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Assignment No. 8

Title : DNS Lookup

Problem Statement:
Write a program for DNS lookup. Given an IP address input, it should return URL & vice versa (using Java/Python)

Outcome :
Students will be able to understand working of DNS protocol.

Theory:

→ **DNS :**
Domain Name System (DNS) is the default name resolution service used in a Microsoft Windows Server 2003 network. DNS is a part of the Windows Server 2003 TCP/IP protocol suite and all TCP/IP connections are, by default, configured with the IP address of at least one DNS server in order to perform name resolution on the network.

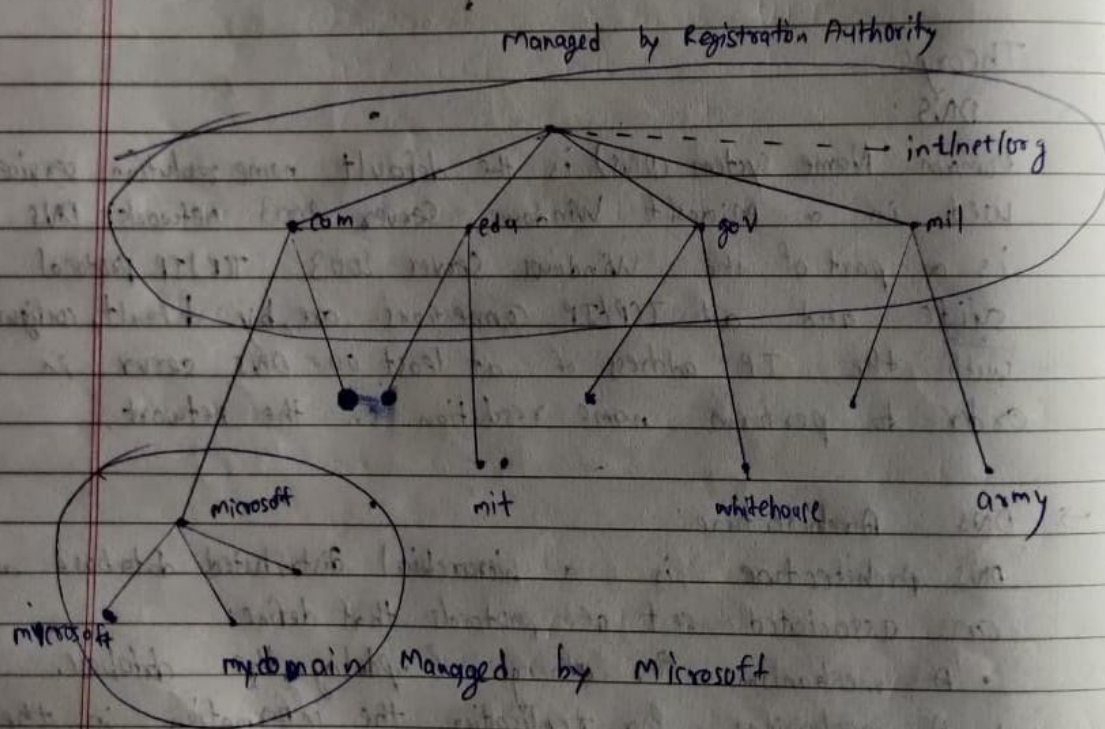
→ **DNS Architecture :**
DNS Architecture is a hierarchical distributed database and an associated set of protocols that define:

- A mechanism for querying & updating the database.
- A mechanism for replicating the information in the database among servers.
- A schema of the database.

→ **DNS Domain Names:**
The Domain Name System is implemented as a hierarchical and distributed database containing various types of data.

including host names and domain names. The names in a DNS database form a hierarchical tree structure called the domain namespace. Domain names consist of individual labels separated by dots. For example, mydomain.microsoft.com. A fully qualified Domain Name (FQDN) uniquely identifies the host's position within the DNS hierarchy by specifying a list of names separated by dots in the path from the referenced host to the root.

→ DNS Domain Name Hierarchy:



→ Working of DNS Lookup

DNS is what translates your familiar domain name (google.com) into an IP address your browser can use (173.194.33.194). Before the page and any resource on the page is loaded, the DNS must be resolved so the answer

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browsers can establish a TCP connection to make the HTTP request.

In addition, for every external resources referenced by an URL, the DNS resolution must complete the same steps (per unique domain) before the request is made over HTTP. The DNS Resolution process starts when the user types an URL address on the browser and hits Enter. At this point, the browser asks the operating system for a specific page, in this case google.com.

