# **Chapter One Exercises**

Set up the environment

'Python', 'Monty',

```
In [5]:
import nltk
from nltk.book import *
*** Introductory Examples for the NLTK Book ***
Loading text1, ..., text9 and sent1, ..., sent9
Type the name of the text or sentence to view it.
Type: 'texts()' or 'sents()' to list the materials.
text1: Moby Dick by Herman Melville 1851
text2: Sense and Sensibility by Jane Austen 1811
text3: The Book of Genesis
text4: Inaugural Address Corpus
text5: Chat Corpus
text6: Monty Python and the Holy Grail
text7: Wall Street Journal
text8: Personals Corpus
text9: The Man Who Was Thursday by G . K . Chesterton 1908
1. Try using the Python interpreter as a calculator, and typing expressions like:
12/(4+1).
In [1]:
12 / (4 + 1)
Out[1]:
2.4
2. Given an alphabet of 26 letters, there are 26 to the power 10, or 26 ** 10, 10-letter strings we can form. That works out to
141167095653376L (The L at the end just indicates that this is Python's lone-number format). How many hundred-letter
strings are possible?
In [2]:
26 ** 100
Out[2]:
964075081611719197835869803511992549376
3. The Python multiplication operation can be applied to lists. What happens when you type ['Monty','Python'] * 20, or 3 *
In [4]:
['Monty', 'Python'] * 20
Out[4]:
['Monty',
 'Python',
 'Monty',
 'Python',
 'Monty',
```

```
'Python',
 'Monty',
 'Python',
 'Monty',
'Python',
 'Monty',
'Python',
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 'Monty',
 'Python',
 'Monty',
 'Python',
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'Python',
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 'Monty',
'Python',
 'Monty',
 'Python',
 'Monty',
 'Python',
 'Monty',
'Python',
 'Monty',
 'Python',
 'Monty',
 'Python']
In [7]:
3 * sent1
Out[7]:
['Call',
 'me',
 'Ishmael',
 'Call',
 'me',
 'Ishmael',
 '.',
 'Call',
 'me',
 'Ishmael',
 '.']
4. Review Section 1.1 on computing with language. How many words are there in text2? How many distinct words are
there?
In [12]:
len(text2) # Number of words (tokens)
Out[12]:
141576
In [14]:
len(set(text2)) # Number of word types
Out[14]:
6833
```

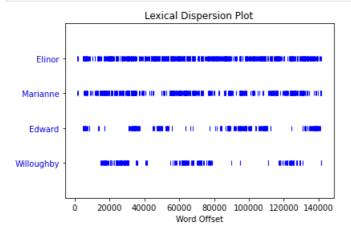
## 5. Compare the lexical diversity scores for humor and romance fiction in Table 1-1. Which genre is more lexically diverse?

Romance fiction is more lexically diverse that humor since it has a higher score.

6. Produce a dispersion plot of the four main protagonist in Sense and Sensibility: Elinor, Marianne, Edward, and Willoughby. What can you observe about the different roles played by the males and females in this novel? Can you identify the couples?

#### In [15]:

```
text2.dispersion_plot(['Elinor', 'Marianne', 'Edward', 'Willoughby'])
```



Clearly, the two main roles are those of Elinor and Marianne, with Elinor being the most prominent.

The word Edward appears often with both Elinor and Marianne, but on closer look the word Elinor appears more often with Edward than Marianne does. So, I could guess that Elinor and Edward are a couple. Similarly, Marianne and Willoghby appear together more often, so I could guess that Marianne and Willoghby are a couple.

## 7. Find the collocations in text5.

#### In [16]:

```
text5.collocations()
wanna chat; PART JOIN; MODE #14-19teens; JOIN PART; PART PART;
```

wanna chat; PART JOIN; MODE #14-19teens; JOIN PART; PART PART; cute.-ass MP3; MP3 player; JOIN JOIN; times . . .; ACTION watches; guys wanna; song lasts; last night; ACTION sits; -...)...- S.M.R.; Lime Player; Player 12%; dont know; lez gurls; long time

8. Consider the following Python expression: len(set(text4)). State the purpose of this expression. Describe the two steps involved in preforming this computation.

#### In [18]:

```
# The purpose of this expression is to count the number of tokens
# in text4, without counting repetitions.

# The first setp, which is the set(text4) command, is to obtain a set of
# elements consisting of tokens from text4, but without any token appearing
# in the set more than once.
# The second step, len(), is to count the number of tokens in the set.
len(set(text4))
```

#### Out[18]:

9. Review Section 1.2 on lists and strings.

a. Define a string and assign it to a variable, e.g. my\_string = 'My String' (but put something more interesting in the string). Print the contents of this variable in two ways, first by simply typing the variable name and pressing Enter, then by using the print statement.

#### In [24]:

my\_string = 'This is a string with something more interesting in it than what was originally sugge sted.'

#### In [25]:

```
my_string
```

#### Out[25]:

'This is a string with something more interesting in it than what was originally suggested.'

#### In [23]:

```
print(my_string)
```

This is a string with something more interesting in it than what was originally suggested.

b. Try adding the string to itself using my\_string + my\_string , or by multiplying it by a number, e.g., my\_string \* 3 . Notice that the strings are joined together without any spaces. How could you fix this?

#### In [26]:

```
my_string + my_string # Adding string to itself
```

#### Out[26]:

'This is a string with something more interesting in it than what was originally suggested. This is a string with something more interesting in it than what was originally suggested.'

#### In [27]:

```
my_string * 3  # Multiplying string by 3
```

#### Out[27]:

'This is a string with something more interesting in it than what was originally suggested. This is a string with something more interesting in it than what was originally suggested. This is a string with something more interesting in it than what was originally suggested.'

## In [28]:

```
# One solution could be to add a "buffer", like a space character ' '
# in between the two string, like so:
my_string + ' ' + my_string
```

## Out[28]:

'This is a string with something more interesting in it than what was originally suggested. This is a string with something more interesting in it than what was originally suggested.'

#### In [32]:

```
# Same solution would work with multiplication, with the caveat that
# the space character ' ' would need to be added to the string first.
(my_string + ' ') * 3
```

#### Out[32]:

'This is a string with something more interesting in it than what was originally suggested. This is a string with something more interesting in it than what was originally suggested. This is a str

ing with something more interesting in it than what was originally suggested.  $^{\prime}$ 

10. Define a variable my\_sent to be a list of words, using the syntax my\_sent = ["My", "sent"] (but with your own words, or a favorite saying).

```
In [48]:

my_sent = ["The", "limits", "of", "my", "language", "mean", "the", "limits", "of", "my", "world"]
```

a. Use ''.join(my\_sent) (note the space between the single quotes) to convert this into a string.

```
In [49]:

my_sent = ' '.join(my_sent)
my_sent

Out[49]:
```

'The limits of my language mean the limits of my world'

b. Use split() to split the string back into the list form you had to start with.

```
In [50]:
```

```
my_sent = my_sent.split()
my_sent

Out[50]:
['The',
    'limits',
    'of',
    'my',
    'language',
    'mean',
    'the',
    'limits',
    'of',
    'my',
    'world']
```

