CMPU4021 Distributed Systems – Labs

Week 1 – Intro to Networking in Java

Learning Outcomes:

1. Be able to access Network Parameters
2. Working with URLs

Note 1: You may need to setup the environment for smooth running. Read `Lab_Environment_Setup.txt` how to create a BAT file that you need to run (for Windows). It sets the PATH and CLASSPATH for Java version being run.

There is also `lab_env_sample_bat.txt`: you can rename it to `lab_env_sample.bat` and use it. It is created to run with Java version 17.0.11, but the installation path in the labs or your laptop may differ.

Note 2: Java versions installed in Labs:

- 17.0.11 (Default Install)
- 8u241
- 21.0.3
- 22.0.1

You will need to modify it the PATH and CLASSPATH – depending where you are running the lab tasks.

Note 3: For MAC users – read `running_on_mac_lab_help.txt` file.

Note 4: If you copy/paste command lines from a PDF/Word document it may not work, as invisible characters are often added. Please type it manually or copy/paste as TEXT ONLY

Tasks

T1. Examine, compile and run `JT1/IPFinder.java` and `JT1/MyLocalIPAddress.java`. Go through the code to understand it. Remember, to compile...

```
:/> javac -classpath . IPFinder.java
:/> javac -classpath . MyLocalIPAddress.java
 and to run...
:/> java -classpath . IPFinder
:/> java -classpath . MyLocalIPAddress
```

Notice the use of the import statements to use the IO and networking packages.

1.1. Examine, compile and run `JT1_1/ ListNIFs.java`

The ListNIFs.java lists the name of all the network interfaces and subinterfaces (if any exist) on a machine.

1.2. Examine, compile and run `JT1_2/ ListNets.java`

`ListNets.java` lists all the network interfaces and their addresses on a machine.

You can obtain this information from a `NetworkInterface` instance by using one of two methods. The first method, `getInetAddresses()`, returns an `Enumeration` of `InetAddress`. The other method, `getInterfaceAddresses()`, returns a list of `java.net.InterfaceAddress` instances.
This method is used when you need more information about an interface address beyond its IP address. For example, you might need additional information about the subnet mask and broadcast address when the address is an IPv4 address, and a network prefix length in the case of an IPv6 address.

T2. Examine, compile and run `JT2/ParseURL.java`

The output displayed by the program should be as follows:

```
protocol = http
authority = example.com:80
host = example.com
port = 80
path = /docs/books/tutorial/index.html
query = name=networking
filename =
/docs/books/tutorial/index.html?name=networking
ref = DOWNLOADING
```

Change `aURL` variable and observe the output.

Further Reading

https://docs.oracle.com/en/java/javase/22/docs/api/java.base/java/net/package-summary.html