DSC540-T301_2237-1_Samanta_Rajib_week_1_2

June 18, 2023

[2]:
```
# Class : DSC540-T301 Data Preparation (2237-1)
# Name : Rajib Samanta
# Assignment : Week 1 & 2 Excercises
## Assignment:  1

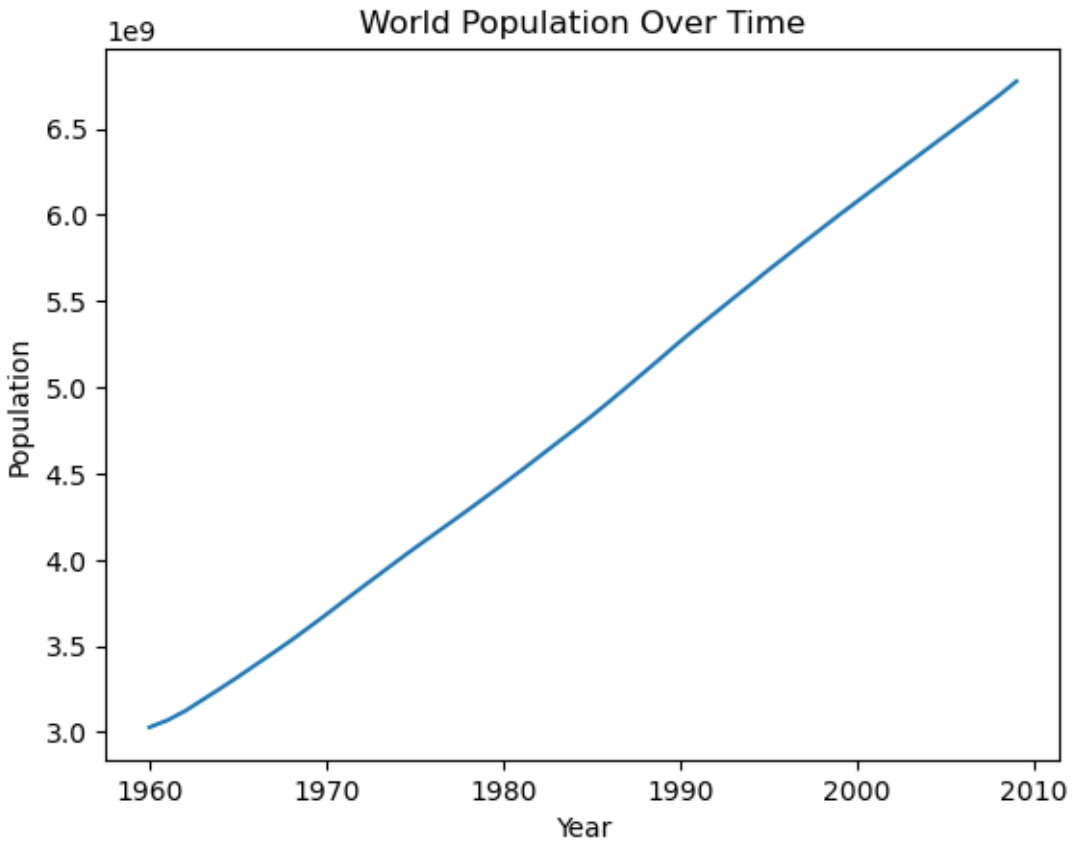
import pandas as pd
import matplotlib.pyplot as plt
#import xlrd

# Read the Excel file
data = pd.read_excel('world-population.xlsm', sheet_name=None)

# prints all sheets
#print(df)
# Extract the necessary columns
years = data['world-population']['Year']
#years
population = data['world-population']['Population']
#population
# Create the line chart
plt.plot(years, population)

# Set the chart title and labels
plt.title('World Population Over Time')
plt.xlabel('Year')
plt.ylabel('Population')

# Display the chart
plt.show()
```



[3]:
```
# Assignment : 3. Complete the following activities:
```

[4]:
```
# a. Data Wrangling with Python: Activity 1 page 17
## : list of random numbers and then generate another list from the first one,␣
 ↪which only contains numbers that are divisible by three. Repeat the␣
 ↪experiment three times.
## Then, we will calculate the average difference of length between the two␣
 ↪lists.
```

