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**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 Layer**

Network controller card

(eg. Realtek PCIe GBE Family Controller) : **Physical Layer**

**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 layer**

IP address : **Network Layer**

MAC address : **Data Link Layer**

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

Determine the MAC address of your laboratory PC:

MAC Address :

Manufacturer :

**Exercise 1D: IP ADDRESSES**

NTU IP address range(**NOT** your PC IP address) :

Determine the special uses of the following IP addresses:

{ 127, <any> } :

{ 172.21, <any> } :

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

Determine the following for your laboratory PC:

DHCP Enabled :

DHCP Server :

Network/Subnet Mask :

What is your IP address(from Ipconfig) :

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

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

**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) : **53**

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?

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

**- DOMAIN NAME SYSTEM (DNS)**

Determine the followings:

Local DNS servers for your laboratory PC :

Authoritative DNS servers for ntu.edu.sg : **155.69.254.5**

IP address of domain name www.ntu.edu.sg : **155.69.7.173**

What is the command to show the entries in the DNS cache?

What is the command to clear the entries in the DNS cache?

**Exercise 1J: PROPRIETARY MICROSOFT WINS**

Determine the followings for your laboratory PC:

NetBIOS/Host name :

Primary WINS server :

Secondary WINS server :

**Exercise 1K: DEFAULT GATeWAY**

IP address of default gateway :

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

**- ADDRESS RESOLUTION PROTOCOL (ARP)**

Physical MAC address of default gateway :

**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?

Physical address of neighbour's PC :

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

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

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