

Experiment No. _____

Date ____ / ____ / 2020

**TITLE OF EXPERIMENT: - A Program to demonstrate the use of
InetAddress class and its factory methods.**

DIVISION: _____ **BRANCH:** _____

BATCH: _____ **ROLL NO.:** _____

PERFORMED ON DATE: _____

SIGNATURE OF TEACHING STAFF:

EXPERIMENT NO. 6

Aim: A Program to demonstrate the use of InetAddress class and its factory methods.

Software:

1. Command prompt
2. JDK 8
3. Internet

Theory:

Java InetAddress class

Java InetAddress class represents an IP address. The `java.net.InetAddress` class provides methods to get the IP of any host name *for example* `www.google.com`, `www.facebook.com`, etc.

An IP address is represented by 32-bit or 128-bit unsigned number. An instance of `InetAddress` represents the IP address with its corresponding host name. There are two types of addresses: Unicast and Multicast. The Unicast is an identifier for a single interface whereas Multicast is an identifier for a set of interfaces.

There are 2 types of addresses:

1. Unicast — An identifier for a single interface.
2. Multicast — An identifier for a set of interfaces.

Moreover, `InetAddress` has a cache mechanism to store successful and unsuccessful host name resolutions.

IP Address

- An IP address helps to identify a specific resource on the network using a numerical representation.
- Most networks combine IP with TCP (Transmission Control Protocol). It builds a virtual bridge among the destination and the source.

There are two versions of IP address:

1. IPv4

IPv4 is the primary Internet protocol. It is the first version of IP deployed for production in the ARAPNET in 1983. It is a widely used IP version to differentiate devices on network using an addressing scheme. A 32-bit addressing scheme is used to store 2^{32} addresses that is more than 4 million addresses.

Features of IPv4:

- It is a connectionless protocol.
- It utilizes less memory and the addresses can be remembered easily with the class based addressing scheme.
- It also offers video conferencing and libraries.

2. IPv6

IPv6 is the latest version of Internet protocol. It aims at fulfilling the need of more internet addresses. It provides solutions for the problems present in IPv4. It provides 128-bit address space that can be used to form a network of 340 undecillion unique IP addresses. IPv6 is also identified with a name IPng (Internet Protocol next generation).

Features of IPv6:

- It has a stateful and stateless both configurations.
- It provides support for quality of service (QoS).
- It has a hierarchical addressing and routing infrastructure.

TCP/IP Protocol

- TCP/IP is a communication protocol model used connect devices over a network via internet.
- TCP/IP helps in the process of addressing, transmitting, routing and receiving the data packets over the internet.

- The two main protocols used in this communication model are:
 1. TCP i.e. Transmission Control Protocol. TCP provides the way to create a communication channel across the network. It also helps in transmission of packets at sender end as well as receiver end.
 2. IP i.e. Internet Protocol. IP provides the address to the nodes connected on the internet. It uses a gateway computer to check whether the IP address is correct and the message is forwarded correctly or not.

Java InetAddress Class - Factory Methods

The InetAddress class is used to encapsulate both, the numerical IP address and the domain name for that address. The InetAddress class has no visible constructors. The InetAddress class has the inability to create objects directly, hence factory methods are used for the purpose. Factory Methods are static methods in a class that return an object of that class.

There are 5 factory methods available in InetAddress class –

Method	Description
<code>public static InetAddress getByName(String host) throws UnknownHostException</code>	It returns the instance of InetAddress containing LocalHost IP and Host name of host represented by host argument.
<code>public static InetAddress getLocalHost() throws UnknownHostException</code>	It returns the instance of InetAddress containing local host name and address.
<code>public String getHostName()</code>	It returns the host name of the IP address.
<code>public String getHostAddress()</code>	It returns the IP address in string format.
<code>public static InetAddress[] getAllByName(String hostName) throws UnknownHostException</code>	This method returns the array of the instance of InetAddress class which contains IP addresses.
<code>public static InetAddress getByAddress(byte IPAddress[]) throws UnknownHostException</code>	This method returns an InetAddress object created from the raw IP address.

Below is the Java implementation of InetAddress class to demonstrate the use of factory methods –

```
import java.io.*;
import java.net.*;
import java.util.*;

class Inetdemo2 {
    public static void main(String[] args)
        throws UnknownHostException
    {
        // To get and print InetAddress of Local Host
        InetAddress address1 = InetAddress.getLocalHost();
        System.out.println("InetAddress of Local Host : "
            + address1);

        // To get and print InetAddress of Named Host
        InetAddress address2
            = InetAddress.getByName("45.22.30.39");
        System.out.println("InetAddress of Named Host : "
            + address2);

        // To get and print ALL InetAddresss of Named Host
        InetAddress address3[]
            = InetAddress.getAllByName("172.19.25.29");
        for (int i = 0; i < address3.length; i++) {
            System.out.println(
                "ALL InetAddresss of Named Host : "
                + address3[i]);
        }

        // To get and print InetAddresss of
        // Host with specified IP Address
        byte IPAddress[] = { 125, 0, 0, 1 };
        InetAddress address4
            = InetAddress.getByAddress(IPAddress);
        System.out.println(
            "InetAddresss of Host with specified IP Address : "
            + address4);

        // To get and print InetAddresss of Host
        // with specified IP Address and hostname
        byte[] IPAddress2
            = { 105, 22, (byte)223, (byte)186 };
        InetAddress address5 = InetAddress.getByAddress(
            "gfg.com", IPAddress2);
        System.out.println(
            "InetAddresss of Host with specified IP Address and hostname : "
```

```
        + address5);
    }
}
```

