
Homework Problems

6-1. Person: Use a dictionary to store information about a person you know. Store their first name, last name, age, and the city in which they live. You should have keys such as `first_name`, `last_name`, and `city`. Print each piece of information stored in your dictionary.

```
In [1]: andrew = {'first_name': 'Andrew', 'last_name': 'Bernas', 'age': 20, 'city': 'Annapolis'}

for key, value in andrew.items():
    print(f"{key.title()}: {str(value).title()}")
```

```
First_Name: Andrew
Last_Name: Bernas
Age: 20
City: Annapolis
```

6-2. Favorite Numbers: Use a dictionary to store people's favorite numbers. Think of five names, and use them as keys in your dictionary. Think of a favorite number for each person, and store each as a value in your dictionary. Print each person's name and their favorite number.

```
In [2]: favorite_numbers = {
        'andrew': 1,
        'maeve': 5,
        'dug': 19,
        'catherine': 7,
        'gabby': 54
    }

for name, number in favorite_numbers.items():
    print(f"{name.title()}'s favorite number is {number}!")
```

```
Andrew's favorite number is 1!
Maeve's favorite number is 5!
Dug's favorite number is 19!
Catherine's favorite number is 7!
Gabby's favorite number is 54!
```

6-3. Glossary: A Python dictionary can be used to model an actual dictionary. However to avoid confusion let's call it a glossary.

- Think of five programming words you've learned about in the previous chapters. Use these words as the keys in your glossary, and store their meanings as values.
- Print each word and its meaning as neatly formatted output. You might print the word followed by a colon and then its meaning, or print the word on one line and then print its

meaning indented on a second line. Use the newline character (`\n`) to insert a blank line between each word-meaning pair in your output.

```
In [3]: glossary = {
        'variable': 'containers for storing data values',
        'list': 'a single variable store multiple items',
        'for loop': 'used for iterating over a sequence (that is either a list, a
        'string': 'a sequence of characters enclosed between single or double quo
        'while loop': 'used execute a set of statements as long as a condition is
    }

    print(f"Variable: {glossary['variable']}. \n")
    print(f"List: {glossary['list']}. \n")
    print(f"For Loop: {glossary['for loop']}. \n")
    print(f"String: {glossary['string']}. \n")
    print(f"While Loop: {glossary['while loop']}. \n")
```

Variable: containers for storing data values.

List: a single variable store multiple items.

For Loop: used for iterating over a sequence (that is either a list, a tuple, a dictionary, or a string).

String: a sequence of characters enclosed between single or double quotation marks.

While Loop: used execute a set of statements as long as a condition is true.

6-4. Glossary 2: Clean up the code from above by replacing your series of `print()` calls with a loop that runs through the dictionary's keys and values. When you're sure that your loop works, add five more Python terms to your glossary. When you run your program again, these new words and meanings should automatically be included in the output.

```
In [4]: glossary['integer'] = 'a whole number, positive or negative, without decimals'
glossary['float'] = 'a number, positive or negative, containing one or more decimals'
glossary['dictionary'] = 'used to store data values in key:value pairs'
glossary['boolean'] = 'used to represent one of two values: True or False'
glossary['tuple'] = 'used to store multiple items in a single variable, like a list, but items remain constant'

for word, definition in glossary.items():
    print(f"{word.title()}: {definition}. \n")
```

Variable: containers for storing data values.

List: a single variable store multiple items.

For Loop: used for iterating over a sequence (that is either a list, a tuple, a dictionary, or a string).

String: a sequence of characters enclosed between single or double quotation marks.

While Loop: used execute a set of statements as long as a condition is true.

Integer: a whole number, positive or negative, without decimals, of unlimited length.

Float: a number, positive or negative, containing one or more decimals.

Dictionary: used to store data values in key:value pairs.

Boolean: used to represent one of two values: True or False.

Tuple: used to store multiple items in a single variable, like a list, but items remain constant.

6-5. Rivers: Make a dictionary containing three major rivers and the country each river runs through. One key-value pair might be 'nile': 'egypt' .

- Use a loop to print a sentence about each river, such as *The Nile runs through Egypt.*
- Use a loop to print the name of each river included in the dictionary.
- Use a loop to print the name of each country included in the the dictionary.

```
In [5]: rivers = {
        'nile': 'egypt',
        'amazon': 'brazil',
        'mississippi': 'united states'
    }

    for name, country in rivers.items():
        print(f"The {name.title()} runs through {country.title()}.")

    for name in rivers.keys():
        print(name)

    for country in rivers.values():
        print(country)
```

The Nile runs through Egypt.
 The Amazon runs through Brazil.
 The Mississippi runs through United States.
 nile
 amazon
 mississippi
 egypt
 brazil
 united states

6-6. Polling: Use the code in *favorite_languages.py* (page 97).

- Make a list of people who should take the favorite languages poll. Include some names that are already in the dictionary and some that are not.
- Loop through the list of people who should take the poll. If they have already taken the poll, print a message thanking them for responding. If they have not yet taken the poll, print a message inviting them to take the poll.

```
In [6]: favorite_languages = {
        'jen': 'python',
        'sarah': 'c',
        'edward': 'rust',
        'phil': 'python'
    }

    take_poll = ['jen', 'dug', 'andrew', 'edward', 'elle']

    for name in favorite_languages.keys():
        if name in take_poll:
            print(f"{name.title()}, please take the poll.")
        else:
            print(f"Thank you {name.title()} for taking the poll!")
```

Jen, please take the poll.
 Thank you Sarah for taking the poll!
 Edward, please take the poll.
 Thank you Phil for taking the poll!

