Exercise: Weeks 1 & 2

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In [47]:
```python
import random
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import math
import itertools
%pwd
```

Out[47]: 'C:\\Users\\Andrew\\Documents\\Grad School\\DSC 540 - Data Preparation\\Assignments'

Question 1. Create a Jupyter notebook where you create a list, iterate over the list and sort your results, generate random numbers, add to the list, and then print your results.

In [3]:
```python
#Create a List
myList = [x for x in range (5, 250) if x % 5 == 0]
myList
```

Out[3]:
```
[5,
 10,
 15,
 20,
 25,
 30,
 35,
 40,
 45,
 50,
 55,
 60,
 65,
 70,
 75,
 80,
 85,
```

```
    90,
    95,
    100,
    105,
    110,
    115,
    120,
    125,
    130,
    135,
    140,
    145,
    150,
    155,
    160,
    165,
    170,
    175,
    180,
    185,
    190,
    195,
    200,
    205,
    210,
    215,
    220,
    225,
    230,
    235,
    240,
```

In [4]:
```python
#Iterate over list and sort results
x = 0
for x in sorted(myList):
    if x % 2 == 0:
        print (x+1)
    else:
        print (x)
    x += 1
```

```
5
11
```

15
21
25
31
35
41
45
51
55
61
65
71
75
81
85
91
95
101
105
111
115
121
125
131
135
141
145
151
155
161
165
171
175
181
185
191
195
201
205
211
215
221
225
231

```
235
241
```

In [5]:
```python
#Generate random numbers
randomList = [random.randint (1,250) for x in range (0, 30)]

#Add them to the list
completeList = myList + randomList

#Print results
print(completeList)
```

```
[5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 105, 110, 115, 120, 125, 130, 135, 14
0, 145, 150, 155, 160, 165, 170, 175, 180, 185, 190, 195, 200, 205, 210, 215, 220, 225, 230, 235, 240, 245, 155, 239,
82, 165, 116, 177, 195, 91, 51, 176, 80, 184, 113, 94, 231, 127, 133, 143, 4, 71, 125, 178, 44, 10, 32, 97, 34, 224, 1
10, 149]
```

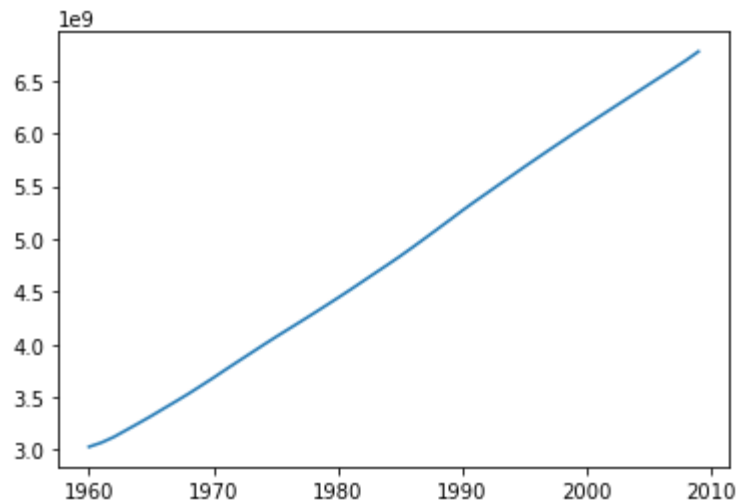Question 2: Create a line chart with Matplotlib and the following data file.

In [6]:
```python
# Import data and create dataframe
pop_df = pd.read_excel('data/world-population.xlsm')
pop_df.head()
```

Out[6]:

	Year	Population
0	1960	3028654024
1	1961	3068356747
2	1962	3121963107
3	1963	3187471383
4	1964	3253112403

In [7]:
```python
# Plot line chart
x = pop_df['Year']
y = pop_df['Population']
plt.plot(x,y)
```

Out[7]:
```
[<matplotlib.lines.Line2D at 0x1d6e2000ca0>]
```

Question 3.A: Activity 1 page 17

In [8]:
```python
# Create a list of 100 random numbers
num1 = [random.randint(1,999) for x in range (0,100)]
```

In [9]:
```python
# Create a new list from this random list, with numbers that are divisible by 3.
num2 = []
for i in num1:
    if i%3 == 0:
        num2.append(i)
print(num2)
```

[594, 507, 189, 819, 699, 540, 471, 39, 690, 843, 183, 252, 813, 774, 984, 72, 141, 129, 540, 726, 648, 261, 192, 54, 60, 819, 411, 729, 486, 405, 669, 855, 879, 675, 669, 234, 846, 819, 144]

In [10]:
```python
# Calculate the length of these two lists and store the difference in a new variable.
num1_length = len(num1)
num2_length = len(num2)
length_diff = num1_length - num2_length
length_diff
```

Out[10]: 61

```python
# Using a loop, perform steps 2 and 3 and find the difference variable three times

length_diff_list = []
for i in range (0, 3):
    num1 = [random.randint(1,999) for x in range (0,100)]
    num2 = []
    for i in num1:
        if i%3 == 0:
            num2.append(i)

    num1_length = len(num1)
    num2_length = len(num2)
    length_diff = num1_length - num2_length

    length_diff_list.append(length_diff)
length_diff_list
```

[69, 75, 62]

```python
# Find the arithmetic mean of these three difference values
length_diff_mean = sum(length_diff_list) / len(length_diff_list)
length_diff_mean
```

