

Writing programs (or programming) is a very creative and rewarding activity. You can write programs for many reasons ranging from making your living to solving a difficult data analysis problem to having fun to helping someone else solve a problem. This book assumes that everyone needs to know how to program and that once you know how to program, you will figure out what you want to do with your newfound skills.

We are surrounded in our daily lives with computers ranging from laptops to cell phones. We can think of these computers as our “personal assistants” who can take care of many things on our behalf. The hardware in our current-day computers is essentially built to continuously ask us the question, “What would you like me to do next?”

Our computers are fast and have vast amounts of memory and could be very helpful to us if we only knew the language to speak to explain to the computer what we would like it to do next. If we knew this language we could tell the computer to do tasks on our behalf that were repetitive. Interestingly, the kinds of things computers can do best are often the kinds of things that we humans find boring and mind-numbing.

Counting Pattern Pt. 1

```
counts = dict()
print('Enter a line of text:')
line = input('')

words = line.split()

print('Words:', words)

print('Counting...')
for word in words:
    counts[word] = counts.get(word, 0) + 1
print('Counts', counts)
```

The general pattern to count the words in a line of text is to **split** the line into words, then loop through the words and use a **dictionary** to track the count of each word independently.

```
python wordcount.py
```

```
Enter a line of text:
```

```
the clown ran after the car and the car ran into the tent  
and the tent fell down on the clown and the car
```

```
Words: ['the', 'clown', 'ran', 'after', 'the', 'car',  
'and', 'the', 'car', 'ran', 'into', 'the', 'tent', 'and',  
'the', 'tent', 'fell', 'down', 'on', 'the', 'clown',  
'and', 'the', 'car']
```

```
Counting...
```

```
Counts {'the': 7, 'clown': 2, 'ran': 2, 'after': 1, 'car':  
3, 'and': 3, 'into': 1, 'tent': 2, 'fell': 1, 'down': 1,  
'on': 1}
```



```
counts = dict()
line = input('Enter a line of text:')
words = line.split()

print('Words:', words)
print('Counting...')

for word in words:
    counts[word] = counts.get(word,0) + 1
print('Counts', counts)
```



```
python wordcount.py
```

Enter a line of text:

the clown ran after the car and the car ran
into the tent and the tent fell down on the
clown and the car

Words: ['the', 'clown', 'ran', 'after', 'the', 'car',
'and', 'the', 'car', 'ran', 'into', 'the', 'tent', 'and',
'the', 'tent', 'fell', 'down', 'on', 'the', 'clown',
'and', 'the', 'car']
Counting...

Counts {'the': 7, 'clown': 2, 'ran': 2, 'after': 1,
'car': 3, 'and': 3, 'into': 1, 'tent': 2, 'fell': 1,
'down': 1, 'on': 1}

Definite Loops and Dictionaries

Even though **dictionaries** are not stored in order, we can write a **for** loop that goes through all the **entries** in a **dictionary** - actually it goes through all of the **keys** in the **dictionary** and **looks up** the values


```
>>> counts = { 'chuck' : 1 , 'fred' : 42, 'jan': 100}
>>> for key in counts:
...     print(key, counts[key])
...
chuck 1
fred 42
jan 100
>>>
```

Retrieving lists of Keys and Values

You can get a list of **keys**, **values**, or **items (both)** from a dictionary

```
>>> jjj = { 'chuck' : 1 , 'fred' : 42, 'jan': 100}
>>> print(list(jjj))
['chuck', 'fred', 'jan']
>>> print(list(jjj.keys()))
['chuck', 'fred', 'jan']
>>> print(list(jjj.values()))
[1, 42, 100]
>>> print(list(jjj.items()))
[('chuck', 1), ('fred', 42), ('jan', 100)]
>>>
```

What is a “tuple”? - coming soon...



Bonus: Two Iteration Variables! Pt. 1

- We loop through the **key-value** pairs in a dictionary using *two* iteration variables

```
jjj = { 'chuck' : 1 , 'fred' : 42, 'jan' : 100 }  
for aaa,bbb in jjj.items() :  
    print(aaa, bbb)
```

```
chuck 1  
fred 42  
jan 100
```

aaa	bbb
[chuck]	1
[fred]	42
[jan]	100

- Each iteration, the first variable is the **key** and the second variable is the corresponding **value** for the key

```
name = input('Enter file:')
handle = open(name)

counts = dict()
for line in handle:
    words = line.split()
    for word in words:
        counts[word] = counts.get(word,0) + 1

bigcount = None
bigword = None
for word,count in counts.items():
    if bigcount is None or count > bigcount:
        bigword = word
        bigcount = count

print(bigword, bigcount)
```

```
python words.py
Enter file: words.txt
to 16
```

```
python words.py
Enter file: clown.txt
the 7
```

Using two nested loops

Summary

- **What is a collection**
- **Lists versus dictionaries**
- **Dictionary Constants**
- **The most common word**
- **Using the `get()` method**
- **Writing dictionary loops**
- **Sneak peek: Tuples**



Acknowledgements / Contributions



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