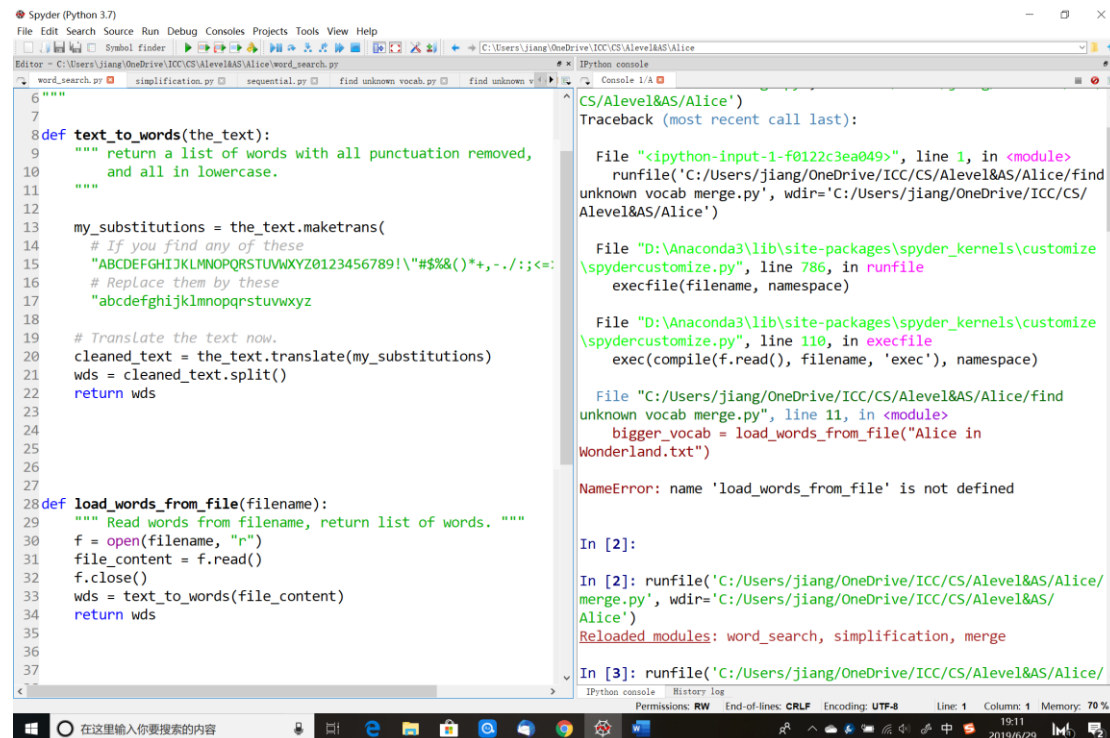


Word search project report

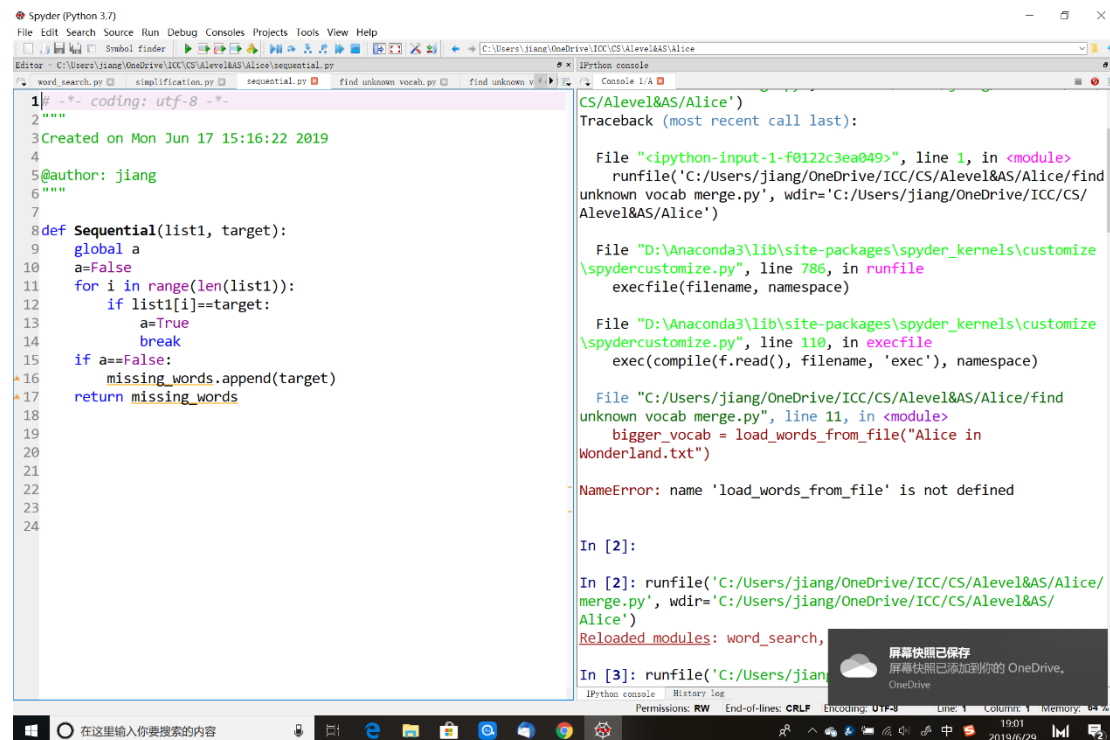
The first step: import the book and the booklet



```
6 """
7
8 def text_to_words(the_text):
9     """ return a list of words with all punctuation removed,
10         and all in lowercase.
11     """
12
13     my_substitutions = the_text.maketrans(
14         # If you find any of these
15         "ABCDEF GHIJ KLMNOPQRST UVWXYZ0123456789!\"#$%&()*+,-./:;<=
16         # Replace them by these
17         "abcdefghijklmnopqrstuvwxyz
18
19     # Translate the text now.
20     cleaned_text = the_text.translate(my_substitutions)
21     wds = cleaned_text.split()
22     return wds
23
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27
28 def load_words_from_file(filename):
29     """ Read words from filename, return list of words. """
30     f = open(filename, "r")
31     file_content = f.read()
32     f.close()
33     wds = text_to_words(file_content)
34     return wds
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```

This function is used to remove repeated words in the book.

The third step: try the sequential search algorithm



