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Socket Programming

Aim:- To implement socket programming and establish connection between client and server.

Theory:-

Socket programming is a way of connecting two nodes on a network to communicate with each other. One socket (node) listens on a particular port at an IP, while other socket reaches out to the other to form a connection. Server forms the listener socket while the client reaches out to the server. They form the backbones of web browsing.

Implementation:-

Java Socket programming is used for communication between the applications running on different JRE.

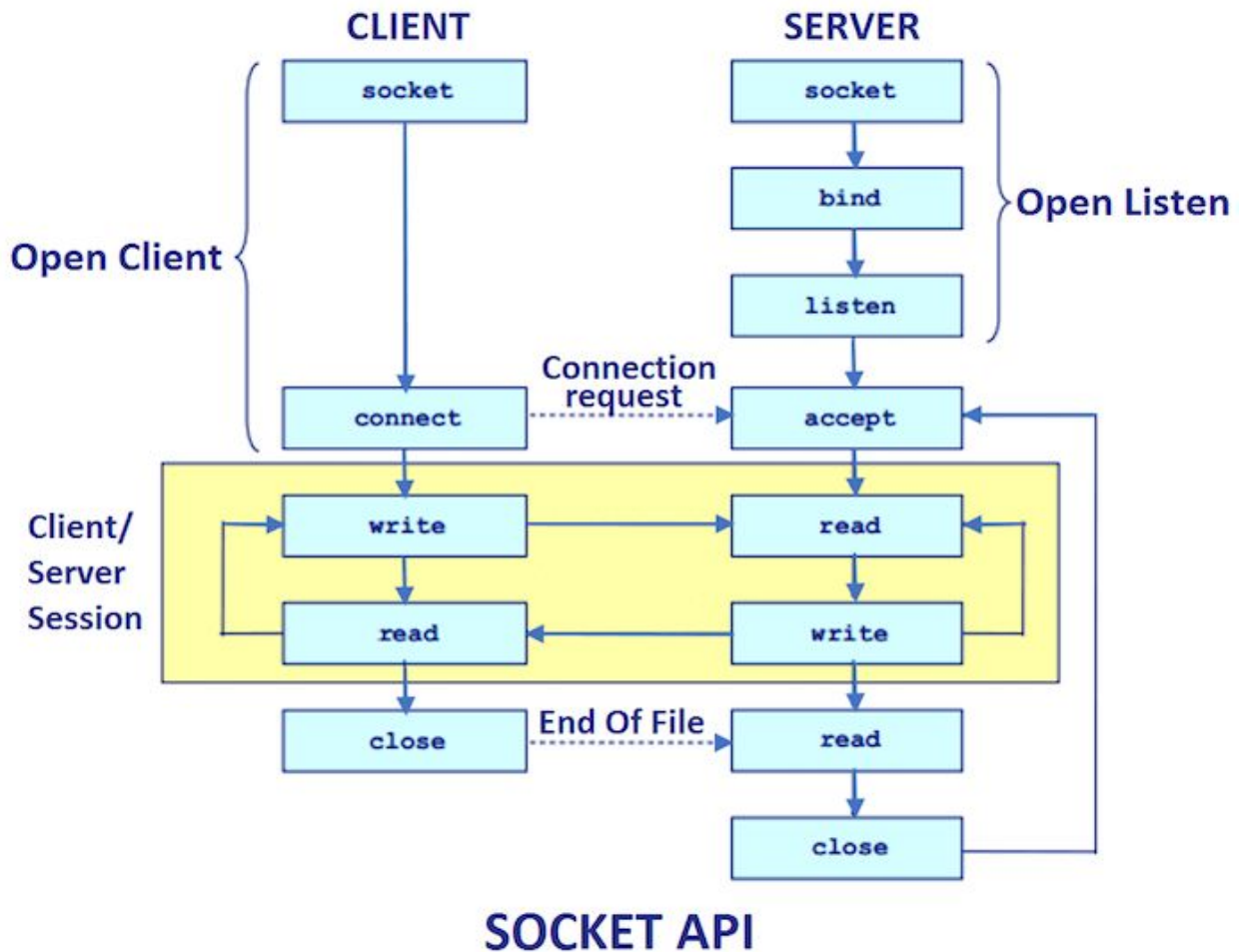
Java Socket programming can be connection-oriented or connection-less.

Socket and ServerSocket classes are used for connection-oriented socket programming and DatagramSocket and DatagramPacket classes are used for connection-less socket programming.

The client in socket programming must know two information:

1. IP Address of Server
2. Port number.

Here, we are going to make one-way client and server communication. In this application, client sends a message to the server, server reads the message and prints it. Here, two classes are being used: Socket and ServerSocket. The Socket class is used to communicate client and server. Through this class, we can read and write message. The ServerSocket class is used at server-side. The accept() method of ServerSocket class blocks the console until the client is connected. After the successful connection of client, it returns the instance of Socket at server-side.



Socket class

A socket is simply an endpoint for communications between the machines. The Socket class can be used to create a socket.

Important methods

Method	Description
1) public InputStream getInputStream()	returns the InputStream attached with this socket.
2) public OutputStream getOutputStream()	returns the OutputStream attached with this socket.
3) public synchronized void close()	closes this socket

ServerSocket class

The ServerSocket class can be used to create a server socket. This object is used to establish communication with the clients.

Important methods

Method	Description
1) public Socket accept()	returns the socket and establish a connection between server and client.
2) public synchronized void close()	closes the server socket.

Code:-

MyServer.java

```
import java.net.*;
import java.io.*;
class MyServer{
public static void main(String args[])throws Exception{
ServerSocket ss=new ServerSocket(3333);
Socket s=ss.accept();
DataInputStream din=new DataInputStream(s.getInputStream());
DataOutputStream dout=new DataOutputStream(s.getOutputStream());
BufferedReader br=new BufferedReader(new InputStreamReader(System.in));

String str="",str2="";
while(!str.equals("stop")){
str=din.readUTF();
System.out.println("client says: "+str);
str2=br.readLine();
dout.writeUTF(str2);
dout.flush();
}
din.close();
}
```

```
s.close();  
ss.close();  
}}
```

MyClient.java

```
import java.net.*;  
import java.io.*;  
class MyClient{  
public static void main(String args[])throws Exception{  
    Socket s=new Socket("localhost",3333);  
    DataInputStream din=new DataInputStream(s.getInputStream());  
    DataOutputStream dout=new DataOutputStream(s.getOutputStream());  
    BufferedReader br=new BufferedReader(new InputStreamReader(System.in));  
  
    String str="",str2="";  
    while(!str.equals("stop")){  
        str=br.readLine();  
        dout.writeUTF(str);  
        dout.flush();  
        str2=din.readUTF();  
        System.out.println("Server says: "+str2);  
    }  
  
    dout.close();  
    s.close();  
}}
```

Output:-

Server

```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.19041.572]
(c) 2020 Microsoft Corporation. All rights reserved.

C:\Users\Shah Parshwa Prakash\Desktop\all files\DCN\socket programming>java MyServer
Error: Could not find or load main class MyServer
Caused by: java.lang.NoClassDefFoundError: MyServer (wrong name: Myserver)

C:\Users\Shah Parshwa Prakash\Desktop\all files\DCN\socket programming>java MyServer
client says: Hello Server,This is client.
Hi Client,Welcome.Lets Communicate.
client says: Can you send me some information on TCP?
Yaa sure!TCP is Transmission Control Protocol which is connection-oriented and reliable.
client says: Thanks.I also want information on ICMP?
ICMP(Internet Control Message Protocol) is used for error reporting and management queries.
client says: Thank you Server.Bye.
stop
client says: stop
STOP

C:\Users\Shah Parshwa Prakash\Desktop\all files\DCN\socket programming>
```

Client

```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.19041.572]
(c) 2020 Microsoft Corporation. All rights reserved.

C:\Users\Shah Parshwa Prakash\Desktop\all files\DCN\socket programming>java MyClient
Hello Server,This is client.
Server says: Hi Client,Welcome.Lets Communicate.
Can you send me some information on TCP?
Server says: Yaa sure!TCP is Transmission Control Protocol which is connection-oriented and reliable.
Thanks.I also want information on ICMP?
Server says: ICMP(Internet Control Message Protocol) is used for error reporting and management queries.
Thank you Server.Bye.
Server says: stop
stop
Server says: STOP

C:\Users\Shah Parshwa Prakash\Desktop\all files\DCN\socket programming>
```

Conclusion:- Hence, I implemented Socket Programming using Socket and ServerSocket Class in Java.

References:-

<https://www.javatpoint.com/socket-programming>