11. Define several variables containing lists of words, e.g., phrase1, phrase2, and so on. Join them together in various combinations (using the plus operator) to form whole sentences. What is the relationship between len(phrase1 + phrase2) and len(phrase1) + len(phrase2)?

```
In [51]:

phrase1 = ['This', 'is', 'the', 'first', 'sentence']
phrase2 = ['blue', 'red', 'green', 'yellow', 'brown']
phrase3 = ['California', 'Texas', 'Oregon', 'Colorado', 'Montana']
phrase4 = ['left', 'right', 'up', 'down']
```

```
In [52]:
```

```
phrase1 + phrase2

Out[52]:
['This',
    'is',
    'the',
    'first',
    'sentence',
    'blue',
    'red',
    'green',
    'yellow',
    'brown'!
```

```
In [53]:
phrase2 + phrase3
Out[53]:
['blue',
 'red',
 'green',
  'yellow',
 'brown',
 'California',
 'Texas',
 'Oregon',
 'Colorado',
 'Montana']
In [54]:
phrase3 + phrase4
Out[54]:
['California',
 'Texas',
 'Oregon',
 'Colorado',
 'Montana',
 'left',
 'right',
 'up',
 'down']
In [55]:
phrase1 + phrase4
Out[55]:
['This', 'is', 'the', 'first', 'sentence', 'left', 'right', 'up', 'down']
In [56]:
len(phrase1 + phrase2)
Out[56]:
10
In [57]:
len(phrase1) + len(phrase2)
Out[57]:
10
The relationship between the two commands above shows the distributive property of the len() function.
12. Consider the following two expressions, which have the same value. Which one will typically be more relevant in NLP?
Why?
a. "Monty Python"[6:12]
b. ["Monty", "Python"][1]
```

~-~... ]

I believe that option b will be more helpful since the expression is a list, and list manipulation is significantly easier to do than individual string manipulation, as it's the case with option a.

13. We have seen how to represent a sentence as a list of words, where each word is a sequence of characters. What does sent1[2][2] do? Why? Experiment with other index values.

```
In [59]:

sent1

Out[59]:
['Call', 'me', 'Ishmael', '.']

In [58]:

sent1[2][2]

Out[58]:
'h'

What the expression sent1[2][2] does is return the third character from the third element in the sent1 list (the 'h' in Ishmael).

14. The first sentence of text3 is provided to you in the variable sent3. The index of *the* in sent3 is 1, because sent3[1] gives us 'the'. What are the indexes of the two other occurrences of this word in sent3?

In [61]:
```

```
sent3
Out[61]:
['In',
 'the',
 'beginning',
 'God',
 'created',
 'the',
 'heaven',
 'and',
 'the'
 'earth',
 '.']
In [68]:
for w,i in zip(sent3, range(len(sent3))):
    if w == "the":
        print(i)
1
5
8
```

The indexes of the other two occurences of the word 'the' are 5 and 8.

15. Review the discussion of conditionals in Section 1.4. Find all words in the Chat Corpus (text5) starting with the letter b. Show them in alphabetical order.

```
In [74]:

# Assuming search is case sensitive (i.e., only lowercase b words)
sorted([w for w in text5 if w.startswith('b')])
Out[74]:
```

```
['b',
'b',
 'b',
 'b',
 'b',
 'b-day',
 'b/c',
 'b4',
'b4',
 'babay',
'babble',
 'babblein',
 'babe',
'babe',
 'babe',
 'babe',
 'babe',
 'babe',
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 'babe',
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'burger',
'burito',
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'bus',
'bus',
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```
Duay ,
 •••]
In [75]:
# If search need to be case sensitive (i.e., words with b or B), then
sorted([w for w in text5 if w.lower().startswith('b')])
Out[75]:
['B',
 'BAAAAALLLLLLLIIIIIIINNNNNNNNNNN',
 'BE',
 'BIG',
 'BIG',
 'BLONDES',
 'BOOTS',
 'BOOTY',
 'BOOTY',
 'BOOTY',
 BOY',
 'BUT',
 'BUt',
 'BYE',
'Back',
 'Barbieee',
 'Barometer',
 'Beach',
 'Beach',
 'Because',
 'Because',
 'Been',
 'Ben',
 'Ben',
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 'Better',
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 'Biiiiiitch',
 'Biographys',
 'Birdgang',
 'Blooooooood',
 'Bloooooooood',
 'Blooooooooood',
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'Bonus',
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 'But',
 'But',
 'But',
 'But',
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'b',
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 'b/c',
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.pappre.'
'babblein',
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'babes',
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'babi',
'babies',
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'babiess',
'baby',
'babycakeses',
'bachelorette',
'back',
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'back',
'backatchya',
\verb|'backfrontsideways and all around the world',\\
'backroom',
'backup',
'bacl',
'bad',
```

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'balck',
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'ball',
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'beautiful',
'because',
'beckley',
'become',
'become',
```

```
'become',
'bed',
'bed',
'bed',
'bed',
'bed',
'bed',
'bed',
'bed',
'bedford',
'bedroom',
'beeeeehave',
'beeehave',
'been',
'beer',
'beer',
'beer',
'beer',
'beer',
'before',
'before',
```

```
'before',
'beg',
'begin',
'behave',
'behave',
'behind',
'behind',
'behind',
'behind',
'bein',
'being',
'beleive',
'believe',
'believe',
'believe',
'believe',
'believe',
'belive',
'bell',
'belly',
'belly',
'belong',
'belong',
'belongings',
'ben',
'bend',
'bend',
'bend',
'benz',
'bes',
'beside',
'besides',
'besides',
'besides',
'best',
'best',
'best',
'best',
'best',
'best',
'best',
'best',
'best',
'bet',
'bet',
'bet',
'bet',
'bet',
'bet',
'bet',
'betrayal',
'betta',
'better',
'better',
```

