Experiment no 1.
Objective: Program to manipulate the IP address of a system.

class ip

public static void main(String args[])
InetAddress ia = InetAddress.getByName("lab5server");
ia.getHostAddress();
ia.getLocalHost();

InetAddress
getByName("lab5server");
getHostAddress();
getLocalHost();

Catch(UnknownHostException e)
System.out.println("error"+e);
import java.net.*;
class InetDemo
{
    public static void main(String args[])
    {
        try
        {
            InetAddress ia = InetAddress.getLocalHost();
            System.out.println("The IP address of local host is "+ia);
            ia=InetAddress.getByName(args[0]);
            System.out.println("the IP address of "+args[0]+" is "+ia);
        }
        catch(UnknownHostException ue)
        {
            System.out.println("There is an error "+ue);
        }
    }
}

Output

C:\JAVA\BIN>javac InetDemo.java

C:\JAVA\BIN>java InetDemo
The IP address of local host is ececom5/192.168.1.175
Exception in thread "main" java.lang.ArrayIndexOutOfBoundsException: 0
    at InetDemo.main(InetDemo.java:7)

C:\JAVA\BIN>
Experiment no. 2

Objective: Program to obtain the information about the (a) Host (b) Port (c)

class url

public static void main(String args[])
URL url = new URL("http://www.yahoo.com");
url.getHost()
url.getProtocol()
url.getPort()

URL

URL(String url1);
getHost( )
getProtocol( )
getPort( )

Catch(IOException e)
System.out.println("error"+e);
import java.lang.*;
import java.io.*;
import java.net.*;

class ud1
{
    public static void main(String args []) throws MalformedURLException
    {
        URL url = new URL("http://www.yahoo.com");
        try
        {
            System.out.println("host name is " + url.getHost());
            System.out.println("port no. is " + url.getPort());
            System.out.println("protocol used is " + url.getProtocol());
        }
        catch (Exception e)
        {
            System.out.println("error"+e);
        }
    }
}

OUTPUT

C:\JAVA\BIN>javac ud1.java
C:\JAVA\BIN>java ud1 yahoo.com
host name is www.yahoo.com
port no. is -1
protocol used is http
C:\JAVA\BIN
Experiment no 3.
Objective: Program to access daytime service from server using socket

```java
class daytimeserver
{
  public static final int SERVICE_PORT = 13;
  public static void main(String args[])
  
  ServerSocket server = new ServerSocket(SERVICE_PORT);
  Socket nextClient = server.accept();
  nextClient.getInetAddress();
  nextClient.getPort();
  PrintStream out = new PrintStream(nextClient.getOutputStream());
  out.print(new java.util.Date());
  out.flush();
  nextClient.close();
}
```

```java
try
  ServerSocket server = new ServerSocket(SERVICE_PORT);
  Socket nextClient = server.accept();
  nextClient.getInetAddress();
  nextClient.getPort();
  PrintStream out = new PrintStream(nextClient.getOutputStream());
  out.print(new java.util.Date());
  out.flush();
  nextClient.close();

catch(BindException be)
  System.err.println("Service already running on port"+SERVICE_PORT);

catch(IOException ioe)
  System.err.println("I/O error"+ioe);
```
class dtc

public static void main(String args[])
Socket dt=new Socket("192.168.1.3",13);
BufferedReader reader=new BufferedReader(new InputStreamReader(dt.getInputStream()))
reader.readLine()
dt.close()
catch(Exception e)
System.out.println("error"+e);
import java.net.*;
import java.io.*;
class daytime
{
    public static void main(String args[])
    {
        try
        {
            Socket daytime=new Socket("192.168.1.7",13);
            System.out.println("Connection established");
            daytime.setSoTimeOut(2000);
            BufferedReader reader=new BufferedReader(new InputStreamReader(daytime.getInputStream()));
            System.out.println("result:"+reader.readLine());
            daytime.close();
        }
        catch(Exception ioe)
        {
            System.err.println("Error"+ioe);
        }
    }
}
OUTPUT

ON CLIENT

C:\JAVA\BIN>javac daytime1.java
C:\JAVA\BIN>java daytime1
Connection established
result:Wed Mar 29 11:01:48 GMT+05:30 2006
C:\JAVA\BIN>

ON SERVER

C:\java\bin>
C:\java\bin>
C:\java\bin>java daytimeserver
Daytime service started
Received request from /192.168.1.175:3043
Experiment no 4.
Objective: Program to get remote and local socket address.

class daytimeserver

public static final int SERVICE_PORT=13
public static void main(String args[])
ServerSocket server=new ServerSocket(SERVICE_PORT)
Socket nextClient=server.accept();
nextClient.getInetAddress()
nextClient.getPort()
out=new PrintStream(nextClient.getOutputStream());
out.print(new java.util.Date( ))
out.flush();
nextClient.close();

catch(BindException be)
System.err.println("Service already running on port"+SERVICE_PORT);

catch(IOException ioe)
System.err.println("I/O error"+ioe);
class dtc
public static void main(String args[])
Socket dt=new Socket("192.168.1.3",13);
BufferedReader reader=new BufferedReader(new InputStreamReader(dt.getInputStream()))
reader.readLine()
daytime.getLocalPort();
daytime.getRemoteSocketAddress();
dt.close()
import java.net.*;
import java.io.*;
class daytime
{
    public static void main(String args[])
    {
        try
        {
            Socket daytime=new Socket("192.168.1.7",13);
            System.out.println("Connection established");
            daytime.setSoTimeout(2000);
            BufferedReader reader=new BufferedReader(new InputStreamReader(daytime.getInputStream()));
            System.out.println("result:"+reader.readLine());
            System.out.println("local socket address"+daytime.getLocalPort());
            System.out.println("remote socket address"+daytime.getRemoteSocketAddress());
            daytime.close();
        }
        catch(Exception ioe)
        {
            System.err.println("Error" + ioe);
        }
    }
}
OUTPUT

ON CLIENT

C:\JAVA\BIN>javac daytime.java

C:\JAVA\BIN>java daytime
Connection established
result:Wed Mar 29 10:32:43 GMT+05:30 2006
local socket address 4200
remote socket address/192.168.1.7:13
C:\JAVA\BIN>

ON SERVER

C:\java\bin>java daytimeserver
Daytime service started
Received request from /192.168.1.175:4200
Experiment no. 5
Objective: Program to find port no running on server.

```
java.net.*;

java.io.*;

class LocalPortScanner

public static void main(String args[])
        for(int port=1024;port<=65535;port++)
        ServerSocket server=new ServerSocket(port)
        catch(IOException e)
        System.out.println("This is server on port"+port+".");
```

ServerSocket

ServerSocket(int port)

catch(IOException e)

System.out.println("This is server on port"+port+".");
import java.net.*;
import java.io.*;
public class LocalPortScanner
{
    public static void main(String args[])
    {
        for(int port=1024;port<=65535;port++)
        {
            try
            {
                ServerSocket server=new ServerSocket(port);
            }
            catch(IOException e)
            {
                System.out.println("There is a server on port"+port);
            }
        }
    }
}
C:\JAVA\BIN>javac LocalPortScanner.java
C:\JAVA\BIN>java LocalPortScanner
There is a server on port4314
There is a server on port4315
There is a server on port4316
There is a server on port4317
There is a server on port4318
C:\JAVA\BIN>
Experiment no 6
Objective: Program to read the source code of the web page

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

class urld
{
pub static void main(String args[])
throws MalformedURLException
{
URL url=new URL("http://imadworks.rediff.com/AdWorks/inbox-Bottom4.htm");
URLConnection urlcon=url.openConnection();
InputStream ip=urlcon.getInputStream();
a=ip.read();
char c=(char)a;
System.out.print(c);
ip.close();
}
}
```

Class URL
- openConnection()

Class URLConnection
- getInputStream();

Class InputStream
- Read()

catch(Exception e)
System.out.println("error"+e);
import java.lang.*;
import java.io.*;
import java.net.*;
class urld
{
public static void main(String args[]) throws MalformedURLException
{
try
{URL url=new URL("http://www.google.com");
URLConnection urlcon=url.openConnection();
InputStream ip=urlcon.getInputStream();
boolean flag=true;
while(flag)
{int a=ip.read();
if(a==-1)
{flag=false;
}
else
{
char c=(char)a;
System.out.print(c);
}
}
ip.close();
}catch(Exception e)
{
System.out.println("error"+e);
}
C:\JAVA\BIN>javac urld.java

C:\JAVA\BIN>java urld
<html><head><meta http-equiv="content-type" content="text/html; charset=ISO-8859-1"><title>Google</title><style><!--
body,td,a,p,.h{font-family:arial,sans-serif;}
.h{font-size: 20px;}
.q{color:#0000cc;}
//-->
</style>
<script>
//-->
</script>
<body bgcolor=#ffffff text=#000000 link=#0000cc vlink=#551a8b alink=#ff0000 onLoad=sf() topmargin=3 marginheight=3><center><table border=0 cellspacing=0 cellpadding=0 width=100%><tr><td align=right nowrap><font size=-1><a href="/url?q=
</td><tr><td class=h align=right valign=top><b></b></td><td valign=top class=h><font color=#6f6f6f style=font-size:16px><b>India</b></font></td></tr></table><br>
<form action=/search name=f><table border=0 cellspacing=0 cellpadding=4><tr><td nowrap><font size=-1><b>Web</b>&nbsp;&nbsp;&nbsp;&nbsp;<a id=1a class=q href="/i=q>more &raquo;</a></b></font></td></tr></table>
</form></center></html>
C:\JAVA\BIN>
Experiment no 7.
Objective: Program to create socket for sending and receiving data

Source code
Server

import java.net.*;
import java.io.*;
public class server {
public static void main(String args[]) {
    int port = 4917; // just a random port. make sure you enter something between 1025 and 65535.
    try {
        ServerSocket ss = new ServerSocket(port); /* create a server socket and bind it to the above port number.*/
        System.out.println("Waiting for a client...");
        Socket socket = ss.accept(); // make the server listen for a connection, and let you know when it gets one.
        System.out.println("Got a client :) ...");
        System.out.println();
        // Get the input and output streams of the socket, so that you can receive and send data to the client.
        InputStream sin = socket.getInputStream();
        OutputStream sout = socket.getOutputStream();
        BufferedReader keyboard = new BufferedReader(new InputStreamReader(System.in));
        // Just converting them to different streams, so that string handling becomes easier.
        DataInputStream in = new DataInputStream(sin);
        DataOutputStream out = new DataOutputStream(sout);
        String line = null;
        while(true) {
            line = in.readUTF(); // wait for the client to send a line of text.
            System.out.println(" client just sending the line : " + line);
            line=keyboard.readLine();
            System.out.println("I'm sending it ..."+line);
            out.writeUTF(line); // send the same line back to the client.
System.out.println("Waiting for the next line...");
System.out.println();
ss.close();
}
}
}
} catch(Exception x) {

System.out.println("Exception caught"+x);
}

public class Client {
public static void main(String[] ar) {

try {

Socket socket = new Socket("192.168.1.7",4917); // create a socket with the server's IP address and server's port.
System.out.println("Yes! I just got hold of the program.");
// Get the input and output streams of the socket, so that you can receive and send data to the client.
InputStream sin = socket.getInputStream();
OutputStream sout = socket.getOutputStream();
// Just converting them to different streams, so that string handling becomes easier.
DataInputStream in = new DataInputStream(sin);
DataOutputStream out = new DataOutputStream(sout);
// Create a stream to read from the keyboard.
BufferedReader keyboard = new BufferedReader(new InputStreamReader(System.in));
String line = null;
System.out.println("Type in something and press enter. Will send it to the server and tell ya what it thinks.");
System.out.println();
while(true) {
    line = keyboard.readLine(); // wait for the user to type in something and press enter.
    System.out.println("Sending this line to the server...");
}
out.writeUTF(line); // send the above line to the server.
out.flush(); // flush the stream to ensure that the data reaches the other end.
line = in.readUTF(); // wait for the server to send a line of text.
System.out.println("The server was very polite. It sent me this : " + line);
System.out.println("Looks like the server is pleased with us. Go ahead and enter more lines.");
System.out.println();
}

} catch(Exception x) {
System.out.println("exception caught"+x);;
}

} }
OUTPUT

Server
C:\java\bin>java server
Waiting for a client...
Got a client :) ...

  client just sending the line: hi
  hi
  I'm sending it ...hi
  Waiting for the next line...

Client
C:\java\bin>java client
Type something in and press enter
Will send it to the server

 Hi
 Sending line to server…
 Text date back from the server hi
 If you want to enter more data then enter
ADDITIONAL SUGGESTED PROGRAMMES FOR THE LABS:-

1. PC to PC/peripherals communication
   - a. Establish RS232 communication
   - b. Establish Parallel port communication

2. MAC Layer LAN Protocols
   Observe the behavior and measure the throughput, compare the performance with other MAC Layer protocols.
   - a. CSMA/CD at MAC Layer
   - b. Token Bus at MAC Layer
   - c. Token Ring at MAC Layer
   - d. CSMA/CA at MAC Layer

3. LLC (Logical Link Control) Layer LAN Protocols
   Observe the behaviour and measure the throughput of reliable data transfer protocols. Compare the performance with other LLC Layer protocols.
   - a. Stop & Wait at LLC Layer
   - b. Sliding Window – Go-Back-N at LLC Layer
   - c. Sliding Window – Selective Repeat at LLC Layer

4. Routing Algorithm
   Performance Study of Routing Algorithms through simulation
   - a. Distance Vector Routing
   - b. Link State Routing

5. Introduction to Socket Communication in Linux & Windows
   - a. Socket programming concept in Windows & Linux platforms
   - b. File Transfer between PC’s through sockets
FAQS for network programming

1. Socket Questions

1.1 Should I use ServerSocket or DatagramSocket in my applications?
1.2 How do I get the IP address of a machine from its hostname?
1.3 How do I perform a hostname lookup for an IP address?
1.4 How can I find out who is accessing my server?
1.5 How can I find out the current IP address for my machine?
1.6 Why can't my applet connect via sockets, or bind to a local port?
1.7 What are socket options, and why should I use them?
1.8 When my client connects to my server, why does no data come out?
1.9 What is the cause of a NoRouteToHost exception?

2. HTTP Questions

2.1 How do I display a particular web page from an applet?
2.2 How do I display more than one page from an applet?
2.3 How can I fetch files using HTTP?
2.4 How do I use a proxy server for HTTP requests?
2.5 What is a malformed URL, and why is it exceptional?
2.6 How do I URL encode the parameters of a CGI script?
2.7 Why is a security exception thrown when using java.net.URL or java.net.URLConnection from an applet?
2.8 How do I prevent caching of HTTP requests?

Advanced programming questions

3. Advanced networking concepts

3.1 How do I handle timeouts in my networking applications?
3.2 How do I control the amount of time a socket will linger before resetting?
3.3 What does the java.net.Socket.setTcpNoDelay method do, and what is Nagle's algorithm?
3.4 How do I implement a
3.5 How do I implement PING in Java?
3.6 How can I send/receive email from Java?

4. Remote method invocation

4.1 What is remote method invocation?
4.2 When should I use remote method invocation?
4.3 Why can't I access RMI from C++?
4.4 Why won't my RMI implementation compile under JDK1.1?
4.5 Why won't my RMI implementation run under Java 2?

5. Common Object Request Broker Architecture

5.1 What is CORBA?
5.2 When should I use CORBA?
5.3 What support does Java have for CORBA?
5.4 How do I start the CORBA nameservice for Java 2?

6. Servlets

6.1 What are Java Servlets?
6.2 What do I need to develop servlets?
6.3 Where can I get more information on servlets?
6.4 How does servlet performance compare to applets?
6.5 How does servlet performance compare to CGI?
6.6 Should I use single-threaded, or multi-threaded, servlets?
6.7 How do I send cookies from a servlet?
6.8 How do I read browser cookies from a servlet?
6.9 How do I make cookies expire after a set time period?
6.10 Why aren't cookies stored by my servlets accessible to my CGI scripts or ASP pages?
6.11 How can I void a cookie, and delete it from the browser