

CSE 160 Section 5 Problems

Dictionaries

Dictionaries are variable types that map keys to values. You can think of dictionaries as lists with indices that can be any type (not just integers). Here are some main dictionary functions:

Creating a dictionary:

```
my_dict = {} # empty dictionary
my_dict = dict() # empty dictionary
my_dict = { key_1: value_1,
            key_2: value_2,
            ...
            key_n: value_n }
```

Accessing a dictionary:

```
My_dict[key_i]
```

Returns the value associated with key_i.

```
my_dict.keys()
```

Returns a list of all the keys in my_dict.

```
my_dict.values()
```

Returns a list of all the values in my_dict.

```
my_dict.items()
```

Returns a list of tuples of each key/value pair in my_dict.

Modifying a dictionary:

```
my_dict[key_i] = value_i
```

Adds the value value_i to be associated with key_i, or changes the value associated with key_i to be value_i.

```
del my_dict[key_i]
```

Removes key_i and the value associated with it.

Exercise 1

Create a function get_squares that accepts a list of numbers as a parameter, and returns a dictionary mapping each number in the list to its square.

For Example:

```
nums = [1, 4, 4]
```

get_squares(nums) returns {1:1, 4:16}

Exercise 2

Write a function `coldest_city` that takes in a list of dictionaries like data below and return the city with the lowest temperature. For example, `coldest_city(data)` would return "Seattle".

data is an example data set that can be passed in as a parameter.

```
data = [ {'city': 'Seattle', 'lowest_temp': 36, 'highest_temp': 45},
          {'city': 'Cupertino', 'lowest_temp': 39, 'highest_temp': 63},
          {'city': 'New York', 'lowest_temp': 57, 'highest_temp': 66} ]
```

Exercise 3

Part 1

Write a function `get_num_types` that takes a dictionary `pokemon_types` mapping pokemon to their type and returns a new dictionary mapping pokemon type to the number of pokemon in `pokemon_type` with that type. For example:

```
pokemon_types = {"pikachu": "electric", "charmander": "fire",
                 "charizard": "fire"}
```

`get_num_types(pokemon_types)` returns `{'electric': 1, 'fire': 2}`

Part 2

Write a function `get_num_types` that takes a dictionary `pokemon_types` mapping pokemon to their type and returns a new dictionary mapping pokemon type to a list of the pokemon in `pokemon_type` with that type. For example:

```
pokemon_types = {"pikachu": "electric", "charmander": "fire",
                 "charizard": "fire"}
```

`get_num_types(pokemon_types)` returns

```
{ 'electric': ["pikachu"],
  'fire': ["charmander", "charizard"] }
```

Exercise 4

Write code that, given a list of dictionaries, creates a single dictionary containing the sums of values with the same key in the given dictionaries. For example:

Given this list of dictionaries:

```
[ {'b': 10, 'a': 5, 'c': 90},
  {'b': 78, 'a': 45},
  {'a': 90, 'c': 10} ]
```

Your code should create: `{'b': 88, 'a': 140, 'c': 100}`

Exercise 5

Write a function `freq` that takes a string as an argument, and returns a dictionary that maps each character to its frequency in the given string. For example, `freq("Star Wars")` should return:

```
{ "S": 1, "t": 1, "a": 2, "r": 2, " ": 1, "W": 1, "s": 1 }.
```