

# TRINITY INTERNATIONAL COLLEGE

(Tribhuvan University Affiliated)



Lab Report:5 Network Programming

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Semester: 7<sup>th</sup>  
Date : 21/06/2020

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KATHMANDU, NEPAL  
2020

## **Unit 5: Network Programming**

- 1. Write two programs that can communicate in a network using TCP Socket? [2070, 7073, 2074]**

### **Q1 ClientSide.java**

```
package q1_clientside;

import java.io.IOException;
import java.io.PrintWriter;
import java.net.Socket;
import java.util.Scanner;

public class Q1_ClientSide {

    /**
     * @param args the command line arguments
     * @throws java.io.IOException
     */
    public static void main(String[] args) throws IOException {
        final String HOST = "127.0.0.1";
        final int PORT = 6789;

        System.out.println("Client started.");
        try {
            Socket socket = new Socket(HOST, PORT);
            PrintWriter out = new
                PrintWriter(socket.getOutputStream(), true);
            Scanner in = new Scanner(socket.getInputStream());
            Scanner s = new Scanner(System.in);

        } {
            while (true) {
                System.out.print("Hello ");
                String input = s.nextLine();
                out.println(input);
                if (input.equalsIgnoreCase("exit")) break;

                System.out.println("Reply from server: " +
                    in.nextLine());
            }
        }
    }
}
```

### **Q1 ServerSide.java**

```
package q1_serverside;

import java.io.IOException;
```

```

import java.io.PrintWriter;
import java.net.ServerSocket;
import java.net.Socket;
import java.util.Scanner;

public class Q1_ServerSide {

    /**
     * @param args the command line arguments
     * @throws java.io.IOException
     */
    public static void main(String[] args) throws IOException {
        final int PORT = 6789;
        System.out.println("Server started.");
        System.out.println("Listening to client...");

        try (
            ServerSocket serverSocket = new ServerSocket(PORT);
            Socket clientSocket = serverSocket.accept();
            PrintWriter out = new
PrintWriter(clientSocket.getOutputStream(), true);
            Scanner in = new
Scanner(clientSocket.getInputStream());
        ) {
            while (true) {
                String input = in.nextLine();
                if (input.equalsIgnoreCase("exit")) break;
                System.out.println("Received from client: " +
input);
                out.println(input);
            }
            System.out.println("Server stopped");
        }
    }
}

```

```

C:\Users\user>cd Documents\NetBeansProjects\Q1_ClientSide\dist
C:\Users\user\Documents\NetBeansProjects\Q1_ClientSide\dist>dir
Volume in drive C has no label.
Volume Serial Number is CE9A-569D

Directory of C:\Users\user\Documents\NetBeansProjects\Q1_ClientSide\dist
22/06/2020  10:04    <DIR>          .
22/06/2020  10:04    <DIR>          ..
22/06/2020  10:04                3,431 Q1_ClientSide.jar
22/06/2020  10:04                1,329 README.TXT
               2 File(s)              4,760 bytes
               2 Dir(s)  3,039,064,064 bytes free

C:\Users\user\Documents\NetBeansProjects\Q1_ClientSide\dist>java -jar Q1_ClientSide.jar
Client started.
Hello Anusha
Reply from server: Anusha
Hello Aliza
Reply from server: Aliza
Hello Ram
Reply from server: Ram
Hello

```

```
Command Prompt - java -jar Q1_ServerSide.jar
Microsoft Windows [Version 10.0.18363.900]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\user>cd Documents\NetBeansProjects\Q1_ServerSide\dist

C:\Users\user\Documents\NetBeansProjects\Q1_ServerSide\dist>dir
Volume in drive C has no label.
Volume Serial Number is CE9A-569D

Directory of C:\Users\user\Documents\NetBeansProjects\Q1_ServerSide\dist

22/06/2020  10:05    <DIR>          .
22/06/2020  10:05    <DIR>          ..
22/06/2020  10:05                3,450 Q1_ServerSide.jar
22/06/2020  10:05                1,329 README.TXT
                2 File(s)              4,779 bytes
                2 Dir(s)  3,038,666,752 bytes free

C:\Users\user\Documents\NetBeansProjects\Q1_ServerSide\dist>java -jar Q1_ServerSide.jar
Server started.
Listening to client...
Received from client: Anusha
Received from client: Aliza
Received from client: Ram
```