```
'better',
'between',
'between',
'between',
'between',
'beuty',
'bf',
'bf',
'bi',
'bi',
'bi',
'bi',
'bi',
'bi',
'bi',
'bi',
'bi',
'biatch',
'biatch',
'bible',
'bible',
'bible',
'biebsa',
'bied',
'big',
'bigest',
'biggest',
'biiiatch',
'bike',
'bikes',
'bikini',
'bio',
'bird',
'birfday',
'birthday',
'birthday',
'bisexual',
'bishes',
'bit',
'bit',
'bit',
'bit',
'bit',
'bit',
'bit',
```

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'bit',
'bit',
'bit',
'bit',
'bit',
'bitch',
'bitch',
'bitch',
'bitch',
'bitches',
'bitches',
'bitches',
'bitdh',
'bite',
'bite',
'bites',
'bites',
'biyatch',
'biz',
'biz',
'bj',
'black',
'black',
'black',
'black',
'black',
'black',
'black',
'blade',
'blade',
'blah',
'blah',
'blah',
'blah',
'blah',
'blank',
'blank',
'blank',
'blank',
'blankie',
'blankie',
'blazed',
'bleach',
'blech',
'bless',
'blessings',
'blew',
'blew',
'blind',
'blind',
'blind',
'blinks',
'bliss',
'blocking',
'bloe',
'blood',
'blood',
'blood',
'blood',
'blood',
'blooded',
'bloody',
'blow',
'blowing',
'blowjob',
'blowup',
'blue',
'blue',
'blue',
'blue',
'blue',
'blue',
'blue',
'blue',
'blueberry',
```

```
'bluer',
'blues',
'blunt',
'board',
'board',
'bob',
'bob',
'bodies',
'bodies',
'body',
'boed',
'boght',
'boi',
'boing',
'boinked',
'bois',
'bomb',
'bone',
'boned',
'bones',
'bones',
'bong',
'boning',
'bonus',
'boo',
'boo',
'boo',
'boo',
'boo',
'booboo',
'boobs',
'boobs',
'book',
'book',
'book',
'book',
'book',
'book',
'book',
'book',
'boom',
'booooooooglyyyyyy',
'boost',
'boot',
'bootay',
'booted',
'booted',
'booted',
'boots',
'boots',
'booty',
'border',
'borderline',
'bored',
'boredom',
'boring',
'boring',
```

```
'boring',
'boring',
'boring',
'boring',
'boring',
'born',
'born',
'born-again',
'born-again',
'bosom',
'boss',
'boss',
'boss',
'boss',
'bossy',
'bot',
'both',
'both',
'both',
'both',
'both',
'bother',
'bothering',
'bottle',
'bottle',
'bottle',
'bottle',
'bottle',
'bought',
'bounced',
'bouncer',
'bouncers',
'bound',
'bout',
'bouts',
'bouts',
'bow',
'bowl',
'box',
'box',
'box',
'box',
'boy',
'boy',
'boy',
'boy',
boy',
'boy',
'boy',
'boy',
'boy',
'boy',
'boy',
'boy',
'bovfriend'.
```

```
~~<sub>1</sub>----,
'boys',
'boys',
'boys',
'boys',
'bra',
'brad',
'brady',
'brain',
'brain',
'brakes',
'brass',
'brat',
'brb',
'brbbb',
'bread',
'bread',
'break',
'break',
'breaks',
'breath',
'breath',
'breathe',
'breathe',
'bred',
'breeding',
'bright',
'brightened',
'bring',
'bring',
'bring',
'bring',
'brings',
bro',
'bro',
'bro',
'broke',
'broke',
'broke',
'broke',
'broke',
'broke',
'brooklyn',
'brothers'.
```

```
'brought',
 'brought',
 'brown',
 'brown',
 'brrrrrrr',
 'bruises',
 'bruises',
 'brunswick',
 'brwn',
 'btw',
 ...]
16. Type the expression range(10) at the interpreter prompt. Now try range(10, 20), range(10, 20, 2), and range(20, 10, -2). We
will see a variety of uses for this built-in function in later chapters.
In [1]:
range(10)
Out[1]:
range(0, 10)
In [2]:
range(10, 20)
Out[2]:
range(10, 20)
In [3]:
range(10, 20, 2)
Out[3]:
range(10, 20, 2)
In [4]:
range(10, 20, -2)
Out[4]:
range(10, 20, -2)
17. Use text9.index() to find the index of the word *sunset*. You'll need to insert this word as an argument between the
parentheses. By a process of trial and error, find the slice for the complete sentence that contains this word.
In [6]:
text9.index('sunset')
Out[6]:
629
In [8]:
' '.join(text9[600:650])
Out[8]:
^{\prime} , and you may safely read . G . K . C . CHAPTER I THE TWO POETS OF SAFFRON PARK THE suburb of Saf
from Park lay on the sunset side of London , as red and ragged as a cloud of sunset . It was built
of a bright'
```

~\_\_\_\_,

```
In [9]:
```

```
' '.join(text9[600:630])
```

#### Out[9]:

 $^{\prime}$ , and you may safely read . G . K . C . CHAPTER I THE TWO POETS OF SAFFRON PARK THE suburb of Saffron Park lay on the sunset  $^{\prime}$ 

#### In [11]:

```
' '.join(text9[580:630])
```

#### Out[11]:

'We have found common things at last and marriage and a creed , And I may safely write it now , an d you may safely read . G . K . C . CHAPTER I THE TWO POETS OF SAFFRON PARK THE suburb of Saffron Park lay on the sunset'

#### In [12]:

```
' '.join(text9[570:630])
```

#### Out[12]:

'strength in striking root and good in growing old . We have found common things at last and marriage and a creed , And I may safely write it now , and you may safely read . G . K . C . CHAPTER I THE TWO POETS OF SAFFRON PARK THE suburb of Saffron Park lay on the sunset'

#### In [15]:

```
' '.join(text9[580:630])
```

## Out[15]:

'We have found common things at last and marriage and a creed , And I may safely write it now , an d you may safely read . G . K . C . CHAPTER I THE TWO POETS OF SAFFRON PARK THE suburb of Saffron Park lay on the sunset'

18. Using list addition, and the set and sorted operations, compute the vocabulary of the sentences sent1 ... sent8.

## In [18]:

```
sorted(set(sent1 + sent2 + sent3 + sent4 + sent5 + sent6 + sent7 + sent8))
```

```
Out[18]:
```

```
['!',
 ',',
'-',
 '1',
 '25',
 '29',
 '61',
 ':',
 'ARTHUR',
 'Call',
 'Citizens',
 'Dashwood',
 'Fellow',
 'God',
 'House',
 'I',
'In',
 'Ishmael',
 'JOIN',
 'KING',
```

'MALE',

```
'Pierre',
 'Representatives',
 'SCENE',
 'SEXY',
 'Senate',
 'Sussex',
 'The',
 'Vinken',
 'Whoa',
 '[',
']',
'a',
 'and',
 'as',
 'attrac',
 'been',
 'beginning',
 'board',
 'clop',
 'created',
 'director',
 'discreet',
 'earth',
 'encounters',
 'family',
 'for',
 'had',
'have',
 'heaven',
 'in',
 'join',
 'lady',
 'lol',
 'long',
 'me',
 'nonexecutive',
 of',
 'old',
 'older',
 'people',
 'problem',
 'seeks',
 'settled',
 'single',
 'the',
 'there',
 'to',
 'will',
 'wind',
 'with',
 'years']
19. What is the difference between the following two lines? Which one will give a larger value? Will this be the case for other
texts?
>>> sorted(set([w.lower() for w in text1]))
>>> sorted([w.lower() for w in set(text1)])
In [19]:
len(set([w.lower() for w in text1]))
Out[19]:
17231
In [20]:
len([w.lower() for w in set(text1)])
011+ [ 20 1 •
```

'PMing',

```
19317
```

One difference between these two expressions is that the first performes the pruning of the text1 after all words have been set to lowercase. The second expression does the pruning first, then what ever words are left are set to lowercase.

The second expression will contain more tokens because, to start with, the set funciton is case sensitive when it comes to processing input. So, when the first expression sets all the words to lowercase before doing the pruning some words were set equal to their lowercase version (i.e. 'The' and 'the' are now the same).

Yes, this will always be the case.

