

Student Name : _____

Group : _____

Date : _____ - - _____

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) : Data Link Layer

EXERCISE 1B: ADDRESSING

Classify the use of the following addresses into their appropriate layers in the TCP/IP architecture (protocol stack in 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 : 00-4E-01-BD-A8-DC

Manufacturer : Dell Inc

EXERCISE 1D: IP ADDRESSES

NTU IP address range (NOT your PC IP address) : 155.69.0.0 – 155.69.255.255

Determine the special uses of the following IP addresses:

{ 127, <any> } : loopback address

{ 172.21, <any> } : private

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 : 255.255.240.0

What is your IP address (from Ipconfig) : 10.96.186.47

What is the reported IP address from website (try <https://whatismyipaddress.com/>) :
155.69.199.24

Who is the owner of the IP address reported by the website? : Nanyang Technological University

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?

You must have Singapore address and singpass, then check whether domain name is available. Then you can purchase and register through SGNIC

EXERCISE 1H: DOMAIN NAMES/IP ADDRESSES TRANSLATION
- DOMAIN NAME SYSTEM (DNS)

Determine the followings:

Local DNS servers for your laboratory PC	: 155.69.3.7, 155.69.3.8, 155.69.3.9
Authoritative DNS servers for ntu.edu.sg	: dnstex.ntu.edu.sg 155.69.254.5 and 155.69.254.230 dnstex1.ntu.sg
IP address of domain name www.ntu.edu.sg	: 104.16.4.14

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	: swl2-r2-v028
Primary WINS server	: 155.69.5.154
Secondary WINS server	: 155.69.5.54

EXERCISE 1K: DEFAULT GATEWAY

IP address of default gateway	: 10.96.191.254
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EXERCISE 1L: IP ADDRESS/PHYSICAL ADDRESS TRANSLATION
- ADDRESS RESOLUTION PROTOCOL (ARP)

Physical MAC address of default gateway	: 00-00-0c-9f-f0-f0
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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, when I pinged my neighbours IP, ARP request is performed and mapping of physical request is saved into ARP cache table

Physical address of neighbour's PC	: 00-4E-01-BD-A8-3B
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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?

No, devices outside of the local subnet are only reachable through a gateway and not directly.

ARP only works for devices on the same network (subnet)