12.7: PARSING HTML USING BEAUTIFULSOUP

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There are a number of Python libraries which can help you parse HTML and extract data from the pages. Each of the libraries has its strengths and weaknesses and you can pick one based on your needs.

As an example, we will simply parse some HTML input and extract links using the *BeautifulSoup* library. You can download and install the BeautifulSoup code from:

http://www.crummy.com/software/

You can download and "install" BeautifulSoup or you can simply place the `BeautifulSoup.py` file in the same folder as your application.

Even though HTML looks like XML[1]i and some pages are carefully constructed to be XML, most HTML is generally broken in ways that cause an XML parser to reject the entire page of HTML as improperly formed. BeautifulSoup tolerates highly flawed HTML and still lets you easily extract the data you need.

We will use `urllib` to read the page and then use `BeautifulSoup` to extract the `href` attributes from the anchor (`a`) tags.

```
# To run this, you can install BeautifulSoup
# https://pypi.python.org/pypi/beautifulsoup4

# Or download the file
# http://www.py4e.com/code3/bs4.zip
# and unzip it in the same directory as this file

import urllib.request, urllib.parse, urllib.error
from bs4 import BeautifulSoup
import ssl

# Ignore SSL certificate errors
ctx = ssl.create_default_context()
ctx.check_hostname = False
ctx.verify_mode = ssl.CERT_NONE

url = input('Enter - ')
html = urllib.request.urlopen(url, context=ctx).read()
soup = BeautifulSoup(html, 'html.parser')

# Retrieve all of the anchor tags
tags = soup('a')
for tag in tags:
    print(tag.get('href', None))

# Code: http://www.py4e.com/code3/urllinks.py
```

The program prompts for a web address, then opens the web page, reads the data and passes the data to the BeautifulSoup parser, and then retrieves all of the anchor tags and prints out the `href` attribute for each tag.

When the program runs it looks as follows:

```
python urllinks.py
Enter - http://www.dr-chuck.com/page1.htm
http://www.dr-chuck.com/page2.htm
```

```
python urllinks.py
Enter - http://www.py4e.com/book.htm
http://www.greenteapress.com/thinkpython/thinkpython.html
http://allendowney.com/
http://www.si502.com/
http://www.lib.umich.edu/espresso-book-machine
http://www.py4e.com/code
http://www.py4e.com/
```

You can use BeautifulSoup to pull out various parts of each tag as follows:

CODE 12.7.1 (PYTHON):

```
# To run this, you can install BeautifulSoup
# https://pypi.python.org/pypi/beautifulsoup4

# Or download the file
# http://www.py4e.com/code3/bs4.zip
# and unzip it in the same directory as this file


from urllib.request import urlopen
from bs4 import BeautifulSoup
import ssl

# Ignore SSL certificate errors
ctx = ssl.create_default_context()
ctx.check_hostname = False
ctx.verify_mode = ssl.CERT_NONE

url = input('Enter - ')
html = urlopen(url, context=ctx).read()

# html.parser is the HTML parser included in the standard Python 3 library.
# information on other HTML parsers is here:
# http://www.crummy.com/software/BeautifulSoup/bs4/doc/#installing-a-parser
soup = BeautifulSoup(html, 'html.parser')

# Retrieve all of the anchor tags
tags = soup('a')
for tag in tags:
    # Look at the parts of a tag
    print('TAG:', tag)
    print('URL:', tag.get('href', None))
    print('Contents:', tag.contents[0])
    print('Attrs:', tag.attrs)

# Code: http://www.py4e.com/code3/urllink2.py
```

run restart

```
python urllink2.py
Enter - http://www.dr-chuck.com/page1.htm
TAG: <a href="http://www.dr-chuck.com/page2.htm">
Second Page</a>
URL: http://www.dr-chuck.com/page2.htm
Content: ['\nSecond Page']
Attrs: [('href', 'http://www.dr-chuck.com/page2.htm')]
```

These examples only begin to show the power of BeautifulSoup when it comes to parsing HTML.