TEB1063/TEB1173/TDB1133 – CN/DCN Test 1

**Matric ID:**

**Student Name:**

# Instructions:

1. Answer all the questions below in **this** Ms Word (.docx) file.
2. Wherever necessary, provide screenshots to supplement your answers.
3. Some questions require you to provide the trace file (**.pcap**), please use the question number as the filename.
4. A network design question requires you to submit all the necessary files for eNSP that are included within a project’s directory.
5. **ALL files are to be compressed together as a zip file and to be uploaded to Ulearn**.

# Q1. Introduction

1. Explain the difference between a protocol and a standard.

[4 marks]

1. Explain how the Internet works.

[8 marks]

1. Based on these two servers **www.utp.edu.my** and **unikl.edu.my**

* How many hops are required to move packets from your computer to both servers?
* Find the roundtrip time RTT from your computer to both servers.
* Compare the RTT for both servers if accessed from outside of Malaysia.
* Find out what IP address range are attributed to each university.
* Find out what are the name servers responsible for both domains.

[10 marks]

# Q2. HTTP and Network Design

1. Based on the trace file **Q2a**-**HTTP-captured.pcap** and the script **Q2a-simpleHTTPServer.py**

* Find the IP address and port numbers for both the client and server.
* Describe the filter you use to show only packets that are relevant to the above application.
* Create a new capture file that contains only the relevant packets to the above application and name it **Q2a-HTTP-filtered.pcap**.
* Identify which packets are involved in the establishment of the connection.
* Identify which packets are involved in the tear down of the connection.
* Extract the content of the communication and save it in an HTML file named **Q2a-content.html**
* Determine the version of HTTP protocol that is/are used in the conversation.
* Determine if the HTTP connection is persistent or non-persistent.

[24 marks]

1. Design using **eNSP**, a corporate network that connects a headquarters to two branch offices. For routing you may use either static routing or dynamic routing (OSPF). Have at least one end device in each of the branches and one server in the headquarters.

* Prove that the hosts within the network are able to communicate with each other by capturing the screenshot of their communications.
* Prove that your network traffic can still be routed correctly in the event of a link failure between any of the branches.
* Save all the configurations in the topology and compile the whole project in a single zip file and name it **Q2b-CorporateNet.zip.**

[18 marks]

# Q3. Transport Layer and Application Design

1. Based on the trace file **Q3a-qotd-multi-client.pcap** answer the following questions:

* Determine the transport layer protocol that was used by the application.
* Determine the number of client and server that were captured in the trace file.
* Determine the server port number and the client’s port numbers.
* Determine if multiplexing and demultiplexing have been used at the transport layer.

[12 marks]

1. Write a set of client and server programs in python named **Q3b-MsgBoardServer.py** and **Q3b-MsgBoardClient.py** that will allow users to post or view messages that will appear on a “Message Board” – to simulate an physical message board that is normally put up on various establishments such as schools and universities. Below are some conditions that the system (client/server) needs to fulfil:

* The client and server make use of TCP transport layer protocol.
* When the server is run, it waits for a client to connect.
* A user (connected using the client application) who wants to post a message needs to supply a set of username and password to the server before it is allowed to post any message on the message board.
* Users who only wants to view the message board need not any username or password.
* The content of the message board is sent to the requesting client in clear text.

Capture the communication between the client and server to prove that your system works and save the packets as **Q3b-MsgBoardCapture.pcap**. Make sure to provide some explanation for the python codes that you have written.

[20 marks]

1. Draw a **finite state machine** (FSM) to formally describe how your MsgBoard Application Layer Protocol in **Q3.b** works.

[4 marks]

**Checklist of files to be submitted (all compressed in a zip file)**

1. **CN-DCN TEST1.docx (with answers**)
2. **Q2a-HTTP-filtered.pcap**
3. **Q2a-content.html**
4. **Q2b-CorporateNet.zip**
5. **Q3b- MsgBoardServer.py**
6. **Q3b- MsgBoardClient.py**
7. **Q3b-MsgBoardCapture.pcap**