Data Structures p.II
Dictionaries & Sets

Exercises

Level - Easy

Exercise 1-1

1. Create a dictionary named person with the keys: "name", "age", and "job".
2. Assign appropriate values to each key.
3. Print the value associated with the key "name" from the dictionary.

Exercise 1-2

1. Given the dictionary prices with the following key-value pairs:
    a. "apple" > 0.5
    b. "banana" > 0.25
    c. "orange" > 0.75
2. Update the price of "banana" to 0.3.
3. Add “cherry” to the dictionary with a price of 0.1
4. Add “pear” to the dictionary with a price of 0.7 using another method.
5. Print the modified dictionary.

Exercise 1-3

1. Create a dictionary named car with keys: "brand", "model", “color” and "year" and assign values to each.
2. Print all the keys of the dictionary using the appropriate dictionary method.
3. Print all the values of the dictionary using the appropriate dictionary method.

Exercise 1-4

1. Create the following list : [('square', 'blue'), ('triangle', 'red'), ('circle', 'yellow')]
2. Transform this list into a dictionary.
   Tips: Use the dict() function.
3. Add ‘rectangle’ to the dictionary with a value of ‘green’.
4. Remove the ‘circle’ key-value pair.
5. Remove the ‘triangle’ key-value pair using another method.
6. Find a way to turn the dictionary into a list of tuples again.

Exercise 1-5

1. Create a set named colors with the items: "red", "green", "blue".
2. Find one other way to create the set above.
3. Remove "green" from the set using the appropriate method.
4. Try removing "yellow" from the set using a method that won't raise an error if the item doesn't exist.
5. Add ‘Purple’ and ‘Pink’ to the set in one operation.
6. Find the length of the set.
7. Empty the set.
8. Delete the set completely.

Exercise 1-6

1. Create a set that contains 5,1,3,7,8,2 and 3.
2. Print the set. Did it keep the order of the elements ?
3. Find the maximum and the minimum of the set.
4. Add the element of this list [False, 3.14, ‘Rose’] to the set.
5. Print the set. What is the order of the elements ?
6. Try to add another 1 to the set. Is it working ? Why ?

Exercise 1-7

1. Create a set named fruits with the items: "apple", "banana", and "cherry".
2. Add "orange" to the set.
3. Check if "apple" is in the set and print the result.

Level - Moderate

Exercise 2-1

1. Create a dictionary named inventory with the following key-value pairs:
    a. "apples" > 10
    b. "bananas" > 12
    c. "cherries" > 34
2. Check if "bananas" is a key in the dictionary.
3. Check if 5 is a value in the dictionary.
4. Print the results.
5. Create a set named fruits with the items: "apples", "bananas" and "cherries"
6. Check if the number of items in the inventory dictionary is greater than the number of items in the fruits set.
7. Print an appropriate message based on the result.

Exercise 2-2

1. Create a dictionary named employees where the keys are employee names and the values are dictionaries containing keys "job_title" and "salary".
2. Add two employees to the employees dictionary with their respective job titles and salaries.
3. Print the salary of the first employee you added.

Exercise 2-3

1. Create two sets: A = {1, 2, 3, 4} and B = {3, 4, 5, 6}.
2. If 5 is in set A, add it to set B. Otherwise, remove it from set B.
3. If 2 is not in set B, remove it from set A.
4. Print the resulting sets A and B.
5. Using a conditional structure, check if the sets have any elements in common.
    a. If so, find the common elements.
    b. If not, print a message.

Exercise 2-4

1. Create three lists that contain between 3 and 6 integers.
2. Find the common elements of these lists.

Exercise 2-5

1. Given three sets:
    a. named A with 1, 2, 3, 4, 5
    b. named B with 3, 4, 5, 6, 7
    c. named C with 4, 5
    d. named D with 7, 8
2. Determine if set C is a subset of set A and set B.
3. Print appropriate messages for each check.
4. Determine if set A is a superset of set C.
5. Print an appropriate message.
6. Check if set A has no elements in common with set B.
    a. If they have, find the common elements.
    b. Otherwise, print an appropriate message.
7. Check if set C is disjoint from D.
8. Print an appropriate message.

Exercise 2-6

1. Create a set C that contains the items: 1.1, 2.2, 3.3.
2. Check if the sum of the items in set C is greater than 6.
    a. If so, add the string "valid" to the set.
    b. Otherwise add "invalid".
3. Create a new set D from the set C without the string you added in the previous step.

Exercise 2-7

1. Given two sets, A = {1, 3, 5, 7} and B = {2, 3, 6, 8}.
2. Find the union, intersection, difference, and symmetric difference between sets A and B using built-in set methods.

Level - Hard

Exercise 3-1

1. Create a dictionary of dictionaries where the outer keys are countries, the second level keys are cities, and the innermost dictionaries represent populations and landmarks.
2. For a given country and city, retrieve and print its population.