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DISTRIBUTED COMPUTING (DC)
EXPERIMENT 04

AIM: Implement group communication using JAVA.

CODE:

GCServer.java

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

public class GCServer {
    // List to store client handlers
    static ArrayList<ClientHandler> clients = new ArrayList<ClientHandler>();

    public static void main(String[] args) throws Exception {
        // Server listens on port 25
        ServerSocket server = new ServerSocket(25);
        Message msg = new Message();
        int count = 0;

        // Accepting clients continuously
        while (true) {
            Socket ss = server.accept();
            DataInputStream din = new DataInputStream(ss.getInputStream());
            DataOutputStream dout = new DataOutputStream(ss.getOutputStream());

            // Creating a new client handler thread
            ClientHandler chlr = new ClientHandler(ss, din, dout, msg);
            clients.add(chlr);
            chlr.start();
            count++;
        }
    }

    // Class to handle message broadcasting
    class Message {
        String msg;

        public void setMsg(String msg) {
            this.msg = msg;
        }

        public void getMsg() {
            System.out.println("\nNEW GROUP MESSAGE: " + this.msg);

            // Broadcasting message to all connected clients
        }
    }
}
```

```

for (int i = 0; i < GCServer.clients.size(); i++) {
    try {
        System.out.println("Client: " + GCServer.clients.get(i).ip + " ");
        GCServer.clients.get(i).out.writeUTF(this.msg);
        GCServer.clients.get(i).out.flush();
    } catch (Exception e) {
        System.out.println(e);
    }
}
}
}

```

// Class to handle individual client connections

class ClientHandler extends Thread {

 DataInputStream in;

 DataOutputStream out;

 Socket socket;

 boolean conn;

 Message msg;

 String ip;

public ClientHandler(Socket s, DataInputStream din, DataOutputStream dout, Message msg) {

 this.socket = s;

 this.in = din;

 this.out = dout;

 this.msg = msg;

 this.conn = true;

 this.ip = (((InetSocketAddress) s.getRemoteSocketAddress()).getAddress()).toString().replace("/", "", 1);

 }

public void run() {

 while (conn) {

 try {

 // Reading message from client and broadcasting

 String input = this.in.readUTF();

 this.msg.setMsg(input);

 this.msg.getMsg();

 } catch (Exception e) {

 conn = false;

 System.out.println(e);

 }

 }

 closeConn();

}

// Method to close client connection

public void closeConn() {

 try {

 this.in.close();

 this.out.close();

```

        this.socket.close();
    } catch (Exception e) {
        System.out.println(e);
    }
}
}

```

GCMaster.Java

```

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

public class GCMaster {
    public static void main(String[] args) throws Exception {
        // Connecting to the server on localhost at port 25
        Socket client = new Socket("127.0.0.1", 25);
        DataInputStream din = new DataInputStream(client.getInputStream());
        DataOutputStream dout = new DataOutputStream(client.getOutputStream());

        System.out.println("Connected as Master");
        Scanner sc = new Scanner(System.in);
        String send = "";

        // Sending messages to server until "stop" is entered
        do {
            System.out.print("Enter message: ");
            send = sc.nextLine();
            dout.writeUTF(send);
            dout.flush();
        } while (!send.equals("stop"));

        // Closing connections
        dout.close();
        din.close();
        client.close();
        sc.close();
    }
}

```

GCSlave.Java

```

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

public class GCSlave {
    public static void main(String[] args) throws Exception {
        // Connecting to the server on localhost at port 25
        Socket client = new Socket("127.0.0.1", 25);
        DataInputStream din = new DataInputStream(client.getInputStream());
    }
}

```

```

System.out.println("Connected as Slave");
String recv = "";

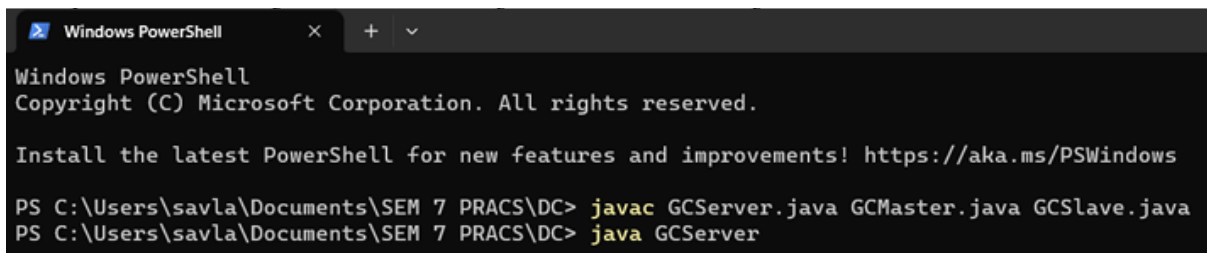
// Receiving messages from server until "stop" is received
do {
    recv = din.readUTF();
    System.out.println("Master Message: " + recv);
} while (!recv.equals("stop"));

// Closing connection
din.close();
client.close();
}
}

```

OUTPUT:

- Compile GCServer.java, GCMaster.java and GCSlave.java



```

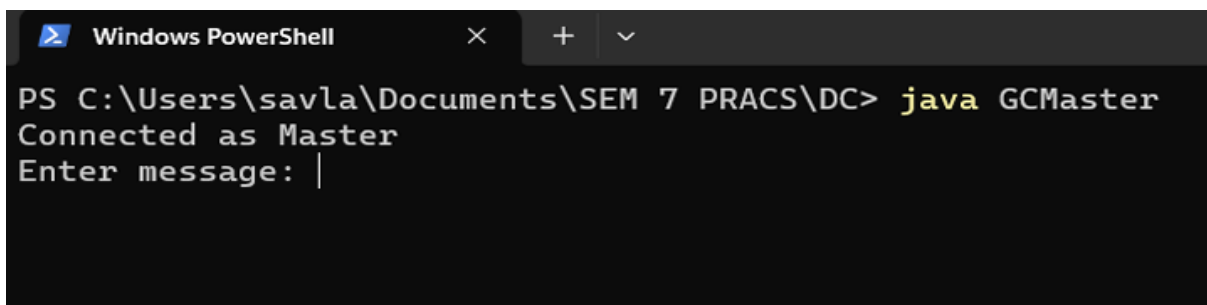
Windows PowerShell
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Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\savla\Documents\SEM 7 PRACS\DC> javac GCServer.java GCMaster.java GCSlave.java
PS C:\Users\savla\Documents\SEM 7 PRACS\DC> java GCServer

```

- Execute GCMaster.java



```

Windows PowerShell
PS C:\Users\savla\Documents\SEM 7 PRACS\DC> java GCMaster
Connected as Master
Enter message: |

```

- Execute GCSlave.java in multiple command prompts

```
Windows PowerShell
PS C:\Users\savla\Documents\SEM 7 PRACS\DC> java GCSlave
Connected as Slave

Windows PowerShell
PS C:\Users\savla\Documents\SEM 7 PRACS\DC> java GCSlave
Connected as Slave
```

- Type Message in GCMaster.java

```
Windows PowerShell
PS C:\Users\savla\Documents\SEM 7 PRACS\DC> java GCMaster
Connected as Master
Enter message: I solemnly swear to god that I am upto no good
Enter message: Mischief Managed
Enter message: stop
PS C:\Users\savla\Documents\SEM 7 PRACS\DC>

Windows PowerShell
NEW GROUP MESSAGE: I solemnly swear to god that I am upto no good
Client: 127.0.0.1;
Client: 127.0.0.1;
Client: 127.0.0.1;

NEW GROUP MESSAGE: Mischief Managed
Client: 127.0.0.1;
Client: 127.0.0.1;
Client: 127.0.0.1;

NEW GROUP MESSAGE: stop
Client: 127.0.0.1;
Client: 127.0.0.1;
Client: 127.0.0.1;
java.io.EOFException
java.io.EOFException
java.io.EOFException

Windows PowerShell
PS C:\Users\savla\Documents\SEM 7 PRACS\DC> java GCSlave
Connected as Slave
Master Message: I solemnly swear to god that I am upto no good
Master Message: Mischief Managed
Master Message: stop
PS C:\Users\savla\Documents\SEM 7 PRACS\DC>
```

<pre>Windows PowerShell NEW GROUP MESSAGE: I solemnly swear to god that I an upto no good Client: 127.0.0.1; Client: 127.0.0.1; Client: 127.0.0.1; NEW GROUP MESSAGE: Mischief Managed Client: 127.0.0.1; Client: 127.0.0.1; Client: 127.0.0.1; NEW GROUP MESSAGE: stop Client: 127.0.0.1; Client: 127.0.0.1; Client: 127.0.0.1; java.io.EOFException java.io.EOFException java.io.EOFException</pre>	<pre>Windows PowerShell PS C:\Users\savla\Documents\SEM 7 PRACS\DC> java GCSlave Connected as Slave Master Message: I solemnly swear to god that I an upto no good Master Message: Mischief Managed Master Message: stop PS C:\Users\savla\Documents\SEM 7 PRACS\DC></pre>
<pre>Windows PowerShell PS C:\Users\savla\Documents\SEM 7 PRACS\DC> java GCMaster Connected as Master Enter message: I solemnly swear to god that I am upto no good Enter message: Mischief Managed Enter message: stop PS C:\Users\savla\Documents\SEM 7 PRACS\DC></pre>	<pre>Windows PowerShell PS C:\Users\savla\Documents\SEM 7 PRACS\DC> java GCSlave Connected as Slave Master Message: I solemnly swear to god that I an upto no good Master Message: Mischief Managed Master Message: stop PS C:\Users\savla\Documents\SEM 7 PRACS\DC></pre>