Output

```
InetAddress of Local Host : localhost/127.0.0.1  
InetAddress of Named Host : /45.22.30.39  
ALL InetAddresses of Named Host : /172.19.25.29  
InetAddresses of Host with specified IP Address : /125.0.0.1  
InetAddresses of Host with specified IP Address and hostname : gfg.com/105.22.223.186
```

Program:

In this program we use InetAddress class and get ip address of www.Facebook.com website.

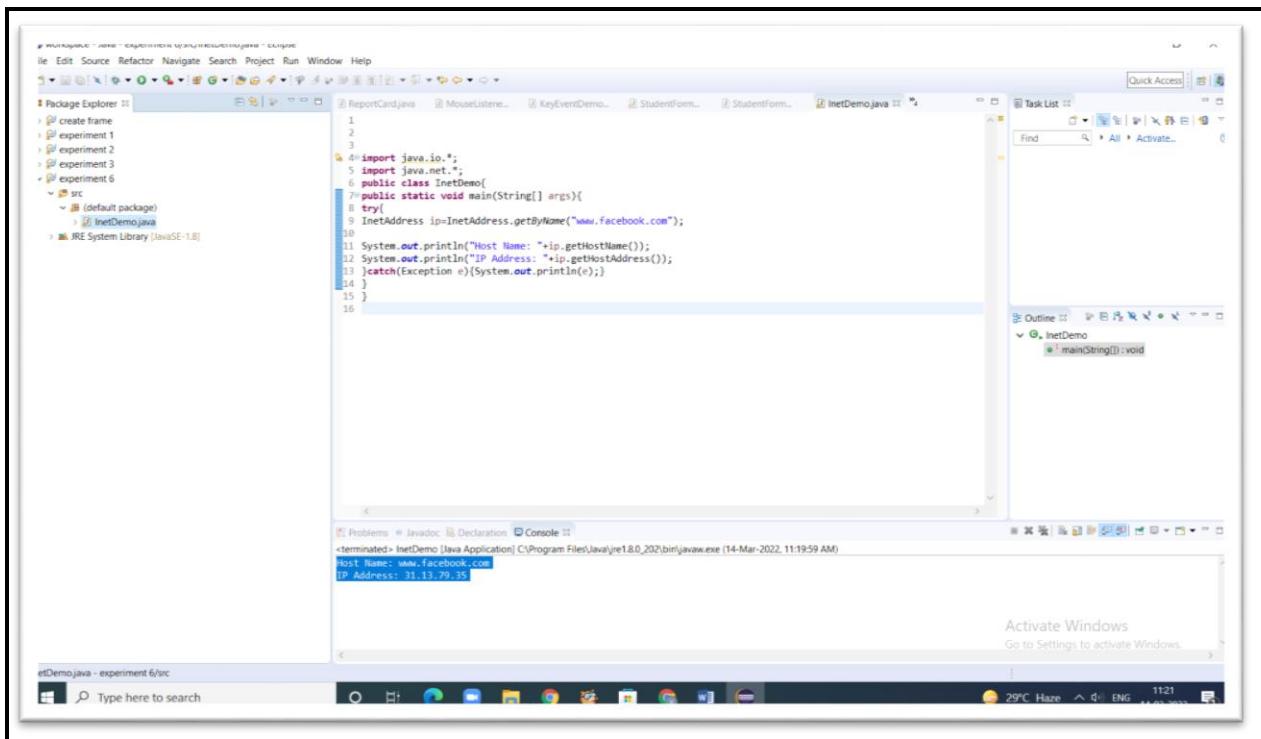
InetDemo.java

```
import java.io.*;  
import java.net.*;  
public class InetDemo{  
    public static void main(String[] args){  
        try{  
            InetAddress ip=InetAddress.getByName("www.Facebook.com");  
  
            System.out.println("Host Name: "+ip.getHostName());  
            System.out.println("IP Address: "+ip.getHostAddress());  
        }catch(Exception e){System.out.println(e);}  
    }  
}
```

Output:

```
Host Name: www.facebook.com  
IP Address: 31.13.79.35
```

Screenshot's of Output:



Conclusion: