Date: _____

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SUBJECT CC&N

ASSIGNMENT

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Q.1: Briefly describe the services provided by the data link layer.

Answer:

Data link layer consists of frames, it is responsible for recieving of data and deviding it into manageable units from network layer. Every frame is made up of both physical addresses of source and destination node. it is also responsible for error control.

Q.2: Compare and Contrast.

Byte oriented Protocol:-

Is a communication protocol. In this protocol bytes are used as control codes. it is also known as character-oriented protocol.

Bit oriented Protocol:- Is a type of communication protocol that sees the transmitted data as an opaque stream of bits with no meanings, the controls code are defined in terms of bits.

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Error control:-

It is the technique to detect and correct blocks of data when any communication takes place between two devices.

HDLC:-

It stands for High-level Data link control. its is a bit-oriented code and a synchronous data link layer product developed by ISO. It provide both connected-oriented and connectionless service.

PPP:-

It is a data link layer communications protocol b/w 2 routers directly without any host or any other networking b/w them.

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Go-Back-N ARQ:-

It is an automatic repeat request protocol, in which the sending process continues to send a number of frames in specified window sizes even without recieving an packet from the reciever about recieving of packet.

Selective-Repeat-ARQ protocol:-

It is a specific instance of the automatic repeat request protocol which is responsible for managing sequence numbers and retransmissions in reliable communications.

Circuit-Switched network:-

In this type of network the comunications between two end devices (nodes) must be set up before they can communicate. Once set up, the

Circuit is dedicated to the two nodes, it connects for the duration of that connection.

Packet-switched networks:-

It moves data in separate, small blocks in form of packets. They move based on the destination address in each packet. When recieved, packets are reassambled in the proper sequence to make up the message.

Q3:- Explain the protocols for noiseless and noisy channel.

Answer:-

A channel in which no frames are lost or corrupted is known as noiseless channel.

Simplest Protocol.

=> There is no flow control and error control mechanism. It is an unidirectional protocol.

=> The reciever can immediately

handle any recived frame

=> The protocols run in the data link layer of the source machine and the reciever runs in the data link layer of the destination machine.

=> Stop and wait protocol.

=> It is the simplest retransmission protocol.

=> The sender sends one frame and then waits for an acknowledge ment before process, this process is known as stop and wait.

Noisy channels:-

A communication channel that makes error in which frames may be either damaged or lost completely.

1. Stop and wait Automatic repeat request:

=> In a noisy Comunication channel, if a frame is damaged in transit, the reciever hardware will detect this when it computes the checksum.

=> If a damaged frame is recieved, it will be discarded and transmitter will retransmit the same frame after recieving a proper acknowledgement.

=> A typical approach to solve this problem is the provision of a sequence number in the header of the message.

2. Sequence numbers:-

The protocol specifies that frames need to be numbered. This is done by using sequence number. A field is is added to the data frame to

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hold the sequence number of that frame.

=> Stop-and-wait ARQ is the simplest mechanism for error and flow controls.

Q6:-

Answer:-(a)

Before A sends any frames.

Sender

0 1 2 3 4 5 6

window of PDU that may be transmitted = 4 bit window.

Reciever

0 1 2 3 4 5 6

Answer (b):-

After A sends frame 0,1,2 and recieve acknowledgment from B for 0 and 1 (suppose B recieved all three frames).

Sender

A has shrunk its window as it has transmitted three PDUs but has recieved ack for 2PDUs hence it is keeping copy of one PDU0123456Acknowledgment recieved for two bits.

Reciever

0 1 2 3 4 5 6

Reciever has recieved all data hence the window remains in 4 bit size.

Answer (c):-

After A sends frame 3, 4 and 5 and B acknowledgment 4 and the ACK is recieved by A.

Seneder

0 1 2 3 4 5 6 7 0 1

Reciever

Acknowledgment recieved for two bits 0 1 2 3 4 5 6 7 0 1

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Q7:- List three techniques of digital-to-digital conversion

The three techniques of conversion are:

1- line coding.

2- Block coding.

3- Scrambling.

line coding is always needed; block coding and scrambling may or may not be needed.
Line coding is the process of converting digital data to digital signals.

Q.8 Distinguish b/w Signal element and data element.

Answer:

A data element is the smallest entity that can represent a piece of information (a bit). A signal element is the shortest

unit of a digital signal. Data elements are the data we need to send and signal elements are being carried while signal element are known as the carriers.

Q.9:- Distinguish between data rate and signal rate.

Answer:-

Data rate is the number of data element that are transmitted per second whereas signal rate is the number of signal element that have to be transmitted per second.

