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1. Which layer of the OSI model establishes, maintains, and terminates connections between applications?
    - Data link
    - Network
    - Presentation
    - **Session**

    The session layer establishes, manages, and terminates sessions between two communicating hosts. The session layer also synchronizes dialog between the presentation layers of the two hosts and manages their data exchange. For example, web servers have many users, so there are many communication processes open at a given time. It is important, then, to keep track of which user communicates on which path. In addition to session regulation, the session layer offers provisions for efficient data transfer, class of service (CoS), and exception reporting of session layer, presentation layer, and application layer problems.

2. Which of the following is the Layer 4 PDU?
    - Bit
    - Frame
    - Packet
    - **Segment**

    The Protocol Data Unit (PDU) of OSI model layer 4 (Transport Layer) is the segment. Layer 4 or The transport layer segments data from the system of the sending host and reassembles the date into a data stream of the system of the receiving host. For example, business users in large corporations often transfer large files from field locations to a corporate site.

3. What layer of the OSI model is responsible for reliable end-to-end network communications?
    - Application
    - Network
    - Physical
    - **Transport**

    Transport layer is responsible for reliable network communication between end nodes. The transport layer provides mechanisms for the establishment, maintenance, and termination of virtual circuits, transport fault detection and recover, and information flow control. Segmenting and reassembling data into a data stream. Uses application segmenting and port numbers.

4. Which of the following best describes the function of the presentation layer?
    - It manages data exchange between layer entities
    - **It ensures that data is readable by the receiving system**
    - It provides connectivity and path selection between two end systems
    - It is responsible for the reliable network connection between end nodes

    The presentation layer ensures that the information sent at the application layer of system is readable by the application layer of another system. For example, a PC program communicates with another computer, one using Extended Binary Coded Decimal Interchange Code (EBCDIC) and the other using American Standard Code for Information Interchange (ASCII) to represent the same characters. If necessary, the presentation layer translates between multiple data formats by using a common format.

5. Which of the following best describes the function of the data link layer?
    - Best path selection
    - Establishment and maintenance of virtual cirucuits
    - Data exchange between presentation layer entities
    - **Media access, ordererd delivery of frames, and physical addressing**

    The data link layer is concerned with physical addressing, network topology, line discipline, error notification, ordered delivery of frames, and flow control. The IEEE has divided this layer into two sublayers: The LCC sublayer (refers upward to higher-layer software functions) and the MAC sublayer (refers downward to lower layer hardware functions).

6. All of the following protocols use the services provided by TCP *except*:
    - FTP
    - HTTP
    - SMTP
    - **TFTP**

    TFTP, or Trivial File Transfer Protocol, is a simple high-level protocol for transferring data servers use to boot diskless workstations, X-terminals, and routers by using User Data Protocol (UDP). Although it may sound similar, TFTP works differently than *FTP* (File Transfer Protocol) and *HTTP*(HyperText Transfer Protocol). Although TFTP is also based in FTP technology, TFTP is an entirely different protocol. Among the differences is that TFTP's transport protocol uses UDP which is not secure while FTP uses **Transmission Control Protoco**l (TCP) to secure information.

7. Which application is common to both TCP and UDP in the TCP/IP reference model?
    - **DNS**
    - FTP
    - HTTP
    - SMTP

DNS which normally uses UDP port 53 for simple requests and replies, which are usually short. Larger messages requiring reliable delivery, such as zone transfers, use TCP port 53 instead. That's why DNS work on both the TCP and UDP Protocols.

8. All of the following are defined by physical layer specifications EXCEPT:
    - Voltage levels
    - **Media access controls**
    - Media connections types
    - Maximum transmission distances

    The physical layer defines the electrical, mechanical, procedural, and functional specifications for activating, maintained, and deactivating the physical link between end systems. Characteristics such as voltage levels, timing of voltage changes, physical data rates, maximum transmission distances, physical connectors, and other similar attributes are defined by physical layer specifications.

9. Which OSI model layer provides packet encapsulation service to Layer 4?
    - Data link layer
    - **Network layer**
    - Physical layer
    - Transport layer

    The process of "data encapsulation": (data, segment, packet, frame, bits)

    The application (layer 7), presentation (layer 6), and session (layer 5) layers present 'data' to the transport layer (layer 4), where it is converted inot 'segments'. These transport layer (layer 4) 'segments' are passed down to the network layer (layer 3), where they gain header information and become 'packets'. Thses network layer (layer 3), 'packets' are passed down to the data link layer (layer 2), where they gain additional information and become 'frames'. Finally, these data link (layer 2) 'frames' are passed to the physical layer (layer 1), where they are converted to 'bits' - voltage - or light pulses representing binary ones and zeros. This process is similar to preparing a package for mailing -- wrapping it, addressing it, & transporting it.