The screenshot shows the Spyder Python IDE with a file named `sequential.py` open. The code defines a function `Sequential(list1, target)` that iterates through `list1` and appends `target` to `missing_words` if it is not present. The console shows a `NameError` because the function `load_words_from_file` is not defined. The traceback indicates the error occurred in `merge.py` at line 11, where `bigger_vocab = load_words_from_file("Alice in Wonderland.txt")` is called.

```
1# -*- coding: utf-8 -*-
2"""
3Created on Mon Jun 17 15:16:22 2019
4
5@author: jiang
6"""
7
8def Sequential(list1, target):
9    global a
10    a=False
11    for i in range(len(list1)):
12        if list1[i]==target:
13            a=True
14            break
15    if a==False:
16        missing_words.append(target)
17    return missing_words
18
19
20
21
22
23
24
```

```
CS/Alevel&AS/Alice')
Traceback (most recent call last):

  File "<ipython-input-1-f0122c3ea049>", line 1, in <module>
    runfile('C:/Users/jiang/OneDrive/ICC/CS/Alevel&AS/Alice/find
unknown vocab merge.py', wdir='C:/Users/jiang/OneDrive/ICC/CS/
Alevel&AS/Alice')

  File "D:\Anaconda3\lib\site-packages\spyder_kernels\customize
\spydercustomize.py", line 786, in runfile
    execfile(filename, namespace)

  File "D:\Anaconda3\lib\site-packages\spyder_kernels\customize
\spydercustomize.py", line 110, in execfile
    exec(compile(f.read(), filename, 'exec'), namespace)

