Assignment week 5 & 6 Raghuwanshi Prashant DSC540

October 9, 2021

Assignment: Week 5 & Week 6 Exercise, Data Formats/Data Structures/Data Sources

Name: Prashant Raghuwanshi

Date: 10/08/2021

Course: DSC540-T301 Data Preparation (2221-1) Complete the following exercises. You can submit a Jupyter Notebook or a PDF of your code. If you submit a .py file you need to also include a PDF or attachment of your results.

1. Data Wrangling with Python: Activity 7, page 207

```
[1]: # Import libraries
import pandas as pd
from bs4 import BeautifulSoup
```

```
[2]: #reading the data from html file by using bs4

fd = open("C:/Users/dell/Documents/docker/List of countries by GDP (nominal) -

→Wikipedia.htm", "r", encoding="utf8")

soup = BeautifulSoup(fd)
fd.close
```

[2]: <function TextIOWrapper.close()>

```
[3]: # Calculate the tables counts in html document:
    all_tables_cnt = soup.find_all("table")
    print("Total number of tables are {}".format(len(all_tables_cnt)))
```

Total number of tables are 9

```
[4]: # list out right table by using class attribute
data_table = soup.find("table", {"class": '"wikitable"|}'})
print(type(data_table))
```

<class 'bs4.element.Tag'>

```
[5]: #find out tr_elements
tr_elements = soup.find_all('table')[2].find_all('tr')
```

```
[6]: # Seperate source and actual data
      sources = data_table.tbody.findAll('tr', recursive=False)[0]
      sources_list = [td for td in sources.find_all('td')]
      print(len(sources_list))
 [7]: # using findAll functions to find the data from the data table body tag
      data = data_table.tbody.findAll('tr', recursive=False)[1].findAll('td',__
      →recursive=False)
 [8]: # using findAll function to find out the data from data table td
      data tables = []
      for td in data:
          data_tables.append(td.findAll('table'))
      # find the length of data table
      len(data_tables)
 [8]: 3
 [9]: # getting list of source name
      sources_names = [sources.findAll('a')[0].getText() for sources in sources_list]
      print(sources_names)
     ['International Monetary Fund', 'World Bank', 'United Nations']
[10]: # seperate the header and data for the source name
      header1 = [th.getText().strip() for th in data_tables[0][0].findAll('thead')[0].
      →findAll('th')]
      header1
[10]: ['Rank', 'Country', 'GDP(US$MM)']
[11]: #find the rows from data table using findAll
      rows1 = data_tables[0][0].findAll('tbody')[0].findAll('tr')[1:]
[12]: # find data from rows1 by using strip function for each td tag
      data_rows1 = [[td.get_text().strip() for td in tr.findAll('td')] for tr in__
       →rows1]
[13]: #create dataframe
      df1 = pd.DataFrame(data rows1, columns=header1)
      df1.head()
[13]:
                     Country GDP(US$MM)
       Rank
          1
             United States 19,390,600
      1
                 China[n 1] 12,014,610
      2
                       Japan 4,872,135
          3
                     Germany
                             3,684,816
```

```
[14]: # seperate the header and data for the second source name
      header2 = [th.getText().strip() for th in data_tables[1][0].findAll('thead')[0].
      →findAll('th')]
      header2
[14]: ['Rank', 'Country', 'GDP(US$MM)']
[15]: #find the rows from data table using findAll for source 2
      rows2 = data_tables[1][0].findAll('tbody')[0].findAll('tr')[1:]
[16]: # find data from rows1 by using strip function for each td tag
      data rows2 a = [[td.get text().strip() for td in tr.findAll('td')] for tr in___
       →rows21
      data rows2 a
[16]: [['1', 'United States', '7007193906040000000 19,390,604'],
       ['', 'European Union[23]', '7007172776980000000 17,277,698'],
       ['2', 'China[n 4]', '700712237700000000 12,237,700'],
       ['3', 'Japan', '7006487213700000000 4,872,137'],
       ['4', 'Germany', '7006367743900000000 3,677,439'],
       ['5', 'United Kingdom', '7006262243400000000 2,622,434'],
       ['6', 'India', '7006259749100000000 2,597,491'],
       ['7', 'France', '7006258250100000000 2,582,501'],
       ['8', 'Brazil', '7006205550600000000 2,055,506'],
       ['9', 'Italy', '7006193479800000000 1,934,798'],
       ['10', 'Canada', '7006165304300000000 1,653,043'],
       ['11', 'Russia[n 2]', '7006157752400000000 1,577,524'],
       ['12', 'South Korea', '7006153075100000000 1,530,751'],
       ['13', 'Australia', '7006132342100000000 1,323,421'],
       ['14', 'Spain', '700613113200000000 1,311,320'],
       ['15', 'Mexico', '7006114991900000000 1,149,919'],
       ['16', 'Indonesia', '7006101553900000000 1,015,539'],
       ['17', 'Turkey', '700585110200000000 851,102'],
       ['18', 'Netherlands', '700582620000000000 826,200'],
       ['19', 'Saudi Arabia', '700568382700000000 683,827'],
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       ['21', 'Argentina', '700563759000000000 637,590'],
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       ['23', 'Poland', '700552451000000000 524,510'],
       ['24', 'Belgium', '7005492681000000000 492,681'],
       ['25', 'Thailand', '7005455221000000000 455,221'],
       ['26', 'Iran', '7005439514000000000 439,514'],
       ['27', 'Austria', '7005416596000000000 416,596'],
       ['28', 'Norway', '7005398832000000000 398,832'],
```

