CMP 206

AOC For Exams

CONTENT

CMP 206

AOC

1 Detailed description of Computer Networks (slide 4-9) 1st slide.

Ans

A Network is a system of interconnected Computers and computerised peripherals such as printers.

Computers may connect to one another by either wired or wireless media

Classification of Computer Networks

a) Geographical Span
b) Interconnectivity
c) Administration
d) Architecture

2 Interconnectivity (slide 10-12) 1st slide

Ans

- Every device can be connected to all other devices in the network to create a mesh
- Every device can be Connected to a single medium but geographically disconnected to create a bus-like structure
- Every device can be connected to a central device to create a star like structure

- All devices can be connected arbitrarily using all previous ways to create a hybrid structure

3 Types of Computer Networks

Ans: PAN
- Explain

LAN
- Explain

MAN
- Explain

WAN
- Explain

4 Network Topology

Ans: Definition

A network topology is an arrangement in which network devices and user devices are connected

Types

a) Point-to-Point
- Explain

b) Bus Topology
- Explain

c) Star Topology (Thus hub device can be)
- Explain

d) Ring Topology
- Explain

e) Mesh Topology (Full Mesh, half Mesh)

f) Tree / Hierarchical Topology

g) Daisy Chain Topology

h) Hybrid Topology

5 Data Link Layer (slide 3-5) 4th slide

Ans: Data link layer is responsible for converting data stream to signals, bit-by-bit and to send the signal over the underlying hardware / media

The reciever picks data in the form of electrical signal from the hardware and assembles them in a recognisable frame format then hands over to upper layer

Data Link Layer Has 2 Sub Layers

a) Logical Link Control: handles protocols, flow control, and error control

b) Media Access Control: handles actual control of media

Functionalities

1) Framing
2) Addressing
3) Synchronisation
4) Error Control
5) Flow Control
6) Multi Access

- Explain
- Explain

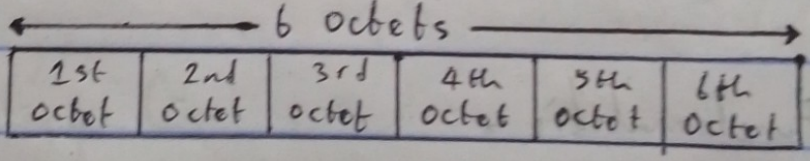
6 Mac Address

Ans: A MAC Address is a unique physical address assigned to each network adapter in a computer or mobile device

It is a 48-bit value consisting of twelve hexadecimal characters

The most common format for displaying MAC address is using six groupings of two characters seperated by a hyphen or Colon:

