WEB SCRAPPING NBA PLAYER STATISTICS

OVERVIEW

A project that gives you a better understanding of scraping data from websites and how to analyse them. Usage of various libraries as NumPy, Mat Plot, Pandas.
In the course of completing the project, you use the web scraping function, converting the extracted data into a pandas data Frame, and Storing the analyzed data.

Problem Statement

Web scrape basketball statistics from Wikipedia of some of the greatest basketball players and export it as a CSV file format.

Software Requirements

1. Programming Language : Python

2. Environment: Jupyter Notebooks / Google Colab

3. Database: CSV(export type)

4. Operation System: Windows XP or above

5. Libraries Used: Beautiful Soup, requests, Pandas, NumPy, boto3 ,Matplotlib, display

1. Open a New Notebook and import the required libraries

Here we import the libraries that are required :

- **bs4** : Beautiful Soup is a **Python** library for pulling data out of HTML and XML files.

- **requests** : to to make HTTP requests simpler and more human-friendly.

- **pandas** : Pandas is a software library written for the python programming language for data manipulation and analysis
- **boto3** : Boto is the Amazon Web Services (AWS) SDK for Python. It enables Python developers to create, configure, and manage AWS services, such as EC2 and S3. Boto provides an easy to use, object-oriented API, as well as low-level access to AWS services.
- **NumPy** : NumPy is a library for the Python programming language, adding support for large, multi-dimensional arrays and matrices, along with a large collection of high-level mathematical functions to operate on these arrays.

.- **Matplotlib :** Matplotlib is a plotting library for the Python programming language and its numerical mathematics extension NumPy.

```
import bs4
import requests
import pandas as pd
import numpy as np
!pip install boto3
import boto3
import matplotlib.pyplot as plt
from IPython.display import display
```

2.Reading the webpage

- We define a function named get_basketball_stats
- This function takes one argument i.e link. The variable link stores the url of the the website data we want to scrape.
- We then initialize a variable that stores link variable.We use the requests.get() method to access the url assigned to the link variable.
- Later we initialize the html parser (stored in variable named soup).

```
def get_basketball_stats(link='https://en.wikipedia.org/wiki/Michael_Jordan'):
    response = requests.get(link)
    soup = bs4.BeautifulSoup(response.text, 'html.parser')
```

3.Main Function Process

- Initialize a variable and assign to it the class name of the main class that contains the data we need to scrape. We use the soup.find() to find the respected class name and access it.
- we create another variable that stores all the headers of the row elements.

- we use the find_all() method that takes the class name as an attribute and finds all the classes with the respective name. We give the header element’s class name as an attribute to the method and store in a variable.
- Next, we create two for loops to loop through the rows and columns of the table.
- When iterating through the rows we iterate from index 1 upto rest of the rows. We do this to exclude the header elements row of the table.
- When iterating through columns we iterate from index 2 upto rest of the columns. We do this to exclude the first two rows.(doesn’t contain required information)
- When iterating through the contents we check whether the data is a digit or ‘.’
- If yes we append this data to the data dictionary.
- we create a variable that stores the minimum value of the data dictionary.
- we create another for loop that converts the integer values to float values (we use the lambda function)upto the minimum value.

```
      table = soup.find(class_='wikitable sortable')
headers = table.tr
      titles = headers.find_all('abbr')
      data = {title['title']: [] for title in titles}
      for row in table.find_all('tr')[1:]:

      for key, a in zip(data.keys(),row.find_all('td')[2:]):
      data[key].append(''.join(c for c in a.text if (c.isdigit(
      ) or c == '.')))
Min = min([len(x) for x in data.values()])
for key in data.keys():
data[key] = list(map(lambda x: float(x), data[key][:Min]))
return data
```

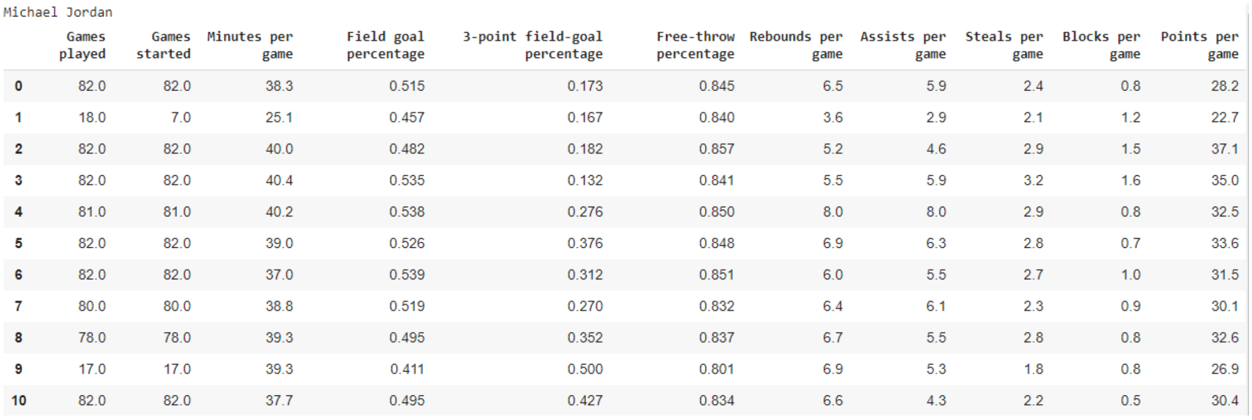
4. Declaring links and names of the personals to scrape the data

- We create two lists. One that stores the links of the respective players and the other stores the names of the players.
- We then call the get_basketball_stats function which takes the elements of the link list.
- We store this in respective variables of every player.
- We now convert this data into data frames.
- Finally we print the output.

```
links=['https://en.wikipedia.org/wiki/Michael_Jordan'\
,'https://en.wikipedia.org/wiki/Kobe_Bryant'\
,'https://en.wikipedia.org/wiki/LeBron_James'\

,'https://en.wikipedia.org/wiki/Stephen_Curry']
```

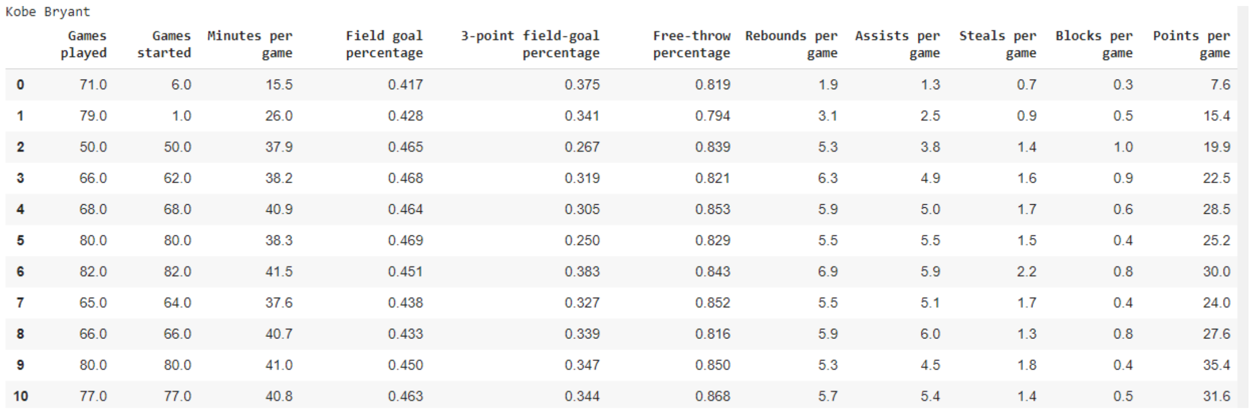
```
names=['Michael Jordan','Kobe Bryant','Lebron James','Stephen C
urry']

michael_jordan_dict = get_basketball_stats(links[0])
kobe_bryant_dict = get_basketball_stats(links[1])
lebron_james_dict = get_basketball_stats(links[2])
stephen_curry_dict = get_basketball_stats(links[3])


mj_table = pd.DataFrame(michael_jordan_dict)
kb_table = pd.DataFrame(kobe_bryant_dict)
lj_table = pd.DataFrame(lebron_james_dict)
sc_table = pd.DataFrame(stephen_curry_dict)


list_table =[mj_table, kb_table, lj_table, sc_table]

i = 0
for name in names:
    print(name)
    display(list_table[i])
    i += 1
```

OUTPUT:



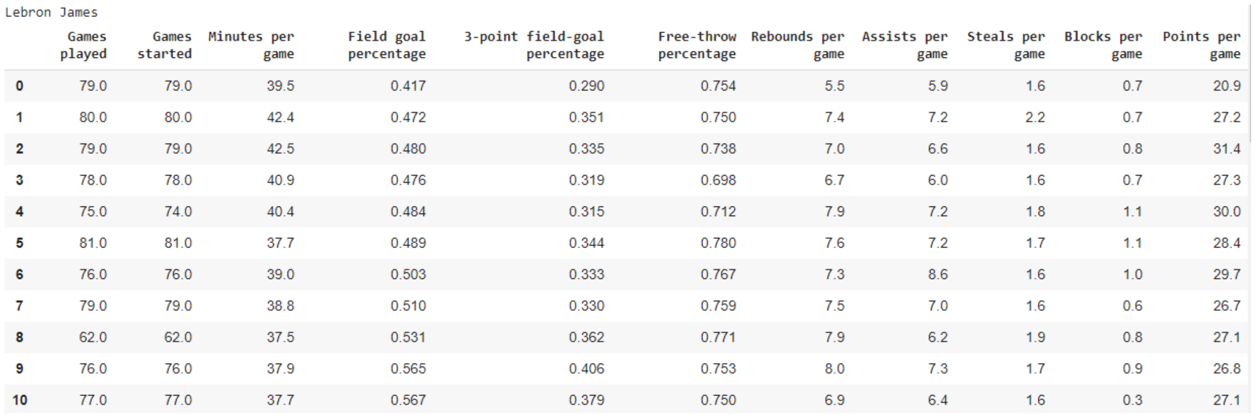
Michael Jordan

	Games played	Games started	Minutes per game	Field goal percentage	3-point field-goal percentage	Free-throw percentage	Rebounds per game	Assists per game	Steals per game	Blocks per game	Points per game
0	82.0	82.0	38.3	0.515	0.173	0.845	6.5	5.9	2.4	0.8	28.2
1	18.0	7.0	25.1	0.457	0.167	0.840	3.6	2.9	2.1	1.2	22.7
2	82.0	82.0	40.0	0.482	0.182	0.857	5.2	4.6	2.9	1.5	37.1
3	82.0	82.0	40.4	0.535	0.132	0.841	5.5	5.9	3.2	1.6	35.0
4	81.0	81.0	40.2	0.538	0.276	0.850	8.0	8.0	2.9	0.8	32.5
5	82.0	82.0	39.0	0.526	0.376	0.848	6.9	6.3	2.8	0.7	33.6
6	82.0	82.0	37.0	0.539	0.312	0.851	6.0	5.5	2.7	1.0	31.5
7	80.0	80.0	38.8	0.519	0.270	0.832	6.4	6.1	2.3	0.9	30.1
8	78.0	78.0	39.3	0.495	0.352	0.837	6.7	5.5	2.8	0.8	32.6
9	17.0	17.0	39.3	0.411	0.500	0.801	6.9	5.3	1.8	0.8	26.9
10	82.0	82.0	37.7	0.495	0.427	0.834	6.6	4.3	2.2	0.5	30.4



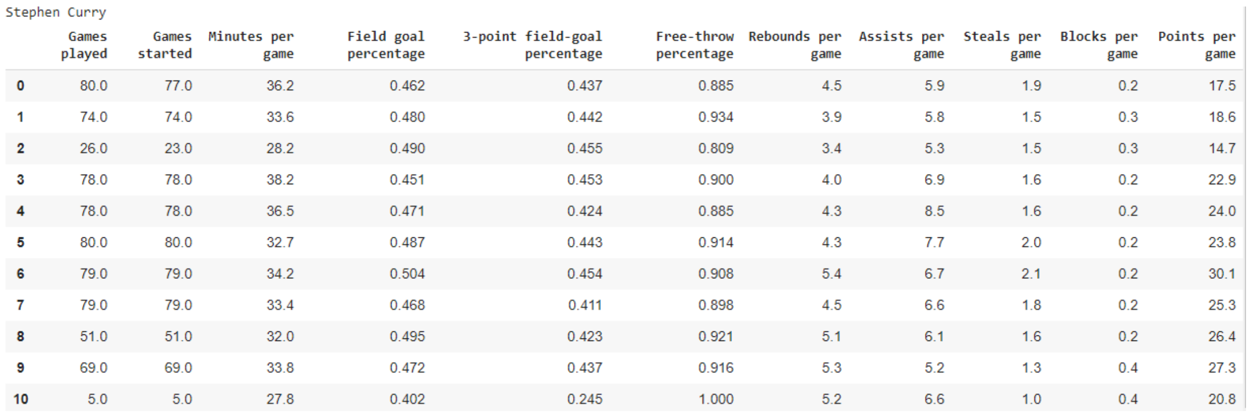
Kobe Bryant

	Games played	Games started	Minutes per game	Field goal percentage	3-point field-goal percentage	Free-throw percentage	Rebounds per game	Assists per game	Steals per game	Blocks per game	Points per game
0	71.0	6.0	15.5	0.417	0.375	0.819	1.9	1.3	0.7	0.3	7.6
1	79.0	1.0	26.0	0.428	0.341	0.794	3.1	2.5	0.9	0.5	15.4
2	50.0	50.0	37.9	0.465	0.267	0.839	5.3	3.8	1.4	1.0	19.9
3	66.0	62.0	38.2	0.468	0.319	0.821	6.3	4.9	1.6	0.9	22.5
4	68.0	68.0	40.9	0.464	0.305	0.853	5.9	5.0	1.7	0.6	28.5
5	80.0	80.0	38.3	0.469	0.250	0.829	5.5	5.5	1.5	0.4	25.2
6	82.0	82.0	41.5	0.451	0.383	0.843	6.9	5.9	2.2	0.8	30.0
7	65.0	64.0	37.6	0.438	0.327	0.852	5.5	5.1	1.7	0.4	24.0
8	66.0	66.0	40.7	0.433	0.339	0.816	5.9	6.0	1.3	0.8	27.6
9	80.0	80.0	41.0	0.450	0.347	0.850	5.3	4.5	1.8	0.4	35.4
10	77.0	77.0	40.8	0.463	0.344	0.868	5.7	5.4	1.4	0.5	31.6



Lebron James

	Games played	Games started	Minutes per game	Field goal percentage	3-point field-goal percentage	Free-throw percentage	Rebounds per game	Assists per game	Steals per game	Blocks per game	Points per game
0	79.0	79.0	39.5	0.417	0.290	0.754	5.5	5.9	1.6	0.7	20.9
1	80.0	80.0	42.4	0.472	0.351	0.750	7.4	7.2	2.2	0.7	27.2
2	79.0	79.0	42.5	0.480	0.335	0.738	7.0	6.6	1.6	0.8	31.4
3	78.0	78.0	40.9	0.476	0.319	0.698	6.7	6.0	1.6	0.7	27.3
4	75.0	74.0	40.4	0.484	0.315	0.712	7.9	7.2	1.8	1.1	30.0
5	81.0	81.0	37.7	0.489	0.344	0.780	7.6	7.2	1.7	1.1	28.4
6	76.0	76.0	39.0	0.503	0.333	0.767	7.3	8.6	1.6	1.0	29.7
7	79.0	79.0	38.8	0.510	0.330	0.759	7.5	7.0	1.6	0.6	26.7
8	62.0	62.0	37.5	0.531	0.362	0.771	7.9	6.2	1.9	0.8	27.1
9	76.0	76.0	37.9	0.565	0.406	0.753	8.0	7.3	1.7	0.9	26.8
10	77.0	77.0	37.7	0.567	0.379	0.750	6.9	6.4	1.6	0.3	27.1



Stephen Curry

	Games played	Games started	Minutes per game	Field goal percentage	3-point field-goal percentage	Free-throw percentage	Rebounds per game	Assists per game	Steals per game	Blocks per game	Points per game
0	80.0	77.0	36.2	0.462	0.437	0.885	4.5	5.9	1.9	0.2	17.5
1	74.0	74.0	33.6	0.480	0.442	0.934	3.9	5.8	1.5	0.3	18.6
2	26.0	23.0	28.2	0.490	0.455	0.809	3.4	5.3	1.5	0.3	14.7
3	78.0	78.0	38.2	0.451	0.453	0.900	4.0	6.9	1.6	0.2	22.9
4	78.0	78.0	36.5	0.471	0.424	0.885	4.3	8.5	1.6	0.2	24.0
5	80.0	80.0	32.7	0.487	0.443	0.914	4.3	7.7	2.0	0.2	23.8
6	79.0	79.0	34.2	0.504	0.454	0.908	5.4	6.7	2.1	0.2	30.1
7	79.0	79.0	33.4	0.468	0.411	0.898	4.5	6.6	1.8	0.2	25.3
8	51.0	51.0	32.0	0.495	0.423	0.921	5.1	6.1	1.6	0.2	26.4
9	69.0	69.0	33.8	0.472	0.437	0.916	5.3	5.2	1.3	0.4	27.3
10	5.0	5.0	27.8	0.402	0.245	1.000	5.2	6.6	1.0	0.4	20.8

5.Making a plot using matplotlib

- Here we plot a graph for the data obtained.

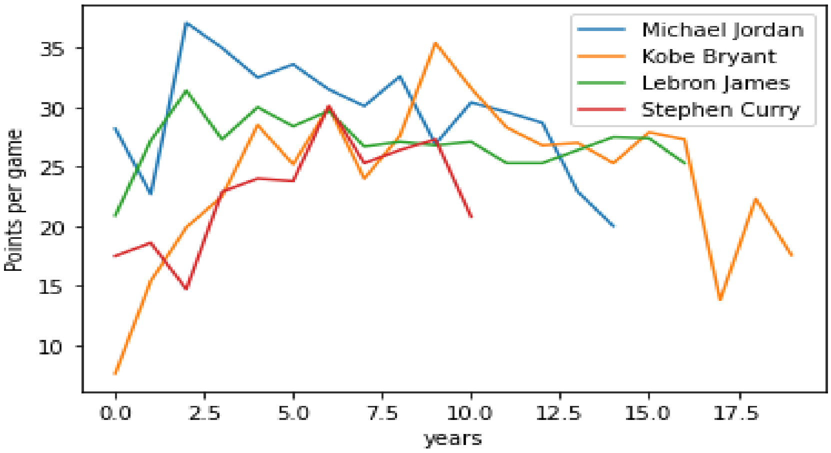
- We create a for loop that loops through the list that contains the names of the players.

- We use the plot function to plot the graph. It access the data from list_tables list and the player name gets assigned to the player name.

- plt.xlabel() and plt.ylabel() functions are used to give the names for x and y axes.

- Further the list_table value gets incremented for the next iteration.

OUTPUT:

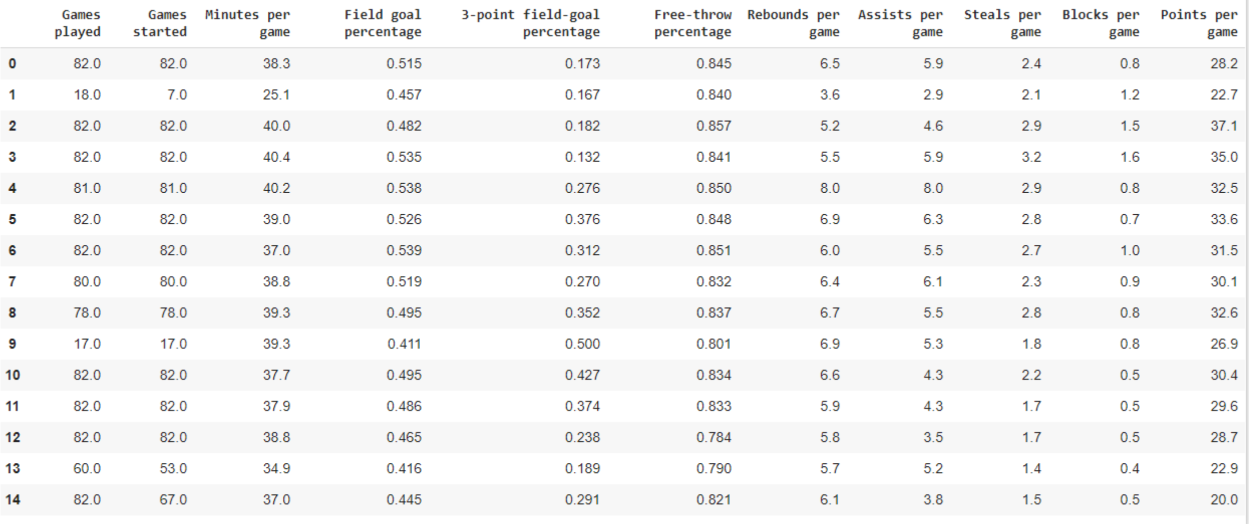


6.Storing the player statistics in Object Storage

- This is the last and final step.

- Here we convert the data frames into a csv file.

```
csv_name = 'MJ1.csv'
mj_table.to_csv(csv_name)
mj_table
```



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10	82.0	82.0	37.7	0.495	0.427	0.834	6.6	4.3	2.2	0.5	30.4
11	82.0	82.0	37.9	0.486	0.374	0.833	5.9	4.3	1.7	0.5	29.6
12	82.0	82.0	38.8	0.465	0.238	0.784	5.8	3.5	1.7	0.5	28.7
13	60.0	53.0	34.9	0.416	0.189	0.790	5.7	5.2	1.4	0.4	22.9
14	82.0	67.0	37.0	0.445	0.291	0.821	6.1	3.8	1.5	0.5	20.0

Conclusion

Therefore, we have successfully scraped the Data of basketball statistics from Wikipedia of a few famous personalities.