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## Computer Networks

## Assignment 01

Q:1) List five non proprietary Internet applications and the applications - Layer Protocols that they use.

| N:1) Application | Application - Layer Protocol |
|---|---|
| 1. Email | SMTP (Simple Mail Transfer Protocol) |
| 2. Web Browsing | HTTP / HTTPS (Hyper Text Transfer Protocol / Secure). |
| 3. File Transfer | FTP (File Transfer Protocol) |
| 4. Remote Login | SSH (Secure Shell) or Telnet |
| 5. Domain Name System | DNS (Domain Name System) |

Q&2) Suppose you wanted to do transaction from a remote client to server as fast as possible. Would you use UDP or TCP? Why?

A.2) I would use **UDP (User Datagram Protocol)** because it is **faster** than TCP. UDP does not establish a connection or perform error checking, which saves time.

**TCP** is reliable but slower because it ensures data delivery, sequencing, and error correction. So, for **speed** UDP is better.

Q:3) List the four broad classes of services that a transport protocol can provide. For each, indicate if either UDP or TCP (or both) Provides such a servise.

The A:3) §

| Service type | Provided by | Explanation |
|---|---|---|
| 1. Reliable Data Transfer | TCP only | Ensure data is received correctly and in order. |
| 2. Connection-oriented service | TCP only | Connection is establish before data transfer. |
| 3. Connectionless service | UPD only | No connection setup; Packets are sent directly. |
| 4. Flow and congestion control | TCP only | Adjust data flow based on network capacity. |

Q:4) Describe how Web caching can reduce delay in receiving a requested object. Will web catching reduce the delay for all objects or only for some? Why?

Ans4) Web caching stores copies of recently accessed web objects (like pages or images) closer to the user. When the same object is requested again, it is delivered quickly from cache instead of downloading it again from the original server.

It reduces delay **only for cached (some) objects**, not all - because only previously requested objects are stored in the cache.

**Q₅.)**

Ans₅ When a customer visists the website, the server sends a cookie (a small data file) to the user's brownser. The browser stores it and sends it back with every request to that site.

This cookie can contain a unique ID lets the server identify the customer and access their purchase record in the data base.

**Q₆)**

Ans₆)

- The **DNS (Domain Name System)** Protocol (Applications Layer) is needed to translate the server's URL into it's IP address.

- The UDP protocol (Transport Layer) is used by DNS to send queries

and recieve responses.

- After obtaining the IP address, TCP is used by HTTP to connect and retrieve the documents.

  So, **DNS (UDP/TCP)** and **TCP** (for HTTP) are needed.

Q87) Suppose within your web browser you click on a link obtain a web pages.....

Ans:7) Steps and time taken.

1) DNS lookup takes **RTT1 + RTT2 +.....+ RTTn** (for n DNS servers).

2) After the IP address is known, the HTTP connection requires.

   - One RTT to establish the TCP connection **(RTT0)**.

   - One RTT for the HTTP request and

response (RTTO)

Total time = $(RTT1 + RTT2 + \ldots + RTTn) + 2 \times$ RTTO.

(assuming zero transmission time for the object).

Q8)

Ans 8) Yes, it is possible to determine if a site was recently accessed.
The local DNS server temporarily stores the domain's IP address in its ~~the~~ cache after a lookup.

If you ~~check~~ check the DNS cache and find an entry for that external website (with a recent timestamp),
However, you **cannot tell which computer** or user made the request, only that it was accessed from within the department.