## 20. What is the difference between the following two tests: w.isupper() and not w.islower()?

The main difference between the two test is the not. In the second test, the not negates the result of the w.islower() test.

```
In [26]:

my_string = "Test"

In [27]:

my_string.isupper()

Out[27]:
False

In [29]:

my_string.islower()

Out[29]:
False
```

21. Write the slice expression that extracts the last two words of text2.

```
In [30]:
text2[-2:]
Out[30]:
['THE', 'END']
```

22. Find all the four-letter words in the Chat Corpus (text5). With the help of a frequency distribution (FreqDist), shows these words in decreasing order of frequency.

```
freq_dist = FreqDist([w for w in text5 if len(w) == 4])

In [38]:

freq_dist.keys()

Out[38]:

dict_keys(['left', 'with', 'this', 'name', 'PART', 'well', 'NICK', 'Ul21', 'golf', 'clap', 'JOIN', 'that', 'nice', 'fuck', 'your', 'dont', 'even', 'know', 'what', 'chat', 'drew', 'cast', 'sexy', 'Ul15', 'girl', 'legs', 'hope', 'draw', 'head', 'good', 'take', 'have', 'docs', 'Slip', 'away', 'Fade', 'Days', 'feel', 'back', 'Ul29', 'fast', 'Ul16', 'bowl', 'bong', 'glad', 'hard', 'from', 'here', 'very', 'fire', 'itch', 'Ul33', 'ogan', 'male', 'show', 'will', 'talk', 'haha', 'opps', 'warm', 'guys', 'cams', 'play', 'sits', 'guyz', 'Ul26', 'gooo', 'sure', 'like', 'room', 'yeee',
```

```
'want', 'pics', 'look', 'U139', 'U138', 'make', 'late', 'lmao', 'ahah', 'does', 'yeah', 'U136', 'hell', 'U101', 'when', 'plan', 'gold', 'jeep', 'ring', 'isnt', 'doin', 'many', 'Just', 'fine', 'hiya', 'Deep', 'Show', 'love', 'Turn', 'Hand', 'just', 'hang', 'such', 'word', 'U141', 'hear', '!!!!', 'deaf', '....', 'hugs', 'baby', 'Only', 'read', 'VBox', 'hate', 'more', 'than', 'ELSE', 'serg', 'most', 'eyes', 'jerk', 'kids', 'type', 'much', 'shut', 'miss', 'work', 'heyy', 'U148',
'wooo', 'sori', 'U169', '<333', 'swim', 'Long', 'poem', 'jack', 'tick', 'tock', 'WITH', 'FROM', 'Rule', 'CAPS', 'junk', 'tips', 'rush', 'Nooo', 'Troy', 'tail', 'Seee', '6:38', 'dyed', 'U988', 'the', 'beam', 'puff', 'daft', 'twit', 'scum', 'U134', 'Type', 'WHOA', 'toke', 'ribs', 'Eggs',
   'side', 'Wyte', 'Heyy', 'moms', 'Over', 'West', 'Rock', 'goof', 'howz', 'U146', "ex's", 'U143',
```

```
'able', 'vamp', 'Nope', 'Kent', 'U989', 'Cool', 'ther', 'U147', 'TEXT', 'SIZE', 'U163', 'gear', 'CALI', 'Matt', 'Rush', 'AWAY', 'NTMN', 'Kiss', 'U158', 'grea', 'U168', 'Look', 'U170', 'guts', 'U175', 'wrek', 'Fort', '2:55', 'AKST', '4:03', 'root', 'wire', 'soda', 'gray', 'tlak', 'ltnc', 'ok'd", 'sayn', 'sock', 'evah', 'bike', 'hill', 'ohwa', 'caca', 'tyvm', 'luvs', 'prep', 'pull', 'dirt', 'vent', '100%', 'safe', 'dogs', 'bull', 'fits', 'asks', 'Road', 'chit', 'grin', 'bred', 'rats', 'Sat.', 'samm', 'Phil', 'nuff', 'rose', 'Ruth', 'rofl', 'grew', 'sand', 'army', 'mena', 'ROFL', 'lapd', 'surf', 'City', 'hazy', 'thot', 'acid', 'wide', 'keys', 'salt', 'mess', 'base', 'byes', 'THAT', "RN's", 'yout', 'numb', 'thah', 'mahn', 'King', 'TALK', 'GIRL', 'WHEN', 'HOTT', 'HERE', 'soup', '6:51', '9.53', 'ltns', 'Mine', 'vega', 'pigs', 'king', 'poof', 'Nova', 'mofo', 'Ohhh', 'flaw', 'Holy', 'sips', 'clay', 'None', 'Male', 'aunt', 'bacl', 'body', 'akon', 'yoll', 'boom', 'News', 'Maps', 'lawl', 'page', 'Okay', 'Tiff', 'wazz', 'Chop', 'toes', 'DAMN', 'TYPR', 'poll', 'boed', 'Dude', 'Does', 'pwns', 'Very', 'Good', 'Food', 'sexi', 'bois', 'KNOW', 'GUYS', 'HAVE', 'NONE', 'YALL', 'EVEN', 'SEEN', 'WILL', 'YOUR', 'COME', 'FACE', 'JUST', 'Lmao', 'Kids', '6:41', 'bied', '6:53', 'U117', 'U149', 'U153', '7:45', 'Uhhh', 'tenn', 'pure', 'Lime', 'U164', 'U150', 'U181', 'gals', 'woah', 'ussy', 'Tisk', 'U190', 'tisk', 'tiff', 'Heys', 'U197', "<3's", 'lisa', 'U819', 'U820', 'brwn', 'hurr', 'Were'])
```

23. Review the discussion of looping with conditions in Section 1.4. Use a combination of for and if statements to loop over the words of the movie script for \*Monty Python and the Holy Grail\* (text6) and print all the uppercase words, one per line.

```
In [39]:
for w in text5:
    if w.isupper():
         print(w)
:P
PART
NICK
U7
U7
ACTION
U121
JOIN
U59
JOIN
PART
U121
PART
PART
PART
JOIN
PART
U1115
JOIN
PART
PART
JOIN
JOTN
JOTN
PART
Т
Ι
U115
U129
U115
PART
JOIN
JOIN
U116
JOIN
U68
PART
PART
JOT N
U121
В
U30
JOIN
PART
JOIN
U133
```

.TOTN

OOTI JOIN PART JOIN PART ACTION U115 ACTION U68 JOIN JOIN U126 PART PART U126 JOIN U30 JOIN I U64 U139 U44 PART PART JOIN JOIN U68 PART JOIN U139 PART JOIN U138 НАНАНА U139 U44 U139 U126 PART U121 ACTION U121 JOIN U139 U20 U68 U136 PMU139 U101 Ι U83 U20 :P PART JOIN Α U30 U6 U7 U115 ACTION U136 PMΙ U7 U139 U121 Ι PART I PART

PART
I
PART
DIRTY
U141
PM
PART
JOIN

υu PART U6 U115 ACTION U6 U115 ACTION U6 I U121 U121 PART U6 U121 JOIN U7 JOIN U121 JOIN ALL U121 PMPART Ι Ι JOIN PART U6 U121 CA U115 U20 U7 ACTION PART U92 JOIN ANYONE ELSE ME JOIN U44 СО U20 I JOIN ACTION U68 PART ACTION Α JOIN U115 U30 Ι U116 PART U7 PART U148 U92 JOIN U148 Ι PART U121 JOIN PART U115 U121 JOIN U7 М UK I PART