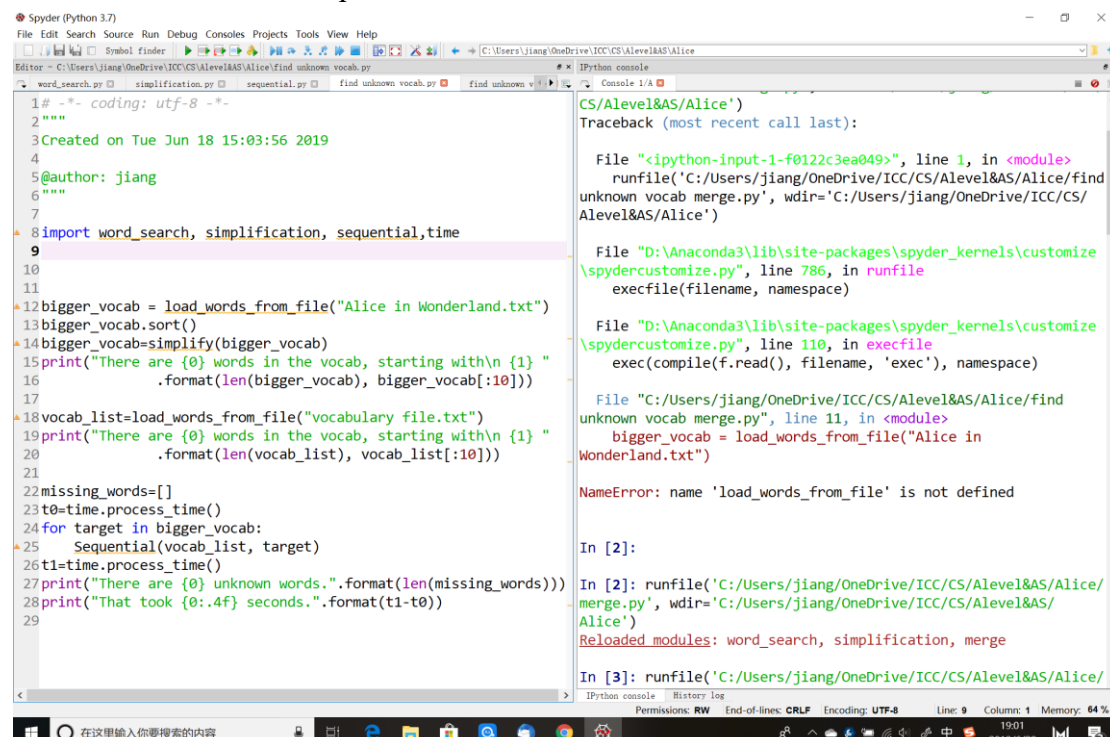
  File "C:/Users/jiang/OneDrive/ICC/CS/Alevel&AS/Alice/find
unknown vocab merge.py", line 11, in <module>
    bigger_vocab = load_words_from_file("Alice in
Wonderland.txt")

NameError: name 'load_words_from_file' is not defined

In [2]:

In [2]: runfile('C:/Users/jiang/OneDrive/ICC/CS/Alevel&AS/Alice/
merge.py', wdir='C:/Users/jiang/OneDrive/ICC/CS/Alevel&AS/
Alice')
Reloaded modules: word_search,
In [3]: runfile('C:/Users/jiang/OneDrive/ICC/CS/Alevel&AS/Alice/
```

This is the function of sequential search.



The screenshot shows the Spyder Python IDE with a file named `sequential.py` open. The code imports `word_search`, `simplification`, `sequential`, and `time`. It loads words from `"Alice in Wonderland.txt"` and `"vocabulary file.txt"`, sorts them, and uses the `Sequential` function to find unknown words. The console shows a `NameError` because the function `load_words_from_file` is not defined. The traceback indicates the error occurred in `merge.py` at line 11, where `bigger_vocab = load_words_from_file("Alice in Wonderland.txt")` is called.

