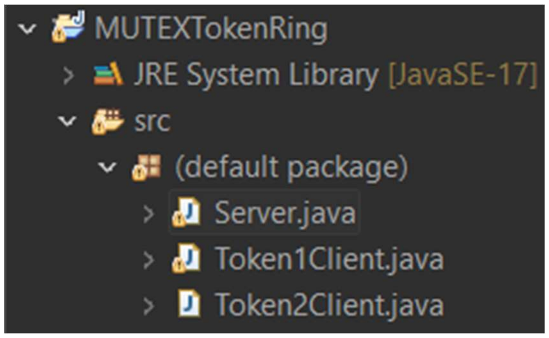
Practical No. 05

Mutual Exclusion

Q.1 Write a java program to implement mutual exclusion using Token ring algorithm.



```
MUTEXTokenRing
    JRE System Library [JavaSE-17]
    src
        (default package)
            Server.java
            Token1Client.java
            Token2Client.java
```

Code:

Server.java

```
import java.net.DatagramPacket;

import java.net.DatagramSocket;

import java.io.*;

class TokenServer{

        public static void main(String args[]) throws Exception{

                while(true) {

                        Server sr = new Server();

                        sr.recPort(8000);

                        sr.recData();

                }

        }

}

public class Server {

        boolean hasToken = false;

        boolean sendData = false;

        int recport;
```

```
	void recPort(int recport) {
		this.recport = recport;
	}
	void recData() throws Exception{
		byte bu[] = new byte[256];
		DatagramSocket ds;
		DatagramPacket dp;
		String str;
		ds = new DatagramSocket(recport);
		dp = new DatagramPacket(bu, bu.length);
		ds.receive(dp);
		ds.close();
		str = new String(dp.getData(), 0, dp.getLength());
		System.out.println("The message is " + str);
	}
}
```

Token1Client.java

```
import java.io.BufferedReader;
import java.io.InputStreamReader;
import java.net.DatagramPacket;
import java.net.DatagramSocket;
import java.net.InetAddress;

public class Token1Client {
	public static void main(String []args) throws Exception{
		InetAddress lclhost;
		BufferedReader br;
```

```
String str = "";
TokenClient12 tkcl, tkser;

boolean hasToken;
boolean setSendData;

while(true) {
        lclhost = InetAddress.getLocalHost();
        tkcl = new TokenClient12(lclhost);
        tkser = new TokenClient12(lclhost);
        //tkcl.setSendPort(9001);
        tkcl.setSendPort(9004);
        tkcl.setRecPort(8002);
        lclhost = InetAddress.getLocalHost();
        tkser.setSendPort(9000);
        if(tkcl.hasToken == true) {
                System.out.println("Do you want to Enter the Data -> Yes/No");
                br = new BufferedReader(new InputStreamReader(System.in));
                str = br.readLine();
                if(str.equalsIgnoreCase("yes")) {
                        System.out.println("Ready to Send");
                        tkser.setSendData = true;
                        tkser.sendData();
                        tkser.setSendData = false;
                }else if (str.equalsIgnoreCase("no")) {
                        System.out.println("I'm in else");
                        tkcl.hasToken = false;
```

```
					tkcl.sendData();
					tkcl.recData();
					System.out.println("I'm Leaving");
				}
			}
			else {
				System.out.println("Entering Receiving Mode ...");
				tkcl.recData();
				tkcl.hasToken = true;
			}
		}
	}
}

class TokenClient12{
	InetAddress lclhost;
	int sendport, recport;
	boolean hasToken = true;
	boolean setSendData = false;
	TokenClient12 tkcl, tkser;

	public TokenClient12(InetAddress lclhost) {
		// TODO Auto-generated constructor stub
		this.lclhost = lclhost;
	}

	public void setSendPort(int sendport) {
        this.sendport = sendport;
}

public void setRecPort(int recport) {
        this.recport = recport;
}

void sendData() throws Exception{
        BufferedReader br;
        String str = "Token";
        DatagramSocket ds;
        DatagramPacket dp;
        if(setSendData == true) {
                System.out.println("sending");
                System.out.println("Enter the Data :");
                br = new BufferedReader(new InputStreamReader(System.in));
                str = "Client One... " + br.readLine();
                System.out.println("now sending");
        }
        ds = new DatagramSocket(sendport);
        dp = new DatagramPacket(str.getBytes(), str.length(), lclhost, sendport-1000);
        ds.send(dp);
        ds.close();
        setSendData = false;
        hasToken = false;
}
void recData() throws Exception{
```

```
                String msgStr;
                byte buffer[] = new byte[256];
                DatagramPacket dp;
                DatagramSocket ds;
                ds = new DatagramSocket(recport);
                dp = new DatagramPacket(buffer, buffer.length);
                ds.receive(dp);
                ds.close();
                msgStr = new String(dp.getData(), 0, dp.getLength());
                System.out.println("The data is " + msgStr);
                if(msgStr.equals("Token")) {
                        hasToken = true;
                }
        }
}
```