5 United Kingdom

2,624,529

['29', 'United Arab Emirates', '7005382575000000000 382,575'],

```
['30', 'Nigeria', '7005375771000000000 375,771'],
['31', 'Israel', '7005350851000000000 350,851'],
['32', 'South Africa', '700534941900000000 349,419'],
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['35', 'Denmark', '700532487200000000 324,872'],
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['37', 'Malaysia', '700531450000000000 314,500'],
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['41', 'Chile', '700527707600000000 277,076'],
['42', 'Finland', '7005251885000000000 251,885'],
['43', 'Bangladesh', '700524972400000000 249,724'],
['44', 'Egypt', '700523536900000000 235,369'],
['45', 'Vietnam', '7005223864000000000 223,864'],
['46', 'Portugal', '7005217571000000000 217,571'],
['47', 'Czech Republic', '7005215726000000000 215,726'],
['48', 'Romania', '700521180300000000 211,803'],
['49', 'Peru', '700521138900000000 211,389'],
['50', 'New Zealand', '700520585300000000 205,853'],
['51', 'Greece', '7005200288000000000 200,288'],
['52', 'Iraq', '7005197716000000000 197,716'],
['53', 'Algeria', '7005170371000000000 170,371'],
['54', 'Qatar', '700516760500000000 167,605'],
['55', 'Kazakhstan', '700515940700000000 159,407'],
['56', 'Hungary', '7005139135000000000 139,135'],
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['58', 'Kuwait', '7005120126000000000 120,126'],
['59', 'Sudan', '700511748800000000 117,488'],
['60', 'Ukraine', '700511215400000000 112,154'],
['61', 'Morocco[n 5]', '700510913900000000 109,139'],
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['64', 'Sri Lanka', '700487175000000000 87,175'],
['65', 'Ethiopia', '700480561000000000 80,561'],
['66', 'Dominican Republic', '700475932000000000 75,932'],
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['68', 'Kenya', '700474938000000000 74,938'],
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['71', 'Luxembourg', '700462404000000000 62,404'],
['72', 'Panama', '700461838000000000 61,838'],
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['74', 'Bulgaria', '700456832000000000 56,832'],
['75', 'Uruguay', '700456157000000000 56,157'],
['76', 'Croatia', '700454849000000000 54,849'],
```

```
['77', 'Belarus', '700454442000000000 54,442'],
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['79', 'Lebanon', '700451844000000000 51,844'],
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['81', 'Macau', '700450361000000000 50,361'],
['82', 'Slovenia', '700448770000000000 48,770'],
['83', 'Uzbekistan', '700448718000000000 48,718'],
['84', 'Ghana', '700447330000000000 47,330'],
['85', 'Lithuania', '700447168000000000 47,168'],
['86', 'Turkmenistan', '700442355000000000 42,355'],
['87', 'Serbia', '700441432000000000 41,432'],
['88', 'Azerbaijan', '700440748000000000 40,748'],
['89', "Cote d'Ivoire", '700440389000000000 40,389'],
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['93', 'Democratic Republic of the Congo', '7004372410000000000 37,241'],
['94', 'Bahrain', '700435307000000000 35,307'],
['95', 'Cameroon', '700434799000000000 34,799'],
['96', 'Latvia', '700430264000000000 30,264'],
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['100', 'Zambia', '700425809000000000 25,809'],
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['107', 'Cyprus[n 7]', '700421652000000000 21,652'],
['108', 'Papua New Guinea', '700421089000000000 21,089'],
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['111', 'Zimbabwe', '700417846000000000 17,846'],
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['114', 'Senegal', '700416375000000000 16,375'],
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['116', 'Georgia[n 8]', '700415159000000000 15,159'],
['117', 'Jamaica', '700414768000000000 14,768'],
['118', 'Gabon', '700414623000000000 14,623'],
['119', 'West Bank and Gaza', '700414498000000000 14,498'],
['120', 'Nicaragua', '700413814000000000 13,814'],
['121', 'Mauritius', '700413338000000000 13,338'],
['122', 'Namibia', '700413245000000000 13,245'],
['123', 'Albania', '700413039000000000 13,039'],
```

