Victoria University of Wellington
School of Engineering and Computer Science

SWEN221: Software Development

Lab Handout (worth ≈1.3% of overall mark)

The purpose of this Tutorial is to sharpen your understanding of Java Threading.

1 Simple Web

SimpleWeb is a very simple web server that can transmit files to a web-browser for display. To run the web server, you can use the following command:

```
java simpleweb.Main
```

At this stage, a web server will be running on port 8080 by default. You can see the server by pointing your web browser to the url `http://localhost:8080/`. The server will serve up files from the current directory (by default). A simple example web-site is provided which you should be able to see. Depending on how you import the Jar, you could be required to manually move index.html, images and shakespeare in the top level folder.

2 What to do

The main issue with SimpleWeb is that it is a *single-threaded web-server*. This means that it can only serve one request at a time. This differs from the majority of real web-servers which can service multiple requests from different users simultaneously, and can often deliver hundreds or thousands of pages per second.

2.1 Task 1

Your first task is to verify that SimpleWeb is indeed single-threaded. There are instructions on the front-page of the simple web-site provided. What you should do is attempt to open a large file from that page in one tab, and then try to load another file in a separate tab. You will find that, until the large file is completed, no other files can be accessed (i.e. the browser window will just sit with the ticker going around and around). I have deliberately reduced the maximum transmission rate of the SimpleWeb server to try and highlight this effect as much as possible.

2.2 Task 2

Your second task is to upgrade SimpleWeb to be a *multithreaded webserver*. To do this, you will need to create a worker thread. When a connection is accepted, this worker thread should take control of the socket and process the request separately, allowing the main thread to accept more connections.

2.3 Task 3

The final task relates to the log method. You may notice in your multi-threaded version of SimpleWeb, that the log messages often appear distorted and some messages come in the middle of others. By using synchronisation, you should resolve this such that each log message is reported intact.

Marking Guide

Each lab is worth just under 1% of your overall mark for SWEN221. The lab should be marked during the lab sessions, according to the following grade scale:

- **0**: Student didn't attend lab.
- **E**: Student did not really participate in the lab.
- **D**: Student's participation was *poor*. For example, he/she made some attempt to work on the lab, but did not complete any activities.
- **C**: Student's participation was *satisfactory*. That is, he/she completed the first task.
- **B**: Student's participation was *good*. That is, he/she completed the second task.
- **A**: Student's participation was *excellent*. That is, he/she completed all tasks.