In this exercise you will explore the DNS protocol on Windows and Linux systems.

The Internet Domain Name System (DNS) provides registry services to convert between Internet hostnames (such as netlab.gmu.edu) and Internet addresses (such as 129.174.65.2). DNS is accessed via an Application Program Interface (API) to the host's operating system so that applications can access remote computers, if their hostnames are available. A utility program called nslookup provides command-line access to DNS. Given a hostname, nslookup accesses the DNS and displays in text the corresponding IP address and also identifies the nameserver that provided the address. Given an IP address, nslookup accesses the DNS and displays the “reverse DNS” in text and associated hostname. (Because the reverse DNS relies on tracking down a host via the registered ownership of the block of IP addresses to which it belongs, the process is less likely to succeed than is the forward DNS lookup.) DNS is a distributed system where nameservers worldwide cooperate to provide service, based on the tree-structure inherent in DNS names. In addition to the name-to-address mappings for the local domain, each nameserver has a cache that stores the locations of root nameservers for the global trees and generally also stores the name-to-address mapping it has recently obtained from other nameservers. This greatly reduces the time to complete multiple lookups of the same host, which are quite common (for example, when browsing the Web).

Lab Steps:
The work for this lab must be done using the IT441 lab set-up at the Prince William campus. Note, however, that labs 3 and 4 can done consecutively, in one visit to this lab.

PART I: Windows

(1) On a Windows system, open a command-line console by clicking Start→Run and typing cmd. Using the nslookup command in the console window, obtain the IP addresses of the following Internet hosts — include the results in your report.
   a. www.gmu.edu
   b. gmu.edu
   c. netlab.gmu.edu
   d. www.ieee.org
   e. venera.isi.edu
   f. noname.gmu.edu

(2) Continuing on the Windows system, use nslookup to make a reverse DNS lookup for the following IP addresses:
   a. 129.174.1.13
   b. 131.120.254.52
   c. 128.150.4.107
   d. 10.100.100.1

PART II: Linux

(3) Use a Linux system to repeat 1 and 2 above. The command nslookup also works on Linux.

Lab Questions:
For each of the results in 1 to 3, explain your observed results. Note any difference between Windows and Linux.