Q.11:- What is the number of bits in an IPv4 address? what is the number of bits in an IPv6 address?

Answer:-

IPv4 address is a 32-bit number, they are divided into four 8-bits number To make addresses more straightforward, or octets which are separated by a decimal point.

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In IPv6, addresses are expressed as a series of eight 4-character hexadecimal numbers, which represent 16 bits each.

Q.12:- What are the differences between classful addressing and classless addressing in IPv4?

Answer

Classful addresing:-

It is a concept that divides the available address space of IPv4 into five classes namely A, B, C, D and E.

Classless Addresing:-

It is an improved IP Addressing system. It makes the allocation of IP Addresses more efficient.

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Q15:- What is the network address in a block of addresses? How can we find the network address if one of the addresses in a block is given?

Answer:-

This address is known as the identifier of the network. It helps in identifying the network. It helps in routing a packet to its final destination. If blocks of addresses is given the first address can be determined by: (prefix in decimal) x 2^32-n.

Q16:- What is NAT? How can NAT help in address depletion?

NAT:- It stands for network address depletion. It is responsible for the translation of IP addresses of computers in local networks to a single IP address. They are sometimes used in routers to connect computers to the internet.

It helps in address depletion by decreasing the number of IP addresses required in an organization thus improving security.

Q.17:- What is the address space in 16-bit addresses?

Answer:

One address can only address one byte. When using 16 bits, we can write 65536 addresses (from 0 to 65535, 65536 different addresses).

Q.19:- Change the following IP addresses from dotted-decimal notation to binary notation.

a) 129.14.8.6

129 = 10000001
14 = 00001110
6 = 00000110
8 = 00001000

binary notation of 129.14.8.6=

10000001
00001110
00000110
00001000

b) 208.34.54.12

208 = 11010000
34 = 00100010
54 = 00110110
12 = 00000110

binary notation of 208.34.54.12=

11010000
00100010
00110110
00001100

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Q.20 : Change the following IP.....

(a) 01111111 11110000
01100111 01111101

a) 01111111 = 0x2^7 + 1x2^6 + 1x2^5 + 1x2^4 + 1x2^3 + 1x2^2 + 1x2^0

= 0 + 64 + 32 + 16 + 8 + 4 + 2 + 1 = 127

11110000 = 1x2^7 + 1x2^6 + 1x2^5 + 1x2^4 + 1x2^3 + 1x2^2 + 1x2^1 + 1x2^0

= 128 + 64 + 32 + 16 + 0 + 0 + 0 + 0

= 240

01100111 = 0x2^7 + 1x2^6 + 1x2^5 + 1x2^4 + 1x2^3 + 1x2^2 + 1x2^1 + 1x2^0

= 0 + 64 + 32 + 0 + 0 + 4 + 2 + 1

= 103

$01111101 = 0\times2^7 + 1\times2^6 + 1\times2^5 + 1\times2^4 + 1\times2^3 + 1\times2^2 + 1\times2^1 + 1\times2^0$

$= 0+64+32+16+8+4+0+1$

$= 125$

In decimal notation the address (a) is

01111111 11110000 01100111 01111101 =
127.240.103.125

(b) $10101111 = 1\times2^7 + 1\times2^6 + 1\times2^5 + 1\times2^4 + 1\times2^3 + 1\times2^2 + 1\times2^1 + 1\times2^0$

$= 128+0+32+0+8+4+2+1$

$= 175$

$11000000 = 1\times2^7 + 1\times2^6 + 1\times2^5 + 1\times2^4 + 1\times2^3 + 1\times2^2 + 1\times2^1 + 1\times2^0$

$= 128+64+0+0+0+0+0+0$

$= 192$

$11111000 = 1\times2^7 + 1\times2^6 + 1\times2^5 + 1\times2^4 + 1\times2^3 + 1\times2^2 + 1\times2^1 + 1\times2^0$

$= 128+64+32+16+8+0+0+0$

$= 248$

$00011101 = 0\times2^7 + 0\times2^6 + 0\times2^5 + 1\times2^4 + 1\times2^3 + 1\times2^2 + 0\times2^1 + 1\times2^0$

$= 0+0+0+16+8+4+0+1$

$= 29$

In decimal notation the address (b) is: 10101111 11000000 11111000 00011101

$= 175.192.248.29$

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Q21:- In a block of addresses, we know the IP address of one host is 25.34.12.56/16 .....

Answer:-

As we know that the IP address of host is 25.34.12.56/16

So,

One host first address = 25.34.0.1
network address = 25.34.0.0
last address (limited broadcast address) = 25.34.255.255