```
1# -*- coding: utf-8 -*-
2"""
3Created on Tue Jun 18 15:03:56 2019
4
5@author: jiang
6"""
7
8import word_search, simplification, sequential, time
9
10
11
12bigger_vocab = load_words_from_file("Alice in Wonderland.txt")
13bigger_vocab.sort()
14bigger_vocab=simplify(bigger_vocab)
15print("There are {} words in the vocab, starting with\n {1} "
16      .format(len(bigger_vocab), bigger_vocab[:10]))
17
18vocab_list=load_words_from_file("vocabulary file.txt")
19print("There are {} words in the vocab, starting with\n {1} "
20      .format(len(vocab_list), vocab_list[:10]))
21
22missing_words=[]
23t0=time.process_time()
24for target in bigger_vocab:
25    Sequential(vocab_list, target)
26t1=time.process_time()
27print("There are {} unknown words.".format(len(missing_words)))
28print("That took {0:.4f} seconds.".format(t1-t0))
29
```

```
CS/Alevel&AS/Alice')
Traceback (most recent call last):

  File "<ipython-input-1-f0122c3ea049>", line 1, in <module>
    runfile('C:/Users/jiang/OneDrive/ICC/CS/Alevel&AS/Alice/find
unknown vocab merge.py', wdir='C:/Users/jiang/OneDrive/ICC/CS/
Alevel&AS/Alice')

  File "D:\Anaconda3\lib\site-packages\spyder_kernels\customize
\spydercustomize.py", line 786, in runfile
    execfile(filename, namespace)

  File "D:\Anaconda3\lib\site-packages\spyder_kernels\customize
\spydercustomize.py", line 110, in execfile
    exec(compile(f.read(), filename, 'exec'), namespace)

  File "C:/Users/jiang/OneDrive/ICC/CS/Alevel&AS/Alice/find
unknown vocab merge.py", line 11, in <module>
    bigger_vocab = load_words_from_file("Alice in
Wonderland.txt")

NameError: name 'load_words_from_file' is not defined

In [2]:

In [2]: runfile('C:/Users/jiang/OneDrive/ICC/CS/Alevel&AS/Alice/
merge.py', wdir='C:/Users/jiang/OneDrive/ICC/CS/Alevel&AS/
Alice')
Reloaded modules: word_search, simplification, merge
In [3]: runfile('C:/Users/jiang/OneDrive/ICC/CS/Alevel&AS/Alice/
```

This the completed algorithm for sequential search. The first step is to import all the functions needed. After that, I imported the book and the booklet using the `word_search` function. Then, use the sequential function to find unknown words, at the same time record the time used.

```
1# -*- coding: utf-8 -*-
2"""
3Created on Tue Jun 18 15:03:56 2019
4
5@author: jiang
6"""
7
8import word_search, simplification, sequential,time
9
10
11
12bigger_vocab = load_words_from_file("Alice in Wonderland.txt")
13bigger_vocab.sort()
14bigger_vocab=simplify(bigger_vocab)
15print("There are {0} words in the vocab, starting with\n {1} "
16      .format(len(bigger_vocab), bigger_vocab[:10]))
17
18vocab_list=load_words_from_file("vocabulary file.txt")
19print("There are {0} words in the vocab, starting with\n {1} "
20      .format(len(vocab_list), vocab_list[:10]))
21
22missing_words=[]
23t0=time.process_time()
24for target in bigger_vocab:
25    Sequential(vocab_list, target)
26t1=time.process_time()
27print("There are {0} unknown words.".format(len(missing_words)))
28print("That took {0:.4f} seconds.".format(t1-t0))
29
```

In [11]: runfile('C:/Users/jiang/OneDrive/ICC/CS/Alevel&AS/Alice/find unknown vocab.py', wdir='C:/Users/jiang/OneDrive/ICC/CS/Alevel&AS/Alice')

Reloaded modules: word_search, simplification, merge

There are 2569 words in the vocab, starting with
['a', 'abide', 'able', 'about', 'above', 'absence', 'absurd',
'acceptance', 'accident', 'accidentally']

There are 19455 words in the vocab, starting with
['a', 'aback', 'abacus', 'abandon', 'abandoned', 'abandonment',
'abashed', 'abate', 'abbey', 'abbreviate']

There are 827 unknown words.
That took 2.5312 seconds.

In [12]:

The sequential method used 2.5s to find 827 unknown words in 2569 words from the book.

The fourth step: try the binary search algorithm