## 2. Write a program to illustrate the use of InetAddress class. [2073]

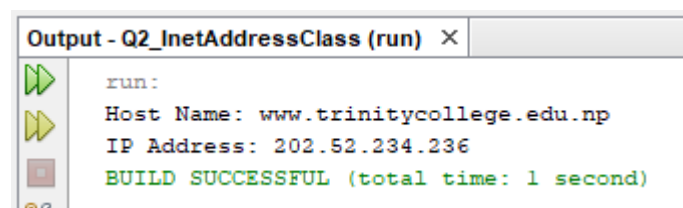
```
package labasssignment_5;

import java.net.InetAddress;

public class Q2_InetAddress {

    public static void main(String[] args) {
        try {
            InetAddress ip = InetAddress.getByName("www.trinitycollege.edu.np");

            System.out.println("Host Name: " + ip.getHostName());
            System.out.println("IP Address: " + ip.getHostAddress());
        } catch (Exception e) {
            System.out.println(e);
        }
    }
}
```



```
Output - Q2_InetAddressClass (run) X
run:
Host Name: www.trinitycollege.edu.np
IP Address: 202.52.234.236
BUILD SUCCESSFUL (total time: 1 second)
```

3. Write client and server programs in which a server program accepts a radius of a circle from the client program, computes area, sends the computed area to the client program, and displays it by client program. [2075]

**TCPclient Circle.java**

```
package tcpclient_circle;

import java.io.IOException;
import java.io.PrintWriter;
import java.net.Socket;
import java.util.Scanner;

public class TCPclient_Circle {

    public static void main(String[] args) throws IOException {
        final String HOST = "127.0.0.1";
        final int PORT = 1234;

        System.out.println("Client started.....");
        System.out.println("Calculate area of circle.....");

        try {
            Socket socket = new Socket(HOST, PORT);
            PrintWriter out = new PrintWriter(socket.getOutputStream(), true);
            Scanner in = new Scanner(socket.getInputStream());
            Scanner s = new Scanner(System.in);
            while (true) {
                System.out.println("Enter Radius");
                String radius = s.nextLine();
                out.println(radius);
                if (radius.equalsIgnoreCase("exit")) {
                    break;
                }
                System.out.println("\n AREA of Circle is : " + in.nextLine());
            }
        }
    }
}
```