68.6666666666667

Question 3.B: Activity 2 Page 31

```python
# Create a multiline_text variable by copying the text from the first chapter of Price and Prejudice
multiline_text = """ It is a truth universally acknowledged, that a single man in possession of a good fortune, must b

However little known the feelings or views of such a man may be on his first entering a neighbourhood, this truth is s

"My dear Mr. Bennet," said his lady to him one day, "have you heard that Netherfield Park is let at last?"

Mr. Bennet replied that he had not.

"But it is," returned she; "for Mrs. Long has just been here, and she told me all about it."

Mr. Bennet made no answer.

"Do not you want to know who has taken it?" cried his wife impatiently.

"You want to tell me, and I have no objection to hearing it."

This was invitation enough.

"Why, my dear, you must know, Mrs. Long says that Netherfield is taken by a young man of large fortune from the north

"What is his name?"

"Bingley."

"Is he married or single?"

"Oh! single, my dear, to be sure! A single man of large fortune; four or five thousand a year. What a fine thing for o

"How so? how can it affect them?"

"My dear Mr. Bennet," replied his wife, "how can you be so tiresome! You must know that I am thinking of his marrying

"Is that his design in settling here?"

"Design! nonsense, how can you talk so! But it is very likely that he may fall in love with one of them, and therefore

"I see no occasion for that. You and the girls may go, or you may send them by themselves, which perhaps will be still

"My dear, you flatter me. I certainly have had my share of beauty, but I do not pretend to be anything extraordinary n

"In such cases, a woman has not often much beauty to think of."
```

```
“But, my dear, you must indeed go and see Mr. Bingley when he comes into the neighbourhood.”

“It is more than I engage for, I assure you.”

“But consider your daughters. Only think what an establishment it would be for one of them. Sir William and Lady Lucas

“You are over scrupulous, surely. I dare say Mr. Bingley will be very glad to see you; and I will send a few lines by

“I desire you will do no such thing. Lizzy is not a bit better than the others; and I am sure she is not half so hands

“They have none of them much to recommend them,” replied he; “they are all silly and ignorant like other girls; but Li

“Mr. Bennet, how can you abuse your own children in such a way? You take delight in vexing me. You have no compassion

“You mistake me, my dear. I have a high respect for your nerves. They are my old friends. I have heard you mention the

“Ah, you do not know what I suffer.”

“But I hope you will get over it, and live to see many young men of four thousand a year come into the neighbourhood.”

“It will be no use to us, if twenty such should come, since you will not visit them.”

“Depend upon it, my dear, that when there are twenty, I will visit them all.”

Mr. Bennet was so odd a mixture of quick parts, sarcastic humour, reserve, and caprice, that the experience of three-a

print(multiline_text)
```

It is a truth universally acknowledged, that a single man in possession of a good fortune, must be in want of a wife.

However little known the feelings or views of such a man may be on his first entering a neighbourhood, this truth is so well fixed in the minds of the surrounding families, that he is considered as the rightful property of some one or other of their daughters.

“My dear Mr. Bennet,” said his lady to him one day, “have you heard that Netherfield Park is let at last?”

Mr. Bennet replied that he had not.

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This was invitation enough.

"Why, my dear, you must know, Mrs. Long says that Netherfield is taken by a young man of large fortune from the north of England; that he came down on Monday in a chaise and four to see the place, and was so much delighted with it that he agreed with Mr. Morris immediately; that he is to take possession before Michaelmas, and some of his servants are to be in the house by the end of next week."

"What is his name?"

"Bingley."

"Is he married or single?"

"Oh! single, my dear, to be sure! A single man of large fortune; four or five thousand a year. What a fine thing for our girls!"

"How so? how can it affect them?"

"My dear Mr. Bennet," replied his wife, "how can you be so tiresome! You must know that I am thinking of his marrying one of them."

"Is that his design in settling here?"

"Design! nonsense, how can you talk so! But it is very likely that he may fall in love with one of them, and therefore you must visit him as soon as he comes."

"I see no occasion for that. You and the girls may go, or you may send them by themselves, which perhaps will be still better, for as you are as handsome as any of them, Mr. Bingley might like you the best of the party."

"My dear, you flatter me. I certainly have had my share of beauty, but I do not pretend to be anything extraordinary now. When a woman has five grown-up daughters, she ought to give over thinking of her own beauty."

"In such cases, a woman has not often much beauty to think of."

"But, my dear, you must indeed go and see Mr. Bingley when he comes into the neighbourhood."

"It is more than I engage for, I assure you."

"But consider your daughters. Only think what an establishment it would be for one of them. Sir William and Lady Lucas are determined to go, merely on that account, for in general, you know, they visit no newcomers. Indeed you must go, for it will be impossible for us to visit him, if you do not."

"You are over scrupulous, surely. I dare say Mr. Bingley will be very glad to see you; and I will send a few lines by you to assure him of my hearty consent to his marrying whichever he chooses of the girls; though I must throw in a good word for my little Lizzy."

"I desire you will do no such thing. Lizzy is not a bit better than the others; and I am sure she is not half so handsome as Jane, nor half so good-humoured as Lydia. But you are always giving her the preference."

"They have none of them much to recommend them," replied he; "they are all silly and ignorant like other girls; but Lizzy has something more of quickness than her sisters."

"Mr. Bennet, how can you abuse your own children in such a way? You take delight in vexing me. You have no compassion on my poor nerves."

"You mistake me, my dear. I have a high respect for your nerves. They are my old friends. I have heard you mention them with consideration these twenty years at least."

"Ah, you do not know what I suffer."

"But I hope you will get over it, and live to see many young men of four thousand a year come into the neighbourhood."

"It will be no use to us, if twenty such should come, since you will not visit them."

"Depend upon it, my dear, that when there are twenty, I will visit them all."

