

Exercises – Week 7

Dictionaries

Creating dictionaries

1. Write a function that takes a list of tuples (string, integer) and creates a dictionary where each string is associated with the sum of all the values it is associated with in the list.

Input: [('a', 7), ('b', 5), ('c', 2), ('a', 3), ('b', 3)]

Output: {'a': 10, 'b': 8, 'c': 2}

2. Write a function that takes a list of strings and creates a dictionary where each string is associated with the number of occurrences in the list.

Input: ["aaa", "bbb", "aaa", "aaa", "bbb", "ccc"]

Output: {'aaa': 3, 'bbb': 2, 'ccc': 1}

Browsing dictionaries

3. Using the reduce function, implement the filter function that creates a new dictionary with only the pairs from the given dictionary which satisfy a given condition.

Input: dict: {'a': 5, 'b': 7, 'c': 1}; condition: value >= 5

Output: {'a': 5, 'b': 7}

4. For collection types (lists, sets, dictionaries) it is useful to have functions that tell us if there is an element that satisfies a certain condition, respectively if all the elements satisfy the condition.

Implement exists and for_all functions for dictionaries, using reduce. They take as parameters a boolean function (condition) of key and value (expressing the condition) and the dictionary to be searched.

Input: dict: {'a': 5, 'b': 7, 'c': 1}; condition: value >= 5

Output: exists: True, for_all: False

5. Using the reduce function, implement the map function that builds a dictionary where all values have been transformed using a given function as a parameter.

Input: {'a': 5, 'b': 7, 'c': 6}, lambda x: x + 1

Output: {'a': 6, 'b': 8, 'c': 7}

6. Write a function that receives a dictionary of strings to integers and a list of strings and returns a set containing all values in the dictionary that match the strings in the list.

Input: {'aa': 5, 'bb': 7, 'ca': 6}, ['aa', 'bb', 'c']

Output: {5, 7}

7. Write a function that receives a function and a dictionary and returns the maximum value of the function applied to all dictionary entries.

The function received as parameter takes as arguments the key and value of an entry, and returns a value. Use reduce for traversing the dictionary, and max (defined for any type) to compare the values returned by the parameter function.