77

U/ PART ACTION JOIN U92 U84 ACTION U92 U68 Ι U6 U83 U84 PART JOIN U115 ACTION U116 ACTION U121 PART U115 JOIN I Ι PMHUGE JOIN PART LOL U7 U83 U83 ACTION U7 JOIN U83 ACTION U121 JOIN U155 U121 ACTION U6 PART PART U92 U30 U121 ACTION U1370 JOIN JOIN ACTION U7 U92 ACTION U1370 U23 PART U115 PART JOIN ACTION U116 PART I IL ACTION ACTION U121 ACTION U92 ACTION ACTION U115 ACTION

7700

UYZ JOIN U121 LOLOLOLLL U12 U115 U12 U68 JOIN ACTION U115 U7 U23 U20 U30 U115 ACTION LOL U109 U6 ACTION U115 PART U68 U6 ACTION Ι JOIN U30 U23 U155 PART U115 U115 U109 PMJOIN CA ACTION U109 U6 U68 U30 PART JOIN U20 ACTION U6 U20 I Ι U84 ACTION Ι U30 PART ACTION JOIN ACTION U20 U121 PART JOIN PART U115 :P СНОСО СНОСО ACTION U7 JOIN PART U36 JOIN ACTION

U68 ACTION U121 U30 ACTION U30 U30 U30 U68 U6 PART JOIN PART U83 PART U165 ACTION U6 U165 Ι PART ACTION U20 ACTION U115 PART U121 U165 U83 PART U6 :P U6 U6 PART U7 PART U165 U165 ACTION U83 U6 JOIN U115 U128 JOIN PART U64 U115 U6 U7 U128 U165 U6 JOIN M PART JOIN PART Ι U11 U11 U9 PART JOIN U15 JOIN U11 U7 U11 ΙI U11 PART U11 U2 U11 U2

U2 JOIN U15 U17 U15 U9 U9 I U7 U7 PART U17 PMLIVE U7 U17 U11 U4 JOIN Ι I U18 U9 JOIN PART U18 U19 U18 U17 U18 JOIN I U9 PART U19 NICK U10 U2 U10 PART U17 U18 U9 PART U19 U19 U9 U17 JOIN U21 JOIN U21 JOIN NICK U10 U23 U9 U23 U9 U17 I U9 U23 I U11 JOIN U24 U17 I PART U23 U19 U19 U17 I U3 PART

U17 U3 U25 U11 U9 PART ACTION U11 U25 U9 U25 PART JOIN JOIN U25 U25 I I U25 PART U21 U26 U17 U25 U9 PART U17 ACTION U10 ACTION WOW JOIN U27 PART JOIN U19 JOIN U9 Ι U17 U28 PMU29 U17 I I U29 JOIN U17 LOL PART U30 U9 U17 Ι I М U9 СО JOIN U31 U31 U9 U31 U11 U17 U31 JOIN U25 U32 U9 U9 I I Ι

JOIN U25 U17 U31 U31 JOIN ACTION U11 U33 U33 U31 JOIN U9 U31 U25 JOIN U35 U35 U34 Ι I Α I PA U35 U31 Α I PΑ JOIN PART U36 U36 I U35 U36 U17 U17 LOL PART I U31 PART JOIN LOL U37 BOOTS U37 ACTION U36 ACTION U17 PART LOL U31 Ι PART JOIN PART U17 U34 OK PART I Ι Α JOIN I ACTION U37 U37 U37 LOL JOIN U28 U39 PART U9 PART

HAHA I I U17 PART PART PART LOL U28 LOL I U18 U37 LOL U3 I U18 U28 JOIN 0 U17 U37 U3 Ι U9 U25 U31 PART U31 LOL Ι U28 U37 U37 I JOIN ACTION I U17 JOIN ACTION ACTION PART U41 ACTION U17 U9 U25 I I ONE MORE TIME U37 O.K Ι U31 U17 JOIN Ι JOIN ACTION LOL LMAO I U12 U28 U42 U42 U37 AGAIN U42 U37 U25 U3

PART U37

```
U42
U41
JOIN
U9
U11
U43
U43
U17
PART
U17
U17
U44
U42
U28
Ι
PART
U25
U37
U28
U31
U42
U31
U31
U31
U42
U
U43
I
U31
PART
U43
Ι
PART
U9
U1
JOIN
JOIN
U31
U31
PART
U17
Ι
I
ACTION
U17
U37
LOL
PRIVMSG
U1
U31
Ι
PART
JOIN
WEEEEEEEEEEEE
I
I
F5
PART
R
PART
I
Ι
Ι
U17
Ι
U31
Ι
Ι
I
NOT
Α
I
U
U12
LMAO
U25
U11
```

U31 U25 U25 U25 U25 U25 U11 U17 U37 U25 U12 U9 PART U11 U31 U37 U37 I Ι I U28 U9 I U17 U9 U6 I U11 U17 U17 U3 U31 U23 U23 JOIN U23 U23 U27 U23 U27 U27 U27 ACTION JOIN U27 U27 U9 U11 U28 U11 U28 U11 U18 U11 U11 U27 U4 I U18 U19 PART U3 U22 U20 JOIN U9 U27 JOIN PART U30 U27 U30 U26 U30 ACTION U30

U27 U30 U11 U29 U24 U3 U30 U29 U16 U20 U20 U6 U29 U24 U30 Ι PART U19 JOIN PART U27 U13 U27 U27 JOIN U31 JOIN U20 U32 I U13 U31 U32 U31 U32 U16 Ι U9 JOIN U33 U33 U33 U11 U33 JOIN U26 U34 U16 U34 U34 U9 U20 U34 U10 U34 PART JOIN U11 PART U33 U8 U33 U33 U34 U8 U33 U19 U34 U30 U16 U20 U34 U11 PART U30 U9 ACTION

PART U19 JOIN U20 U35 U32 U3 K U34 JOIN U34 U35 U35 U36 U11 U30 JOIN PART U11 U32 PART U20 U9 I U34 I PART U37 I U37 I LOL JOIN Ι U27 U27 U30 U27 U35 JOIN U34 I U34 OOPS I ACTION U34 U35 U30 PART U27 JOIN U19 Ι ID I U11 U9 U9 JOIN U30 U11 U30 U27 U39 JOIN U34 U11 U11 Ι JOIN PART PART U30 I U27 PART

U9

U27

U16

U16

JOIN

U27

U27

JOIN

PART

U42

U42

U43

U3

U35

U43

U16

PART

U43 U30

JOIN

U43

U19

U30

U34

U44

U43

U44

U9

JOIN

U35

U44 U45

PART

PART

U3 U43

U20

U6

U45

ACTION

MODE

U16

U16

JOIN

JOIN U20

U43

U46 U3

PART

U39

U34

U46

U47 U45

U9

U34 U25

JOIN

U43

U48

LOL U43

JOIN

JOIN U20

PART

U49

JOIN

U46

U47 U48

U49

U50 U49

U49

U48

U9 U49 U9 U49 U43 U9 U43 U49 U34 U48 U16 U43 JOIN U49 U20 U3 MODE U16 U49 U52 JOIN U52 U13 U52 U52 U53 U20 U3 U52 U53 U43 U26 U53 U53 U13 U52 U30 U53 Ι U52 U53 U18 U16 U53 U9 PART U53 U53 U26 U46 \*VBS\* U50 U46 U45 U52 JOIN U16 U54 U53 U34 U53 U52 U54 Ι U11 U44 U3 U54 U46 TCU46 U43 U54 U11 U54 U49