**TCPserver Circle.java**

```
package tcpserver_circle;

import java.io.IOException;
import java.io.PrintWriter;
import java.net.ServerSocket;
import java.net.Socket;
import java.util.Scanner;
```

```

public class TCPserver_Circle {

    public static void main(String[] args) throws IOException {
        final int PORT = 1234;
        System.out.println("Server started.");
        System.out.println("Listening to client.....");

        try {
            ServerSocket serverSocket = new ServerSocket(PORT);
            Socket clientSocket = serverSocket.accept();
            PrintWriter out = new PrintWriter(clientSocket.getOutputStream(),
            true);
            Scanner in = new Scanner(clientSocket.getInputStream());) {
                while (true) {
                    String inputline = in.nextLine();
                    int radius = Integer.valueOf(inputline);

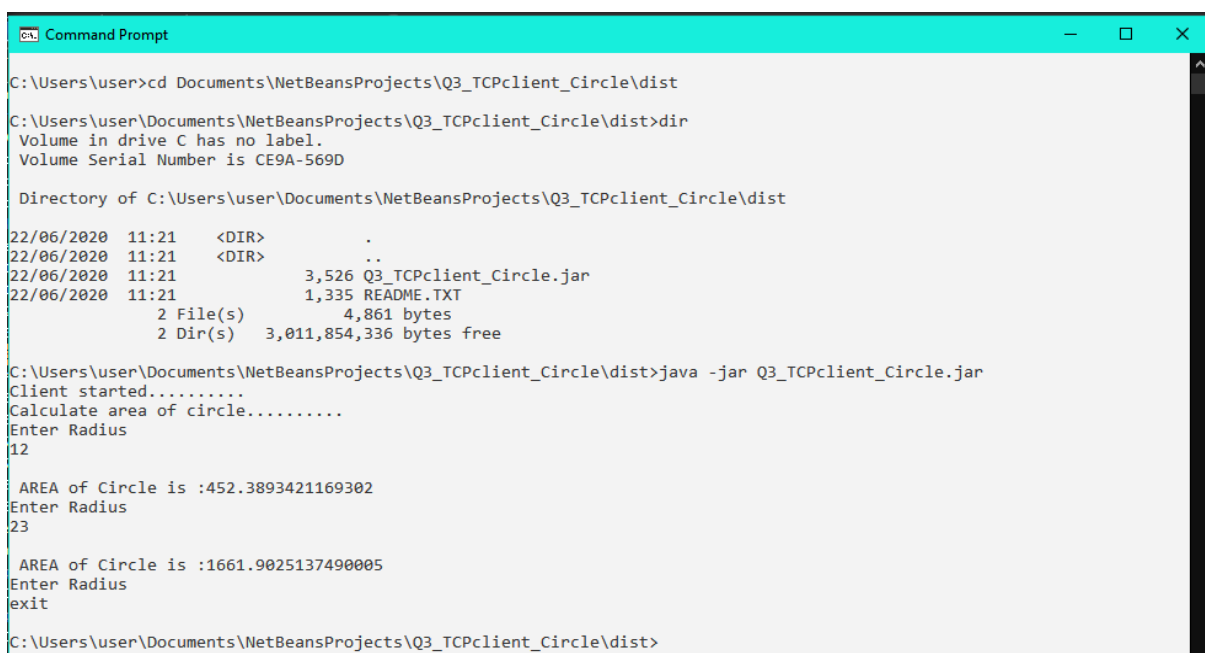
                    if (inputline.equalsIgnoreCase("exit")) {

                        break;
                    }

                    System.out.println("Ok..I will calculate the area of circle for "
                    + "radius =" + radius);

                    double area = Math.PI * radius * radius;
                    inputline = Double.toString(area);
                    out.println(inputline);
                }
            }
            System.out.println("Server stopped.");
        }
    }
}

```



```

C:\Users\user>cd Documents\NetBeansProjects\Q3_TCPclient_Circle\dist
C:\Users\user\Documents\NetBeansProjects\Q3_TCPclient_Circle\dist>dir
Volume in drive C has no label.
Volume Serial Number is CE9A-569D

Directory of C:\Users\user\Documents\NetBeansProjects\Q3_TCPclient_Circle\dist

22/06/2020  11:21    <DIR>          .
22/06/2020  11:21    <DIR>          ..
22/06/2020  11:21                3,526 Q3_TCPclient_Circle.jar
22/06/2020  11:21                1,335 README.TXT
               2 File(s)              4,861 bytes
               2 Dir(s)  3,011,854,336 bytes free

C:\Users\user\Documents\NetBeansProjects\Q3_TCPclient_Circle\dist>java -jar Q3_TCPclient_Circle.jar
Client started.....
Calculate area of circle.....
Enter Radius
12
AREA of Circle is :452.3893421169302
Enter Radius
23
AREA of Circle is :1661.9025137490005
Enter Radius
exit
C:\Users\user\Documents\NetBeansProjects\Q3_TCPclient_Circle\dist>

```

```
Command Prompt
Microsoft Windows [Version 10.0.18363.900]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\user>cd Documents\NetBeansProjects\Q3_TCPserver_Circle\dist

C:\Users\user\Documents\NetBeansProjects\Q3_TCPserver_Circle\dist>dir
Volume in drive C has no label.
Volume Serial Number is CE9A-569D

Directory of C:\Users\user\Documents\NetBeansProjects\Q3_TCPserver_Circle\dist

22/06/2020  11:21    <DIR>          .
22/06/2020  11:21    <DIR>          ..
22/06/2020  11:21                3,868 Q3_TCPserver_Circle.jar
22/06/2020  11:21                1,335 README.TXT
               2 File(s)              5,203 bytes
               2 Dir(s)  3,011,584,000 bytes free

C:\Users\user\Documents\NetBeansProjects\Q3_TCPserver_Circle\dist>java -jar Q3_TCPserver_Circle.jar
Server started.
Listening to client.....
Ok..I will calculate the area of circle for radius =12
Ok..I will calculate the area of circle for radius =23
```

