, 'John Smith'), (103, 'Mary'),
(104, 'Emily')])
```

Practice with Dictionary Functions

```
>>> for key,value in students.items():
     print(key,value)


101 John Smith
103 Mary
104 Emily
```

Practice with Dictionary Functions

```
>>> len(students)
3

>>> 102 in students
False

>>> 101 in students
True

>>> students.get(103)
'Mary'
```

Practice with Dictionary Functions

```
>>> students.update({104:'Emma’})

>>> students
{101: 'John Smith', 103: 'Mary', 104: 'Emma’}

>>> students.clear()

>>> students
{}
```

Practice Exercise 1

- Given a dictionary (dict1) with key-value pair, write a program that would generate a new dictionary (dict2) with key as value of dict1 and value as value from dict1 multiplied by 5.

```
Sample run:
Initial dictionary
{1: 11, 2: 22, 3: 33, 4: 44, 5: 55}
Updated dictionary
{11: 55, 22: 110, 33: 165, 44: 220, 55: 275}
```

Practice Exercise 2

- Write a Python script to concatenate following dictionaries to create a new one.

```
Example:
dict1={1:10, 2:20}
dict2={3:30, 4:40}
dict3={5:50,6:60}
Expected Result : {1: 10, 2: 20, 3: 30, 4: 40, 5:
50, 6: 60}
```

Practice Exercise 3

- Write a Python script to check whether a given key already exists in a dictionary.

Thank you!
Questions?