- Step 1: OS Recursive Query to DNS Resolver
- Step 2: DNS Resolver Iterative Query to the Root Server
- Step 3: Root Server Response
- Step 4: DNS Resolver Iterative Query to the TLD server
- Step 5: TLD Server Response
- Step 6: DNS Resolver Iterative Query to the google.com NS
- Step 7: Google.com NS Response
- Step 8: DNS Resolver Response to OS
- Step 9: Browser starts TCP handshake.

Conclusion: Hence, we have studied working of DNS Protocol.

Code

```
import socket
```

```
i="1"
```

```
while i=="1" or i=="2":
```

```
    i = input("Enter 1 for IP to domain name or 2 for Domain Name to IP: ")
```

```
    if i=="1":
```

```
        j = input("Enter IP Address: ")
```

```
        domain = socket.gethostbyaddr(j)[0]
```

```
print(domain)

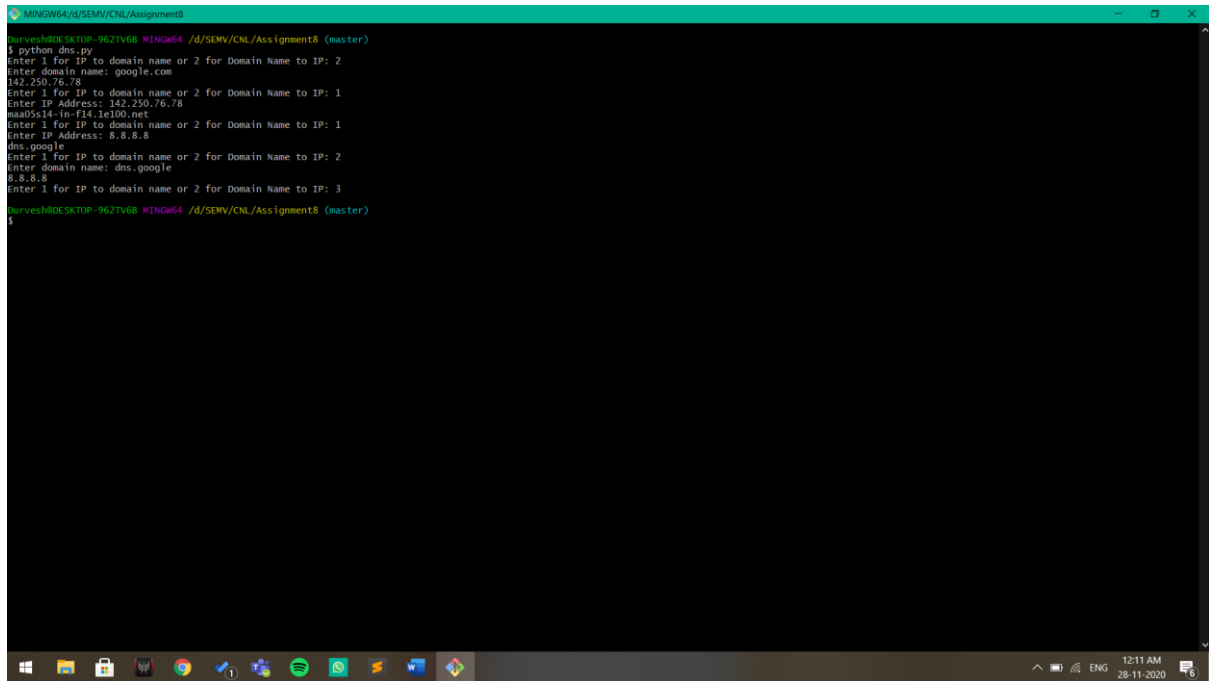
if i=="2":

    k = input("Enter domain name: ")

    ip = socket.gethostbyname(k)

    print(ip)
```

Outputs



```
survesh@DESKTOP-962TV68 MINGW64 /d/SEM/CNL/Assignment8 (master)
$ python dns.py
Enter 1 for IP to domain name or 2 for Domain Name to IP: 2
Enter domain name: google.com
142.250.76.78
Enter 1 for IP to domain name or 2 for Domain Name to IP: 1
Enter IP Address: 142.250.76.78
maa05s14-in-f14.1e100.net
Enter 1 for IP to domain name or 2 for Domain Name to IP: 1
Enter IP Address: 8.8.8.8
dns.google
Enter 1 for IP to domain name or 2 for Domain Name to IP: 2
Enter domain name: dns.google
8.8.8.8
Enter 1 for IP to domain name or 2 for Domain Name to IP: 3
survesh@DESKTOP-962TV68 MINGW64 /d/SEM/CNL/Assignment8 (master)
$
```