Government College of Engineering, Jalgaon
(An Autonomous Institute of Government of Maharashtra)

Name : **Semester :** V **PRN :**
Class : T. Y. B.Tech Computer **Academic Year :** 2024-25 **Subject : CNTL**
CourseTeacher : Mrs. Prajakta Sawale
Date of Performance : **Date of Completion :**

Practical No : 2

Writeup	Correctness of program.	Documentation of program	Viva	Attendance For practical	Timely completion	Total	Dated sign of course teacher
4	2	2	5	2	5	20	

Practical No : 2

Aim : Write a program to find the internet address of a remote computer.

Software Used :- Idle Python 3

Theory :-

What is an IP address ?

An **IP address** (Internet Protocol address) is a unique identifier assigned to each device connected to a network. It allows devices like computers, smartphones, servers, and routers to communicate with one another over the internet or a local network.

Types of IP Addresses :

1. IPv4 (Internet Protocol version 4)

- **Format**: It is a 32-bit address written as four decimal numbers separated by dots (e.g., 192.168.1.1). Each number can range from 0 to 255.

2. IPv6 (Internet Protocol version 6)

- **Format**: It is a 128-bit address written as eight groups of four hexadecimal digits separated by colons (e.g., 2001:0db8:85a3:0000:0000:8a2e:0370:7334).

Categories of IP Addresses :

IP addresses can also be classified into **private** and **public**:

1. Public IP Address:

- A **public IP address** is assigned by an Internet Service Provider (ISP) and is used to identify a device on the wider internet.
- Devices with public IP addresses can communicate directly over the internet.
- Example: When you visit a website, the server has a public IP address that allows your browser to request data.

2. Private IP Address:

- A **private IP address** is used within local networks (e.g., homes or offices) and is not accessible from the internet.
- Devices in the same local network use private IP addresses to communicate with each other.
- Private addresses are translated to public IPs via **Network Address Translation (NAT)**, allowing multiple devices on a local network to share a single public IP.

What is Remote Computer ?

A **remote computer** is any computer or device that is accessed from a distance over a network, such as the internet or a local area network (LAN). Instead of being physically close, users can interact with a remote computer as if they were sitting in front of it. This is useful for a variety of tasks, including system administration, file access, troubleshooting, and collaboration.

Working of the Program :

1. **Importing the socket Library**: The socket library in Python allows access to low-level network interfaces and functions. In this case, we utilize it to perform DNS resolution.

   import socket

2. **Defining a Function get_remote_ip(hostname)**: This function takes a domain name (hostname) as input and returns its corresponding IP address by using the socket.gethostbyname() method. This method looks up the DNS records of the hostname and retrieves its associated IP address. If the lookup is successful, the IP address is returned.

   ```
   def get_remote_ip(hostname):
       try:
           ip_address = socket.gethostbyname(hostname)
           return ip_address
       except socket.error as err:
           return f"Error: {err}"
   ```

3. **Handling Exceptions**: Network operations are prone to errors, such as the unavailability of the DNS server or incorrect domain names. To handle such cases, the program includes error handling using a try-except block. If the DNS lookup fails, it returns an error message instead of terminating the program abruptly.

4. **Example Usage**: An example hostname, www.example.com, is used to demonstrate the functionality. The program passes the hostname to the get_remote_ip() function, retrieves the corresponding IP address, and prints it.

   ```
   remote_hostname = 'www.example.com'
   ip = get_remote_ip(remote_hostname)
   print(f"The IP address of {remote_hostname} is {ip}")
   ```

Conclusion :

This program demonstrates how to resolve domain names into IP addresses using Python's socket library. By integrating DNS resolution into network-related applications, developers can automate the process of converting human-readable domain names into machine-readable IP addresses. This fundamental networking operation is an essential part of internet communication.

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