



FACULTY OF ENGINEERING & TECHNOLOGY

BCS-503: Object Oriented Techniques

Lecture-32

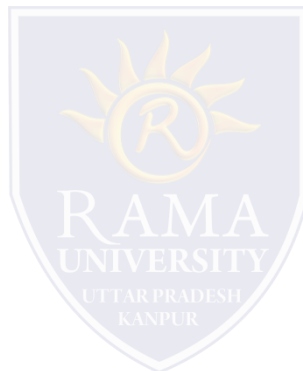
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OBJECTIVES

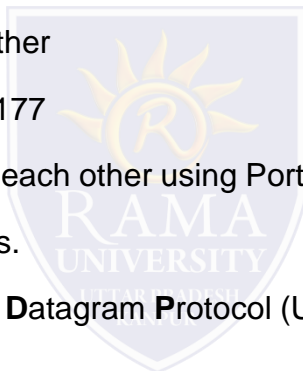
In this PPT, you will learn to:

- ❖ Discuss applets and URLs
- ❖ Explain Sockets
- ❖ Explain Channels
- ❖ Explore the `java.net` package



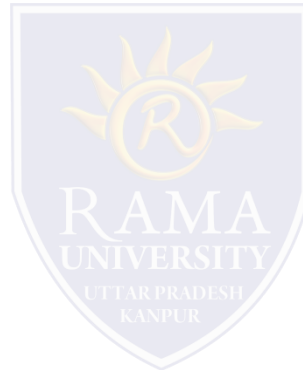
INTRODUCTION

- Communication plays a major role in every individual's life.
- Computers are the best means to communicate when it comes to global communication.
- Computers on the Internet communicate using **T**ransmission **C**ontrol **P**rotocol (TCP)/Internet **P**rotocol (IP).
- An IP address differentiates one PC from the other
 - Example of an IP address : 205.20.167.177
- Programs within the system communicate with each other using Ports.
- Ports enable communication between programs.
- **T**ransmission **C**ontrol **P**rotocol (TCP) and **U**ser **D**atagram **P**rotocol (UDP) are two such protocols.



INTERNET ADDRESS

- The InetAddress class is used to encapsulate both numerical IP address and the domain name for the address.
- The InetAddress has no constructors and to create an object of this class, one has to use the factory methods.
- The three methods getLocalHost(), getByName() and getAllByName() can be used to create instances of InetAddress.



EXAMPLE

```
import java.net.*;
class InetAddressDemo
{
    public static void main(String [] args)
    {
        try
        {
            if(args.length > 0)
            {
                String host = args[0];
                InetAddress [] address = InetAddress.getAllByName(host);
                for(int i = 0; i < address.length; i++)
                    System.out.println(address[i]);
            }
            else
            {
                InetAddress localaddress = InetAddress.getLocalHost();
                System.out.println(localaddress);
            }
        }
        catch(Exception e)
        {
            e.printStackTrace();
        }
    }
}
```

USING URLS WITH APPLETS

Internet is made up of many networks



Resource may be on any of these networks

Uniform Resource Locator (URL)



Client



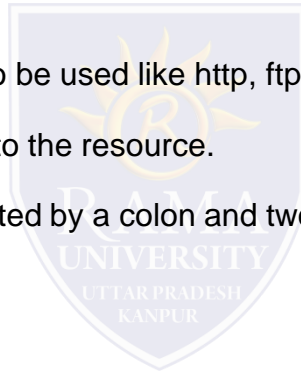
Java applets help connect to various web sites



Server

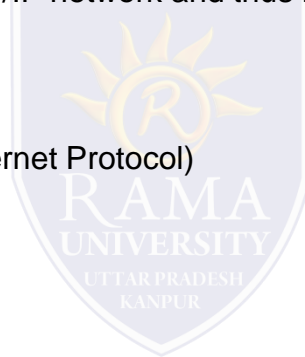
USING URLS WITH APPLETS (Contd.)

- Using Java applets, we can connect to various Web sites and browse or access the information.
- Each Web site has a URL.
- The java.net package contains a number of classes that implement browser-server connections.
- A URL has two main components:
 - Protocol Identifier- identifies the protocol to be used like http, ftp and so on.
 - Resource name- is the complete address to the resource.
- Protocol identifier and resource name are separated by a colon and two forward slashes.