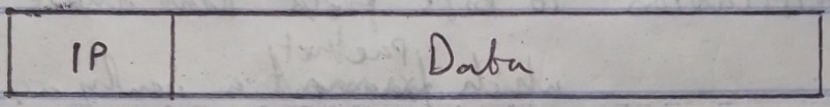
D4-BE-DP-8D-46-9A



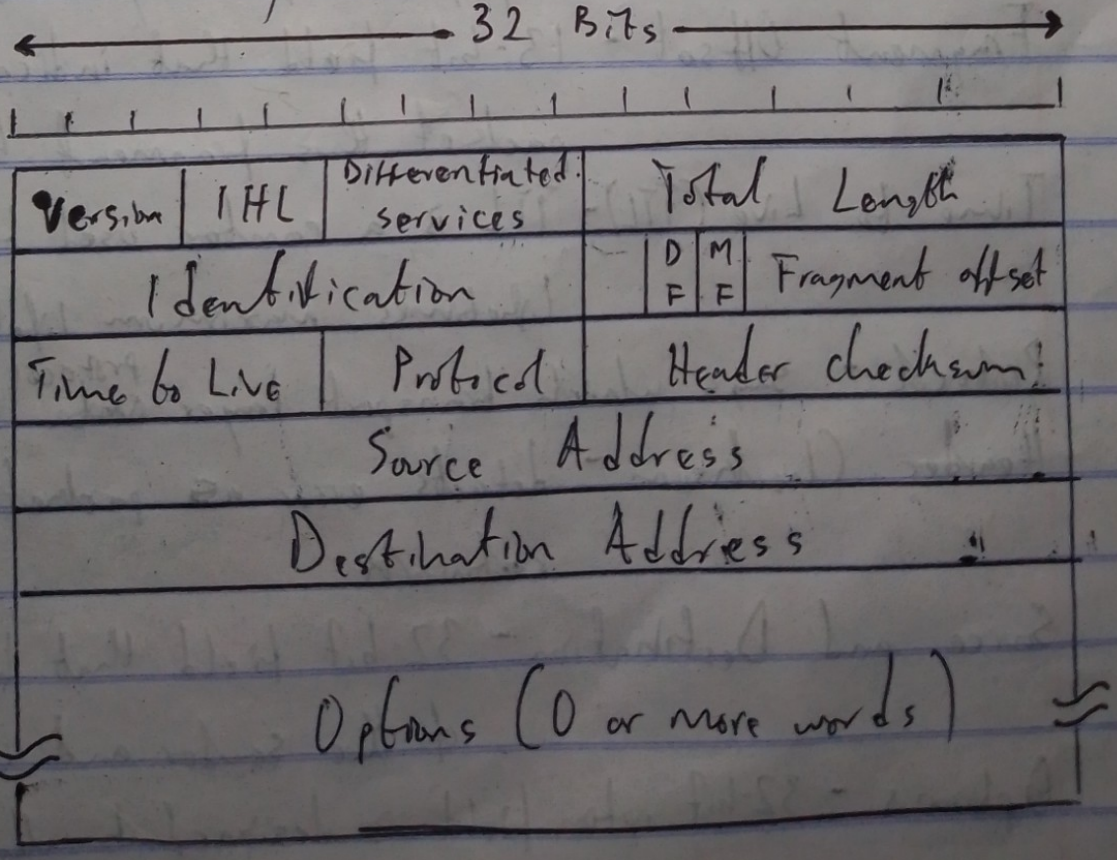
7 IP Header

An IPv4 datagram consists of a header part and a body part

The header has 20-byte fixed part and a variable-length optional part



IPv4 header is as described in the picture (diagram) below showing all it's Components that allows accurate data delivery:



version - 4 bits field, that keeps track of the version of protoc

Differentiated Service (DS) - 8-bits field distinguishing differen
classes of service

Total Length - 16-bits field saying the total length of everyt
ing. Maximum length is 65,535 bytes.

Identification - 16-bits field that allows the host determine
which fragment a newly arrived packet belongs to

DF (Don't Fragment) - A 1-bit field saying ordering not to
fragment the packet

MF (More Fragment) - A 1-bit field that indicates when all
fragments of datagram have arrived.

Fragment Offset - 13-bit field that indicates where in a
packet this fragment belongs

Time to Live (TTL) - TTL is a counter used to limit packet
lifetimes. maximum lifetime of 225 seconds

Protocol - says which transport layer protocol should handle packe

Header Checksum - detects error as packet travels through
network

Source and Destination - 32-bit field that indicates address
of the sender and receiver

Options - 32-bit option field is designed to allow subsequent
versions of protocol to include information not present
in the original design

8 IP Addressing

Addressing is a key function of the network layer protocols. Addressing enables data communication between hosts on the same networks or on different networks

IPV4 addresses are easier to write, remember and verbally communicate than strings of 32-bits

Representing IPV4 addresses as dotted decimals
~~big~~ Separating the 32-bits strings into bytes using dots.

Each byte called an octet

Each byte is called an octet which represents a decimal numbers that are 1 byte (8 bits) each

E.g 10101100000100000000010000010100 is expressed as 10101100.00010000.00000100.00010100

And in decimal as 172.16.4.20

The dotted decimal format makes it easier for people to use and remember addresses

IPv4 addresses have two parts:

1) Network Portion 2) Host Portion

172.16.14.20

network host

Type of Addressing

1) unicast
2) broadcast
3) multicast

9 Types of IP Addressing

In IPv4 networks, host communicates in three (3) different ways data from sender to reciever.

- unicast : This is the normal host-to-host communication.
- broadcast: process of sending a packet from one host to all hosts in network.
- multicast: allows hosts to send a packet to a selected set of hosts

Type of Address

In an IPv4 network, there are three types of addresses:

- Network Address: this address refers to the network and can't be assigne to a device. 0.0.0.0

- Broadcast Address: this address is used in communication to all the hosts in a network. 1.1.1.1

- Host Address: this address is required by every device on a network. Host Address is assigned in between the Network Address and the Broadcast Address