Esame di Reti di Calcolatori

11-07-2012

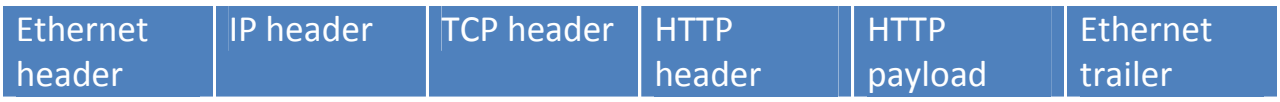
1. **Disegnare il modello OSI e descrivere brevemente la funzione di ogni livello (4 pts: 0.5 pts x risposta con arrotondamento)**

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

2. **Quali sono le 4 cause di ritardo in Internet ? Quali sono le 2 cause di perdita dei pacchetti ? (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 formato di un pacchetto (ovvero , identificare la posizione e il nome di headers e trailers) di una richiesta HTTP GET inoltrata su un link Ethernet. (3 pts)**



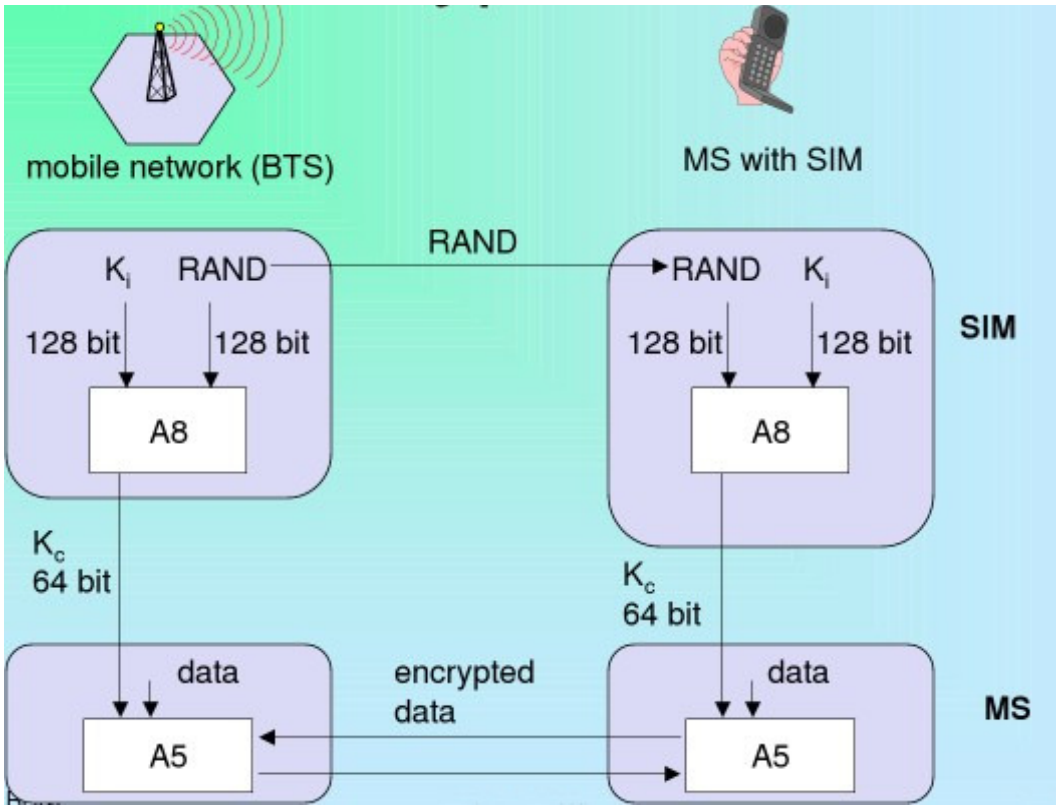
4. **Descrivere il protocollo HTTP in circa 100 parole. La valutazione si baserà sulla completezza e sintesi della descrizione. Circa 0.5 pt per ogni punto saliente (6 pts in totale)**

   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. **Data la rete 172.30.0.0/16, applicate il subnetting per soddisfare i seguenti requisiti (3 pts)**

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	172.30.8.0/21	172.30.8.1	72.30.15.254	72.30.15.255
C	750	72.30.16.0/22	72.30.16.1	72.30.19.254	72.30.19.255
D	500	72.30.20.0/22	72.30.20.1	172.30.23.254	172.30.23.255
E	300	172.30.24.0/23	172.30.24.1	172.30.25.254	172.30.25.255
F	200	172.30.26.0/24	172.30.26.1	172.30.26.254	172.30.26.255

6. **Descrivere la figura seguente in modo breve e dettagliato. La valutazione si baserà sulla completezza e sintesi della descrizione. (7 pts)**



Trattasi della procedura di cifratura del GSM:

- **Il terminale mobile contatta la rete e fornisce il suo codice di identificazione**
- **La rete genera un numero casuale e lo invia al mobile**
- **Attraverso la coppia (Ki, RAND) viene calcolato Kc sia dalla rete che dal mobile applicando l'algoritmo A8**
- **Kc è la chiave simmetrica da utilizzare per criptare e decriptare i dati attraverso l'algoritmo A5**

7. **Per testare una rete un utente prova a fare ping ad una macchina remota. A quale livello del modello OSI il comando ping opera ? (2pts)**
    - **A. Session**
    - **B. Network**
    - **C. Transport**
    - **D. Maintenance**
    - **E. Physical**

The correct answer is B.

A. 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.

B. As the ping command is used to test network connectivity, it resides on the network layer of the OSI model.

C. 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.

D. There is no maintenance layer in the OSI model.

E. The physical layer deals with bits, bytes and electrical signals and has nothing to do with the ping command.

8. **Un utente usa il meccanismo PAT (Port Address Translation) per condividere la sua connessione Internet tra i sue due computers di casa. Quale di questi Protocolli può avere problemi con il Port Address Translation? (2pts)**
    - **A. HTTP**
    - **B. SMTP**
    - **C. FTP Active mode**
    - **D. POP3**
    - **E. IXMA**

A. PAT works comfortably with HTTP

B. SMTP works well with PAT

C. FTP Active mode does not work with PAT as it initiates connection from server side

D. POP3 also works well with PAT

E. There is no such protocol as IXMA