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**Course:** Communication, Security & Privacy (TCOM3003)

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**The IPCONFIG commands:**

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Questions:

1. An IP address is a unique address that helps us identify a device on the internet or on a local network while a MAC address is a unique identifier that is assigned to a NIC. This ensures that the physical address of a computer is unique. The difference is that the MAC address is an unchanging address while an IP address can change according to the internet network or local network you are situated.
2. A default gateway is a node that enables smooth connections between networks so that they can communicate with each other.
3. A DNS server role is to translate domain names into IP addresses, which makes it a possibility for DNS clients to reach the server where it originated.
4. A subnet mask is a 32 bit number which is used to divide an IP address into two parts (host and the network.)

**The Ping command:**

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Questions:

1. 4 packets are sent because that is the default for windows operating systems. Auser have the option on setting a higher number which allows the ping to continue to run. This in turn can either gather more data or to ensure the system remains responsive.
2. TTL (Time to Live) is the amount of time that a packet is set to exist inside a network before being discarded by a router.
3. A Packet lost can be the result of many factors:

* Network congestion Software bugs
* Network hardware problems
* Network congestion
* Deficient infrastructure

1. Each host name has an address assigned to them.

**The Traceroute command:**

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Questions:

1. They go through 16.
2. Why are some links slower than others? Some links are slower than others because some servers may have more traffic than others.
3. Who owns all those computers routers that route the packets?
4. This is how a traceroute work:

* The TTL limits how long data can live in an IP network. Every packet of data is assigned a TTL value, and every time a data packet reaches a hop, the TTL value is decreased by one.
* Traceroute ensures each hop on the way to a destination device drops a packet and sends back an ICMP (internet control message protocol) error message. This means traceroute can measure the duration of time between when the data is sent and when the ICMP message is received back for each hop, giving you the RTT (Real Time Text) value for each hop.

**The Netstat commands:**

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Questions:

1. Netstat delivers basic stats on all network activities and informs users on which ports and addresses the corresponding connections are running and which ports are open for tasks.
2. Netstat can diagnose network problems by measuring the amount of network traffic in a network. If something is out of the ordinary, it will get flagged.
3. The routing table (netstat -r) is useful because it contains information necessary to forward a packet along the best path toward its destination.
4. Why would someone need different statistics for IP, IPv6, ICMP, TCP, UDP, etc.?

**Nslookup command:**

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Questions:

1. Why are there multiple IP addresses associated with a single domain name?
2. Someone can use nslookup in an unethical manner by finding the IP of different servers within a particular business to find weaknesses for an attack
3. Domain names and IP addresses get registered by:
   * To register names, you need to go to ICANN (Internet Corporation for Assigned Names and Numbers)
   * If the domain name is available for registration, they will create a WHOIS record for the person/entity registering.