Mr. Bennet was so odd a mixture of quick parts, sarcastic humour, reserve, and caprice, that the experience of three-and-twenty years had been insufficient to make his wife understand his character. Her mind was less difficult to develop. She was a woman of mean understanding, little information, and uncertain temper. When she was discontented, she fan

In [14]:
```python
# Find type of multiline_text
type(multiline_text)
```

Out[14]: str

In [15]:
```python
# Find length of multiline_text
len(multiline_text)
```

Out[15]: 4474

```python
In [16]:    # Remove all new lines
            multiline_text = multiline_text.replace('\n',"")
            multiline_text
```

Out[16]: ' It is a truth universally acknowledged, that a single man in possession of a good fortune, must be in want of a wif
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temper. When she was discontented, she fancied herself nervous. The business of her life was to get her daughters marr
ied; its solace was visiting and news.'

```python
# Remove all symbols
multiline_text2 = ""
for char in multiline_text:
    if char == "":
        multiline_text2 += char
    elif char.isalnum():
        multiline_text2 += char
    else:
        multiline_text2 += " "
multiline_text2
```

' It is a truth universally acknowledged that a single man in possession of a good fortune must be in want of a wife However little known the feelings or views of such a man may be on his first entering a neighbourhood this truth is s o well fixed in the minds of the surrounding families that he is considered as the rightful property of some one or o ther of their daughters My dear Mr Bennet   said his lady to him one day   have you heard that Netherfield Park is l et at last Mr Bennet replied that he had not But it is   returned she   for Mrs Long has just been here and she t old me all about it Mr Bennet made no answer Do not you want to know who has taken it   cried his wife impatiently You want to tell me and I have no objection to hearing it This was invitation enough Why my dear you must know M rs Long says that Netherfield is taken by a young man of large fortune from the north of England that he came down o n Monday in a chaise and four to see the place and was so much delighted with it that he agreed with Mr Morris immed iately that he is to take possession before Michaelmas and some of his servants are to be in the house by the end of next week   What is his name   Bingley   Is he married or single   Oh single my dear to be sure A single man of la rge fortune four or five thousand a year What a fine thing for our girls   How so how can it affect them   My dear Mr Bennet   replied his wife how can you be so tiresome You must know that I am thinking of his marrying one of th em   Is that his design in settling here   Design nonsense how can you talk so But it is very likely that he may fa ll in love with one of them and therefore you must visit him as soon as he comes   I see no occasion for that You an d the girls may go or you may send them by themselves which perhaps will be still better for as you are as handsome as any of them Mr Bingley might like you the best of the party   My dear you flatter me I certainly have had my sh are of beauty but I do not pretend to be anything extraordinary now When a woman has five grown up daughters she ou ght to give over thinking of her own beauty   In such cases a woman has not often much beauty to think of   But my d ear you must indeed go and see Mr Bingley when he comes into the neighbourhood   It is more than I engage for I ass ure you   But consider your daughters Only think what an establishment it would be for one of them Sir William and L ady Lucas are determined to go merely on that account for in general you know they visit no newcomers Indeed you must go for it will be impossible for us to visit him if you do not   You are over scrupulous surely I dare say Mr Bingley will be very glad to see you and I will send a few lines by you to assure him of my hearty consent to his mar rying whichever he chooses of the girls though I must throw in a good word for my little Lizzy   I desire you will do no such thing Lizzy is not a bit better than the others and I am sure she is not half so handsome as Jane nor half so good humoured as Lydia But you are always giving her the preference   They have none of them much to recommend the m   replied he   they are all silly and ignorant like other girls but Lizzy has something more of quickness than her sisters   Mr Bennet how can you abuse your own children in such a way You take delight in vexing me You have no co mpassion on my poor nerves   You mistake me my dear I have a high respect for your nerves They are my old friends I have heard you mention them with consideration these twenty years at least   Ah you do not know what I suffer   But I hope you will get over it and live to see many young men of four thousand a year come into the neighbourhood   It w

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r When she was discontented she fancied herself nervous The business of her life was to get her daughters married
its solace was visiting and news '

In [18]:
```python
# Find all of the words in multiline_text2
word_list = multiline_text2.split()
word_list
```

Out[18]: ['It',
 'is',
 'a',
 'truth',
 'universally',
 'acknowledged',
 'that',
 'a',
 'single',
 'man',
 'in',
 'possession',
 'of',
 'a',
 'good',
 'fortune',
 'must',
 'be',
 'in',
 'want',
 'of',
 'a',
 'wife',
 'However',
 'little',
 'known',
 'the',
 'feelings',
 'or',
 'views',
 'of',
 'such',

'a',
'man',
'may',
'be',
'on',
'his',
'first',
'entering',
'a',
'neighbourhood',
'this',
'truth',
'is',
'so',
'well',
'fixed',
'in',
'the',
'minds',
'of',
'the',
'surrounding',
'families',
'that',
'he',
'is',
'considered',
'as',
'the',
'rightful',
'property',
'of',
'some',
'one',
'or',
'other',
'of',
'their',
'daughters',
'My',
'dear',
'Mr',
'Bennet',
'said',

'his',
'lady',
'to',
'him',
'one',
'day',
'have',
'you',
'heard',
'that',
'Netherfield',
'Park',
'is',
'let',
'at',
'last',
'Mr',
'Bennet',
'replied',
'that',
'he',
'had',
'not',
'But',
'it',
'is',
'returned',
'she',
'for',
'Mrs',
'Long',
'has',
'just',
'been',
'here',
'and',
'she',
'told',
'me',
'all',
'about',
'it',
'Mr',
'Bennet',

'made',
'no',
'answer',
'Do',
'not',
'you',
'want',
'to',
'know',
'who',
'has',
'taken',
'it',
'cried',
'his',
'wife',
'impatiently',
'You',
'want',
'to',
'tell',
'me',
'and',
'I',
'have',
'no',
'objection',
'to',
'hearing',
'it',
'This',
'was',
'invitation',
'enough',
'Why',
'my',
'dear',
'you',
'must',
'know',
'Mrs',
'Long',
'says',
'that',

'Netherfield',
'is',
'taken',
'by',
'a',
'young',
'man',
'of',
'large',
'fortune',
'from',
'the',
'north',
'of',
'England',
'that',
'he',
'came',
'down',
'on',
'Monday',
'in',
'a',
'chaise',
'and',
'four',
'to',
'see',
'the',
'place',
'and',
'was',
'so',
'much',
'delighted',
'with',
'it',
'that',
'he',
'agreed',
'with',
'Mr',
'Morris',
'immediately',