#### 4. Write a program to send email using Java [2073, 2074]

```
package q4_email;

import java.io.IOException;
import java.io.PrintWriter;
import java.net.InetAddress;
import java.net.Socket;
import java.util.Scanner;

public class Email_Send {

    public static void main(String[] args) throws IOException {
        Email email = new Email(
            "anusha474232@gmail.com",
            "anusha.pant@student.trinity.edu.np",
            "Test email.");
        email.send();
    }
}

class Email {
    private Scanner in = null;
    private PrintWriter out = null;
    private final String SMTP_SERVER = "smtp.ntc.net.np";
    private final int SMTP_PORT = 25;
    private String from = null;
    private String to = null;
    private String message = null;

    public Email(String from, String to, String message) {
        this.from = from;
        this.to = to;
        this.message = message;
    }
}
```

```

    }

    private void send(String s) throws IOException {
        System.out.println(">> " + s);
        out.print(s.replaceAll("\n", "\r\n"));
        out.print("\r\n");
        out.flush();
    }

    private void receive() throws IOException {
        String line = in.nextLine();
        System.out.println("    " + line);
    }

    public void send() throws IOException {
        Socket socket = new Socket(SMTP_SERVER, SMTP_PORT);
        in = new Scanner(socket.getInputStream());
        out = new PrintWriter(socket.getOutputStream(), true);
        String hostName = InetAddress.getLocalHost().getHostName();
        receive();
        send("HELO " + hostName);
        receive();
        send("MAIL FROM: <" + from + ">");
        receive();
        send("RCPT TO: <" + to + ">");
        receive();
        send("DATA");
        receive();
        send(message);
        send(".");
        receive();
        socket.close();
    }
}

```

```

Output X
user - C:\Users\user X Q4_Email (run) X
run:
220 smtp.ntc.net.np ESMTP
>> HELO DESKTOP-0BSSL3Q
530 #5.7.0 Must issue a STARTTLS command first
>> MAIL FROM: <anusha474232@gmail.com>
530 #5.7.0 Must issue a STARTTLS command first
>> RCPT TO: <anusha.pant@student.trinity.edu.np>
530 #5.7.0 Must issue a STARTTLS command first
>> DATA
530 #5.7.0 Must issue a STARTTLS command first
>> Test email.
>> .
500 #5.5.1 command not recognized
BUILD SUCCESSFUL (total time: 8 seconds)

```



**5. Write client and server programs in which a server program accepts the length and breadth of a rectangle from the client program, computes area, sends the computed area to the client program, and displays it by client program.**

**Tcpclient\_lengthbreadth.java**

```
package tcpclient_lengthbreadth;

import java.io.IOException;
import java.io.PrintWriter;
import java.net.Socket;
import java.util.Scanner;

public class Tcpclient_lengthbreadth {

    public static void main(String[] args) throws IOException {
        final String HOST = "127.0.0.1";
        final int PORT = 1234;

        System.out.println("Client started.....");
        System.out.println("Calculate area of circle.....");

        try {
            Socket socket = new Socket(HOST, PORT);
            PrintWriter out = new PrintWriter(socket.getOutputStream(), true);
            Scanner in = new Scanner(socket.getInputStream());
            Scanner s = new Scanner(System.in);
            while (true) {
                System.out.println("Enter Length");
                String length = s.nextLine();
                out.println(length);
                System.out.println("Enter Breadth");
                String breadth = s.nextLine();
                out.println(breadth);
                if (length.equalsIgnoreCase("exit")) {
                    break;
                }
                System.out.println("\n AREA of Rectangle is :" + in.nextLine());
            }
        }
    }
}
```

**Tcpserver\_lengthbreadth.java**

```
package tcpserver_lengthbreadth;

import java.io.IOException;
import java.io.PrintWriter;
```

```

import java.net.ServerSocket;
import java.net.Socket;
import java.util.Scanner;

public class Tcpserver_lengthbreadth {

    public static void main(String[] args) throws IOException {
        final int PORT = 1234;
        System.out.println("Server started.");
        System.out.println("Listening to client.....");

        try {
            ServerSocket serverSocket = new ServerSocket(PORT);
            Socket clientSocket = serverSocket.accept();
            PrintWriter out = new PrintWriter(clientSocket.getOutputStream(),
            true);
            Scanner in = new Scanner(clientSocket.getInputStream()); {
                while (true) {
                    String line1 = in.nextLine();
                    int length = Integer.valueOf(line1);
                    String line2 = in.nextLine();
                    int breadth = Integer.valueOf(line2);

                    if (line1.equalsIgnoreCase("exit")) {

                        break;
                    }

                    System.out.println("Ok..I will calculate the area of rectangle for "
                    + "length =" + length + "breadth="+breadth);

                    double area = length*breadth;
                    String inputline = Double.toString(area);

                    out.println(inputline);
                }
            }

            System.out.println("Server stopped.");
        }
    }
}

