IPC: Sockets

Subject:- Unix Operating System

System Lab Class :- TYIT

Name	PRN
Aditi Sudhir Ghate	2020BTEIT00044

Assignment No 9a

Title- Write two programs (server/client) and establish a socket to communicate..

Objective:

1. To learn about fundamentals of IPC through C socket programming.
2. Learn and understand the OS interaction with socket programming.
3. Use of system call and IPC mechanism to write effective application programs.
4. To know the port numbering and process relation
5. To knows the iterative and concurrent server concept

Theory:

A very basic one-way Client and Server setup where a Client connects, sends messages to the server and the server shows them using socket connection. Java API networking package (java.net) takes care of all of that, making network programming very easy for programmers

CLIENT SIDE PROGRAMMING:

Establish a Socket Connection

- To connect to another machine we need a socket connection.
- A socket connection means the two machines have information about each other’s network location (IP Address) and TCP port.The java.net.Socket class represents a Socket.
- To open a socket: Socket socket = new Socket(“127.0.0.1”, 5000)
  • First argument – IP address of Server. (127.0.0.1 is the IP address of localhost, where code will run on a single stand-alone machine).
  • Second argument – TCP Port. (Just a number representing which application to run on a server. For example, HTTP runs on port 80. Port number can be from 0 to 65535) To communicate over a socket connection, streams are used to both input and output the data. Closing the connection The socket connection is closed explicitly once the message to the server is sent.

SERVER SIDE PROGRAMMING:

Establish a Socket Connection

To write a server application two sockets are needed.

- ▪ A ServerSocket which waits for the client requests (when a client makes a new Socket())
- ▪ A plain old Socket socket to use for communication with the client. getOutputStream() method is used to send the output through the socket. Close the Connection After finishing, it is important to close the connection by closing the socket as well as input/output streams

Data Dictionary:

SR.NO	Variable/Function	Data Type	Use
1.	ss	ServerSocket	Create a socket for server side communication.
2.	s	Socket	Socket is created
3.	dos	DatOutputStream	Output Stream
4.	dis	DataInputStream	Input Stream.
5.	str	String	String to display messages from clients.

Program-

Server-

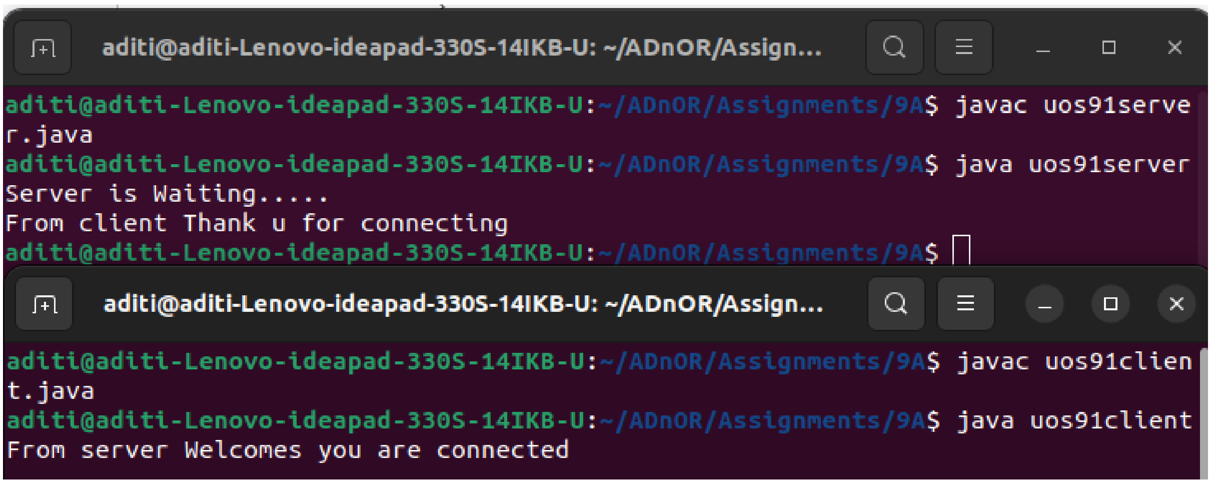
```
import java.net.*;
import java.io.*;
class uos91server
{
public static void main(String []args)throws Exception
{
ServerSocket ss=new ServerSocket(5050);
System.out.println("Server is Waiting.....");
Socket s=ss.accept();
DataOutputStream dos=new DataOutputStream(s.getOutputStream());
DataInputStream dis=new DataInputStream(s.getInputStream());
String str="Welcomes you are connected \n";
dos.writeUTF(str);
str=dis.readUTF();
System.out.println("From client"+" "+str);
ss.close();
s.close();
dos.close();
dis.close();
}
}
```

Client-

```
import java.net.*;
import java.io.*;
class uos91client
{
public static void main(String []args)throws Exception
{
```

```
Socket s=new Socket("localhost",5050);
DataOutputStream dos=new DataOutputStream(s.getOutputStream());
DataInputStream dis=new DataInputStream(s.getInputStream());
String str=dis.readUTF();
System.out.println("From server"+" "+str);
str="Thank u for connecting";
dos.writeUTF(str);
s.close();
dos.close();
dis.close();
}
}
```

Output-


aditi@aditi-Lenovo-ideapad-330S-14IKB-U: ~/ADnOR/Assign...
aditi@aditi-Lenovo-ideapad-330S-14IKB-U: ~/ADnOR/Assign...

```
aditi@aditi-Lenovo-ideapad-330S-14IKB-U:~/ADnOR/Assignments/9A$ javac uos91serve
r.java
aditi@aditi-Lenovo-ideapad-330S-14IKB-U:~/ADnOR/Assignments/9A$ java uos91server
Server is Waiting.....
From client Thank u for connecting
aditi@aditi-Lenovo-ideapad-330S-14IKB-U:~/ADnOR/Assignments/9A$ 
```

```
aditi@aditi-Lenovo-ideapad-330S-14IKB-U:~/ADnOR/Assignments/9A$ javac uos91clien
t.java
aditi@aditi-Lenovo-ideapad-330S-14IKB-U:~/ADnOR/Assignments/9A$ java uos91client
From server Welcomes you are connected
```

Conclusion-

Java can be used to establish communication between two programs on remote or the same machine using sockets and system calls.

Reference-

http://www.prasannatech.net/2008/07/socket-programming-tutorial.html