```
1# -*- coding: utf-8 -*-
2"""
3Created on Mon Jun 17 15:47:15 2019
4
5@author: jiang
6"""
7
8def bi_search(list1,target):
9    if len(list1)==0:
10        missing_words.append(target)
11        return missing_words
12    else:
13        mid=len(list1)//2
14        if list1[mid]==target:
15            return True
16        else:
17            if target<list1[mid]:
18                return bi_search(list1[:mid],target)
19            else:
20                return bi_search(list1[mid+1:],target)
21
22
23
24
25
```

In [11]: runfile('C:/Users/jiang/OneDrive/ICC/CS/Alevel&AS/Alice/find unknown vocab.py', wdir='C:/Users/jiang/OneDrive/ICC/CS/Alevel&AS/Alice')

Reloaded modules: word_search, simplification, merge

There are 2569 words in the vocab, starting with
['a', 'abide', 'able', 'about', 'above', 'absence', 'absurd',
'acceptance', 'accident', 'accidentally']

There are 19455 words in the vocab, starting with
['a', 'aback', 'abacus', 'abandon', 'abandoned', 'abandonment',
'abashed', 'abate', 'abbey', 'abbreviate']

There are 827 unknown words.
That took 2.5312 seconds.

In [12]:

The function of binary search

```
1# -*- coding: utf-8 -*-
2"""
3Created on Wed Jun 19 10:07:57 2019
4
5@author: jiang
6"""
7
8import word_search, bi_sequential, simplification, time
9
10
11bigger_vocab = load_words_from_file("Alice in Wonderland.txt")
12
13bigger_vocab.sort()
14
15bigger_vocab=simplify(bigger_vocab)
16
17
18print("There are {} words in the vocab, starting with\n {} "
19      .format(len(bigger_vocab), bigger_vocab[:10]))
20
21vocab_list=load_words_from_file("vocabulary file.txt")
22print("There are {} words in the vocab, starting with\n {} "
23      .format(len(vocab_list), vocab_list[:10]))
24
25missing_words=[]
26t0=time.process_time()
27for target in bigger_vocab:
28    bi_search(vocab_list, target)
29t1=time.process_time()
30print("There are {} unknown words.".format(len(missing_words)))
31print("That took {:.4f} seconds.".format(t1-t0))
```

In [11]: runfile('C:/Users/jiang/OneDrive/ICC/CS/Alevel&AS/Alice/find unknown vocab.py', wdir='C:/Users/jiang/OneDrive/ICC/CS/Alevel&AS/Alice')
Reloaded modules: word_search, simplification, merge
There are 2569 words in the vocab, starting with
['a', 'abide', 'able', 'about', 'above', 'absence', 'absurd', 'acceptance', 'accident', 'accidentally']
There are 19455 words in the vocab, starting with
['a', 'aback', 'abacus', 'abandon', 'abandoned', 'abandonment', 'abashed', 'abate', 'abbey', 'abbreviate']
There are 827 unknown words.
That took 2.5312 seconds.

In [12]:

Do the similar steps as in the sequential algorithm.