[5]:
```
import random

num_experiments = 3
list_length = 100 # list length to generate 100 random number

# Initialize variables
total_diff_length = 0

# Perform the experiment Three times
for _ in range(num_experiments):
    # Generate a  list of random numbers between 1 to 10,000
```

```
    random_list = [random.randint(1, 10000) for _ in range(list_length)]

    # Filter the new list for numbers divisible by 3
    divisible_by_three_list = [num for num in random_list if num % 3 == 0]

    # Calculate the difference in length
    diff_length = len(random_list) - len(divisible_by_three_list)

    # Accumulate the difference in length for averaging later
    total_diff_length += diff_length

# Calculate the average difference in length
average_diff_length = total_diff_length / num_experiments

print(f"Average difference in length: {average_diff_length}")
```

```
Average difference in length: 67.0
```

[6]:
```
# Assignment : b. Data Wrangling with Python: Activity 2 page 31
```

[7]:
```
# initialize list variable
multi_lines= []
# assign the text copying from https://github.com/TrainingByPackt/
 ↪Data-Wrangling-with-Python/tree/master/Chapter01/Activity02
multi_lines= ["This eBook is for the use of anyone anywhere in the United␣
 ↪States and most other parts of the world at no cost and with almost no␣
 ↪restrictions whatsoever. You may copy it, give it away or re-use it under␣
 ↪the terms of the Project Gutenberg License included with this eBook or␣
 ↪online at www.gutenberg.org. If you are not located in the United States,␣
 ↪you will have to check the laws of the country where you are located before␣
 ↪using this eBook.\n"
"Title: Pride and prejudice\n"
"Author: Jane Austen\n"
"Release Date: November 12, 2022 [eBook #1342]\n"
"[Most recently updated: April 14, 2023]\n"
"\n"
"Language: English\n"
"\n"
"Produced by: Produced by: Chuck Greif and the Online Distributed Proofreading␣
 ↪Team at http://www.pgdp.net (This file was produced from images available at␣
 ↪The Internet Archive)"]

print(multi_lines)


#print(multi_lines)
```

```
# Join the lines into a single multiline string
#multi_lines_text = '\n'.join(multi_lines)
#print(multi_lines_text)

# Print the multiline text
#print("Multiline text:")
#print(multiline_text)"
# Prompt the user for multiline input
```

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[8]:
```
# print Type
type(multi_lines)
```

[8]: list

[9]:
```
# Print length
len(multi_lines)
```

[9]: 1

[10]:
```
# Convert List to string
multi_lines_text = '\n'.join(multi_lines)
# "Remove all new lines and symbols using the replace function."
clean_text = multi_lines_text.replace('\n', '').replace('@', '').replace('#',␣
 ↪'').replace('!', '').replace('[', ' ').replace(']', ' ').replace('(', ' ').
 ↪replace(')', ' ').replace(',', '')
#multi_lines_text.replace('\n','')
print(clean_text)
```

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produced from images available at The Internet Archive
```

[11]:
```
# Split the multiline text into words
word_list = clean_text.split()
print("List of words:")
print(word_list)
```

```
List of words:
['This', 'eBook', 'is', 'for', 'the', 'use', 'of', 'anyone', 'anywhere', 'in',
'the', 'United', 'States', 'and', 'most', 'other', 'parts', 'of', 'the',
'world', 'at', 'no', 'cost', 'and', 'with', 'almost', 'no', 'restrictions',
'whatsoever.', 'You', 'may', 'copy', 'it', 'give', 'it', 'away', 'or', 're-use',
'it', 'under', 'the', 'terms', 'of', 'the', 'Project', 'Gutenberg', 'License',
'included', 'with', 'this', 'eBook', 'or', 'online', 'at', 'www.gutenberg.org.',
'If', 'you', 'are', 'not', 'located', 'in', 'the', 'United', 'States', 'you',
'will', 'have', 'to', 'check', 'the', 'laws', 'of', 'the', 'country', 'where',
'you', 'are', 'located', 'before', 'using', 'this', 'eBook.Title:', 'Pride',
'and', 'prejudiceAuthor:', 'Jane', 'AustenRelease', 'Date:', 'November', '12',
'2022', 'eBook', '1342', 'Most', 'recently', 'updated:', 'April', '14', '2023',
'Language:', 'EnglishProduced', 'by:', 'Produced', 'by:', 'Chuck', 'Greif',
'and', 'the', 'Online', 'Distributed', 'Proofreading', 'Team', 'at',
'http://www.pgdp.net', 'This', 'file', 'was', 'produced', 'from', 'images',
'available', 'at', 'The', 'Internet', 'Archive']
```

[12]:
```
# "Create a list from this list that will contain only the unique words."
# Create a new list with unique words using set
unique_word_list = list(set(word_list))

