**Exercise**

Here are some exercises. You should submit answers *only* to the questions asked. In particular, please do not include pages of output from dig unless specifically requested. As usual, you can print and submit in the class or through emails. It is better to show the screenshots in your response.

* **(1)** Using dig, find the IP address for imc.kean.edu. What command you used? What is the IP address?
* **(2)dig +domain=kean.edu eve**   
  What is the resulting IP addresses?
* **(3)** Look at the man page for dig to see what the +domain= parameter does.
* **(4)** Using dig, find the email server host names for kean.edu. What command you used?

*Understanding hierarchy*

For this problem, you will go through the steps of resolving a particular hostname, mimicing a standard recursive query. Assuming it knows nothing else about a name, a DNS resolver will ask a well-known *root server*. The root servers on the Internet are in the domain root-servers.net. One way to get a list of them is with the command:

[xyz@eve ~]$ **dig . ns**

* **(5)** Use dig to ask *one* of the root servers the address of imc.kean.edu, *without* recursion. What command do you use to do this?
* **(6)** It is unlikely that these servers actually know the answer so they will *refer* you to a server (or list of servers) that might know more. Go through the hierarchy from the root **without recursion**, following the referrals manually, until you have found the address of imc.kean.edu. What commands did you use to do this? What IP address did you find for imc?

*Understanding caching*

These queries will show you how your local machine's DNS cache works.

* Ask your default server for information, without recursion, about the host www.dmoz.org.

**(7)** What command did you use?  **(8)** Did your default server have the answer in its cache? How do you know? **(9)** How long did this query take? If this information was cached, please find some other host name that is not cached and do this section with that other host.  
(**10)** Now, ask your default server this same query but *with* recursion. It should return an answer for you. How long did this take?

* **(11)** Finally, ask your default server again without recursion. How long does this request take? Has the cache served its purpose?