Labs Course Content:

- Basic networking commands
- Basic network devices and their structure
- Network Cabling (straight and cross cabling)
- IP Classes
- Sub netting and super netting
- Routing protocols
- Router programming
- Setting up a small network

Tools we will use in our Lab are:

- Packet tracer
- NS2

Grading Criteria

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Lab # 01

In this lab we will do some very basic commands on our own PCs, to have a understanding of a few important things about networking.

You just need to follow the under write instructions.

1. Verify the connectivity of your workstation to the internet.

2. Open the Command Prompt of the operating system using either of the following methods:
   - Click on Start > All Programs > Accessories > Command Prompt
   - OR
   - Click on Start > Run, enter cmd (short for command) and click on ok.

   A Command Prompt screen should open.

3. Type ipconfig (short for IP configuration) and press Enter, the screen will show the IP address, subnet mask, and default gateway for your computer’s connection.

   The IP address and the default gateway should be in the same network/subnet; otherwise this host would not be able to communicate outside the network. In Fig. 1, the subnet mask tells us that the first three octets of the IP address and the default gateway must be same in order to be in the same network.

   ![ipconfig](image)

   Fig. 1 A successful result of a ipconfig
4. Check more detailed TCP/IP configuration information:

Type `ipconfig /all` and press Enter. What are the DNS and DHCP server addresses? What are their functions? What is the MAC of the network interface card?

(Search; what is DHCP server?)

![Fig.2 Result of a ipconfig/all](image)

5. Ping the IP address of another computer. Note that for the ping and tracert commands to work the PC firewalls have to be disabled. Why do you think this is so?

*Ask the IP address of the workstation that is being used by another group of students. Then type ping, space, and the IP address that you received, then press Enter. Notice the outputs.*

6. Ping the IP address of the gateway router from the details that have been observed in the output of step 4 above. If the ping is successful, it means that there is a physical connectivity to the router on the local network and probably the rest of the world.
7. Ping the Loopback IP address of your computer. Type the following command:
   - ping 127.0.0.1.

   The IP address 127.0.0.1 is reserved for loopback testing. If the ping is successful, then TCP/IP is properly installed and functioning on this computer.

8. You can also ping using names like websites. Ping the IP address of the UET Taxila website. Type ping space and www.uettaxila.edu.pk or www.google.com then presses Enter. Notice the outputs. A DNS server will resolve the name to an IP address and the ping will be successful only in the existence of the DNS server.
9. Ping www.ee.uct.ac.za and observe the results. Is there a difference in time between the results shown by pinging www.uettaxila.edu.pk and www.ee.uct.ac.za. If so why and if not why?

10. Trace the route to the Cisco website. Type `tracert www.uettaxila.edu.pk` and press enter. In a successful output, you will see listings of all routers the tracert requests had to pass through to get to the destination.

11. Trace the route to the website of the Department of Software Engineering. Type `tracert http://web.uettaxila.edu.pk/uet/software/about.htm` and press enter. The output should take less time than that of step 9.

12. Type `arp –a` in cmd, this command handles the resolution of a IP to a physical address. The command gives a list of IPs and physical addresses on your local network.

13. Type `Nslookup` in cmd and then the address of a website. With this tool you can check your DNS servers. For example, imagine you are experiencing a problem with your current DNS and it cannot resolve the address www.mintywhite.com. You can test it with nslookup and use other DNS servers to try to resolve the address. Type `nslookup`, space `www.google.com` and press enter.
14. `ipconfig /displaydns` shows the content of the DNS cache. To clear it, type `ipconfig /flushdns`. 