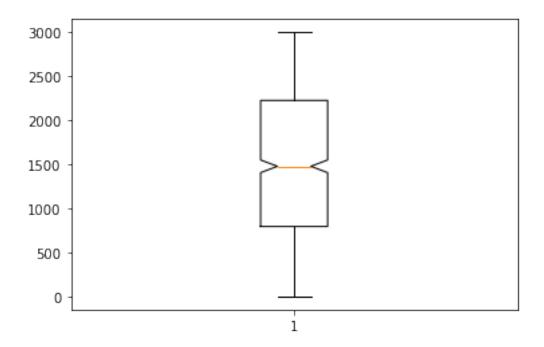
```
['124', 'Burkina Faso', '700412873000000000 12,873'],
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['127', 'Mozambique', '700412334000000000 12,334'],
['128', 'The Bahamas', '700412162000000000 12,162'],
['129', 'Brunei', '700412128000000000 12,128'],
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['131', 'Madagascar', '70041150000000000 11,500'],
['132', 'Mongolia', '700411488000000000 11,488'],
['133', 'Macedonia', '700411338000000000 11,338'],
['134', 'Guinea', '700410491000000000 10,491'],
['135', 'Chad', '700399810000000000 9,981'],
['136', 'Benin', '700392740000000000 9,274'],
['137', 'Rwanda', '700391370000000000 9,137'],
['138', 'Republic of the Congo', '700387230000000000 8,723'],
['139', 'Haiti', '700384080000000000 8,408'],
['140', 'Moldova[n 9]', '700381280000000000 8,128'],
['141', 'Niger', '700381200000000000 8,120'],
['142', 'Kyrgyzstan', '700375650000000000 7,565'],
['143', 'Somalia', '700373690000000000 7,369'],
['144', 'Tajikistan', '700371460000000000 7,146'],
['145', 'Kosovo', '700371290000000000 7,129'],
['146', 'Malawi', '700363030000000000 6,303'],
['147', 'Fiji', '700350610000000000 5,061'],
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['150', 'Barbados', '700347970000000000 4,797'],
['151', 'Montenegro', '700347740000000000 4,774'],
['152', 'Maldives', '700345970000000000 4,597'],
['153', 'Swaziland', '700344090000000000 4,409'],
['154', 'Sierra Leone', '700337740000000000 3,774'],
['155', 'Guyana', '700336760000000000 3,676'],
['156', 'Burundi', '700334780000000000 3,478'],
['157', 'Suriname', '700333240000000000 3,324'],
['158', 'Andorra', '700330130000000000 3,013'],
['159', 'Timor-Leste', '700329550000000000 2,955'],
['160', 'Lesotho', '7003263900000000000 2,639'],
['161', 'Bhutan', '700325120000000000 2,512'],
['162', 'Liberia', '7003215800000000000 2,158'],
['163', 'Central African Republic', '700319490000000000 1,949'],
['164', 'Djibouti', '700318450000000000 1,845'],
['165', 'Belize', '700318380000000000 1,838'],
['166', 'Cabo Verde', '700317540000000000 1,754'],
['167', 'Saint Lucia', '700317120000000000 1,712'],
['168', 'San Marino', '700316590000000000 1,659'],
['169', 'Antigua and Barbuda', '700315320000000000 1,532'],
['170', 'Seychelles', '700314860000000000 1,486'],
```

```
['171', 'Guinea-Bissau', '700313470000000000 1,347'],
       ['172', 'Solomon Islands', '700313030000000000 1,303'],
       ['173', 'Grenada', '700311190000000000 1,119'],
       ['174', 'The Gambia', '700310150000000000 1,015'],
       ['175', 'Saint Kitts and Nevis', '700294600000000000 946'],
       ['176', 'Vanuatu', '700286300000000000 863'],
       ['177', 'Samoa', '700285700000000000 857'],
       ['178', 'Saint Vincent and the Grenadines', '700279000000000000790'],
       ['179', 'Comoros', '700264900000000000 649'],
       ['180', 'Dominica', '700256300000000000 563'],
       ['181', 'Tonga', '7002426000000000000 426'],
       ['182', 'Sao Tome and Principe', '700239100000000000 391'],
       ['183', 'Federated States of Micronesia', '700233600000000000 336'],
       ['184', 'Palau', '7002292000000000000 292'],
       ['185', 'Marshall Islands', '700219900000000000 199'],
       ['186', 'Kiribati', '700219600000000000 196'],
       ['187', 'Nauru', '700211400000000000 114'],
       ['188', 'Tuvalu', '700140000000000000 40']]
[17]: # Removing unwanted data values by using strip function
      def find_right_text(i, td):
          if i == 0:
             return td.getText().strip()
          elif i == 1:
             return td.getText().strip()
          else:
              index = td.text.find(" ")
             return td.text[index+1:].strip()
[18]: # find data from rows2 by using strip function for each td tag
      data rows2 = [[find right text(i, td) for i, td in enumerate(tr.findAll('td'))]__
      →for tr in rows2]
[19]: #create dataframe 2
      df2 = pd.DataFrame(data_rows2, columns=header2)
      df2.head()
[19]: Rank
                         Country GDP(US$MM)
           1
                  United States 19,390,604
             European Union[23] 17,277,698
      1
      2
                     China[n 4] 12,237,700
      3
                           Japan 4,872,137
          3
                         Germany 3,677,439
          4
[20]: # seperate the header and data for the third source name
      header3 = [th.getText().strip() for th in data_tables[2][0].findAll('thead')[0].
       →findAll('th')]
```