'that',
'he',
'is',
'to',
'take',
'possession',
'before',
'Michaelmas',
'and',
'some',
'of',
'his',
'servants',
'are',
'to',
'be',
'in',
'the',
'house',
'by',
'the',
'end',
'of',
'next',
'week',
'What',
'is',
'his',
'name',
'Bingley',
'Is',
'he',
'married',
'or',
'single',
'Oh',
'single',
'my',
'dear',
'to',
'be',
'sure',
'A',
'single',

'man',
'of',
'large',
'fortune',
'four',
'or',
'five',
'thousand',
'a',
'year',
'What',
'a',
'fine',
'thing',
'for',
'our',
'girls',
'How',
'so',
'how',
'can',
'it',
'affect',
'them',
'My',
'dear',
'Mr',
'Bennet',
'replied',
'his',
'wife',
'how',
'can',
'you',
'be',
'so',
'tiresome',
'You',
'must',
'know',
'that',
'I',
'am',
'thinking',

'of',
'his',
'marrying',
'one',
'of',
'them',
'Is',
'that',
'his',
'design',
'in',
'settling',
'here',
'Design',
'nonsense',
'how',
'can',
'you',
'talk',
'so',
'But',
'it',
'is',
'very',
'likely',
'that',
'he',
'may',
'fall',
'in',
'love',
'with',
'one',
'of',
'them',
'and',
'therefore',
'you',
'must',
'visit',
'him',
'as',
'soon',
'as',

'he',
'comes',
'I',
'see',
'no',
'occasion',
'for',
'that',
'You',
'and',
'the',
'girls',
'may',
'go',
'or',
'you',
'may',
'send',
'them',
'by',
'themselves',
'which',
'perhaps',
'will',
'be',
'still',
'better',
'for',
'as',
'you',
'are',
'as',
'handsome',
'as',
'any',
'of',
'them',
'Mr',
'Bingley',
'might',
'like',
'you',
'the',
'best',

'of',
'the',
'party',
'My',
'dear',
'you',
'flatter',
'me',
'I',
'certainly',
'have',
'had',
'my',
'share',
'of',
'beauty',
'but',
'I',
'do',
'not',
'pretend',
'to',
'be',
'anything',
'extraordinary',
'now',
'When',
'a',
'woman',
'has',
'five',
'grown',
'up',
'daughters',
'she',
'ought',
'to',
'give',
'over',
'thinking',
'of',
'her',
'own',
'beauty',

'In',
'such',
'cases',
'a',
'woman',
'has',
'not',
'often',
'much',
'beauty',
'to',
'think',
'of',
'But',
'my',
'dear',
'you',
'must',
'indeed',
'go',
'and',
'see',
'Mr',
'Bingley',
'when',
'he',
'comes',
'into',
'the',
'neighbourhood',
'It',
'is',
'more',
'than',
'I',
'engage',
'for',
'I',
'assure',
'you',
'But',
'consider',
'your',
'daughters',

'Only',
'think',
'what',
'an',
'establishment',
'it',
'would',
'be',
'for',
'one',
'of',
'them',
'Sir',
'William',
'and',
'Lady',
'Lucas',
'are',
'determined',
'to',
'go',
'merely',
'on',
'that',
'account',
'for',
'in',
'general',
'you',
'know',
'they',
'visit',
'no',
'newcomers',
'Indeed',
'you',
'must',
'go',
'for',
'it',
'will',
'be',
'impossible',
'for',

'us',
'to',
'visit',
'him',
'if',
'you',
'do',
'not',
'You',
'are',
'over',
'scrupulous',
'surely',
'I',
'dare',
'say',
'Mr',
'Bingley',
'will',
'be',
'very',
'glad',
'to',
'see',
'you',
'and',
'I',
'will',
'send',
'a',
'few',
'lines',
'by',
'you',
'to',
'assure',
'him',
'of',
'my',
'hearty',
'consent',
'to',
'his',
'marrying',

'whichever',
'he',
'chooses',
'of',
'the',
'girls',
'though',
'I',
'must',
'throw',
'in',
'a',
'good',
'word',
'for',
'my',
'little',
'Lizzy',
'I',
'desire',
'you',
'will',
'do',
'no',
'such',
'thing',
'Lizzy',
'is',
'not',
'a',
'bit',
'better',
'than',
'the',
'others',
'and',
'I',
'am',
'sure',
'she',
'is',
'not',
'half',
'so',

'handsome',
'as',
'Jane',
'nor',
'half',
'so',
'good',
'humoured',
'as',
'Lydia',
'But',
'you',
'are',
'always',
'giving',
'her',
'the',
'preference',
'They',
'have',
'none',
'of',
'them',
'much',
'to',
'recommend',
'them',
'replied',
'he',
'they',
'are',
'all',
'silly',
'and',
'ignorant',
'like',
'other',
'girls',
'but',
'Lizzy',
'has',
'something',
'more',
'of',

'quickness',
'than',
'her',
'sisters',
'Mr',
'Bennet',
'how',
'can',
'you',
'abuse',
'your',
'own',
'children',
'in',
'such',
'a',
'way',
'You',
'take',
'delight',
'in',
'vexing',
'me',
'You',
'have',
'no',
'compassion',
'on',
'my',
'poor',
'nerves',
'You',
'mistake',
'me',
'my',
'dear',
'I',
'have',
'a',
'high',
'respect',
'for',
'your',
'nerves',

'They',
'are',
'my',
'old',
'friends',
'I',
'have',
'heard',
'you',
'mention',
'them',
'with',
'consideration',
'these',
'twenty',
'years',
'at',
'least',
'Ah',
'you',
'do',
'not',
'know',
'what',
'I',
'suffer',
'But',
'I',
'hope',
'you',
'will',
'get',
'over',
'it',
'and',
'live',
'to',
'see',
'many',
'young',
'men',
'of',
'four',
'thousand',

'a',
'year',
'come',
'into',
'the',
'neighbourhood',
'It',
'will',
'be',
'no',
'use',
'to',
'us',
'if',
'twenty',
'such',
'should',
'come',
'since',
'you',
'will',
'not',
'visit',
'them',
'Depend',
'upon',
'it',
'my',
'dear',
'that',
'when',
'there',
'are',
'twenty',
'I',
'will',
'visit',
'them',
'all',
'Mr',
'Bennet',
'was',
'so',
'odd',

'a',
'mixture',
'of',
'quick',
'parts',
'sarcastic',
'humour',
'reserve',
'and',
'caprice',
'that',
'the',
'experience',
'of',
'three',
'and',
'twenty',
'years',
'had',
'been',
'insufficient',
'to',
'make',
'his',
'wife',
'understand',
'his',
'character',
'Her',
'mind',
'was',
'less',
'difficult',
'to',
'develop',
'She',
'was',
'a',
'woman',
'of',
'mean',
'understanding',
'little',
'information',

```
    'and',
    'uncertain',
    'temper',
    'When',
    'she',
    'was',
    'discontented',
    'she',
    'fancied',
    'herself',
    'nervous',
    'The',
    'business',
    'of',
    'her',
    'life',
    'was',
    'to',
    'get',
    'her',
    'daughters',
    'married'.
```

In [19]:
```python
# Create a list containing only the unique words
unique_words = dict.fromkeys(word_list)
unique_words
```

Out[19]:
```
{'It': None,
 'is': None,
 'a': None,
 'truth': None,
 'universally': None,
 'acknowledged': None,
 'that': None,
 'single': None,
 'man': None,
 'in': None,
 'possession': None,
 'of': None,
 'good': None,
 'fortune': None,
 'must': None,
 'be': None,
```

```
'want': None,
'wife': None,
'However': None,
'little': None,
'known': None,
'the': None,
'feelings': None,
'or': None,
'views': None,
'such': None,
'may': None,
'on': None,
'his': None,
'first': None,
'entering': None,
'neighbourhood': None,
'this': None,
'so': None,
'well': None,
'fixed': None,
'minds': None,
'surrounding': None,
'families': None,
'he': None,
'considered': None,
'as': None,
'rightful': None,
'property': None,
'some': None,
'one': None,
'other': None,
'their': None,
'daughters': None,
'My': None,
'dear': None,
'Mr': None,
'Bennet': None,
'said': None,
'lady': None,
'to': None,
'him': None,
'day': None,
'have': None,
'you': None,
```

```
'heard': None,
'Netherfield': None,
'Park': None,
'let': None,
'at': None,
'last': None,
'replied': None,
'had': None,
'not': None,
'But': None,
'it': None,
'returned': None,
'she': None,
'for': None,
'Mrs': None,
'Long': None,
'has': None,
'just': None,
'been': None,
'here': None,
'and': None,
'told': None,
'me': None,
'all': None,
'about': None,
'made': None,
'no': None,
'answer': None,
'Do': None,
'know': None,
'who': None,
'taken': None,
'cried': None,
'impatiently': None,
'You': None,
'tell': None,
'I': None,
'objection': None,
'hearing': None,
'This': None,
'was': None,
'invitation': None,
'enough': None,
'Why': None,
```

```
'my': None,
'says': None,
'by': None,
'young': None,
'large': None,
'from': None,
'north': None,
'England': None,
'came': None,
'down': None,
'Monday': None,
'chaise': None,
'four': None,
'see': None,
'place': None,
'much': None,
'delighted': None,
'with': None,
'agreed': None,
'Morris': None,
'immediately': None,
'take': None,
'before': None,
'Michaelmas': None,
'servants': None,
'are': None,
'house': None,
'end': None,
'next': None,
'week': None,
'What': None,
'name': None,
'Bingley': None,
'Is': None,
'married': None,
'Oh': None,
'sure': None,
'A': None,
'five': None,
'thousand': None,
'year': None,
'fine': None,
'thing': None,
'our': None,
```

```
'girls': None,
'How': None,
'how': None,
'can': None,
'affect': None,
'them': None,
'tiresome': None,
'am': None,
'thinking': None,
'marrying': None,
'design': None,
'settling': None,
'Design': None,
'nonsense': None,
'talk': None,
'very': None,
'likely': None,
'fall': None,
'love': None,
'therefore': None,
'visit': None,
'soon': None,
'comes': None,
'occasion': None,
'go': None,
'send': None,
'themselves': None,
'which': None,
'perhaps': None,
'will': None,
'still': None,
'better': None,
'handsome': None,
'any': None,
'might': None,
'like': None,
'best': None,
'party': None,
'flatter': None,
'certainly': None,
'share': None,
'beauty': None,
'but': None,
'do': None,
```

```
'pretend': None,
'anything': None,
'extraordinary': None,
'now': None,
'When': None,
'woman': None,
'grown': None,
'up': None,
'ought': None,
'give': None,
'over': None,
'her': None,
'own': None,
'In': None,
'cases': None,
'often': None,
'think': None,
'indeed': None,
'when': None,
'into': None,
'more': None,
'than': None,
'engage': None,
'assure': None,
'consider': None,
'your': None,
'Only': None,
'what': None,
'an': None,
'establishment': None,
'would': None,
'Sir': None,
'William': None,
'Lady': None,
'Lucas': None,
'determined': None,
'merely': None,
'account': None,
'general': None,
'they': None,
'newcomers': None,
'Indeed': None,
'impossible': None,
'us': None,
```

```
'if': None,
'scrupulous': None,
'surely': None,
'dare': None,
'say': None,
'glad': None,
'few': None,
'lines': None,
'hearty': None,
'consent': None,
'whichever': None,
'chooses': None,
'though': None,
'throw': None,
'word': None,
'Lizzy': None,
'desire': None,
'bit': None,
'others': None,
'half': None,
'Jane': None,
'nor': None,
'humoured': None,
'Lydia': None,
'always': None,
'giving': None,
'preference': None,
'They': None,
'none': None,
'recommend': None,
'silly': None,
'ignorant': None,
'something': None,
'quickness': None,
'sisters': None,
'abuse': None,
'children': None,
'way': None,
'delight': None,
'vexing': None,
'compassion': None,
'poor': None,
'nerves': None,
'mistake': None,
```

```
'high': None,
'respect': None,
'old': None,
'friends': None,
'mention': None,
'consideration': None,
'these': None,
'twenty': None,
'years': None,
'least': None,
'Ah': None,
'suffer': None,
'hope': None,
'get': None,
'live': None,
'many': None,
'men': None,
'come': None,
'use': None,
'should': None,
'since': None,
'Depend': None,
'upon': None,
'there': None,
'odd': None,
'mixture': None,
'quick': None,
'parts': None,
'sarcastic': None,
'humour': None,
'reserve': None,
'caprice': None,
'experience': None,
'three': None,
'insufficient': None,
'make': None,
'understand': None,
'character': None,
'Her': None,
'mind': None,
'less': None,
'difficult': None,
'develop': None,
'She': None,
```

```
    'mean': None,
    'understanding': None,
    'information': None,
    'uncertain': None,
    'temper': None,
    'discontented': None,
    'fancied': None,
    'herself': None,
    'nervous': None,
    'The': None,
    'business': None,
    'life': None,
    'its': None,
```

