Compito di Reti di Calcolatori

L'Aquila 24-9-2013

1. **Elencare i Livelli del modello OSI descrivendo brevemente le funzioni ad ogni livello (4 pt)**

Application	7 – Provides access to applications
Presentation	6 – Provides data independence
Session	5 – Manages end-to-end connections
Transport	4 – Provides reliable end-to-end data transfer
Network	3 – Maintains point-to-point connections
Data link	2 – Provides reliable error-free point-to-point data transfer
Physical	1 – Transmission of bit stream (cabling, voltages, etc.)

2. **Quali sono le 4 cause di ritardo di un pacchetto in Internet ? Quali sono le 2 cause di perdita di pacchetto ? (3 pts)**

   The four causes of delay are propagation, transmission, processing, and queuing.

   The two causes of loss are electrical noise and buffer overflow.

3. **Disegnare il format di un pacchetto (cioè, identificare la posizione e il nome di tutti gli headers e trailers) di una richiesta HTTP GET spedita su un link Ethernet. (3 pts)**

Ethernet header	IP header	TCP header	HTTP header	HTTP payload	Ethernet trailer

4. **Descrivere HTTP in non più di 100 parole. La valutazione si baserà sulla completezza della descrizione. (6 pt totali)**

   The HyperText Transfer Protocol (HTTP) is a **stateless application** layer protocol. HTTP is used to transfer web content between a **browser application (client) and an HTTP server**. All web content is identified by a **URL**. HTTP is a request-response protocol that typically uses **TCP** for assured delivery. HTTP uses **ASCII** encoded headers. The HTTP GET command retrieves **HTML files** and **other objects**. The GET header includes the **URL of the object** and other optional fields such as capability, languages, and so on. The response includes a response header with a code (e.g., **code 200 is OK** and **404 is page not found**). Other commands include **POST** and **HEAD**.

5. **Descrivere il contenuto di un HTTP GET header.**
   Elencare due possibili codici di risposta ad una GET. (4 pt)

   The HTTP GET header starts with a string **GET /filename HTTP/1.0** where filename is the **URI** of the file to be downloaded. The 1.0 could also be 1.1 (1.0 and 1.1 are the two versions of HTTP). Following this string are optional header fields for Accept (files types to accept), **Cookies**, **Date** (date sent), **Host** (domain name of host), and many other optional fields. The header **terminates with a BLANK line**.

   Two possible response codes are 200 for everything OK and 404 for page not found.

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6. **Descrivere le operazioni di un Web server con high-level pseudocode.**
   É sufficiente mostrare le operazioni per il solo caso di una HTTP GET.   (4 pt)

   Main process
   Listen for a connection on port 80
   Accept a connection and spin-off a thread or process to handle the connection
   Handle GET process
   Parse the HTTP header for the GET object name
   Open the file for the object
   If file not found, send an HTTP 404 message
   If file found, send an HTTP 200 message followed by the file
   Close the connection
   Exit the thread or process

7. **Per testare la connettività si usa il commando ping.**
   A quale dei 7 livelli OSI il comando ping opera ? (2pts)

   a. **Session**
   b. **Network**
   c. **Transport**
   d. **Maintenance**
   e. **Physical**

   The correct answer is B.
   The session layer is responsible for establishing, managing and terminating communications sessions between presentation layer entities. This layer is not responsible for the ping command.
   As the ping command is used to test network connectivity, it resides on the network layer of the OSI model.
   The transport layer of the OSI model is responsible for the delivery of information in either a reliable or unreliable manner. Ping does not reside at this layer of the OSI model.
   There is no maintenance layer in the OSI model.
   The physical layer deals with bits, bytes and electrical signals and has nothing to do with the ping command.

8. **Data la Rete 172.30.0.0/16, applicare il subnetting per soddisfare I seguenti requisiti:**

Net	Hosts	Net Address/Mask	1st Address	Last Address	Broadcast
A	1500	172.30.0.0/21	172.30.0.1	172.30.7.254	172.30.7.255
B	1000	172.30.8.0/22	172.30.8.1	172.30.11.254	72.30.11.255
C	750	172.30.12.0/22	172.30.15.1	172.30.15.254	72.30.15.255
D	500	172.30.16.0/23	172.30.16.1	172.30.17.254	172.30.17.255
E	300	172.30.18.0/23	172.30.18.1	172.30.19.254	172.30.19.255
F	200	172.30.20.0/24	172.30.20.1	172.30.20.254	172.30.20.255