

CSC 332 Programming Assignment #2

Due Wednesday, February 28 at 5pm

- You are welcome (and encouraged) to work in pairs
- Mind the academic integrity policy described in the syllabus
- Late assignments are not accepted (but you can earn partial credit for an incomplete assignment)

For this assignment, you'll be gaining a deeper understanding and appreciation of DNS by writing your own DNS resolver.

Instructions:

You'll need the `dnspython` library we installed in lab. Here is a link to the documentation: [dnspython](#)

Note that you *may not* use the `Resolver` class we used in lab. (That would be boring!) Instead, import these:

```
import dns.message
```

```
import dns.query
```

And use `dns.query.udp()` (or `tcp()`, up to you) to query each nameserver, starting at the root.

Here is a list of all root nameservers to use as a starting point:

```
root_servers = ['198.41.0.4', '170.247.170.2', '192.33.4.12',  
'199.7.91.13', '192.203.230.10', '192.5.5.241', '192.112.36.4',  
'198.97.190.53', '192.36.148.17', '192.58.128.30',  
'193.0.14.129', '199.7.83.42', '202.12.27.33']
```

Write a Python program that, given a hostname, outputs an IP address associated with that hostname. (It is possible for a hostname to be associated with more than one IP. Just choose one.)

In addition to the final IP of the webserver, your program should output the IP addresses of all the nameservers it contacts in the process of finding the IP.

Sample output for `stereogum.com`:

```
Asking root server 192.33.4.12 about stereogum.com
```

Asking 192.55.83.30 about stereogum.com

Asking 205.251.193.113 about stereogum.com

Got it! 3.161.136.89

Sample output for static.stereogum.com:

Asking root server 198.41.0.4 about static.stereogum.com

Asking 192.12.94.30 about static.stereogum.com

Asking 205.251.193.113 about static.stereogum.com

Asking root server 199.7.83.42 about
d187k17946sx3n.cloudfront.net.

Asking 192.5.6.30 about d187k17946sx3n.cloudfront.net.

Asking 205.251.194.154 about d187k17946sx3n.cloudfront.net.

Asking root server 202.12.27.33 about ns-1049.awsdns-03.org.

Asking 199.19.57.1 about ns-1049.awsdns-03.org.

Asking 205.251.192.131 about ns-1049.awsdns-03.org.

Asking 205.251.196.25 about d187k17946sx3n.cloudfront.net.

Got it! 54.230.31.50

You may run into CNAMEs (like in the second example above). Look at each section of the DNS response closely (including Authority, Answer, and Additional) to determine what to do in each possible case. Test a wide range of domains to ensure that your solution works. Include a list of these domains in a comment at the top of your code.