```
1# -*- coding: utf-8 -*-
2"""
3Created on Wed Jun 19 10:07:57 2019
4
5@author: jiang
6"""
7
8import word_search, bi_sequential, simplification, time
9
10
11bigger_vocab = load_words_from_file("Alice in Wonderland.txt")
12
13bigger_vocab.sort()
14
15bigger_vocab=simplify(bigger_vocab)
16
17
18print("There are {} words in the vocab, starting with\n {} "
19      .format(len(bigger_vocab), bigger_vocab[:10]))
20
21vocab_list=load_words_from_file("vocabulary file.txt")
22print("There are {} words in the vocab, starting with\n {} "
23      .format(len(vocab_list), vocab_list[:10]))
24
25missing_words=[]
26t0=time.process_time()
27for target in bigger_vocab:
28    bi_search(vocab_list, target)
29t1=time.process_time()
30print("There are {} unknown words.".format(len(missing_words)))
31print("That took {:.4f} seconds.".format(t1-t0))
```

In [11]: runfile('C:/Users/jiang/OneDrive/ICC/CS/Alevel&AS/Alice/find unknown vocab.py', wdir='C:/Users/jiang/OneDrive/ICC/CS/Alevel&AS/Alice')
Reloaded modules: word_search, simplification, merge
There are 2569 words in the vocab, starting with
['a', 'abide', 'able', 'about', 'above', 'absence', 'absurd', 'acceptance', 'accident', 'accidentally']
There are 19455 words in the vocab, starting with
['a', 'aback', 'abacus', 'abandon', 'abandoned', 'abandonment', 'abashed', 'abate', 'abbey', 'abbreviate']
There are 827 unknown words.
That took 2.5312 seconds.

In [12]: runfile('C:/Users/jiang/OneDrive/ICC/CS/Alevel&AS/Alice/find unknown vocab bi.py', wdir='C:/Users/jiang/OneDrive/ICC/CS/Alevel&AS/Alice')
Reloaded modules: word_search, simplification, sequential
There are 2569 words in the vocab, starting with
['a', 'abide', 'able', 'about', 'above', 'absence', 'absurd', 'acceptance', 'accident', 'accidentally']
There are 19455 words in the vocab, starting with
['a', 'aback', 'abacus', 'abandon', 'abandoned', 'abandonment', 'abashed', 'abate', 'abbey', 'abbreviate']
There are 827 unknown words.
That took 0.2656 seconds.

In [13]:

The binary method only use 0.27s to do the same thing, much faster than the sequential one.

The fifth step: try the merging search algorithm

```
Spyder (Python 3.7)
File Edit Search Source Run Debug Consoles Projects Tools View Help
Editor - C:\Users\jiang\OneDrive\ICC\CS\Alevel&AS\Alice\merge.py
find unknown vocab bi.py bi_sequential.py merge.py find unknown vocab merge.py
Python console
In [11]: runfile('C:/Users/jiang/OneDrive/ICC/CS/Alevel&AS/Alice/find unknown vocab.py', wdir='C:/Users/jiang/OneDrive/ICC/CS/Alevel&AS/Alice')
Reloaded modules: word_search, simplification, merge
There are 2569 words in the vocab, starting with
['a', 'abide', 'able', 'about', 'above', 'absence', 'absurd',
'acceptance', 'accident', 'accidentally']
There are 19455 words in the vocab, starting with
['a', 'aback', 'abacus', 'abandon', 'abandoned', 'abandonment',
'abashed', 'abate', 'abbey', 'abbreviate']
There are 827 unknown words.
That took 2.5312 seconds.

In [12]: runfile('C:/Users/jiang/OneDrive/ICC/CS/Alevel&AS/Alice/find unknown vocab bi.py', wdir='C:/Users/jiang/OneDrive/ICC/CS/Alevel&AS/Alice')
Reloaded modules: word_search, simplification, sequential
There are 2569 words in the vocab, starting with
['a', 'abide', 'able', 'about', 'above', 'absence', 'absurd',
'acceptance', 'accident', 'accidentally']
There are 19455 words in the vocab, starting with
['a', 'aback', 'abacus', 'abandon', 'abandoned', 'abandonment',
'abashed', 'abate', 'abbey', 'abbreviate']
There are 827 unknown words.
That took 0.2656 seconds.