Token2Client.java

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

public class Token2Client {
  static boolean setSendData ; static boolean hasToken ;
public static void main(String arg[]) throws Exception
{
  InetAddress lclhost; BufferedReader br;
  String str1;
  TokenClient21 tkcl;
  TokenClient21 ser;
```

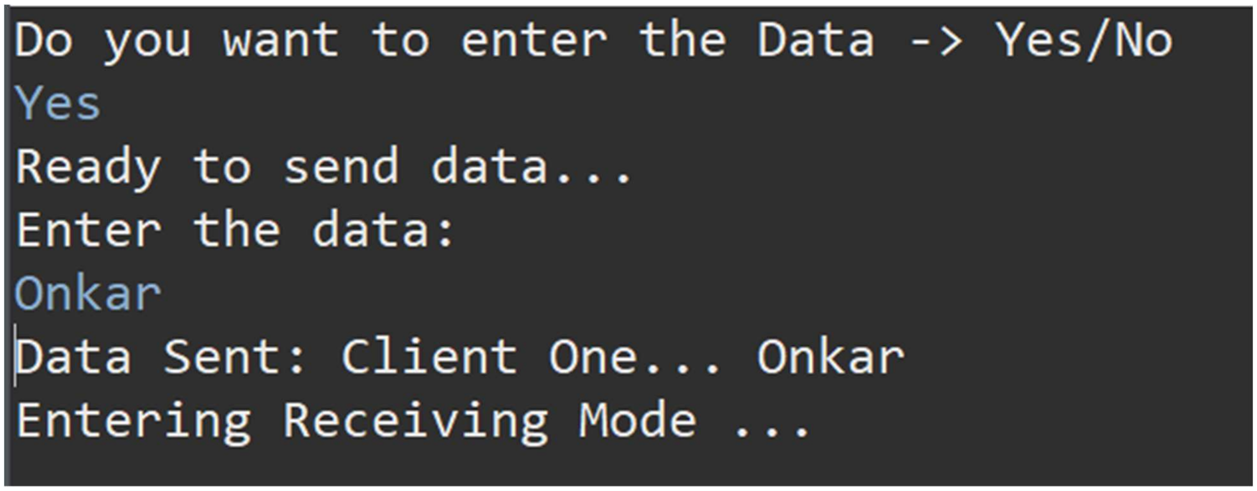
```
while(true)
{
   lclhost=InetAddress.getLocalHost();
   tkcl = new TokenClient21(lclhost);
   tkcl.setRecPort(8004);
   tkcl.setSendPort(9002);
   lclhost=InetAddress.getLocalHost();
   ser = new TokenClient21(lclhost);
   ser.setSendPort(9000);
   System.out.println("entering if");
   if(hasToken == true)
   {
      System.out.println("Do you want to enter the Data –> YES/NO");
      br=new BufferedReader(new InputStreamReader(System.in));
      str1=br.readLine();
      if(str1.equalsIgnoreCase("yes"))
      {
         System.out.println("ignorecase");
         ser.setSendData = true;
         ser.sendData();
      }
      else if(str1.equalsIgnoreCase("no"))
      {
         tkcl.sendData();
         tkcl.hasToken=false; tkcl.sendData(); tkcl.recData();
         hasToken=false;
      }
```

```
        }
        else
        {
            System.out.println("entering recieving mode");
            tkcl.recData();
            hasToken=true;
        }
    }
}
}
class TokenClient21
{
    InetAddress lclhost;
    int sendport,recport;
    boolean setSendData = false;
    boolean hasToken = false;
    TokenClient21 tkcl;
    TokenClient21 ser;
    TokenClient21(InetAddress lclhost)
    {
        this.lclhost = lclhost;
    }
    void setSendPort(int sendport)
    {
        this.sendport = sendport;
    }
    void setRecPort(int recport)
```

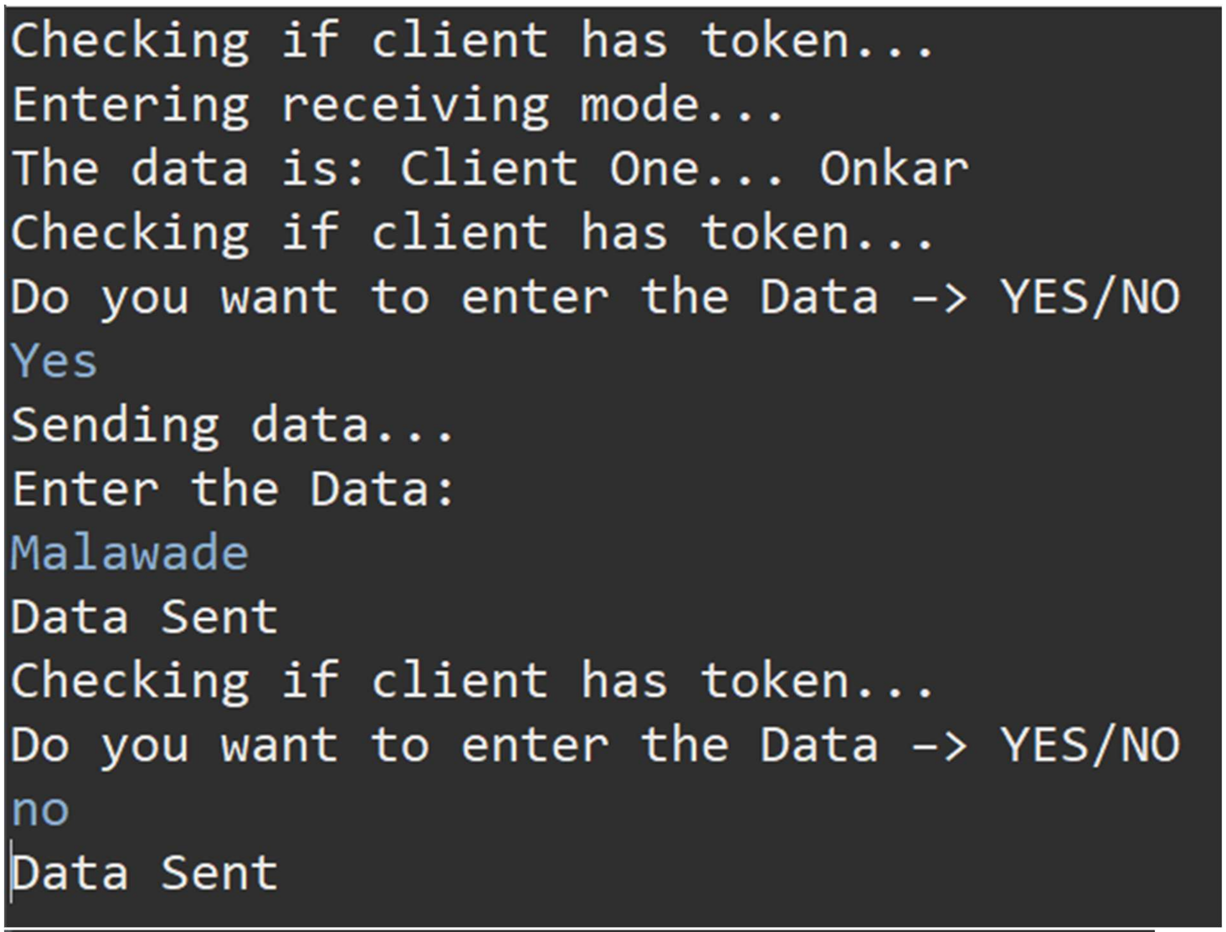
```
  {
     this.recport = recport;
  }
  void sendData() throws Exception
  {
     System.out.println("case");
     BufferedReader br;
     String str="Token";
     DatagramSocket ds;
     DatagramPacket dp;
     if(setSendData == true)
     {
        System.out.println("Enter the Data");
        br=new BufferedReader(new InputStreamReader(System.in));
        str ="ClientTwo….." + br.readLine();
     }
     ds = new DatagramSocket(sendport);
     dp = new DatagramPacket(str.getBytes(),str.length(),lclhost,sendport-1000);
     ds.send(dp);
     ds.close();
     System.out.println("Data Sent");
     setSendData = false; hasToken = false;
  }
  @SuppressWarnings("resource")
void recData()throws Exception
  {
     String msgstr;
```

```
        byte buffer[] = new byte[256];
        DatagramSocket ds;
        DatagramPacket dp;
        ds = new DatagramSocket(recport);
        ds = new DatagramSocket(4000);
        dp = new DatagramPacket(buffer,buffer.length);
        ds.receive(dp);
        ds.close();
        msgstr = new String(dp.getData(),0,dp.getLength());
        System.out.println("The data is "+msgstr);
        if(msgstr.equals("Token"))
        {
           hasToken = true;
        }
   }
}
```

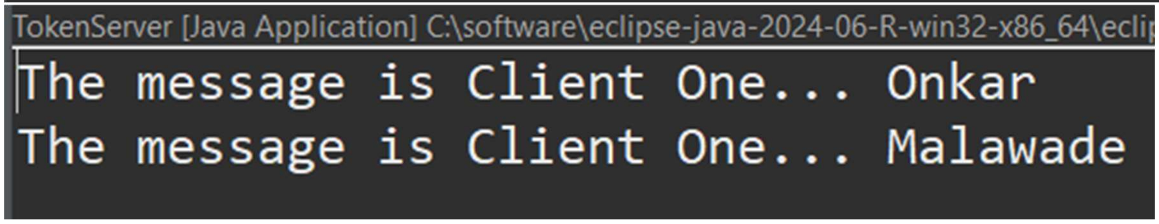
Output:



```
Do you want to enter the Data -> Yes/No
Yes
Ready to send data...
Enter the data:
Onkar
Data Sent: Client One... Onkar
Entering Receiving Mode ...
```



```
Checking if client has token...
Entering receiving mode...
The data is: Client One... Onkar
Checking if client has token...
Do you want to enter the Data -> YES/NO
Yes
Sending data...
Enter the Data:
Malawade
Data Sent
Checking if client has token...
Do you want to enter the Data -> YES/NO
no
Data Sent
```



TokenServer [Java Application] C:\software\eclipse-java-2024-06-R-win32-x86_64\eclip

```
The message is Client One... Onkar
The message is Client One... Malawade
```