Writing a (Simple) Web Server

Preamble

This is a **group assignment of up to three (3) members per team**. Marks gained through this assignment will form part of your final marks for the computation of your grades.

By proceeding with this assignment, you acknowledge that you have read and understood the entire assignment document, including the **Rules of Engagement** and **Statement on Academic and Professional Misconduct**.

Overview

In this assignment, you are required to write a simple web server using the Emojicode[1] programming language and deploy it to a cloud instance. Your web server should be capable of hosting static HTML pages and other static contents, such as images, JavaScript, and CSS files.

Task

Read and perform the tasks carefully. You will be required to employ some new knowledge to complete the tasks.

Set up an **Ubuntu Server 18.04 LTS or 20.04 LTS** cloud instance hosted on a cloud service provider of your choice. On this cloud instance, deploy your web server.

There is little restriction on how you can deploy and configure your web server, however you must ensure the following on your cloud instance

- All ports on the server must be closed *except* for ports 1002 and 8888; your SSH server listens at port 1002, instead of the default port 22
- In addition to your other Ubuntu user accounts, you must create a user account with the username **weihan** on your server, which must be accessible via SSH
- Your SSH server *must not* permit password-based logins, and only accept public-key authentication

[1] https://www.emojicode.org/

- The SSH authorized keys file for the user account **weihan** must contain the following three (3) public keys[2]

```
ecdsa-sha2-nistp521
AAAAE2VjZHNhLXNoYTItbmlzdHA1MjEAAAAIbmlzdHA1MjEAAACFBAA8TEpeBPWUALuFbS
RvRl1BoslQ+3eL5uMUQXGtiurCdwoGfhzV1VcfZGRKy/gTysIom4SoS+PmeudOzBdKBMdo
5QGEaNp1cFipDp4JiV1C5fDdTxstRRtBZ0aPJZmhe+4UWw7obu6E+BS9+eurDX4WEkacUZ
PXPuulwV/isn4HRWP+Dw==
```

```
ecdsa-sha2-nistp521
AAAAE2VjZHNhLXNoYTItbmlzdHA1MjEAAAAIbmlzdHA1MjEAAACFBABeXyksVFNYxhNOqg
AhrhvSxOi024cwhiYeCxjZosiHHASPFqUt19kSNgKeQxX4+BJy580zqxVz54q7jhGQRZqZ
vAGY8OGMaK+V/xZr+Jnjhemd1pWuo+erKyfDkeRqAqogFEmeO3gkIaSGsx7//XbyCTCuaD
ZBNGTFIvZpj7/OY5Ob3A==
```

```
ecdsa-sha2-nistp521
AAAAE2VjZHNhLXNoYTItbmlzdHA1MjEAAAAIbmlzdHA1MjEAAACFBAATID5NpT+S0Lv+QB
ael9elNnFiYCqD7J+wUFDyPUru9p0Eca+8GxggwuWI85KKN2cFQCkn+soeFtQIDex6lcu4
DwEYQb2W94HWliOS0h/6c4nNwCMHKQ/MYwFdfIRuOaezr7AKRmaE0yxxY/jQzkka0+xe5G
oHsraxtgk5cnyitFOuvA==
```

Note that you are **not** required to point a domain name to your server instance.

Web Server Requirements

Your web server must be written using the Emojicode programming language, and meet the following requirements

- Listens and serve contents over **TCP port 8888**
- Capable of serving static contents, such as static HTML pages, images, JavaScript, and CSS files
- Able to return appropriate status codes to user agents; at minimum it should properly return **200 OK** and **404 NOT FOUND** responses

Your server must be able to serve contents from a **web root directory** that is separate from where the web server executable resides[3].

[2] Note that each public key entry in the authorized keys file is a single line without line breaks; if in doubt, refer to the authorized keys file for your SSH account to understand its format.

[3] For example, if **`httpd`** is the file name of your web server executable, and it is located at **`/home/user/webserver/httpd`**, your web root directory must not be located at **`/home/user/webserver/`**, although it can be a subdirectory within that location, e.g., **`/home/user/webserver/webroot/`**.

Test Site

Towards the end of the assignment, you will be provided with a test website containing a set of files that you will need to host at your web root directory. The instructor shall access these resources on your web server as part of the grading process.

Should the instructor not be able to access the test website on your web server, you will be deemed to have failed to in your implementation or deployment of the web server.

Rules of Engagement

Please read the following carefully before proceeding.

- This assignment shall end on **Wednesday, April 7, 2021 at 11:59PM (end of Week 13)**

- You are not allowed to modify your web server or cloud instance configuration after the deadline; should we determine that any configuration have been modified after the deadline, action, including disqualification from this assignment, may be taken against the team

- A survey form will be provided closer to the assignment deadline where you will be required to specify your **team members**, **domain name**, and **IP address of your cloud instance**

- This is a team assignment; you are not allowed to communicate with other teams regarding any solutions or direction towards such during the assignment, whether online or offline, and including the use of any online collaboration platforms, shared document platforms, chat software, etc. to do so; any student caught doing so shall be deemed to be engaging in, or have the intention to engage in academic misconduct, and action, including disqualification from this assignment, may be taken against his or her team

- You are not allowed to modify the web server or cloud instance configuration of another team, or allow any other person to modify the web server or cloud instance configuration of your team; any student caught engaging in such behaviour shall be deemed to be engaging in, or have the intention to engage in academic misconduct, and action, including disqualification from this assignment, may be taken against his or her team

- Marks will be awarded for aspects of the web server development and features, unless otherwise stated

- No cooperation is allowed between teams, and you are not allowed to share findings or provide hints to, or receive answers or hints from others; any student caught doing so shall be deemed to be engaging in academic misconduct, and action, including disqualification from this assignment, may be taken against his or her team

- Unless otherwise prohibited by the rules of engagement, this is an open-book, open-internet assignment

Academic and Professional Misconduct

The instructor may disqualify any student from this assignment without prior notice, and submit his or her name for further disciplinary action, including expulsion from the university, in the instructor's sole discretion, if there is sufficient reason to believe that there is intention to engage in academic and / or professional misconduct, or that such misconduct had taken place.

Deliverables

You are to deliver a properly developed web server for this assignment, capable of hosting the **test website** provided. Leave the source code for your web server within the cloud instance, as the instructor will be retrieving them from there. All marking will be done by the instructor accessing your server and determining that the required items and functionality are in place. Hence there is no report or other deliverables to submit for this assignment.

Marks

You can be awarded up to **twenty (20) marks** for this assignment.

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