Client Server Computing
(Sockets for Client)

CS Computing: Things to Consider

- Basic Network Concepts
- Sockets for Clients
- Streams
- Sockets for Servers
- Threads

Basic Network Concepts

- Assumptions:
    - Internet Protocol
    - TCP (Transmission Control)

Socket (Client)

- Socket = Host + Port
- Host/Node
- Any device or computer with IP address (through DHCP or by manually assigning an IP address)

Socket (Client)

- Port (65,535 per transport layer protocol)
- Port numbers between 1 and 1,023 are reserved
  - FTP – 21
  - HTTP – 80
  - SMTP – 25
  - POP – 110
  - TELNET – 23

Internet Addressing with JAVA

A host can be accessed using a dotted decimal format (e.g. 125.212.62.18) as IP address or hostname (www.slu.edu.ph)

Java Class that deals with IP addresses/hostnames

`java.net.InetAddress`

java.net.InetAddress
Common Methods

byte[] getAddress()

String getHostAddress()

String getHostName()

static InetAddress getLocalHost()

static InetAddress getByName(String hostname)

static InetAddress[] getAllByName(String hostname)

Exercise 1

Create a program that will look up a variable number of host names/IP addresses

The program will ask the name of a host to search and then immediately display the host names and ip addresses of the host given by the user.

The program will then ask the user if the user wants to search for another host (if yes, repeat the process above, otherwise, exit the program)

Exercise 1

Sample Run:
Host 1 – Type IP address/Hostname: **yahoo.com**
　　Number of Hosts/IPs: 2
　　Host name: yahoo.com
　　IP Address: 68.180.206.184
　　Host name: yahoo.com
　　IP Address: 206.190.60.37
Search another? [y/n]: **Y**
Host 2 – Type IP address/Hostname: **slu.edu.ph**
　　Number of Hosts/IPs: 1
　　Host name: slu.edu.ph
　　IP Address: 125.212.62.5
Search another? [y/n]: **N**
BYE!!!

Creating Client Sockets in Java

- Constructors
  - Socket (InetAddress address, int port) throws java.io.IOException, java.lang.SecurityException
  - Socket (String host, int port) throws java.net.UnknownHostException, java.io.IOException, java.lang.SecurityException

Sample

```java
import java.net.*;
// ....

    String server_name = "localhost";
    try {
        Socket sock = new Socket(server_name, 21);
        System.out.println(" *** Connected to " + server_name + " ***");
        // do the IO here (with streams)
        sock.close( );
    } catch (java.io.IOException e) {
        System.err.println("error connecting to " + server_name + ": " + e);
        return;
    }
```

Exercise 2

- Create a program that will scan all open ports (from 1 to 1024) of a computer (localhost or any computer within a network)

- Sample

  - >java -cp . PortChecker www.slu.edu.ph
  - www.slu.edu.ph : 21 is open!
  - www.slu.edu.ph : 22 is open!
  - www.slu.edu.ph : 80 is open!
  - www.slu.edu.ph : 111 is open!
  - www.slu.edu.ph : 443 is open!
  - www.slu.edu.ph : 724 is open!