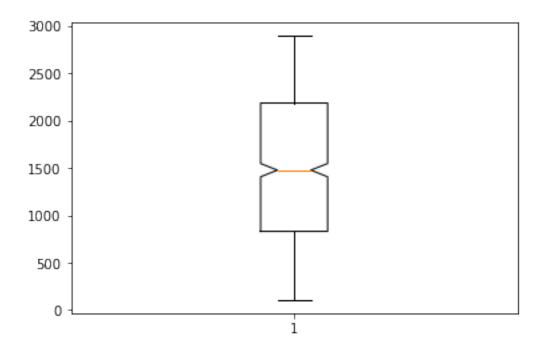
```
header3
[20]: ['Rank', 'Country', 'GDP(US$MM)']
[21]: #find the rows from data table using findAll for source 3
      rows3 = data_tables[2][0].findAll('tbody')[0].findAll('tr')[1:]
[22]: # find data from rows3 by using strip function for each td tag
      data_rows3 = [[td.get_text().strip() for td in tr.findAll('td')] for tr in_u
       ⊶rows3]
[23]: #create dataframe 3
      df3 = pd.DataFrame(data_rows3, columns=header3)
      df2.head()
[23]:
        Rank
                         Country
                                  GDP (US$MM)
      0
                   United States 19,390,604
              European Union[23] 17,277,698
      1
      2
                      China[n 4] 12,237,700
      3
           3
                           Japan 4,872,137
      4
           4
                         Germany
                                   3,677,439
 []:
     2. Data Wrangling with Python: Activity 8, page 233
[24]: # load libraries
      import numpy as np
      import matplotlib.pyplot as plt
      %matplotlib inline
[25]: # loading data to dataframe
      df_visit = pd.read_csv("C:/Users/dell/Documents/Packt-Data_Wrangling/Lesson 6/
      ⇔visit_data.csv")
      df_visit.head()
         id first_name last_name
[25]:
                                                        email gender \
          1
                 Sonny
                            Dahl
                                             sdahl0@mysql.com
                                                                Male
      0
      1
          2
                   {\tt NaN}
                             NaN
                                            dhoovart1@hud.gov
                                                                 NaN
      2
          3
                   Gar
                           Armal
                                       garmal2@technorati.com
                                                                 NaN
          4
      3
               Chiarra
                           Nulty
                                        cnulty3@newyorker.com
                                                                 NaN
          5
                   NaN
                                  sleaver4@elegantthemes.com
                                                                 NaN
                             {\tt NaN}
              ip_address
                           visit
           135.36.96.183 1225.0
      0
      1 237.165.194.143
                           919.0
      2
          166.43.137.224
                           271.0
          139.98.137.108 1002.0
```

4 46.117.117.27 2434.0

```
[26]: # find out the duplicates present in required columns
      print("Is Duplicate data is present in first_name columns - {}".
      →format(any(df_visit.first_name.duplicated())))
      print("Is Duplicate data is present in last_name columns - {}".
       →format(any(df_visit.last_name.duplicated())))
      print("Is Duplicate data is present in email name columns - {}".
       →format(any(df visit.email.duplicated())))
     Is Duplicate data is present in first_name columns - True
     Is Duplicate data is present in last_name columns - True
     Is Duplicate data is present in email_name columns - False
[27]: # find out the null present in required columns
      print(f"is null is present in email -- {df_visit.email.isnull().values.any()}")
      print(f"is null is present in ipaddress -- {df_visit.ip_address.isnull().values.
       \rightarrowany()}")
      print(f"is null is present in visit -- {df_visit.visit.isnull().values.any()}")
     is null is present in email -- False
     is null is present in ipaddress -- False
     is null is present in visit -- True
[28]: save_old_shape = df_visit.shape
[29]: # use numpy.isfinite(), fix if an element is finite or not.
      df_visit = df_visit[np.isfinite(df_visit['visit'])]
[30]: size_after = df_visit.shape
      print(f"old size {save_old_shape} new size{size_after}")
     old size (1000, 7) new size(974, 7)
[31]: #plot boxplot to find outliers data
      plt.boxplot(df_visit.visit, notch=True)
[31]: {'whiskers': [<matplotlib.lines.Line2D at 0x18cb7320790>,
        <matplotlib.lines.Line2D at 0x18cb7320af0>],
       'caps': [<matplotlib.lines.Line2D at 0x18cb7320e50>,
       <matplotlib.lines.Line2D at 0x18cb73371f0>],
       'boxes': [<matplotlib.lines.Line2D at 0x18cb7320430>],
       'medians': [<matplotlib.lines.Line2D at 0x18cb7337550>],
       'fliers': [<matplotlib.lines.Line2D at 0x18cb73378b0>],
       'means': []}
```



herei found the lots of data points exist in between 700 to 2300, so removing outliers below 100 and above 2900