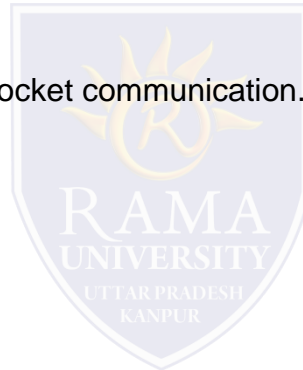
SOCKETS

- Each person connected through a telephone system is allotted a unique telephone number.
- TCP service connects the sender and receiver in the case of Internet, using sockets.
- Socket is a reference to communication links over a network with an application.
- Sockets enable transfer of messages over a TCP/IP network and thus make it easy to develop custom client/server applications.
- The two type of sockets are:
 - TCP (Transfer Control Protocol) or IP (Internet Protocol)
 - UDP (User Datagram Protocol)



SOCKET PROGRAMMING IN JAVA

- Sockets are often used in client/server applications in Java.
- Java provides the following classes for socket programming:
 - java.net.Socket
 - java.net.ServerSocket
- The Socket class is generally used for two-way socket communication.



DATAGRAM PACKETS

- Applications that use datagram have to communicate by sending and receiving independent packets of information.
- Clients and servers need not have any point – to – point connection.
- Delivery and order of delivery of packets are not guaranteed.



SOCKET CHANNEL

- Socket Channels are different from File Channel.
- The three socket channel classes (Datagram Channel, Socket Channel, ServerSocket Channel) extend from AbstractSelectableChannel
- All socket channels create a peer socket object when they are instantiated.
- Socket Channels can operate in non-blocking mode.



REFERENCES

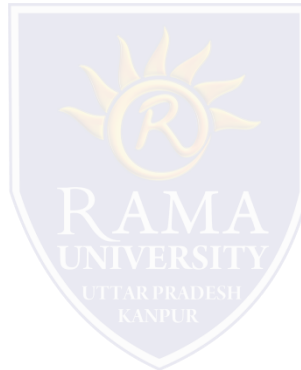
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MULTIPLE CHOICE QUESTION

Multiple Choice Question:

Q1. Which of these package contains classes and interfaces for networking?

- a) java.io
- b) java.util
- c) java.net
- d) java.network

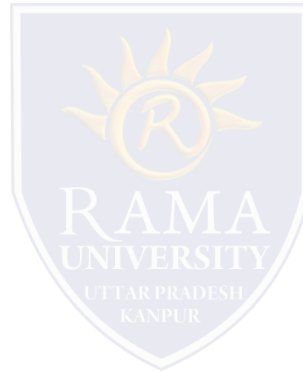


MULTIPLE CHOICE QUESTION

Multiple Choice Question:

Q2. Which of these is a protocol for breaking and sending packets to an address across a network?

- a) TCP/IP
- b) DNS
- c) Socket
- d) Proxy Server



MULTIPLE CHOICE QUESTION

Multiple Choice Question:

Q3. How many ports of TCP/IP are reserved for specific protocols?

- a) 10
- b) 1024
- c) 2048
- d) 512

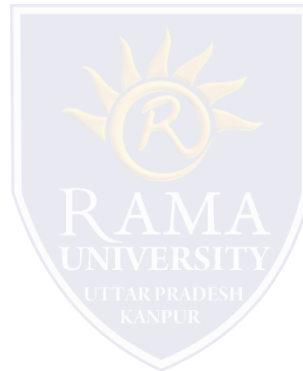


MULTIPLE CHOICE QUESTION

Multiple Choice Question:

Q4. How many bits are in a single IP address?

- a) 8
- b) 16
- c) 32
- d) 64

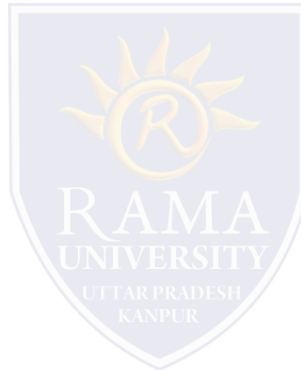


MULTIPLE CHOICE QUESTION

Multiple Choice Question:

Q5. Which of these is a full form of DNS?

- a) Data Network Service
- b) Data Name Service
- c) Domain Network Service
- d) Domain Name Service



Summary

In this PPT, you learned that:

- An IP address is a 32-bit number written in decimal, hexadecimal or any other format and is used to distinguish one system from another during computer-computer communication.
- Transport protocols are used to enable communication from one port to another.
- TCP and UDP are two such protocols.
- TCP is more commonly used than UDP.
- The java.net package contains a number of classes that implement browser-server connections, the simplest among which is the URL class. The URL class encapsulates Web objects by their URL address.
- A socket is a handle/reference to communication links over a network with an application.

