02:27

Web Scraping Tables using Pandas

Estimated Effort: 5 mins

The Pandas library in Python contains a function `read_html()` that can be used to extract tabular information from any web page.

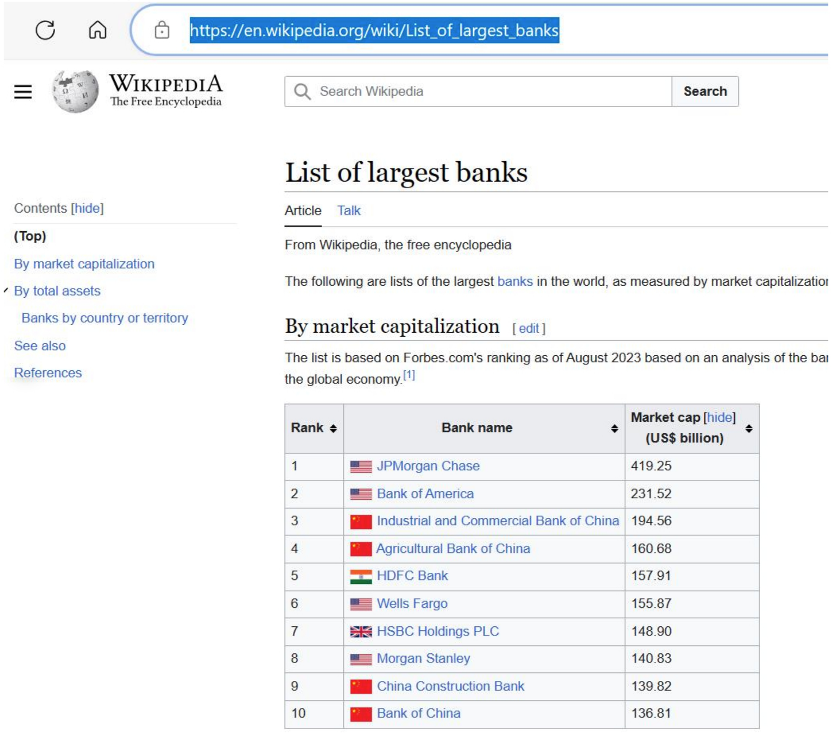
Consider the following example:

Let us assume we want to extract the list of the largest banks in the world by market capitalization, from the following link:

```
URL = 'https://en.wikipedia.org/wiki/List_of_largest_banks'
```

We may use `pandas.read_html()` function in python to extract all the tables in the web page directly.

A snapshot of the webpage is shown below.



https://en.wikipedia.org/wiki/List_of_largest_banks

List of largest banks

From Wikipedia, the free encyclopedia

The following are lists of the largest banks in the world, as measured by market capitalizatior

By market capitalization [edit]

The list is based on Forbes.com's ranking as of August 2023 based on an analysis of the bai the global economy.[1]

Rank	Bank name	Market cap [hide] (US$ billion)
1	JPMorgan Chase	419.25
2	Bank of America	231.52
3	Industrial and Commercial Bank of China	194.56
4	Agricultural Bank of China	160.68
5	HDFC Bank	157.91
6	Wells Fargo	155.87
7	HSBC Holdings PLC	148.90
8	Morgan Stanley	140.83
9	China Construction Bank	139.82
10	Bank of China	136.81

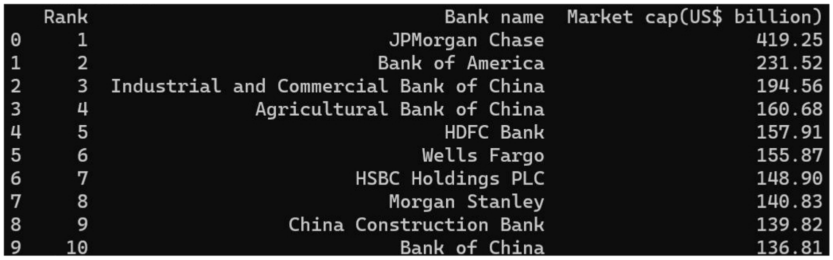
We can see that the required table is the first one in the web page.

> *Note: This is a live web page and it may get updated over time. The image shown above has been captured in November 2023. The process of data extraction remains the same.*

We may execute the following lines of code to extract the required table from the web page.

```
import pandas as pd
URL = 'https://en.wikipedia.org/wiki/List_of_largest_banks'
tables = pd.read_html(URL)
df = tables[0]
print(df)
```

This will extract the required table as a dataframe `df`. The output of the print statement would look as shown below.



```
   Rank                                Bank name  Market cap(US$ billion)
0     1                           JPMorgan Chase                   419.25
1     2                          Bank of America                   231.52
2     3  Industrial and Commercial Bank of China                   194.56
3     4               Agricultural Bank of China                   160.68
4     5                                HDFC Bank                   157.91
5     6                              Wells Fargo                   155.87
6     7                        HSBC Holdings PLC                   148.90
7     8                           Morgan Stanley                   140.83
8     9                  China Construction Bank                   139.82
9    10                            Bank of China                   136.81
```

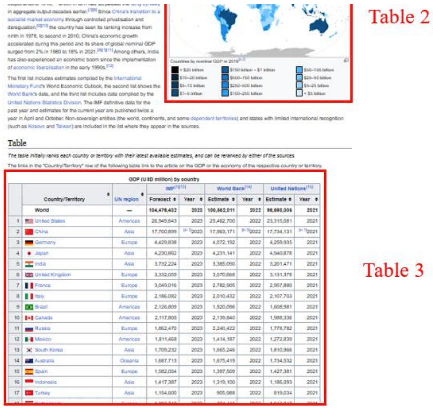
Although convenient, this method comes with its own set of limitations.
Firstly, web pages may have content saved in them as tables but they may not appear as tables on the web page.

For instance, consider the following URL showing the list of countries by GDP (nominal).

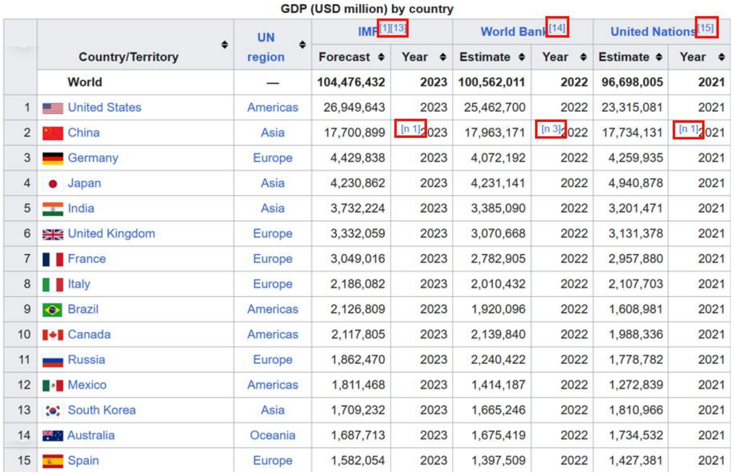
```
URL = 'https://en.wikipedia.org/wiki/List_of_countries_by_GDP_(nominal)'
```

The images on the web page are also saved in tabular format. A snapshot of the web page is shared below.

List of countries by GDP (nominal)
Table 1



Secondly, the contents of the tables in the web pages may contain elements such as hyperlink text and other denoters, which are also scraped directly using the pandas method. This may lead to a requirement of further cleaning of data.
A closer look at table 3 in the image shown above indicates that there are many hyperlink texts which are also going to be treated as information by the pandas function.



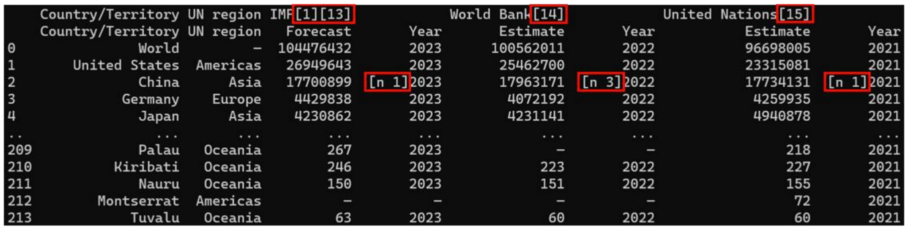
GDP (USD million) by country

	Country/Territory	UN region	IMF[1][13]		World Bank[14]		United Nations[15]	
			Forecast	Year	Estimate	Year	Estimate	Year
	World	—	104,476,432	2023	100,562,011	2022	96,698,005	2021
1	United States	Americas	26,949,643	2023	25,462,700	2022	23,315,081	2021
2	China	Asia	17,700,899	[n 1]2023	17,963,171	[n 3]2022	17,734,131	[n 1]2021
3	Germany	Europe	4,429,838	2023	4,072,192	2022	4,259,935	2021
4	Japan	Asia	4,230,862	2023	4,231,141	2022	4,940,878	2021
5	India	Asia	3,732,224	2023	3,385,090	2022	3,201,471	2021
6	United Kingdom	Europe	3,332,059	2023	3,070,668	2022	3,131,378	2021
7	France	Europe	3,049,016	2023	2,782,905	2022	2,957,880	2021
8	Italy	Europe	2,186,082	2023	2,010,432	2022	2,107,703	2021
9	Brazil	Americas	2,126,809	2023	1,920,096	2022	1,608,981	2021
10	Canada	Americas	2,117,805	2023	2,139,840	2022	1,988,336	2021
11	Russia	Europe	1,862,470	2023	2,240,422	2022	1,778,782	2021
12	Mexico	Americas	1,811,468	2023	1,414,187	2022	1,272,839	2021
13	South Korea	Asia	1,709,232	2023	1,665,246	2022	1,810,966	2021
14	Australia	Oceania	1,687,713	2023	1,675,419	2022	1,734,532	2021
15	Spain	Europe	1,582,054	2023	1,397,509	2022	1,427,381	2021

We can extract the table using the code shown below.

```
import pandas as pd
URL = 'https://en.wikipedia.org/wiki/List_of_countries_by_GDP_(nominal)'
tables = pd.read_html(URL)
df = tables(2) # the required table will have index 2
print(df)
```

The output of the print statement is shown below.



```
    Country/Territory UN region IMF[1][13]            World Bank[14]            United Nations[15]
    Country/Territory UN region   Forecast       Year       Estimate       Year       Estimate       Year
0               World         —  104476432       2023      100562011       2022       96698005       2021
1       United States  Americas   26949643       2023       25462700       2022       23315081       2021
2               China      Asia   17700899  [n 1]2023       17963171  [n 3]2022       17734131  [n 1]2021
3             Germany    Europe    4429838       2023        4072192       2022        4259935       2021
4               Japan      Asia    4230862       2023        4231141       2022        4940878       2021
..                ...       ...        ...        ...            ...        ...            ...        ...
209             Palau   Oceania        267       2023              —          —            218       2021
210          Kiribati   Oceania        246       2023            223       2022            227       2021
211             Nauru   Oceania        150       2023            151       2022            155       2021
212        Montserrat  Americas          —          —              —          —             72       2021
213            Tuvalu   Oceania         63       2023             60       2022             60       2021
```

Note that the hyperlink texts have also been retained in the code output.

It is further prudent to point out, that this method exclusively operates only on tabular data extraction. BeautifulSoup library still remains the default method of extracting any kind of information from web pages.

Author(s)

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