6-7. People: Start with the program you wrote for Exercise 6-1. Make two new dictionaries representing different people, and store all three dictionaries in a list called `people`. Loop through your list of people. As you loop through the list, print everything you know about each person.

```
In [7]: maeve = {'first_name': 'maeve', 'last_name': 'carrigg', 'city': 'West Port'}
        david = {'first_name': 'aavid', 'last_name': 'chin', 'city': 'Tokyo'}
        people = [andrew, maeve, david]

        for name in people:
            print(f"{name['first_name'].title()} {name['last_name'].title()} is from
```

```

        andrew['city'].title()}

        Andrew Bernas is from Annapolis
        Maeve Carrigg is from West Port
        Aavid Chin is from Tokyo
```

6-8. Pets: Make several dictionaries, where each dictionary represents a different pet. In each dictionary, include the kind of animal and the owner's name. Store these dictionaries in a list called `pets`. Next, loop through your list and as you do, print everything you know about each pet.

```
In [8]: pet1 = {'kind': 'dog', 'owner': 'andrew'}
        pet2 = {'kind': 'cat', 'owner': 'dug'}
        pet3 = {'kind': 'fish', 'owner': 'catherine'}
        pets = [pet1, pet2, pet3]
        num = 1

        for pet in pets:
            print(f"Pet {num} is a {pet['kind']} and its owner is {pet['owner'].title()}")
            num += 1
```

```

        Pet 1 is a dog and its owner is Andrew
        Pet 2 is a cat and its owner is Dug
        Pet 3 is a fish and its owner is Catherine
```

6-9. Favorite Places: Make a dictionary called `favorite_places`. Think of three names to use as keys in the dictionary, and store one to three favorite places for each person. Loop through the dictionary, and print each person's name and their favorite place.

```
In [9]: favorite_places = {
        'andrew': 'forest',
        'dug': 'lake',
        'maeve': 'beach'
    }

    for name, place in favorite_places.items():
        print(f"{name.title()}'s favorite place is the {place}!")
```

Andrew's favorite place is the forest!
Dug's favorite place is the lake!
Maeve's favorite place is the beach!

6-10. Favorite Numbers: Modify your program from Exercise 6-2 so each person can have more than one favorite number. Then print each person's name along with their favorite numbers.

```
In [10]: favorite_numbers = {
        'andrew': [1, 4],
        'maeve': [5, 14, 32],
        'dug': [19, 21, 71, 100],
        'catherine': [7, 89, 68],
        'gabby': [54, 49, 31, 59]
    }

    for name, numbers in favorite_numbers.items():
        print(f"{name.title()}'s favorite numbers are: ")
        for number in numbers:
            print(number)
```

Andrew's favorite numbers are:
1
4
Maeve's favorite numbers are:
5
14
32
Dug's favorite numbers are:
19
21
71
100
Catherine's favorite numbers are:
7
89
68
Gabby's favorite numbers are:
54
49
31
59

6-11 Cities: Make a dictionary called `cities` . Use the names of three cities as keys in your dictionary. Create a dictionary of information about each city and include the country that the city is in, its approximate population, and one fact about that city. The keys for each city's dictionary should be something like `country` , `population` , and `fact` . Print the name of each city and all of the information you have stored about it.

```
In [11]: cities = {
    'tokyo': {'country': 'japan', 'population': 13_960_000, 'fact': 'Most popu
    'annapolis': {'country': 'united states', 'population': 40_687, 'fact': '
    'san francisco': {'country': 'united states', 'population': 815_201, 'fac
}

for city, info in cities.items():
    print(f"{city.title()} is in the country {info['country'].title()}, has a
    print("\n")
```

Tokyo is in the country Japan, has a population of 13960000 people, and its fun fact is: Most populous metropolitan area

Annapolis is in the country United States, has a population of 40687 people, and its fun fact is: Home of the United States Naval Academy

San Francisco is in the country United States, has a population of 815201 people, and its fun fact is: Famous for the Golden Gate Bridge

6-12. Extensions: We're now working with examples that are complex enough that they can be extended in any number of ways. Use one of the example programs from this chapter, and extend it by adding new keys and values, changing the context of the program or improving the formatting of the output.

```
In [12]: users = {
    'aeinstein': {
        'first': 'albert',
        'last': 'einstein',
        'location': 'princeton',
    },

    'mcurie': {
        'first': 'marie',
        'last': 'curie',
        'location': 'paris',
    },

    'cmaeve': {
        'first': 'maeve',
        'last': 'carrigg',
        'location': 'west port'
    },

    'bcatherine': {
        'first': 'catherine',
        'last': 'baker',
        'location': 'woodside'
    }
}

for username, user_info in users.items():
    print(f"\nUsername: {username}")
    full_name = f"{user_info['first']} {user_info['last']}"
    location = user_info['location']

    print(f"\tFull name: {full_name.title()}")
    print(f"\tLocation: {location.title()}")
```

```
Username: aeinstein
    Full name: Albert Einstein
    Location: Princeton
```

```
Username: mcurie
    Full name: Marie Curie
    Location: Paris
```

```
Username: cmaeve
    Full name: Maeve Carrigg
    Location: West Port
```

```
Username: bcatherine
    Full name: Catherine Baker
    Location: Woodside
```


In []: