Java

Networking

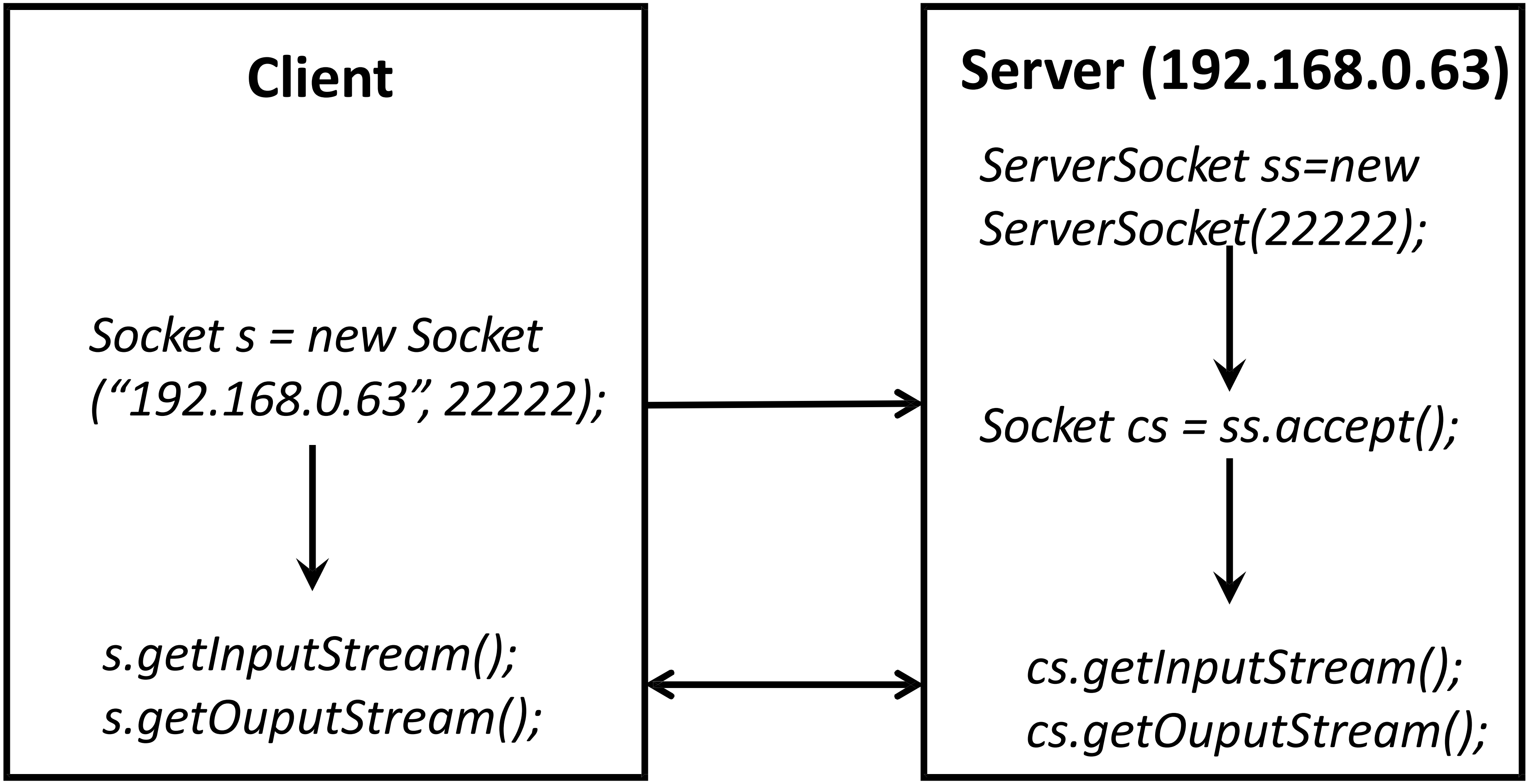
TCP

- TCP stands for Transmission Control Protocol
- TCP is connection-oriented
- It provides reliability
- What is Server and Client?
  - A server is a piece of software which advertises and then provides some service on request
  - A client is a piece of software (usually on a different machine) which makes use of some service

TCP Sockets

- Two types of TCP Sockets
- ***ServerSocket***
  - ServerSocket is used by servers so that they can accept incoming connections from client
- ***Socket***
  - Socket is used by clients who wish to establish a connection to a (remote) server

Scenario



Client

```
Socket s = new Socket
(“192.168.0.63”, 22222);
```

```
s.getInputStream();
s.getOuputStream();
```

Server (192.168.0.63)

```
ServerSocket ss=new
ServerSocket(22222);
```

```
Socket cs = ss.accept();
```

```
cs.getInputStream();
cs.getOuputStream();
```

TCP Sockets

- ***Packages***:
  - ***tcpsimple*** *(no threading)*
  - ***tcpstring*** *(multithreading, string send and receive)*
  - ***tcpobject*** *(multithreading, object send and receive)*
  - ***tcpdiff*** *(multithreading, multiple clients simultaneously)*

- ***Sources***:
  - *Server.java*
  - *Client.java*
  - *ReadThread.java*
  - *WriteThread.java*
  - *NetworkUtil.java*
  - *Data.java*

UDP

- UDP stands for User Datagram Protocol
- UDP is not connection-oriented
- It does not provide reliability
- It sends and receives packets known as Datagram

Datagram Packet & Socket

- One type of Packet and one type of Socket
- ***DatagramPacket***
  - Used to encapsulate Datagram
- ***DatagramSocket***
  - DatagramSocket is used by both server and client to receive DatagramPacket
- ***Example****: DatagramServer.java, DatagramClient.java*

InetAddress

- Java has a class ***java.net.InetAddress*** which abstracts network addresses
- Major methods
  - getLocalHost()
  - getByAddress()
  - getByName()
- ***Example****: HostInfo.java, AddressGenerator.java, Resolver.java*

HttpURLConnection

- Java provides a class ***java.net.HttpURLConnection*** that provides support for HTTP connections
- You can obtain HttpURLConnection by calling openConnection( ) on URL object
- You must cast the result to HttpURLConnection
- You can then read/write from/to the connection
- ***Example****: TestHttpURL.java*