<center>**Assignment**</center>

Aim:
Write a program for DNS lookup. Given an IP address input, it should return URL and vice-versa.

Theory:

Domain Name System:
The **Domain Name System (DNS)** translates Internet domain and host names to IP addresses and vice versa.
On the Internet, DNS automatically converts between the names we type in our Web browser address bar to the IP addresses of Web servers hosting those sites. Larger corporations also use DNS to manage their own company intranet. Home networks use DNS when accessing the Internet but do not use it for managing the names of home computers.

How DNS Works:

DNS is a client/server network communication systems: DNS clients send requests to and receive responses from DNS servers. Requests containing a name, that result in an IP address being returned from the server, are called *forward DNS lookups*. Requests containing an IP address and resulting in a name, called *reverse DNS lookups,* are also supported. DNS implements a distributed database to store this name and last-known address information for all public hosts on the Internet.

The DNS database resides on a hierarchy of special database servers. When clients like Web browsers issue requests involving Internet host names, a piece of software (usually built into the network operating system) called the *DNS resolver* first contacts a DNS server to determine the server's IP address. If the DNS server does not contain the needed mapping, it will, in turn, forward the request to a different DNS server at the next higher level in the hierarchy.

After potentially several forwarding and delegation messages are sent within the DNS hierarchy, the IP address for the given host eventually arrives at the resolver, that in turn completes the request over Internet Protocol.

DNS additionally includes support for *caching* requests and for *redundancy*. Most network operating systems support configuration of primary, secondary, and tertiary DNS servers, each of which can service initial requests from clients.

Setting Up DNS on Personal Devices and Home Networks

Internet Service Providers (ISPs) maintain their own DNS servers and use DHCP to automatically configure their customer's networks, Automatic DNS server assignment relieves households of the burden of DNS configuration. Home network administrators are not required to keep their ISPs settings, however. Some prefer to use one of the available public Internet DNS services instead. Public DNS services are designed to offer better performance and reliability over what a typical ISP can reasonably offer.

Home broadband routers and other network gateway devices store primary, secondary and tertiary DNS server IP addresses for the network and assign them to client devices as needed. Administrators can choose to enter addresses manually or obtain them from DHCP. Addresses can

also be updated on a client device via its operating system configuration menus.

