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Date : 31 Jan 2023\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**LAB 1: UNDERSTANDING NETWORKING WITH INTERNET TECHNOLOGIES**

**Exercise 1A: communication architectures**

Classify the following installed communication modules into their appropriate layers in the TCP/IP architecture(ie protocol stack in figure 1.1):

Internet Protocol (IP) : Network

Network controller card

(eg. Realtek PCIe GBE Family Controller) : Physical

**Exercise 1B: ADDRESSING**

Classify the use of the following addresses into their appropriate layers in the TCP/IP architecture(protocol stack in figure figure 1.1):

Port number : Transport

IP address :Network

MAC address :Data link

**Exercise 1C: PHYSICAL/MAC/ETHERNET ADDRESSES**

Determine the MAC address of your laboratory PC:

MAC Address :A4-BB-6D-5F-C8-F2

Manufacturer :Dell

**Exercise 1D: IP ADDRESSES**

NTU IP address range(**NOT** your PC IP address) : 155.69.0.0/16

Determine the special uses of the following IP addresses:

{ 127, <any> } :Lookback address

{ 172.21, <any> } :Class B private IP address

**Exercise 1E: DYNAMIC HOST CONFIGURATION PROTOCOL (DHCP)**

Determine the following for your laboratory PC:

DHCP Enabled :Yes

DHCP Server :155.69.3.8

Network/Subnet Mask :255.255.248.0

What is your IP address(from Ipconfig) : 172.21.148.5

What is the reported IP address from website (try https://whatismyipaddress.com/ ) :155.69.176.9

Who is the owner of the IP address reported by the website? NTU

**Exercise 1F: PORT NUMBERS**

Determine the well-known ports for the following services:

TELNET :23

Simple Mail Transfer Protocol (SMTP) :25

Quote of the Day Protocol :17

Domain Name Service (DNS) :90

Hyper-Text Transfer Protocol (HTTP) :80

**Exercise 1G: DOMAIN NAMES**

How do you register/buy a domain name under .sg, e.g. myweb.per.sg?

Domain name with “.sg” suffix can be registered by any of the SGNIC’s accredited registrars. Some extension of com.sg will require business certificates number as well as copies of the company’s registration documents, which should include a valid address and phone number.

**Exercise 1H: DOMAIN NAMES/IP ADDRESSES TRANSLATION**

**- DOMAIN NAME SYSTEM (DNS)**

Determine the followings:

Local DNS servers for your laboratory PC :155.69.3.8 / 155.69.3.9

Authoritative DNS servers for ntu.edu.sg : dns-cits-02.NTU.edu.sg

IP address of domain name www.ntu.edu.sg :155.69.3.8

What is the command to show the entries in the DNS cache? Ipconfig/displaydns

What is the command to clear the entries in the DNS cache? Ipconfig/flushdns

**Exercise 1J: PROPRIETARY MICROSOFT WINS**

Determine the followings for your laboratory PC:

NetBIOS/Host name :hw11-vb09

Primary WINS server :155.69.5.154

Secondary WINS server :155.69.5.54

**Exercise 1K: DEFAULT GATeWAY**

IP address of default gateway :172.21.151.254

**Exercise 1L: IP ADDRESS/PHYSICAL ADDRESS TRANSLATION**

**- ADDRESS RESOLUTION PROTOCOL (ARP)**

Physical MAC address of default gateway :00-08-e3-for-fc-a0

**Exercise 1M: NETWORK REACHABILITY - *PING* COMMAND**

***ping*** your neighbour's PC and run ***arp*** command again. Do you see your neighbour's PC listed? Why?

Yes, Because once PC pinged, the PC will store IP address and MAC address in the arp table.

Physical address of neighbour's PC :a4-bb-6d-61-d5-f8

**Exercise 1N: TRACE ROUTE - *TRACERT* COMMAND**

How many routers are separating your laboratory PC and the local DNS servers? 4

Run ***arp*** command again. Can you find the MAC address of the DNS servers? Why?

Yes, because when DNS server pinged, the physical addressiis stored within arp table of the machine.