In [13]:
```

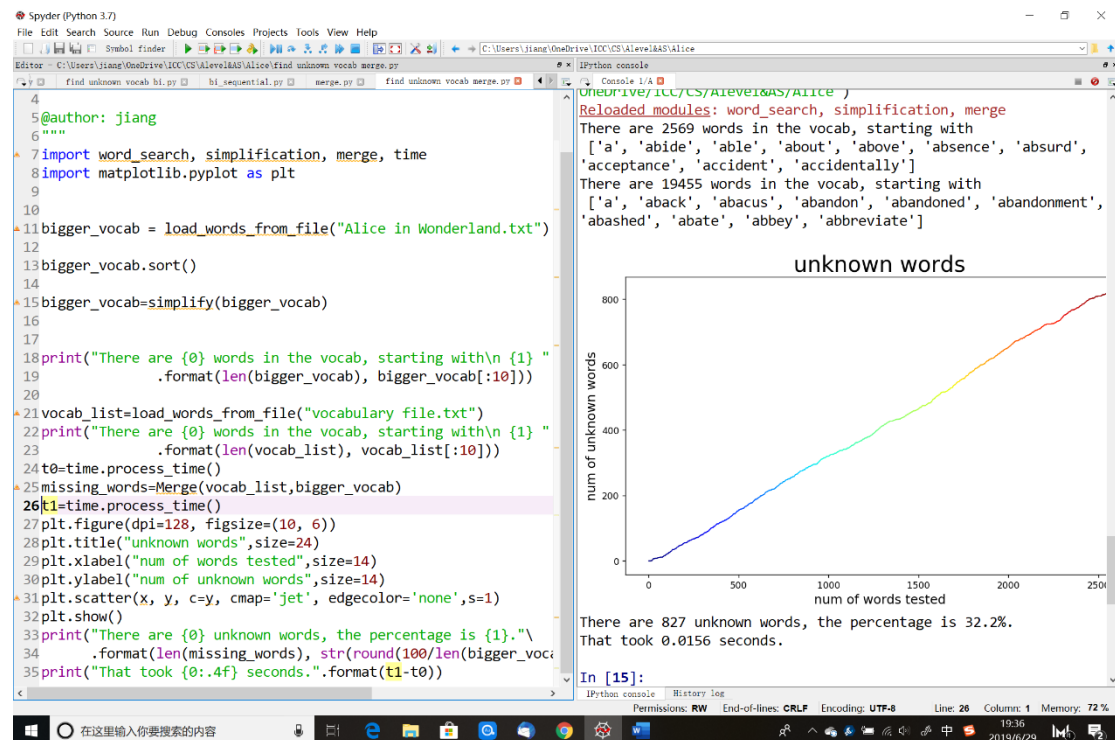
The function of merging search

```
Spyder (Python 3.7)
File Edit Search Source Run Debug Consoles Projects Tools View Help
Editor - C:\Users\jiang\OneDrive\ICC\CS\Alevel&AS\Alice\find unknown vocab merge.py
find unknown vocab bi.py bi_sequential.py merge.py find unknown vocab merge.py
Python console
In [11]: runfile('C:/Users/jiang/OneDrive/ICC/CS/Alevel&AS/Alice/find unknown vocab.py', wdir='C:/Users/jiang/OneDrive/ICC/CS/Alevel&AS/Alice')
Reloaded modules: word_search, simplification, merge
There are 2569 words in the vocab, starting with
['a', 'abide', 'able', 'about', 'above', 'absence', 'absurd',
'acceptance', 'accident', 'accidentally']
There are 19455 words in the vocab, starting with
['a', 'aback', 'abacus', 'abandon', 'abandoned', 'abandonment',
'abashed', 'abate', 'abbey', 'abbreviate']
There are 827 unknown words.
That took 2.5312 seconds.

In [12]: runfile('C:/Users/jiang/OneDrive/ICC/CS/Alevel&AS/Alice/find unknown vocab bi.py', wdir='C:/Users/jiang/OneDrive/ICC/CS/Alevel&AS/Alice')
Reloaded modules: word_search, simplification, sequential
There are 2569 words in the vocab, starting with
['a', 'abide', 'able', 'about', 'above', 'absence', 'absurd',
'acceptance', 'accident', 'accidentally']
There are 19455 words in the vocab, starting with
['a', 'aback', 'abacus', 'abandon', 'abandoned', 'abandonment',
'abashed', 'abate', 'abbey', 'abbreviate']
There are 827 unknown words.
That took 0.2656 seconds.

In [13]:
```

Do about the same thing as before, but this time I calculated the percentage of unknown words and plotted a graph of the searching process.



This time, it only takes 0.0156s to finish the searching.