In [20]:
```python
# Count the number of times the unique word has appeared in the list
for word in word_list:
    if unique_words[word] is None:
        unique_words[word] = 1
    else:
        unique_words[word] += 1
unique_words
```

Out[20]:
```
{'It': 3,
 'is': 12,
 'a': 20,
 'truth': 2,
 'universally': 1,
 'acknowledged': 1,
 'that': 15,
 'single': 4,
 'man': 4,
 'in': 11,
 'possession': 2,
 'of': 29,
 'good': 3,
 'fortune': 3,
 'must': 7,
 'be': 11,
 'want': 3,
 'wife': 4,
 'However': 1,
 'little': 3,
 'known': 1,
```

```
'the': 17,
'feelings': 1,
'or': 5,
'views': 1,
'such': 5,
'may': 4,
'on': 4,
'his': 11,
'first': 1,
'entering': 1,
'neighbourhood': 3,
'this': 1,
'so': 8,
'well': 1,
'fixed': 1,
'minds': 1,
'surrounding': 1,
'families': 1,
'he': 11,
'considered': 1,
'as': 8,
'rightful': 1,
'property': 1,
'some': 2,
'one': 5,
'other': 2,
'their': 1,
'daughters': 4,
'My': 3,
'dear': 8,
'Mr': 10,
'Bennet': 6,
'said': 1,
'lady': 1,
'to': 22,
'him': 4,
'day': 1,
'have': 7,
'you': 24,
'heard': 2,
'Netherfield': 2,
'Park': 1,
'let': 1,
'at': 2,
```

```
'last': 1,
'replied': 3,
'had': 3,
'not': 9,
'But': 6,
'it': 11,
'returned': 1,
'she': 6,
'for': 11,
'Mrs': 2,
'Long': 2,
'has': 5,
'just': 1,
'been': 2,
'here': 2,
'and': 17,
'told': 1,
'me': 5,
'all': 3,
'about': 1,
'made': 1,
'no': 7,
'answer': 1,
'Do': 1,
'know': 5,
'who': 1,
'taken': 2,
'cried': 1,
'impatiently': 1,
'You': 7,
'tell': 1,
'I': 17,
'objection': 1,
'hearing': 1,
'This': 1,
'was': 8,
'invitation': 1,
'enough': 1,
'Why': 1,
'my': 10,
'says': 1,
'by': 4,
'young': 2,
'large': 2,
```

```
'from': 1,
'north': 1,
'England': 1,
'came': 1,
'down': 1,
'Monday': 1,
'chaise': 1,
'four': 3,
'see': 5,
'place': 1,
'much': 3,
'delighted': 1,
'with': 4,
'agreed': 1,
'Morris': 1,
'immediately': 1,
'take': 2,
'before': 1,
'Michaelmas': 1,
'servants': 1,
'are': 8,
'house': 1,
'end': 1,
'next': 1,
'week': 1,
'What': 2,
'name': 1,
'Bingley': 4,
'Is': 2,
'married': 2,
'Oh': 1,
'sure': 2,
'A': 1,
'five': 2,
'thousand': 2,
'year': 2,
'fine': 1,
'thing': 2,
'our': 1,
'girls': 4,
'How': 1,
'how': 4,
'can': 4,
'affect': 1,
```

```
'them': 11,
'tiresome': 1,
'am': 2,
'thinking': 2,
'marrying': 2,
'design': 1,
'settling': 1,
'Design': 1,
'nonsense': 1,
'talk': 1,
'very': 2,
'likely': 1,
'fall': 1,
'love': 1,
'therefore': 1,
'visit': 5,
'soon': 1,
'comes': 2,
'occasion': 1,
'go': 4,
'send': 2,
'themselves': 1,
'which': 1,
'perhaps': 1,
'will': 9,
'still': 1,
'better': 2,
'handsome': 2,
'any': 1,
'might': 1,
'like': 2,
'best': 1,
'party': 1,
'flatter': 1,
'certainly': 1,
'share': 1,
'beauty': 3,
'but': 2,
'do': 4,
'pretend': 1,
'anything': 1,
'extraordinary': 1,
'now': 1,
'When': 2,
```

```
'woman': 3,
'grown': 1,
'up': 1,
'ought': 1,
'give': 1,
'over': 3,
'her': 5,
'own': 2,
'In': 1,
'cases': 1,
'often': 1,
'think': 2,
'indeed': 1,
'when': 2,
'into': 2,
'more': 2,
'than': 3,
'engage': 1,
'assure': 2,
'consider': 1,
'your': 3,
'Only': 1,
'what': 2,
'an': 1,
'establishment': 1,
'would': 1,
'Sir': 1,
'William': 1,
'Lady': 1,
'Lucas': 1,
'determined': 1,
'merely': 1,
'account': 1,
'general': 1,
'they': 2,
'newcomers': 1,
'Indeed': 1,
'impossible': 1,
'us': 2,
'if': 2,
'scrupulous': 1,
'surely': 1,
'dare': 1,
'say': 1,
```

```
'glad': 1,
'few': 1,
'lines': 1,
'hearty': 1,
'consent': 1,
'whichever': 1,
'chooses': 1,
'though': 1,
'throw': 1,
'word': 1,
'Lizzy': 3,
'desire': 1,
'bit': 1,
'others': 1,
'half': 2,
'Jane': 1,
'nor': 1,
'humoured': 1,
'Lydia': 1,
'always': 1,
'giving': 1,
'preference': 1,
'They': 2,
'none': 1,
'recommend': 1,
'silly': 1,
'ignorant': 1,
'something': 1,
'quickness': 1,
'sisters': 1,
'abuse': 1,
'children': 1,
'way': 1,
'delight': 1,
'vexing': 1,
'compassion': 1,
'poor': 1,
'nerves': 2,
'mistake': 1,
'high': 1,
'respect': 1,
'old': 1,
'friends': 1,
'mention': 1,
```

'consideration': 1,
'these': 1,
'twenty': 4,
'years': 2,
'least': 1,
'Ah': 1,
'suffer': 1,
'hope': 1,
'get': 2,
'live': 1,
'many': 1,
'men': 1,
'come': 2,
'use': 1,
'should': 1,
'since': 1,
'Depend': 1,
'upon': 1,
'there': 1,
'odd': 1,
'mixture': 1,
'quick': 1,
'parts': 1,
'sarcastic': 1,
'humour': 1,
'reserve': 1,
'caprice': 1,
'experience': 1,
'three': 1,
'insufficient': 1,
'make': 1,
'understand': 1,
'character': 1,
'Her': 1,
'mind': 1,
'less': 1,
'difficult': 1,
'develop': 1,
'She': 1,
'mean': 1,
'understanding': 1,
'information': 1,
'uncertain': 1,
'temper': 1,

```
        'discontented': 1,
        'fancied': 1,
        'herself': 1,
        'nervous': 1,
        'The': 1,
        'business': 1,
        'life': 1,
        'its': 1,
```

In [21]:
```python
# Find 25 most used unique words
top_25 = sorted(unique_words.items(),key=lambda item: item[1],reverse=True)
top_25[:25]
```

Out[21]:
```
[('of', 29),
 ('you', 24),
 ('to', 22),
 ('a', 20),
 ('the', 17),
 ('and', 17),
 ('I', 17),
 ('that', 15),
 ('is', 12),
 ('in', 11),
 ('be', 11),
 ('his', 11),
 ('he', 11),
 ('it', 11),
 ('for', 11),
 ('them', 11),
 ('Mr', 10),
 ('my', 10),
 ('not', 9),
 ('will', 9),
 ('so', 8),
 ('as', 8),
 ('dear', 8),
 ('was', 8),
 ('are', 8)]
```

Question 3.C: Activity 3 page 40

```python
In [26]:    # Look up the definition of permutations and dropwhile from itertools.
            from itertools import permutations, dropwhile
            permutations?
            dropwhile?
```

```python
In [32]:    # Write an expression to generate all the possible three digit numbers using 0, 1, and 2
            perms = permutations([0,1,2])
            for i in list(perms):
                print(i)
```

```
(0, 1, 2)
(0, 2, 1)
(1, 0, 2)
(1, 2, 0)
(2, 0, 1)
(2, 1, 0)
```

```python
In [41]:    # Loop over the iterator expression you generated before. Use print to print each element returned by the iterator.
            # Use assert and isinstance to make sure that the elements are of type tuple
            for my_tuple in permutations([0,1,2]):
                print(my_tuple)
                assert isinstance(my_tuple, tuple)
```

```
(0, 1, 2)
(0, 2, 1)
(1, 0, 2)
(1, 2, 0)
(2, 0, 1)
(2, 1, 0)
```

```python
In [42]:    # Write the loop again. But this time use dropwhile with a lambda expression to drop any leading zeros from the tuples
            # As an example (0, 1, 2) will become [0, 2]. Also cast the output of the dropwhile to a list.
            for my_tuple in permutations([0,1,2]):
                print(list(dropwhile(lambda x:x <=0, my_tuple)))
```

```
[1, 2]
[2, 1]
[1, 0, 2]
[1, 2, 0]
[2, 0, 1]
```

```
[2  1  0]
```

```python
# Write all the logic you had written above, but this time write a separate function where you will be passing the
# list generated from dropwhile and the function will return the whole number contained in the list. As an example if
# pass [1, 2] to the fucntion it will return 12 to you.Make sure that the return type is indeed a number and not a str
# Although this task can be achieved using some other tricks, we require that you  treat the incoming list as a stack
# the function and generate the number there.

def combine_nums(my_stack):
    x = 0
    for i in range(0, len(my_stack)):
        x += (my_stack.pop() * (math.pow(10,i)))
    return x

for my_tuple in permutations([0,1,2]):
    my_stack = list(dropwhile(lambda x:x <=0, my_tuple))
    print (combine_nums(my_stack))
```

```
12.0
21.0
102.0
120.0
201.0
210.0
```

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```python
# Import zip_longest from itertools. Create a function to zip header, line, and fillvalue=NONE
from itertools import zip_longest

def zippy_func(header,line):
    line_zip = zip_longest(header,line,fillvalue=None)
    z_dict = {key_val[0]:key_val[1] for key_val in line_zip}
    return z_dict
```

```
In [57]:    # Open the accompanying sales_record.csv file from the GitHub link by using r mode inside a block and first check that
            # it is opened
            with open("data/sales_record.csv", "r") as fd:
                # Read the first line and use string method to generate a list of all the column names
                first_line = fd.readline()
                header = first_line.replace("\n", "").split(",")
                # Read file line by line and pass each line to a function
                for i, line in enumerate(fd):
                    line = line.replace("\n", "").split(",")
                    d = zippy_func(header, line)
                    print(d)
                    if i > 10:
                        break
```