U54

U54 PART U34 Ι PART U11 U7 U52 U52 U52 U52 I JOIN U52 U47 U24 U11 Х PART U24 U25 U52 I U47 I U24 U16 U20 U46 U47 PART PART U34 U11 PART U20 JOIN PART U25 U55 U55 U49 U9 Ծ55 U55 U43 I U55 U11 U3 U3 U25 JOIN U55 I U11 U52 U16 U56 U20 U3 U20 U52 U3 U9 U9 U11 U25 LONG U35 I Ι Ι I I U53

1153

U52 U53 U49 U53 U3 PART U13 I U25 U53 U11 U9 OK U20 U53 LOL U7 PART TYU11 Ι CHAT Ι U25 U7 JOIN I U13 ACTION U13 U52 U7 U34 U34 U52 U7 U11 U7 U34 U3 U7 JOIN JOIN U34 U58 U29 U29 U13 PART U24 OOH U15 U16 ACTION U32 PART U5 NOT PMPART U32 PART U32 Ι U35 Ι LIX DOES U23 U520 U32 I U16 PART U520 U520

11520

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041 U16 I LOL I U28 HALO U35 WTF ARE YOU TALKING ABOUT U35 U36 U1 U32 U28 U1 U28 U1 PART Ι U41 U23 U23 U35 Ι U1 U37 I Ι LOL U34 Ι YOU U1 U37 U16 :P U39 U28 I Ι U37 JOIN U32 LOL LOL U19 U28 U16 U28 U23 JOIN I I U23 Ι I PART ACTION JOIN JOIN U15 ACTION U46 U47 U47 U47 U19 U47 U27 U47 U1 ACTION ττ1 Ω

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U34 JOIN U19 PART U47 U46 U15 U47 U47 U21 Ι U19 I U45 U34 U30 U30 U15 U22 U18 U18 U45 U18 U30 U22 JOIN PART PART PART ACTION Ι Ι U15 JOIN U2 U18 U22 I U18 I U48 JOIN U22 U15 U49 U22 JOIN U49 U49 U34 Ι U18 U7 U34 U50 U50 U15 U18 I I U48 U50 U50 U30 PART Ι U30 LOL U30 U48 ACTION U48 PART JOIN U7 U8 U51

U51 JOIN U52 U52 U52 MODE U52 U52 U18 U18 U52 U52 U52 U52 MODE U52 U52 U19 U52 PART U7 U8 U7 U8 U51 U51 U27 U48 U51 U52 U52 U52 U52 U47 PART U34 U48 U52 U15 U52 U19 U47 U34 U52 PART U22 U47 U18 U49 U49 U34 U52 U47 U49 U48 PART U18 U48 U52 U49 U52 U52 U19 I U52 I I MD PART U18 U48 PART U52 MD U52 MD

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U49 U47 U48 I OC U49 U18 PART U49 U48 U47 :0 U52 JOIN PART ACTION MD MD I U49 U47 LOL JOIN MD YOU U52 U7 U52 U53 U53 U49 U48 U34 U47 U48 JOIN U55 U55 U55 U3 U55 U3 U18 U19 U52 U49 U52 JOIN I U18 PART U35 U35 U49 U48 ROFL U18 U27 U18 U3 JOIN JOIN MD PART U52 JOIN U52

U18 U49 U56 U28 U56 U56 U56 U49 U49 U3 U3 I U52 I U52 PART U19 S G U18 LOL DO N"T U52 U48 U27 U18 ΗI U7 U28 ACTION U56 ACTION U55 ACTION U45 Ι PART PART JOIN PART PART PART PART U8 U22 JOIN U12 U29 U24 U8 JOIN Ι PART JOIN ACTION U12 PART PART JOIN U53 U24 PART U29 JOIN JOIN U12 I U54 PART JOIN U32 PART PART U0 PART ACTION U22 PART U0 JOIN PART PART NICK

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OF

таьь ΑI Ν'Т EVEN SEEN MY BOOTY AND NONE OF YOU WILL SEE MY BOOTY so IF YOU HAVE SOMETHING TO SAY DO N'TRUN YOUR MOUTH COME AND SAY IT то MY FACE CUZ THAT IT JUST SHOWS YOUR NOT MAN OR WOMAN ENOUGH PART JOIN U33 HEY U33 JOIN PART PART PART JOIN PART PART PART PART PART JOIN JOIN PMEST JOIN JOIN PART PMEST JOIN JOIN U148 PART PART

JOIN PART JOIN PART JOIN U57 JOIN JOIN PART JOIN JOIN U156 U117 ACTION U117 JOIN U149 JOIN JOIN U153 U117 U35 Ι I NO U153 PART DJ U153 Ι PART JOIN Ι PART JOIN U117 I PART Ι PART JOIN JOIN JOIN JOIN JOIN JOIN Ι JOIN PART PART JOIN JOIN PART JOIN U156 JOIN U168 PART JOIN PART JOIN JOIN Ծ57 PART JOIN PART JOIN ACTION U25 I PART JOIN ACTION YES Ι PART JOIN PART JOIN

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m FL}$ MSN Ι JOIN I :P :D I USA PART PART I :P U57 I JOIN U98 U98 U98 MODE U98 JOIN U104 JOIN JOIN JOIN U197 I U197 JOIN U156 U104 PART U197 U122 ACTION U197 ACTION U197 JOIN JOIN ACTION JOIN JOIN PART PART PART JOIN JOIN I Ι I PART JOIN PART PART U122 JOIN U34 U34 U34 MODE