```

```

C:\Users\user\Documents\NetBeansProjects\Q5_Tcpclient_lengthbreadth\dist>java -jar Tcpclient_lengthbreadth.jar
Client started.....
Calculate area of circle.....
Enter Length
12
Enter Breadth
12
AREA of Rectangle is :144.0
Enter Length

```

```
Command Prompt - java -jar Tcpserver_lengthbreadth.jar
Microsoft Windows [Version 10.0.18363.900]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\user>cd Documents\NetBeansProjects\Q5_Tcpserver_lengthbreadth\dist

C:\Users\user\Documents\NetBeansProjects\Q5_Tcpserver_lengthbreadth\dist>dir
Volume in drive C has no label.
Volume Serial Number is CE9A-569D

Directory of C:\Users\user\Documents\NetBeansProjects\Q5_Tcpserver_lengthbreadth\dist

22/06/2020  11:36    <DIR>          .
22/06/2020  11:36    <DIR>          ..
22/06/2020  11:36                1,339  README.TXT
22/06/2020  11:36                4,113  Tcpserver_lengthbreadth.jar
               2 File(s)              5,452 bytes
               2 Dir(s)  3,000,791,040 bytes free

C:\Users\user\Documents\NetBeansProjects\Q5_Tcpserver_lengthbreadth\dist>java -jar Tcpserver_lengthbreadth.jar
Server started.
Listening to client.....
Ok..I will calculate the area of rectangle for length =12breadth=12
```

## 6. Write echo server and echo client program using UDP.

### UDPCClient.java

```
package udpclient;

import java.net.DatagramPacket;
import java.net.DatagramSocket;

public class UDPCClient {

    DatagramSocket ds;
    DatagramPacket dp;
    public static void main(String[] args) {
        UDPCClient client=new UDPCClient();
        client.receiveDateTime();
    }
    public void receiveDateTime(){
        byte b[]=new byte[64];
        String str;
        try{
            ds=new DatagramSocket(1234);
            dp=new DatagramPacket(b,b.length);
            while(true){
                ds.receive(dp);
                str=new String(dp.getData());
                System.out.println("Time Signal Received from"+dp.getAddress()+
                "\nTime is:"+str);
            }
        }
        catch(Exception e){
            System.out.println(e);
        }
    }
}
```

```
}  
}
```

### UDPServer.java

```
package udpserver;  
  
import java.net.DatagramPacket;  
import java.net.DatagramSocket;  
import java.net.InetAddress;  
import java.util.Date;  
  
public class UDPServer {  
  
    DatagramSocket ds;  
    DatagramPacket dp;  
    InetAddress addr;  
    public static void main(String[] args) throws Exception {  
        UDPServer db = new UDPServer();  
        db.sendDateTime();  
    }  
    public UDPServer() throws Exception{  
        addr=InetAddress.getByName("localhost");  
        ds=new DatagramSocket();  
    }  
    public void sendDateTime() throws Exception{  
        byte[] buff;  
        for(int i=1;i<=5;i++){  
            Thread.sleep(2000);  
            System.out.println("Sending Date and Time to Client");  
            String s=(new Date()).toString();  
            buff=s.getBytes();  
            dp=new DatagramPacket(buff,buff.length,addr,1234);  
            ds.send(dp);  
        }  
    }  
}
```



```
Microsoft Windows [Version 10.0.18363.900]  
(c) 2019 Microsoft Corporation. All rights reserved.  
  
C:\Users\user>cd Documents\NetBeansProjects\Q6_UDPServer\dist  
  
C:\Users\user\Documents\NetBeansProjects\Q6_UDPServer\dist>dir  
Volume in drive C has no label.  
Volume Serial Number is CE9A-569D  
  
Directory of C:\Users\user\Documents\NetBeansProjects\Q6_UDPServer\dist  
  
22/06/2020  11:49    <DIR>          .  
22/06/2020  11:49    <DIR>          ..  
22/06/2020  11:49                2,255 Q6_UDPServer.jar  
22/06/2020  11:49                1,328 README.TXT  
                2 File(s)              3,583 bytes  
                2 Dir(s)  2,995,200,000 bytes free  
  
C:\Users\user\Documents\NetBeansProjects\Q6_UDPServer\dist>java -jar Q6_UDPServer.jar  
Sending Date and Time to Client  
Sending Date and Time to Client  
Sending Date and Time to Client  
Sending Date and Time to Client  
Sending Date and Time to Client  
  
C:\Users\user\Documents\NetBeansProjects\Q6_UDPServer\dist>
```

```
Command Prompt - java -jar Q6_UDPClient.jar
Microsoft Windows [Version 10.0.18363.900]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\user>cd Documents\NetBeansProjects\Q6_UDPClient\dist

C:\Users\user\Documents\NetBeansProjects\Q6_UDPClient\dist>dir
Volume in drive C has no label.
Volume Serial Number is CE9A-569D

Directory of C:\Users\user\Documents\NetBeansProjects\Q6_UDPClient\dist

22/06/2020  11:49    <DIR>          .
22/06/2020  11:49    <DIR>          ..
22/06/2020  11:49                2,281 Q6_UDPClient.jar
22/06/2020  11:49                1,328 README.TXT
               2 File(s)              3,609 bytes
               2 Dir(s)      2,995,335,168 bytes free

C:\Users\user\Documents\NetBeansProjects\Q6_UDPClient\dist>java -jar Q6_UDPClient.jar
Time Signal Received from/127.0.0.1
Time is:Mon Jun 22 11:51:23 NPT 2020
Time Signal Received from/127.0.0.1
Time is:Mon Jun 22 11:51:25 NPT 2020
Time Signal Received from/127.0.0.1
Time is:Mon Jun 22 11:51:27 NPT 2020
Time Signal Received from/127.0.0.1
Time is:Mon Jun 22 11:51:29 NPT 2020
```

**7. Write client and server programs in which a server program accepts a radius of a circle from the client program, computes area, sends the computed area to the client program, and displays it by client program. The server should be able to handle multiple clients.**

#### **Thread TCPcircle\_client.java**

```
package thread_tcpcircle_client;

import java.io.IOException;
import java.io.PrintWriter;
import java.net.Socket;
import java.util.Scanner;

public class Thread_TCPcircle_client {

    public static void main(String[] args) throws IOException {
        final String HOST = "127.0.0.1";
        final int PORT = 1234;

        System.out.println("Client started.....");
        System.out.println("Calculate area of circle.....");

        try {
            Socket socket = new Socket(HOST, PORT);
```

```
        PrintWriter out = new  
            PrintWriter(socket.getOutputStream(), true);  
Scanner in = new Scanner(socket.getInputStream());  
Scanner s = new Scanner(System.in);) {  
while (true) {  
System.out.println("Enter Radius");  
String radius = s.nextLine();  
out.println(radius);  
if (radius.equalsIgnoreCase("exit")) {  
break;  
}  
System.out.println("\n AREA of Circle is : " +  
in.nextLine());  
}  
}  
}
```

**Thread TCPcircle server.java**

```
package thread_tcpcircle_server;

import java.io.IOException;
import java.io.PrintWriter;
import java.net.ServerSocket;
import java.net.Socket;
import java.util.Scanner;

public class Thread_TCPcircle_server {

    public static void main(String[] args) throws
        IOException, NumberFormatException {
        final int PORT = 1234;
        ServerSocket serverSocket = new ServerSocket(PORT);

        System.out.println("Server started.");
        System.out.println("Listening to client.....");

        while (true) {
            Socket clientSocket = serverSocket.accept();
            Thread t = new Thread() {
                @Override
                public void run() {
                    try {
                        PrintWriter out = new PrintWriter(clientSocket.getOutputStream(), true);
                        Scanner in = new Scanner(clientSocket.getInputStream());
                        while (in.hasNextLine()) {
                            String inputline = in.nextLine();
                            int radius= Integer.valueOf(inputline);
```

```

if (inputline.equalsIgnoreCase("exit")) {

break;
}
System.out.println("\nOk..I will calculate the area of circle for "
+ "radius =" + radius);
double area = Math.PI * radius * radius;
inputline = Double.toString(area);
out.println(inputline);
}
} catch (IOException e) {
}
}
};
t.start();
}
}
}
}

```

```

C:\Users\user>cd Documents\NetBeansProjects\Q7_Thread_TCPcircle_server\dist
C:\Users\user\Documents\NetBeansProjects\Q7_Thread_TCPcircle_server\dist>dir
Volume in drive C has no label.
Volume Serial Number is CE9A-569D

Directory of C:\Users\user\Documents\NetBeansProjects\Q7_Thread_TCPcircle_server\dist

22/06/2020  11:55    <DIR>          .
22/06/2020  11:55    <DIR>          ..
22/06/2020  11:55                4,762 Q7_Thread_TCPcircle_server.jar
22/06/2020  11:55                1,342 README.TXT
                2 File(s)              6,104 bytes
                2 Dir(s)            2,991,542,272 bytes free

C:\Users\user\Documents\NetBeansProjects\Q7_Thread_TCPcircle_server\dist>java -jar Q7_Thread_TCPcircle_server.jar
Server started.
Listening to client.....

Ok..I will calculate the area of circle for radius =12
Ok..I will calculate the area of circle for radius =1
Ok..I will calculate the area of circle for radius =14
Ok..I will calculate the area of circle for radius =12
Ok..I will calculate the area of circle for radius =1

```

```

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C:\Users\user>cd Documents\NetBeansProjects\Q7_Thread_TCPcircle_client\dist
C:\Users\user\Documents\NetBeansProjects\Q7_Thread_TCPcircle_client\dist>dir
Volume in drive C has no label.
Volume Serial Number is CE9A-569D

Directory of C:\Users\user\Documents\NetBeansProjects\Q7_Thread_TCPcircle_client\dist

22/06/2020  11:54    <DIR>          .
22/06/2020  11:54    <DIR>          ..
22/06/2020  11:54                3,617 Q7_Thread_TCPcircle_client.jar
22/06/2020  11:54                1,342 README.TXT
                2 File(s)              4,959 bytes
                2 Dir(s)            2,992,734,208 bytes free

C:\Users\user\Documents\NetBeansProjects\Q7_Thread_TCPcircle_client\dist>java -jar Q7_Thread_TCPcircle_client.jar
Client started.....
Calculate area of circle.....
Enter Radius
12

AREA of Circle is :452.3893421169302
Enter Radius
1

AREA of Circle is :3.141592653589793
Enter Radius

```

```
Command Prompt - java -jar Q7_Thread_TCPcircle_client.jar
C:\Users\user\Documents\NetBeansProjects\Q7_Thread_TCPcircle_client\dist>dir
Volume in drive C has no label.
Volume Serial Number is CE9A-569D

Directory of C:\Users\user\Documents\NetBeansProjects\Q7_Thread_TCPcircle_client\dist

22/06/2020  11:54    <DIR>          .
22/06/2020  11:54    <DIR>          ..
22/06/2020  11:54                3,617 Q7_Thread_TCPcircle_client.jar
22/06/2020  11:54                1,342 README.TXT
                2 File(s)              4,959 bytes
                2 Dir(s)            2,991,652,864 bytes free

C:\Users\user\Documents\NetBeansProjects\Q7_Thread_TCPcircle_client\dist>java -jar Q7_Thread_TCPcircle_client.jar
Client started.....
Calculate area of circle.....
Enter Radius
14

AREA of Circle is :615.7521601035994
Enter Radius
12

AREA of Circle is :452.3893421169302
Enter Radius
1

AREA of Circle is :3.141592653589793
Enter Radius
```

8. Write client and server programs in which a server program accepts the length and breadth of a rectangle from the client program, computes area, sends the computed area to the client program, and displays it by client program. The server should be able to handle multiple clients.

#### Thread TCPrectangle client.java

```
package thread_tcprectangle_client;

import java.io.IOException;
import java.io.PrintWriter;
import java.net.Socket;
import java.util.Scanner;

public class Thread_TCPrectangle_client {

    public static void main(String[] args) throws IOException {
        final String HOST = "127.0.0.1";
        final int PORT = 1234;

        System.out.println("Client started.....");
        System.out.println("Calculate area of rectangle.....");

        try {
            Socket socket = new Socket(HOST, PORT);
            PrintWriter out = new PrintWriter(socket.getOutputStream(), true);
            Scanner in = new Scanner(socket.getInputStream());
```



```

Scanner s = new Scanner(System.in);) {
while (true) {
System.out.println("Enter Length");
String length = s.nextLine();
out.println(length);
System.out.println("Enter Breadth");
String breadth = s.nextLine();
out.println(breadth);
if (length.equalsIgnoreCase("exit")) {
break;
}
System.out.println("\n AREA of Rectangle is :" + in.nextLine());
}
}
}
}
}

```

### **Thread TCPrectangle server.java**

```

package thread_tcprectangle_server;

import java.io.IOException;
import java.io.PrintWriter;
import java.net.ServerSocket;
import java.net.Socket;
import java.util.Scanner;

public class Thread_TCPrectangle_server {

    public static void main(String[] args) throws IOException,
        NumberFormatException {
        final int PORT = 1234;
        ServerSocket serverSocket = new ServerSocket(PORT);

        System.out.println("Server started.");
        System.out.println("Listening to client.....");

        while (true) {
            Socket clientSocket = serverSocket.accept();
            Thread t = new Thread() {
                @Override
                public void run() {
                    try {
                        PrintWriter out = new PrintWriter(clientSocket.getOutputStream(),
                            true);
                        Scanner in = new Scanner(clientSocket.getInputStream());) {
                            while (in.hasNextLine()) {
                                String line1 = in.nextLine();
                                int length = Integer.valueOf(line1);
                                String line2 = in.nextLine();

```

```

int breadth = Integer.valueOf(line2);

if (line1.equalsIgnoreCase("exit")) {

break;
}

System.out.println("\nOk..I will calculate the area of rectangle for
"
+ "length =" + length + "breadth=" + breadth);

double area = length * breadth;
String inputline = Double.toString(area);

out.println(inputline);
}
} catch (IOException e) {
}
}
};
t.start();
}
}
}
}

```

The image contains two screenshots of Windows Command Prompts. The top screenshot shows the server application running. The user navigates to the directory C:\Users\user\Documents\NetBeansProjects\Q8\_Thread\_TCPrectangle\_server\dist and runs the command java -jar Q8\_Thread\_TCPrectangle\_server.jar. The output shows the server starting and listening for a client. Two lines of input are shown: "Ok..I will calculate the area of rectangle for length =12breadth=12" and "Ok..I will calculate the area of rectangle for length =1breadth=2".

The bottom screenshot shows the client application running. The user navigates to the directory C:\Users\user\Documents\NetBeansProjects\Q8\_Thread\_TCPrectangle\_client\dist and runs the command java -jar Q8\_Thread\_TCPrectangle\_client.jar. The output shows the client starting and prompting the user to calculate the area of a rectangle. The user enters "12" for length and "12" for breadth. The output shows the calculated area: "AREA of Rectangle is :144.0".

```
Command Prompt - java -jar Q8_Thread_TCPrectangle_client.jar
Microsoft Windows [Version 10.0.18363.900]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\user>cd Documents\NetBeansProjects\Q8_Thread_TCPrectangle_client\dist

C:\Users\user\Documents\NetBeansProjects\Q8_Thread_TCPrectangle_client\dist>dir
Volume in drive C has no label.
Volume Serial Number is CE9A-569D

Directory of C:\Users\user\Documents\NetBeansProjects\Q8_Thread_TCPrectangle_client\dist

22/06/2020  12:02    <DIR>          .
22/06/2020  12:02    <DIR>          ..
22/06/2020  12:02                3,742 Q8_Thread_TCPrectangle_client.jar
22/06/2020  12:02                1,345 README.TXT
               2 File(s)              5,087 bytes
               2 Dir(s)  2,981,552,128 bytes free

C:\Users\user\Documents\NetBeansProjects\Q8_Thread_TCPrectangle_client\dist>java -jar Q8_Thread_TCPrectangle_client.jar
Client started.....
Calculate area of rectangle.....
Enter Length
1
Enter Breadth
2

AREA of Rectangle is :2.0
Enter Length
```