Engineering for Internet Applications SWEN90002 Lab Week 1 REVISION LAB - NO FORMAL LAB CLASS

General Information

The purpose of the labs is to obtain some practical experience with a range of different techniques and tools. The lab content is additional to the lecture content, i.e. it is not necessarily implementing something discussed in lectures, though it may be.

Lab exercises are *not* prescribed step-by-step - you are expected to achieve the goals of the lab exercises by searching for and making use of additional information, on the Internet, via discussion on the subject forum, or from relevant books.

Lab slides may contain some additional lecture material prior to the Lab itself.

Eclipse IDE is provided for you to use in the labs. We will use the same Eclipse installation as SWEN90007 - this can be found in CIS Specific Applications.

Lab Reports

Each lab requires you to submit a **Lab Report** that provides the results from the lab; that may include answering questions.

- Your lab report is to be **PDF FORMAT ONLY**.
- All other formats may not be accepted and may result in lost or no marks.
- E.g. **DO NOT SUBMIT .DOC OR .DOCX FORMAT**

The Lab slides (these slides) will indicate when a result from the lab needs to be included in the Lab Report; using a "📌" icon and a reference number, e.g. "📌 (1): include the output of your java code in your Lab Report."

Completing and Submitting

You don't need to complete the lab during the lab class, you can complete in your own time (and in any labs available to you, or at home, etc.) and submit the Lab Report by the lab-specific due dates discussed in Week 1 Lecture. Submission is via LMS.

The Lab Report is one of the results of completing a lab and sometimes may be the only result. You may also need to submit other files when completing a lab.

Follow the submission instructions for each lab exactly. The only archive formats acceptable are:

- **.ZIP**,

- **.TAR** and
- **.WAR** (for web archives).

DO NOT USE .RAR FORMAT.

When submitting multiple files, **ALWAYS** submit them in an archive as a single file. **Never** use absolute pathnames for the archive.

Lab Week 1 Overview

The purpose of the lab is to revise some concepts of networking and to brush up on some basic HTML and Javascript. None of these things require using a server, they can all be done on the desktop.

1. Read through the slides (next) on computer networks, TCP/UDP/IP.
2. Write a Java program that inputs a host name and outputs the host's official host name and IP address.
3. Modify the program to "ping" the provided host and output whether it is reachable or not.
4. Write a simple HTML page.

1. Computer Networks TCP/UDP/IP

Practically all Internet applications are based on the TCP/UDP/IP protocols, including Web servers.

- IP: Internet Protocol
    - ♦ specifies, among other things, how routers and other network devices process and transmit information and the *addressing* scheme that is used to identify hosts
    - ♦ every host connected to the Internet has a unique IP address
    - ♦ network address translation is used to share a single IP address among a number of hosts

🔖 (1) Write in your lab report a paragraph describing the drawbacks of using network address translation, as opposed to using a unique IP address for every host.

1. Computer Networks cont...

- UDP: User Datagram Protocol is *connectionless* and *unreliable*, used to send a fixed sized "packet" of information from one host to another (like mail)
- TCP: Transmission Control Protocol is *connection-oriented* and *reliable*, used to send a stream of information between hosts (like telephone)

Every host that uses UDP or TCP, whether it be a client or a server will make use of a port numbers for each instance of use. The port number is 16 bits so there are 65536 different ports available on each host.

A complete address for a UDP packet or a TCP connection requires a host IP address *and* a port number.

1. Computer Networks cont...

Servers *bind* to port numbers and *listen* to them for incoming packets and connections from clients.

Clients are responsible for initiating communication to servers.

Well known servers use well known ports, e.g.:

Port	Protocol
7	Echo
9	Discard
11	Users
13	Daytime
17	Quote
19	Chargen
53	Nameserver
67	Bootps
68	Bootpc
69	TFTP
111	RPC
123	NTP

2. Java refresher

Write a Java program called `hostname.java` (make sure to call it **exactly** this name) that inputs exactly one host name from the user as a command line argument and prints the host name and IP address.

```
!java
import java.net.*;
...
public static void main(String[] args) {
...
    ConsoleIO.write("Found: "+
        inetAddress.getHostName() + "=" +
        inetAddress.getHostAddress());
...
}
```

3. Java refresher cont...

Examine the InetAddress interface. Use the `isReachable(int timeout)` method to also print whether the host name is reachable or not: e.g.

```
www.unimelb.edu.au = 128.250.148.40 and is reachable
yahoo.com = 98.138.253.109 and is not reachable
```

📌 (3.1) What is the purpose of the `timeout` argument?

📌 (3.2) If an `IOException` is thrown by `isReachable`, what would be an appropriate action to take and why?

📌 (3.3) Include the output of your program for the following inputs: `localhost`, `www.unimelb.edu.au`, `yahoo.com`, `google.com`.

4. HTML refresher

- Prepare a basic HTML page called `lab1.html`. Make sure to call it **exactly** this name.
- Include in `lab1.html`:
  - ♦ some headings,
  - ♦ some text,
  - ♦ some tables and
  - ♦ some links to images found on the Internet (you don't need to include the actual image files in your submission, just link to them).

Make up your own content for this.

Some handy references for HTML: w3schools, echoecho.com, tizag

📌 (4) Write a paragraph explaining the use of the `<div>` and `<span>` tags. What is the difference between them?

5. Submission

📌 (5) Submit a `lab1.zip` file (or `.tar` file) with the following contents:

- `lab1.pdf`
- `hostname.java`
- `lab1.html`

Those should be the only files in your archive submission and they should be named exactly as given above.