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U819
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JOIN
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JOIN
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JOIN
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JOTN
U820
U820
U820
U820
U34
PART
PART
JOIN
U57
:0
ACTION
ACTION
U34
BAAAAALLLLLLIIIIIIINNNNNNNNNNN
U156
JOIN
U34
U34
U3
JOIN
U197
Ι
U98
24. Write expressions for finding all words in text6 that meet the following conditions. The result should be in the form of a
list of words: ['word1', 'word2', ...].
a. Ending in *ize*
b. Containing the letter *z*
c. Containing the sequence of letters *pt*
d. All lowercase letters except for an initial capital(i.e., titlecase)
In [43]:
[w for w in text6 if w.endswith('ize')]
Out[43]:
[]
In [44]:
[w for w in text6 if 'z' in w]
                                                       # b
Out[44]:
['zone',
'amazes',
 'Fetchez',
 'Fetchez',
 'zoop',
```

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zoo',
 'frozen',
 'zoosh']
In [45]:
[w for w in text6 if 'pt' in w]
                                                     # C
Out[45]:
['empty',
 'aptly',
 'Thpppppt',
 'Thppt',
 'empty',
 'Thppppt',
 'temptress',
 'temptation',
 'ptoo',
 'Chapter',
 'excepting',
 'Thpppt']
In [46]:
[w for w in text6 if w.istitle()]
                                                     # d
Out[46]:
['Whoa',
 'Halt',
 'Who',
 'It',
 'I',
 'Arthur',
 'Uther',
 'Pendragon',
 'Camelot',
 'King',
 'Britons',
 'Saxons',
 'England',
 'Pull',
 'I',
 'Patsy',
 'We',
 'Camelot',
 Ί',
 'What',
 'Ridden',
 'Yes',
 'You',
 'What',
 'You',
 'So',
 'We',
 'Mercea',
 'Where',
 'We',
 'Found',
 'In',
 'Mercea',
 'The',
'What',
 'Well',
 'The',
 'Are',
 'Not',
'They',
 'What',
 'A',
'It',
'It',
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'It',
'A',
'Well',
'Arthur',
'Court',
'Camelot',
'Listen',
'In',
'Please',
'Am',
'I',
'I',
'It',
'African',
'Oh',
'African',
'European',
'That',
'Oh',
'I',
'Will',
'Camelot',
'But',
'African',
'Oh',
'So',
'Wait',
'Supposing',
'No',
'Well',
'They',
'What',
'Well',
'Bring',
'Bring',
'Bring',
'Bring',
'Bring',
'Bring',
'Bring',
'Bring',
'Ninepence',
'Bring',
'Bring',
'Bring',
'Bring',
'Here',
'Ninepence',
'I',
'What',
'Nothing',
'Here',
'I',
'Ere',
'He',
'Yes',
'I',
'He',
'Well',
'He',
'I',
'No',
'You',
'Oh',
'I',
'It',
'I',
'Oh',
'I',
'I',
'Well',
'I',
'Well',
'He',
'No',
'I',
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'Robinson',
'They',
'Thursday',
'I',
'You',
'I',
'I',
'Ah',
'Not',
'See',
'Thursday',
'Right',
'All',
'I',
'Must',
'Why',
'He',
'King',
'Arthur',
'King',
'Arthur',
'Old',
'Man',
'Man',
'Sorry',
'What',
'I',
'I',
'I',
'Well',
'I',
'Man',
'Well',
'Dennis',
'Well',
'I',
'Dennis',
'Well',
'I',
'What',
'I',
'Well',
'I',
'And',
'By',
'If',
'Dennis',
'Oh',
'How',
'How',
'I',
'Arthur',
'King',
'Britons',
'Who',
'King',
'The',
'Britons',
'Who',
'Britons',
'Well',
'We',
'Britons',
'I',
'I',
'You',
'We',
'A',
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'That',
'If',
'Please',
'I',
'Who',
'No',
'Then',
'We',
'What',
'I',
'We',
'We',
'Yes',
'Yes',
'I',
'By',
'Be',
'But',
'Be',
'I',
'Order',
'Who',
'Heh',
'I',
'Well',
'I',
'You',
'Well',
'The',
'Lake',
'Excalibur',
'Divine',
'Providence',
'I',
'Arthur',
'Excalibur',
'That',
'I',
'Listen',
'Supreme',
'Be',
'Well',
'Shut',
'I',
'I',
'Shut',
'Shut',
'Ah',
'Shut',
'Oh',
'Come',
'Help',
'I',
'Bloody',
'Oh',
'Did',
'That',
'I',
'Did',
'You',
'King',
'Arthur',
'Aaagh',
'King',
'Arthur',
'Aaagh',
'Ooh',
'King',
'Arthur',
'Aagh',
'Oh',
'King',
'Arthur',
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'Ooh',
'Aaagh',
'Agh',
'Aaaaaah',
'Aaaaaaaaah',
'Umm',
'You',
'Sir',
'Knight',
'I',
'Arthur',
'King',
'Britons',
'I',
'Camelot',
'You',
'Will',
'You',
'So',
'Come',
'Patsy',
'None',
'What',
'None',
'I',
'Sir',
'Knight',
'I',
'Then',
'I',
'King',
'Britons',
'I',
'So',
'Aaah',
'Now',
'Tis',
'A',
'Your',
'No',
'Well',
'I',
'You',
'Come',
'Huyah',
'Hiyaah',
'Aaaaaaaah',
'Victory',
'We',
'Thee',
'Lord',
'Thy',
'Hah',
'Come',
'What',
'Have',
'Eh',
'You',
'Sir',
'Knight',
'Oh',
'Look',
'You',
'I',
'Look',
'Just',
'Chicken',
'Chickennn',
'Look',
'I',
'Right',
'Right',
'I',
'You',
'Come',
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'What',
'I',
'You',
'The',
'Black',
'Knight',
'Have',
'Ooh',
'All',
'Come',
'Patsy',
'Oh',
'Oh',
'I',
'Running',
'You',
'Come',
'I',
'Pie',
'Iesu',
'Pie',
'Iesu',
'Pie',
'Iesu',
'A',
'A',
'A',
'Pie',
'Iesu',
'A',
'A',
'A',
'A',
'A',
'A',
'A',
'We',
'A',
'Burn',
'Burn',
'Burn',
'We',
'We',
'A',
'A',
'We',
'May',
'Burn',
'Burn',
'Burn',
'Burn',
'How',
'Right',
'Yeah',
'Yeah',
'Bring',
'I',
'Uh',
'They',
'We',
'And',
'It',
'Well',
'Well',
'\mathtt{The}',
'And',
'Yeah',
'We',
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'Right',
'Yeaaah',
'Yeaah',
'Did',
'No',
'No',
'No',
'No',
'No',
'Yes',
'Yes',
'Yes',
'Yeah',
'A',
'A',
'She',
'What',
'Well',
'A',
'Burn',
'Burn',
'Burn',
'Burn',
'Burn',
'Quiet',
'Quiet',
'Quiet',
'Quiet',
'There',
'Are',
'Ah',
'What',
'Tell',
'Tell',
'Burn',
'Burn',
'Burn',
'Burn',
'Burn',
'And',
'More',
'Shh',
'Wood',
'So',
'B',
'Good',
'Heh',
'Oh',
'Oh',
'So',
'Build',
'Ah',
'Oh',
'Oh',
'True',
'Uhh',
'Does',
'No',
'No',
'No',
'It',
'Throw',
'The',
'Throw',
'What',
'Bread',
'Apples',
'Uh',
'Cider',
'Uh',
'Cherries',
'Mud',
'Churches'.
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'Churches',
'Lead',
'Lead',
'A',
'Oooh',
'Exactly',
'So',
'If',
'And',
'A',
'A',
'A',
'Here',
'Use',
'We',
'Ohh',
'Ohh',
'Burn',
'Burn',
'Burn',
'Burn',
'Burn',
'Burn',
'Burn',
'Ahh',
'Ahh',
'Right',
'Remove',
'A',
'A',
'A',
'Burn',
'Burn',
'Burn',
'Burn',
'Burn',
'Who',
'I',
'Arthur',
'King',
'Britons',
'My',
'Good',
'Sir',
'Knight',
'Camelot',
'Round',
'Table',
'My',
'I',
'What',
'Bedevere',
'Then',
'I',
'Sir',
'Bedevere',
'Knight',
'Round',
'Table',
'The',
'Bedevere',
'King',
'Arthur',
'Sir',
'Lancelot',
'Brave',
'Sir',
'Gallahad',
'Pure',
'Sir',
'Robin'.
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'Sir',
'Lancelot',
'Dragon',
'Angnor',
'Chicken',
'Bristol',
'Battle',
'Badon',
'Hill',
'Sir',
'Not',
'Together',
'Knights',
'Round',
'Table',
'And',
'This',
'Sir',
'Bedevere',
'Explain',
'Oh',
'Look',
'Camelot',
'Camelot',
'Camelot',
'It',
'Shh',
'Knights',
'I',
'Let',
'Camelot',
'We',
'We',
'We',
'With',
'We',
'Camelot',
'We',
'We',
'Round',
'Table',
'Our',
'But',
'That',
'We',
'Camelot',
'We',
'In',
'Quite',
'Between',
'Clark',
'Gable',
'It',
'Camelot',
'I',
'Well',
'Camelot',
'It',
'Right',
'Right',
'Arthur',
'Arthur',
'King',
'Britons',
'Oh',
'One',
'I',
'Sorry',
'And',
'Every',
'I',
'What',
'I',
'O',
Lord',
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werr ,
'It',
'Psalms',
'Now',
'Yes',
'Lord',
'Right',
'Arthur',
'King',
'Britons',
'Knights',
'Round',
'Table',
'Good',
'O',
'Lord',
'Course',
'Behold',
'Arthur',
'Holy',
'Grail',
'Look',
'Arthur',
'That',
'Arthur',
'Holy',
'A',
'Lord',
'God',
'King',
'Arthur',
'Halt',
'Hallo',
'Hallo',
'Allo',
'Who',
'It',
'King',
'Arthur',
'Knights',
'Round',
'Table',
'Who',
'This',
'Guy',
'Loimbard',
'Go',
'God',
'If',
'Holy',
'Well',
'I',
'I',
'Uh',
'What',
'He',
'Are',
'Oh',
'I',
'Well',
'Of',
'You',
'English',
'Well',
'I',
'French',
'Why',
'I',
'What',
'England',
'Mind',
'If',
'Grail',
'You',
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пидттан ,
'Go',
'I',
'Arthur',
'King',
'English',
'Thpppppt',
'Thppt',
'What',
 'Now',
'I',
- .
'You',
'Is',
'No',
'I',
'Now',
'I',
'Fetchez',
'Quoi',
 'Fetchez',
 'If',
'I',
'Jesus',
'Christ',
'Christ',
'Ah',
'Ohh',
'Right',
'Charge',
'Charge',
 'Hey',
 'There',
'And',
'Run',
'Thppppt',
'Fiends',
'I',
'No',
'No',
'Sir',
'I',
'Quoi',
'Un',
'What',
'A',
'Oh',
'Oui',
'Hurry',
'What',
'Let',
 'Oh',
'On',
'Bon',
'Over',
'What',
'Well',
 'Launcelot',
 'Galahad',
'I',
'French',
'Not',
'Who',
 'U',
'Launcelot',
'Galahad',
'I',
'Uh',
'Ohh',
'Oh',
'Um',
'Run',
'Run',
'Run',
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Kun ,
'Run',
'Run',
'Run',
'Run',
'Oh',
'Haw',
'Haw',
'Picture',
'Schools',
'Action',
'Defeat',
'King',
'Arthur',
'The',
'French',
'Arthur',
'Holy',
'Grail',
'Arthur',
'Grail',
'Now',
'Launcelot',
'Aaaah',
'S',
'Frank',
'The',
'Tale',
'Sir',
'Robin',
'So',
'Sir',
'Robin',
'Ewing',
'Bravely',
'Sir',
'Robin',
'Camelot',
'He',
'O',
'Sir',
'Robin',
'He',
'Brave',
'Sir',
'Robin',
'He',
'To',
'And',
'Sir',
'Robin',
'His',
'And',
'And',
'And',
'Heh',
'Looks',
'Anarcho',
'Oh',
'Dennis',
'We',
'Halt',
'Who',
'He',
'Sir',
'Robin',
'Sir',
'Robin',
'Shut',
'Um',
'I',
'What',
'To',
'Shut',
'Um',
```

```
'Sir',
'Knight',
'I',
'Ah',
'W',
'I',
'Knight',
'Round',
'Table',
'You',
'Knight',
'Round',
'I',
'In',
'I',
'Shall',
'I',
'Oh',
'I',
'Well',
'I',
'I',
'Oh',
'Oh',
'Perhaps',
'I',
'And',
'Oh',
'Get',
'I',
'Oh',
'Yes',
'What',
'Yapping',
'You',
'You',
'What',
'You',
'Oh',
'I',
'Anyway',
'Well',
'Oh',
'Oh',
'All',
'We',
'Yes',
'Oh',
'All',
'All',
'Right',
'He',
'So',
'He',
'Brave',
'Sir',
'Robin',
'No',
'Bravely',
'I',
'When',
'No',
'Yes',
'Sir',
'Robin',
'I',
'And',
'I',
'He',
'All',
'Bravest',
'Sir',
'Robin',
```

```
'Pie',
 'Iesu',
 'Heh',
 'Pie',
 'Iesu',
 'Wayy',
 'Но',
 'Woa',
 'Heh',
 'Heh',
 'Wayy',
 'Wayy',
 'Forgive',
 'Oh',
 '0000',
 'The',
'Tale',
 'Sir',
 'Galahad',
 'Open',
 'Open',
 'In',
 'King',
 'Arthur',
 'Hello',
 'Welcome',
 'Sir',
 'Knight',
 'Welcome',
 'Castle',
 'Anthrax',
 'The',
 ...]
25. Define sent to be the list of words ['she', 'seals', 'shells', 'by', 'the', 'sea', 'shore']. Now write code to perform the
following tasks:
a. Print all words beginning with sh.
b. Print all words longer than four characters.
In [47]:
sent = ['she', 'sells', 'sea', 'shells', 'by', 'the', 'sea', 'shore']
In [49]:
# a
for w in sent:
    if w.startswith('sh'):
       print(w)
she
shells
shore
In [50]:
# b
for w in sent:
    if len(w) > 4:
        print(w)
```