de.wikipedia.org.
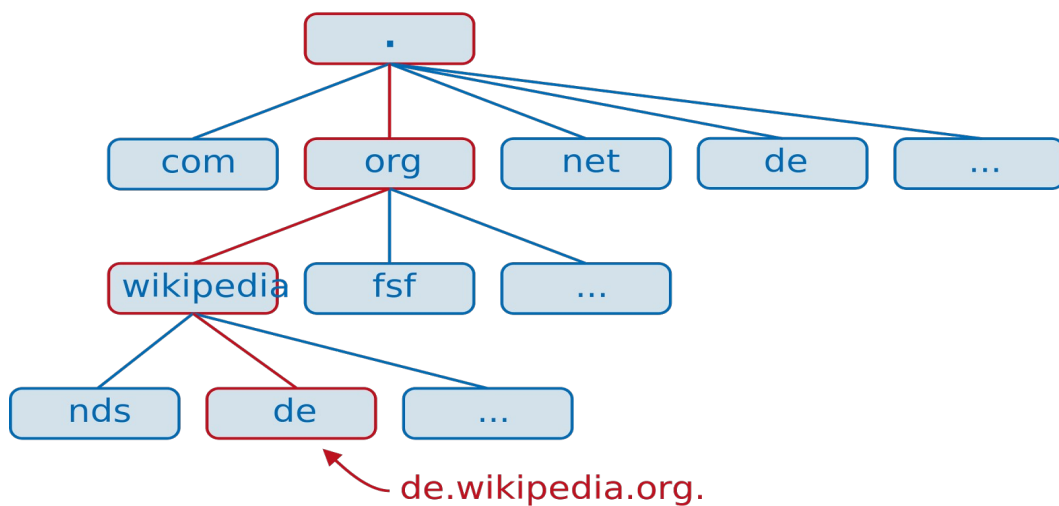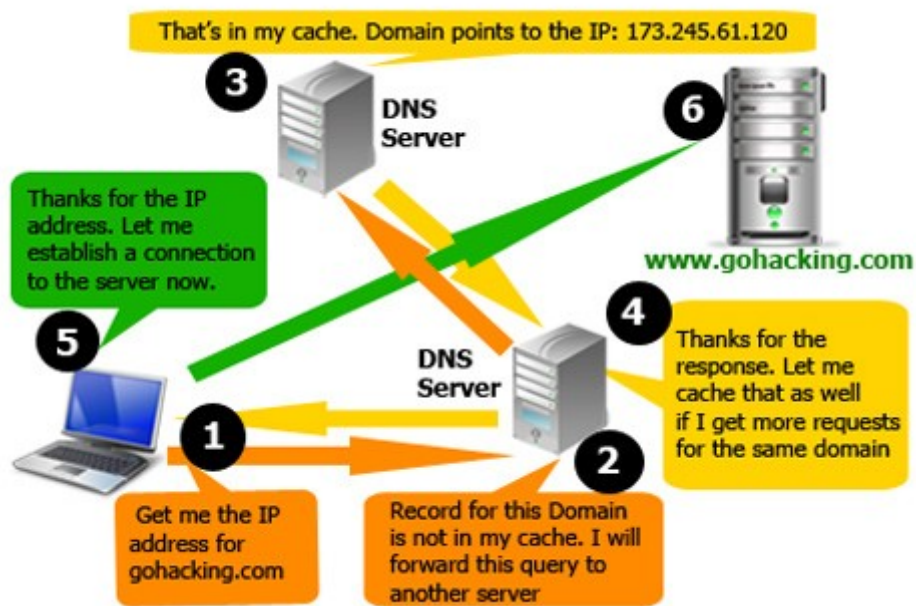
Dynamic Host Configuration Protocol:

DHCP (Dynamic Host Configuration Protocol) is a communications protocol that network administrators use to centrally manage and automate the network configuration of devices attaching to an Internet Protocol (IP) network.

DHCP allows devices needing an IP address to request one when they are starting up, for example, rather than an address preassigned and manually configured on each device. With DHCP, if a device is moved from place to place, it will be assigned a new address in each location. Without DHCP, network administrators must not only manually configure each device with a valid IP address, but also reconfigure the device with a new IP address if it moves to a new location on the network. DHCP exists for both IPv4 and IPv6 (Internet Protocol version 6).

Devices reach out to the local network to discover any available DHCP server and request network configuration information. Servers manage pools of valid addresses and assign addresses out of those pools. DHCP uses the concept of leasing the amount of time a given IP address will be valid for a device. The lease time can vary depending on how long a user is likely to require the Internet connection at a particular location. Devices release addresses when their leases expire and request a renewal from the DHCP server if they are staying online. The DHCP server may assign them a new address rather than renewing an old one. The protocol also supports static addresses for computers like Web servers that need a permanent IP address.

Although DHCP is generally considered an addressing automation protocol, network administrators can use it to push out other network configuration information as well. For example, DHCP can push out a DNS (domain name system) server address, network time server address, host name for the device receiving configuration, a domain name, or a default gateway address.

Installation of DHCP server:
1. To install the DHCP server, you need dhcpd. You can obtain it via the source code from ftp://ftp.isc.org/isc/dhcp or install the package that came with your Linux distribution.
2. Installing dhcpd
   Once you have the source tarball or the RPM/DEB package for your distribution, install it. For RPM/DEB package users, this process is simple and straightforward. To install from the source code, untar the source code and enter the dhcp_2.0 subdirectory, then type:
   ./configure
   make
   make install

Conclusion:
Successfully implemented the program for DNS Lookup.