- 3. Insert data into a SQL Lite database create a table with the following data (Hint: Python for Data Analysis page 191):
 - a. Name, Address, City, State, Zip, Phone Number

```
[35]: # import sqllite library
      import sqlite3
[36]: # create ddl statement variable
      create_table_sql = """CREATE TABLE IF NOT EXISTS projects (
              Name VARCHAR[20],
              Address text NOT NULL,
              City VARCHAR[10],
              State VARCHAR[10],
              Phone_Number VARCHAR[10]
      );"""
[37]: # establish connection with default sqllite connector
      con = sqlite3.connect('mydata.sqlite')
[38]: # execute ddl statement
      con.execute(create_table_sql)
[38]: <sqlite3.Cursor at 0x18cb74915e0>
[39]: #Commit the transaction
      con.commit()
```

b. Add at least 10 rows of data and submit your code with a query generating your results.

```
[40]: # create data list contains sample data for projects table
     data = [('Prashant', 'test add1', 'moline', 'IL', '123456789'), ('Prashant1', |
      _{\hookrightarrow}'moline', 'IL', '123456789'), ('Prashant4', 'test add1', 'moline', 'IL', _{\sqcup}
      →'123456789'), ('Prashant5', 'test add1', 'moline', 'IL', '123456789'), □
      →('Prashant6', 'test add1', 'moline', 'IL', '123456789'), ('Prashant7', 'test_
      →add1', 'moline', 'IL', '123456789'), ('Prashant8', 'test add1', 'moline', 
      →'IL', '123456789'), ('Prashant9', 'test add1', 'moline', 'IL', '123456789'), □
       →('Prashant10', 'test add1', 'moline', 'IL', '123456789')]
[41]: # create sql select statemet variable
     sql statement = "INSERT INTO projects VALUES(?, ?, ?, ?, ?)"
[42]: # execute ddm statement
     con.executemany(sql_statement, data)
[42]: <sqlite3.Cursor at 0x18cb7491f80>
[43]: #Commit the transaction
     con.commit()
[44]: # pull out records from table
     cursor = con.execute('select * from projects')
     #fetch all rows by using cursor
     rows = cursor.fetchall()
      # display the fetched data
     rows
[44]: [('Prashant', 'test add1', 'moline', 'IL', '123456789'),
       ('Prashant1', 'test add2', 'moline', 'IL', '123456789'),
       ('Prashant3', 'test add1', 'moline', 'IL', '123456789'),
       ('Prashant4', 'test add1', 'moline', 'IL', '123456789'),
       ('Prashant5', 'test add1', 'moline', 'IL', '123456789'),
       ('Prashant6', 'test add1', 'moline', 'IL', '123456789'),
       ('Prashant7', 'test add1', 'moline', 'IL', '123456789'),
       ('Prashant8', 'test add1', 'moline', 'IL', '123456789'),
       ('Prashant9', 'test add1', 'moline', 'IL', '123456789'),
       ('Prashant10', 'test add1', 'moline', 'IL', '123456789'),
       ('Prashant', 'test add1', 'moline', 'IL', '123456789'),
       ('Prashant1', 'test add2', 'moline', 'IL', '123456789'),
       ('Prashant3', 'test add1', 'moline', 'IL', '123456789'),
       ('Prashant4', 'test add1', 'moline', 'IL', '123456789'),
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