ECE 528- Application Software Design

Alan Palayil

Due Date: February 14th, 2023

Question 1:

i.

There are 2 network interfaces which are: enp0s3 (Ethernet Network Peripheral) and lo (Loopback Interface).

ii.

The list of MAC addresses of the network interfaces are: enp0s3 → 08:00:27:54:B6:29

iii.

- enp0s3: IP: 10.0.2.15 and subnet: 255.255.255.0
- lo: IP: 127.0.0.1 and subnet: 255.0.0.0

iv.

There are 3 rules, and the default gateway address is 10.0.2.2

v.

We will apply Rule 2 since the default gateway is the same subnet, therefore routing is not necessary.

Question 2:

The considered URL http://127.0.0.1:8080/light?action=on

The protocol: HTTP; host: 127.0.0.1; port: 8080; path: /light; and query: action=on

Question 3:

Data is transmitted across the internet using the TCP (Transmission Control Protocol) and UDP (User Datagram Protocol) communication protocols. The two are fundamentally different from one another in terms of header structure, level of dependability, and overhead. As it carries more information and offers more dependability characteristics, the TCP header is larger than the UDP header in size. There are fields in the TCP header for data sequencing, flow management, error detection, and data packet acknowledgment. UDP headers, on the other hand, have smaller and lighter packet sizes. Only the length of the data, the checksum, and the source and destination ports are displayed. The reduced header size, which derives from the absence of error detection, data sequencing, and flow control fields, makes it quicker and more effective. As a result of its decreased header size compared to TCP, UDP is thought of as a lighter protocol, making it more effective for real-time applications like online gaming and video streaming where a few packet losses are tolerable.

Question 4:

In Project 2 "The Control IoT Simulator via Web Pages", a Java Interface is used to define a set of methods that must be implemented by the class to provide a standard and consistent way of handling HTTP requests from web pages. Java program allows us to execute multiple threads within the code and tests. The interface, named HTTPCommands implements RequestHandler, with the override handleGet method that the implementing class must provide. This interface acts as a blueprint for the implementing class, ensuring

that the class provides a consistent and well-defined way of handling HTTP requests in project 2 code. This allows for a clean separation between the interface definition and its implementation, making the code more modular, maintainable, and easier to test.