.T.

sells shells shore 20. what does the following Python code do? sum(lien(w) for w in text i.j). Can you use it to work out the average word length of a text?

The above expression sums up all the numbers in the list.

```
In [54]:
```

```
avg_word_length = sum([len(w) for w in text1]) / len(text1)
avg_word_length

Out[54]:
3.830411128023649
```

27. Define a function called vocab\_size(text), that has a single parameter for the text, and which returns the vocabulary size of the text.

```
In [55]:

def vocab_size(text):
    return len(set(text))
```

28. Define a function percent(word, text), that calculates how often a given word occurs in a text and express the result as a percentage.

```
In [65]:
```

```
def percent(word,text):
    freq_dist = FreqDist(text)
    percent = 100 * (freq_dist[word] / len(text))
    print(str(round(percent, 2)) + '%')
```

```
In [74]:
```

```
percent('the', text1)
```

5.26%

29. We have been using sets to store vocabularies. Try the following Python expression: set(sent3) < set(text1). Experiment with this using different arguments to set(). What does it do? Can you think of a practical application for this?

```
In [75]:
```

```
set(sent3) < set(text1)
Out[75]:</pre>
```

True

```
In [76]:
```

```
set(sent1) < set(text1)</pre>
```

Out[76]:

True

## In [77]:

```
A = ['a', 'b', 'c']
B = ['d', 'e', 'f']
S = ['a', 'b', 'c', 'e', 'f']
```

```
In [78]:
```

```
A < S
```

```
Out[78]:
True

In [79]:
B < S
Out[79]:</pre>
```

From this smaller example it can be seen that the way the relational operator works with sets is the same way as they work in mathematics.

A practical application could be to categorize customers/users.

False