print("List of unique words:")
print(unique_word_list)
```

```
List of unique words:
['and', 'AustenRelease', '12', 'was', '1342', 'laws', 'Jane', 'anywhere',
'Produced', 'Online', 'away', 'prejudiceAuthor:', '2023', 'located', 'terms',
'the', 'at', 'Date:', 'have', 'www.gutenberg.org.', 'for', 'April',
'restrictions', 'online', 'Gutenberg', 'anyone', 'check', 'EnglishProduced',
'are', 'This', 'Proofreading', 'it', 'you', 'recently', 'Language:', 'this',
'produced', 'to', 'almost', 'November', 'most', 'Archive', 'not', 'use',
'world', 'images', 'cost', 'States', 'updated:', 'Chuck', 'Greif', 'included',
'Distributed', 'License', 'Internet', 'United', 'will', 'http://www.pgdp.net',
'with', 'under', 'Team', 'country', 're-use', 'Pride', '2022', 'eBook.Title:',
'using', 'in', '14', 'no', 'of', 'whatsoever.', 'before', 'from', 'by:', 'or',
'available', 'Most', 'If', 'parts', 'give', 'eBook', 'The', 'Project', 'copy',
'You', 'where', 'file', 'is', 'other', 'may']
```

[13]:
```
# "Count the number of times the unique word has appeared in the list using the␣
 ↪key and value in dict."
```

```
# Create an empty dictionary to store word counts
word_counts = {}

# Count the occurrences of each unique word
for word in word_list:
    if word in word_counts:
        word_counts[word] += 1
    else:
        word_counts[word] = 1

print("Word counts:")
print(word_counts)
```

```
Word counts:
{'This': 2, 'eBook': 3, 'is': 1, 'for': 1, 'the': 9, 'use': 1, 'of': 4,
'anyone': 1, 'anywhere': 1, 'in': 2, 'United': 2, 'States': 2, 'and': 4, 'most':
1, 'other': 1, 'parts': 1, 'world': 1, 'at': 4, 'no': 2, 'cost': 1, 'with': 2,
'almost': 1, 'restrictions': 1, 'whatsoever.': 1, 'You': 1, 'may': 1, 'copy': 1,
'it': 3, 'give': 1, 'away': 1, 'or': 2, 're-use': 1, 'under': 1, 'terms': 1,
'Project': 1, 'Gutenberg': 1, 'License': 1, 'included': 1, 'this': 2, 'online':
1, 'www.gutenberg.org.': 1, 'If': 1, 'you': 3, 'are': 2, 'not': 1, 'located': 2,
'will': 1, 'have': 1, 'to': 1, 'check': 1, 'laws': 1, 'country': 1, 'where': 1,
'before': 1, 'using': 1, 'eBook.Title:': 1, 'Pride': 1, 'prejudiceAuthor:': 1,
'Jane': 1, 'AustenRelease': 1, 'Date:': 1, 'November': 1, '12': 1, '2022': 1,
'1342': 1, 'Most': 1, 'recently': 1, 'updated:': 1, 'April': 1, '14': 1, '2023':
1, 'Language:': 1, 'EnglishProduced': 1, 'by:': 2, 'Produced': 1, 'Chuck': 1,
'Greif': 1, 'Online': 1, 'Distributed': 1, 'Proofreading': 1, 'Team': 1,
'http://www.pgdp.net': 1, 'file': 1, 'was': 1, 'produced': 1, 'from': 1,
'images': 1, 'available': 1, 'The': 1, 'Internet': 1, 'Archive': 1}
```

[14]:
```
# "Find the top 25 words from the unique words that you have found using the␣
 ↪slice function."

# Sort the words based on their counts in descending order
sorted_words = sorted(word_counts, key=word_counts.get, reverse=True)

# Get the top 25 words
top_25_words = sorted_words[:25]

print("Top 25 words:")
print(top_25_words)
```

```
Top 25 words:
['the', 'of', 'and', 'at', 'eBook', 'it', 'you', 'This', 'in', 'United',
'States', 'no', 'with', 'or', 'this', 'are', 'located', 'by:', 'is', 'for',
'use', 'anyone', 'anywhere', 'most', 'other']
```

[15]:
```
# Assignment : c. Data Wrangling with Python: Activity 3 page 49
## "using permutations to generate all possible three-digit numbers that can be␣
 ↪generated using 0, 1, and 2. Then, loop over this iterator, and also use␣
 ↪isinstance and assert to make sure that the return types are tuples. Also,␣
 ↪use a single line of code involving dropwhile and lambda expressions to␣
 ↪convert all the tuples to lists while dropping any leading zeros (for␣
 ↪example, (0, 1, 2) becomes [1, 2]). Finally, write a function that takes a␣
 ↪list like before and returns the actual number contained in it."
from itertools import permutations, dropwhile