```
{'Region': 'Central America and the Caribbean', 'Country': 'Antigua and Barbuda ', 'Item Type': 'Baby Food', 'Sales Ch
annel': 'Online', 'Order Priority': 'M', 'Order Date': '12/20/2013', 'Order ID': '957081544', 'Ship Date': '1/11/2014
', 'Units Sold': '552', 'Unit Price': '255.28', 'Unit Cost': '159.42', 'Total Revenue': '140914.56', 'Total Cost': '87
999.84', 'Total Profit': '52914.72'}
{'Region': 'Central America and the Caribbean', 'Country': 'Panama', 'Item Type': 'Snacks', 'Sales Channel': 'Offline
', 'Order Priority': 'C', 'Order Date': '7/5/2010', 'Order ID': '301644504', 'Ship Date': '7/26/2010', 'Units Sold': '
2167', 'Unit Price': '152.58', 'Unit Cost': '97.44', 'Total Revenue': '330640.86', 'Total Cost': '211152.48', 'Total P
rofit': '119488.38'}
{'Region': 'Europe', 'Country': 'Czech Republic', 'Item Type': 'Beverages', 'Sales Channel': 'Offline', 'Order Priorit
y': 'C', 'Order Date': '9/12/2011', 'Order ID': '478051030', 'Ship Date': '9/29/2011', 'Units Sold': '4778', 'Unit Pri
ce': '47.45', 'Unit Cost': '31.79', 'Total Revenue': '226716.10', 'Total Cost': '151892.62', 'Total Profit': '74823.48
'}
{'Region': 'Asia', 'Country': 'North Korea', 'Item Type': 'Cereal', 'Sales Channel': 'Offline', 'Order Priority': 'L',
'Order Date': '5/13/2010', 'Order ID': '892599952', 'Ship Date': '6/15/2010', 'Units Sold': '9016', 'Unit Price': '20
5.70', 'Unit Cost': '117.11', 'Total Revenue': '1854591.20', 'Total Cost': '1055863.76', 'Total Profit': '798727.44'}
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Order Date': '7/20/2015', 'Order ID': '571902596', 'Ship Date': '7/27/2015', 'Units Sold': '7542', 'Unit Price': '152.
58', 'Unit Cost': '97.44', 'Total Revenue': '1150758.36', 'Total Cost': '734892.48', 'Total Profit': '415865.88'}
{'Region': 'Middle East and North Africa', 'Country': 'Morocco', 'Item Type': 'Personal Care', 'Sales Channel': 'Offli
ne', 'Order Priority': 'L', 'Order Date': '11/8/2010', 'Order ID': '412882792', 'Ship Date': '11/22/2010', 'Units Sold
': '48', 'Unit Price': '81.73', 'Unit Cost': '56.67', 'Total Revenue': '3923.04', 'Total Cost': '2720.16', 'Total Prof
it': '1202.88'}
{'Region': 'Australia and Oceania', 'Country': 'Federated States of Micronesia', 'Item Type': 'Clothes', 'Sales Channe
l': 'Offline', 'Order Priority': 'H', 'Order Date': '3/28/2011', 'Order ID': '932776868', 'Ship Date': '5/10/2011', 'U
nits Sold': '8258', 'Unit Price': '109.28', 'Unit Cost': '35.84', 'Total Revenue': '902434.24', 'Total Cost': '295966.
72', 'Total Profit': '606467.52'}
{'Region': 'Europe', 'Country': 'Bosnia and Herzegovina', 'Item Type': 'Clothes', 'Sales Channel': 'Online', 'Order Pr
iority': 'M', 'Order Date': '10/14/2013', 'Order ID': '919133651', 'Ship Date': '11/4/2013', 'Units Sold': '927', 'Uni
t Price': '109.28', 'Unit Cost': '35.84', 'Total Revenue': '101302.56', 'Total Cost': '33223.68', 'Total Profit': '680
```

78.88'}
{'Region': 'Middle East and North Africa', 'Country': 'Afghanistan', 'Item Type': 'Clothes', 'Sales Channel': 'Offline', 'Order Priority': 'M', 'Order Date': '8/27/2016', 'Order ID': '579814469', 'Ship Date': '10/5/2016', 'Units Sold': '8841', 'Unit Price': '109.28', 'Unit Cost': '35.84', 'Total Revenue': '966144.48', 'Total Cost': '316861.44', 'Total Profit': '649283.04'}
{'Region': 'Sub-Saharan Africa', 'Country': 'Ethiopia', 'Item Type': 'Baby Food', 'Sales Channel': 'Online', 'Order Priority': 'M', 'Order Date': '4/13/2015', 'Order ID': '192993152', 'Ship Date': '5/7/2015', 'Units Sold': '9817', 'Unit Price': '255.28', 'Unit Cost': '159.42', 'Total Revenue': '2506083.76', 'Total Cost': '1565026.14', 'Total Profit': '941057.62'}
{'Region': 'Middle East and North Africa', 'Country': 'Turkey', 'Item Type': 'Office Supplies', 'Sales Channel': 'Offline', 'Order Priority': 'C', 'Order Date': '9/25/2013', 'Order ID': '557156026', 'Ship Date': '10/15/2013', 'Units Sold': '3704', 'Unit Price': '651.21', 'Unit Cost': '524.96', 'Total Revenue': '2412081.84', 'Total Cost': '1944451.84', 'Total Profit': '467630.00'}
{'Region': 'Middle East and North Africa', 'Country': 'Oman', 'Item Type': 'Cosmetics', 'Sales Channel': 'Online', 'Order Priority': 'M', 'Order Date': '5/12/2013', 'Order ID': '741101920', 'Ship Date': '5/17/2013', 'Units Sold': '7382', 'Unit Price': '437.20', 'Unit Cost': '263.33', 'Total Revenue': '3227410.40', 'Total Cost': '1943902.06', 'Total Profit': '1283508.34'}