**CSE421**

**Lab 02 Hometask**

**Summer 2023**

1. How would a proxy server check to see if its data is up to date with the most updated data in the Origin Server?

**Answer:** A proxy server will check if its data is up to date with the most updated data in the origin server using its header information.

1. The HTTP protocol is implemented in the Physical layer. Is this statement true or false?

**Answer:** False

1. Can you receive mail using SMTP, why or why not?

**Answer:** No, I can’t receive emails using SMTP because SMTP servers don't work in both directions. They can only deliver mails but can’t receive them.

1. Briefly explain how SMTP and POP3 protocol works using a scenario.

**Answer:** Let’s assume that I want to send an email to my brother Akif. In this scenario, from my PC to his PC, TCP will establish a connection first and then the email will be sent from my side to the email server using SMTP protocol. On the other hand, the email to be received at Akif’s end, a POP3 protocol will be generated, and it will go to the email server and pull out the email from there and finally make it visible to his PC.

1. Why does root DNS servers maintain a hierarchical structure rather than a centralized structure?

**Answer:** We know, DNS is a distributed system. If there would be a centralized structure, then there would be-

1. Single point of failure
2. increase in traffic volume
3. difficulty to maintain distant centralized database
4. high maintenance cost

So, DNS basically uses its hierarchical structure to manage its distributed database system.

1. Suppose, you have a quiz which will take place at bux but your local DNS server does not know the IP address of “bux.bracu.ac.bd”. Will you be able to attend your quiz? Please, provide a brief explanation.

**Answer:** No, I won’t be able to take the quiz. “bux.bracu.ac.bd” is a website and to access it we first must go to the local DNS server, then our local DNS server provides my PC with the IP address of the server where the actual information is stored. By tracking that IP address, we can visit our desired website.

1. Suppose, you recently changed your ISP and the new ISP forgot to set the DNS server’s IP address when configuring your internet connection. Can you now browse the internet properly?

**Answer:** No, in that case I can’t browse the internet properly since without my IP address the DNS server cannot provide me any internet facilities. Since it won’t know my IP address it will automatically reject all my browsing requests.

1. What is the size of an ARP request or reply packet (in bytes)?

**Answer:** The size of an ARP request or reply packet is 28 bytes.

1. What happens to an ARP request packet when it is received by a host that does not match the target IP address of the request?

**Answer:** The request gets rejected.

1. What is the value of the 'operation' field in an ARP reply packet?

**Answer:** In the operation field of ARP packet, it has source MAC and target MAC also source IP and target IP.

1. What flags are used during a TCP connection establishment and TCP connection termination process.

**Answer:** For connection establishment: SYN (0000 0010).

For termination process: FIN (0000 0001).

1. A web server sends a TCP packet to a client with sequence number=0 and acknowledgement number =1. Which stage of the 3 way handshake is this and what does the sequence and acknowledgement number mean?

**Answer:** This is the 2nd stage of the 3-way handshake. The sequence number keeps track of the amount of data transmitted, while the acknowledgement number informs the sender that the transmitted data was successfully received. In this specific case, a sequence number of 0 indicates that no data has been sent yet and an acknowledgement number of 1 signifies the acknowledgment of the client's SYN flag in packet 1.

1. In an outbound PDU packet, what does source port: 80 and destination port: 1027 means?

**Answer:** Source port 80 means it’s an Internet Communication Protocol HTTP and port 1027 means it’s a Transmission Control Protocol (TCP).