def get_number_from_list(num_list):
    num_str = ''.join(str(digit) for digit in num_list)
    return int(num_str)

digits = [0, 1, 2]
three_digit_numbers = permutations(digits, 3)
for num_tuple in three_digit_numbers:
    assert isinstance(num_tuple, tuple)
    # remove leading 0 using dropwhile and lambda function
    num_list = list(dropwhile(lambda x: x == 0 and num_tuple.index(x) == 0,␣
 ↪num_tuple))
    print(num_list)
```

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

[16]:
```
#"Check the actual type that dropwhile returns."
# Generate all possible three-digit numbers
three_digit_numbers = dropwhile(lambda x: x[0] == 0, permutations(digits, 3))
print(type(three_digit_numbers))
```

```
<class 'itertools.dropwhile'>
```

[17]:
```
## "Combine the preceding code into one block, and this time write a separate␣
 ↪function where you will pass the list generated from dropwhile,"

def get_whole_number(num_list):
    num_str = ''.join(map(str, num_list))
    return int(num_str)
```

[18]:
```
# Generate all possible three-digit numbers
three_digit_numbers = dropwhile(lambda x: x[0] == 0, permutations(digits, 3))

for num_tuple in three_digit_numbers:
```

```
    num_list = list(num_tuple)
    print(num_list)
    number = get_whole_number(num_list)
    print(number)
```

```
[1, 0, 2]
102
[1, 2, 0]
120
[2, 0, 1]
201
[2, 1, 0]
210
```

[19]:
```
# Assignment : d. Data Wrangling with Python: Activity 4 page 59
```

[20]:
```
# "Import zip_longest from itertools. Create a function to zip header, line and fillvalue=None."
from itertools import zip_longest

def zip_header_line(header, line, fillvalue=None):
    zipped_data = zip_longest(header, line, fillvalue=fillvalue)
    return list(zipped_data)
# Function to process each line and construct a dictionary
def process_line(line, headers):
    values = line.strip().split(',')
    data_dict = dict(zip(headers, values))
    # Fill up the dictionary with key-value pairs
    for header, value in zip(headers, values):
        if value == '':
            data_dict[header] = None
        else:
            data_dict[header] = value
    return data_dict
```

[21]:
```
# "Open the accompanying sales_record.csv file from the GitHub link by using r mode inside a with block and first check that it is opened."
import csv
#import urllib.request
import requests

url = "https://github.com/TrainingByPackt/Data-Wrangling-with-Python/blob/master/Lesson02/Activity04/sales_record.csv"
# Download the file using requests
response = requests.get(url)
# Check if the download was successful
if response.status_code == 200:
```

```
    # Open the file in "r" mode using a with block
    with open("sales_record.csv", "r") as file:
        # File is successfully opened
        print("File opened successfully.")
        # Perform further operations on the file
        # Read the first line
        reader = csv.reader(file)
        header_row = next(reader)
        #print(header_row)
        # "Read the first line and use string methods to generate a list of all␣
↪the column names."
        # Generate a list of column names
                # Convert list to string with comma separator
        column_names_string = ', '.join(header_row)
        print("List of columns: ")
        print(column_names_string)
        # Skip the header row as it is already printed
        next(file)
        for line in file:

            # Process each line
            #print(line)
            # "Read each line and pass that line to a function, along with the␣
↪list of the headers. The work of the function is to construct a dict out of␣
↪these two "
            # Construct Dictionary
            # Process each line and construct a dictionary
            data = process_line(line.strip(), header_row)

            # Print the dictionary
            #print(data)
        # Just priniting last line to avoid big file
        print(data)

else:
    # Download failed
    print("Failed to download the file.")
```

```
File opened successfully.
List of columns:
Region, Country, Item Type, Sales Channel, Order Priority, Order Date, Order ID,
Ship Date, Units Sold, Unit Price, Unit Cost, Total Revenue, Total Cost, Total
Profit
{'Region': 'Sub-Saharan Africa', 'Country': 'Tanzania', 'Item Type':
'Vegetables', 'Sales Channel': 'Online', 'Order Priority': 'L', 'Order Date':
'7/8/2011', 'Order ID': '996861922', 'Ship Date': '8/7/2011', 'Units Sold':
'2450', 'Unit Price': '154.06', 'Unit Cost': '90.93', 'Total Revenue':
```

```
'377447.00', 'Total Cost': '222778.50', 'Total Profit': '154668.50'}
```

[ ]: