Web Scraping with Python

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Description of the project

That is a Script for Webscraping. The main goal of this script is to demonstrate the variety of possibilities of how to collect data with python.

Explanation of the content:

- **1) Web Scraping with Beautiful Soup:**

  The code grabs all "li" elements from the HTML, navigates to all "a" tags, extracts the text from that element, transforms it into a pandas dataframe and saves it into a "h_terms.csv" file.

- **2) Web Scraping with lxml:**

  Parse data (S&P 500) from yahoo finance and save it as a dataframe. Second example is similar, but with an XML file. It is navigated to a tag and all child elements of that tag are printed out.

- **3) Interaction with HTML and Web APIs:**

  in the last example, the code grabs data from a JSON file through an API and puts out the content.

1) Web Scraping with Beautiful Soup

Data source: https://www.computer-dictionary-online.org (https://www.computer-dictionary-online.org)

In [57]:

```
# Import requests for getting the URL and Beautifulsoup for webscraping.
import requests
from bs4 import BeautifulSoup

# Get the URL here.
r = requests.get("https://www.computer-dictionary-online.org/glossary/h.html")
# Get the content.
c = r.content

# Get the HTML element.
soup = BeautifulSoup(c,"html.parser")
```

In [58]:

```
# Find all list-elements in HTML.
all = soup.find_all("li")
```

In [59]:

```
# Create a list and iterate through all a-elements.
# Then get the text of that element and list it out
list = []
for item in all:
    list.append(str(item.find_all("a")[0].text))
```

In [60]:

```
# Import pandas and create namespace pd.
import pandas as pd
```

In [61]:

```
# Create a Pandas dataframe object.
df = pd.DataFrame(list)
```

In [62]:

```
# Creates a *.csv file in saves it within the scrapped data.
df.to_csv('h_terms.csv', index=False)
```

2) ... with lxml

2.1) Parsing HTML

In this example it is tried to get information about the previous close, open and the olume of the S&P 500. The data source is https://finance.yahoo.com/quote/%5EGSPC?p=^GSPC (https://finance.yahoo.com/quote/%5EGSPC?p=%5EGSPC). Parsing HTML should be demonstrated by that example.

2.2) Parsing XML

Exmple number two shows how to parse XML data from

2.1) Parsing HTML

Data source: https://finance.yahoo.com/quote/%5EGSPC?p=^GSPC (https://finance.yahoo.com/quote/%5EGSPC?p=%5EGSPC)

In [63]:

```
# Import the packages.
from lxml.html import parse
from urllib.request import urlopen
```

In [64]:

```
# Parse the data.
parsed = parse(urlopen('https://finance.yahoo.com/quote/%5EGSPC?p=^GSPC'))
parsed
```

Out[64]:

```
<lxml.etree._ElementTree at 0x22308bc1d48>
```

In [65]:

```
# Return the HTML element object.
doc = parsed.getroot()
doc
```

Out[65]:

```
<Element html at 0x22307274ef8>
```

In [66]:

```
# Get the objects that display "a" elements.
links = doc.findall('.//a')
links[15:30]
```

Out[66]:

```
[<Element a at 0x2230727a318>,
 <Element a at 0x2230727a228>,
 <Element a at 0x2230727a4f8>,
 <Element a at 0x2230727a188>,
 <Element a at 0x2230727a138>,
 <Element a at 0x22308ad5638>,
 <Element a at 0x22308ad5548>,
 <Element a at 0x22308ad55e8>,
 <Element a at 0x22308ad54a8>,
 <Element a at 0x22308ad5598>,
 <Element a at 0x22309c59728>,
 <Element a at 0x22309c59598>,
 <Element a at 0x22309c592c8>,
 <Element a at 0x22309c594a8>,
 <Element a at 0x22309c59778>]
```

In [67]:

```
# Get a link out of the list.
lnk = links[18]
```

In [68]:

```
# Give the URL back of the link.
lnk.get('href')
```

Out[68]:

```
'/news/us-stock-market-overview-stocks-230045758.html'
```

In [69]:

```
# Finally get the content back.
lnk.text_content()
```

Out[69]:

```
'US Stock Market Overview - Stocks Slide on Profit Taking Despite Strong Job
s Data'
```

In [70]:

```
# Now a list will be created, that show all URLs conected to that site.
urls = [lnk.get('href') for lnk in doc.findall('.//a')]
urls[-10:]
```

Out[70]:

```
['/watchlists',
 '/portfolios',
 '/screener',
 '/premium?ncid=navbarprem_fqbo1nu0ks0',
 '/calendar',
 '/industries',
 'https://money.yahoo.com',
 '/videos/',
 '/news/',
 '/tech']
```

In [71]:

```
# Now find the calls and puts data of the site.
tables = doc.findall('.//table')
calls = tables[0]
puts = tables[-40:]
```

In [72]:

```
# Find all header lines of the elements.
rows = calls.findall('.//tr')
rows
```

Out[72]:

```
[<Element tr at 0x22309c5dc28>,
 <Element tr at 0x22309c5dcc8>,
 <Element tr at 0x22309c5da98>]
```

In [73]:

```
# Extract the data out of the headers.
def _unpack(row, kind='td'):
    elems = row.findall('.//%s' % kind)
    return [val.text_content() for val in elems]
```

In [74]:

```
_unpack(rows[2], kind='td')
```

Out[74]:

```
['Volume', '1,851,359,693']
```

In [75]:

```
# Combine steps to get a dataframe. To do that first of all import libraries.
from pandas.io.parsers import TextParser
```

In [76]:

```
# Define a function for convertion of types automatically.
def parse_options_data(table):
    rows = table.findall('.//tr')
    header = _unpack(rows[0], kind='th')
    data = [_unpack(r) for r in rows[0:]]
    return TextParser(data, names=header).get_chunk()
```

In [77]:

```
# Call the function to get the Output.
call_data = parse_options_data(calls)
call_data
```

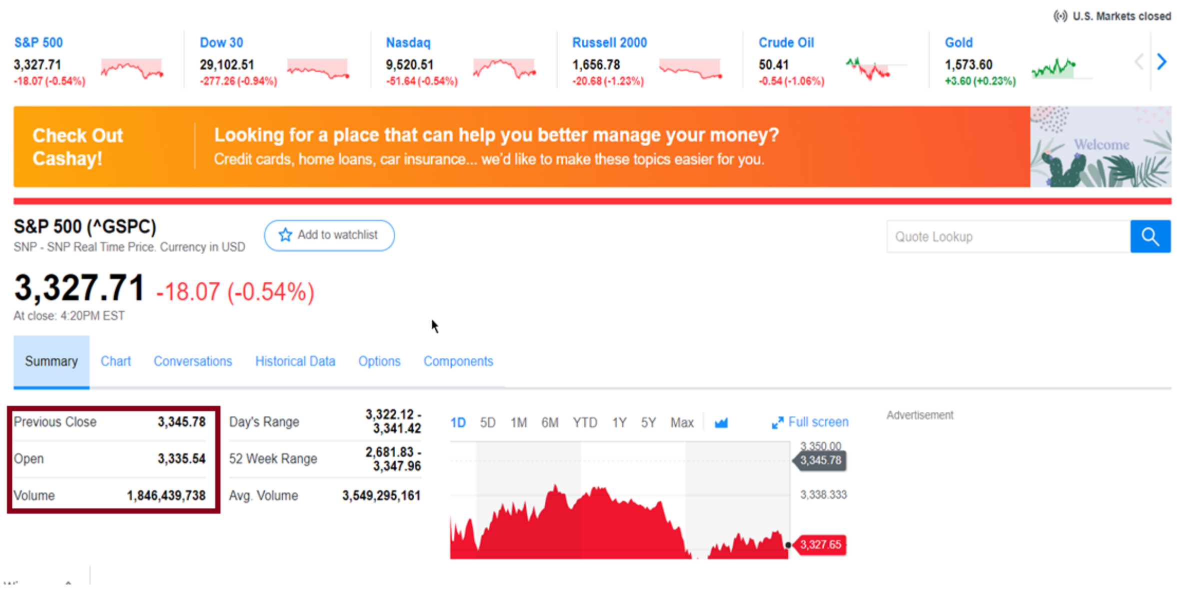
Out[77]:

	0	1
0	Previous Close	3,345.78
1	Open	3,335.54
2	Volume	1,851,359,693

In [78]:

```
# Online site shown to prove that the file worked.
from IPython.display import Image
Image("online_site.png")
```

Out[78]:



(•) U.S. Markets closed

S&P 500	Dow 30	Nasdaq	Russell 2000	Crude Oil	Gold
3,327.71	29,102.51	9,520.51	1,656.78	50.41	1,573.60
-18.07 (-0.54%)	-277.26 (-0.94%)	-51.64 (-0.54%)	-20.68 (-1.23%)	-0.54 (-1.06%)	+3.60 (+0.23%)

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S&P 500 (^GSPC)
SNP - SNP Real Time Price. Currency in USD

3,327.71 -18.07 (-0.54%)
At close: 4:20PM EST

Previous Close	3,345.78	Day's Range	3,322.12 - 3,341.42
Open	3,335.54	52 Week Range	2,681.83 - 3,347.96
Volume	1,846,439,738	Avg. Volume	3,549,295,161

2.2) Parsing XML

In [79]:

```
# Import objectify.
from lxml import objectify
```

In [80]:

```
# Set the path, ...
path = 'letterVanGogh.xml'
# ... parse the object ...
parsed = objectify.parse(open(path))
# ... and get reference to the root element.
root = parsed.getroot()
```

In [81]:

```
# Put out the whole content of the first "listPerson" tag in the document,
# and rint out all child elements of that tag.
for elem in root.teiHeader.fileDesc.sourceDesc.listPerson.person:
    for child in elem.getchildren():
        data = []
        data.append(child.text)
        print(data)
```

```
['Vincent van Gogh']
['Theo van Gogh']
['Harry Gladwell']
['18']
['described as a "young Englishman" in the letter, obviously V. Van\n
Gogh\'s roommate']
['Mr Tersteeg']
```

3) Interaction with HTML and Web APIs

Data source: https://samples.openweathermap.org/data/2.5/weather?q=London,uk&appid=b6907d289e10d714a6e88b30761fae22 (https://samples.openweathermap.org/data/2.5/weather?q=London,uk&appid=b6907d289e10d714a6e88b30761fae22)

In [82]:

```
import requests
```

In [83]:

```
# Assigning the API to the "url" variable.
url = 'https://samples.openweathermap.org/data/2.5/weather?q=London,uk&appid=b6907d289e10d7
```

In [89]:

```
# Get the webpage
resp = requests.get(url)
# Response 200 is the expected output. It is the request for a successful HTTP request.
resp
```

Out[89]:

```
<Response [200]>
```

In [90]:

```
# Get parsed object back.
data = resp.json()
print(data)
```

```
{'coord': {'lon': -0.13, 'lat': 51.51}, 'weather': [{'id': 300, 'main': 'Dri
zzle', 'description': 'light intensity drizzle', 'icon': '09d'}], 'base': 's
tations', 'main': {'temp': 280.32, 'pressure': 1012, 'humidity': 81, 'temp_m
in': 279.15, 'temp_max': 281.15}, 'visibility': 10000, 'wind': {'speed': 4.
1, 'deg': 80}, 'clouds': {'all': 90}, 'dt': 1485789600, 'sys': {'type': 1,
'id': 5091, 'message': 0.0103, 'country': 'GB', 'sunrise': 1485762037, 'suns
et': 1485794875}, 'id': 2643743, 'name': 'London', 'cod': 200}
```