Name:- Syed Danish Ali

I.D:- 14712

Dept:- BSCCS) 4th Semester

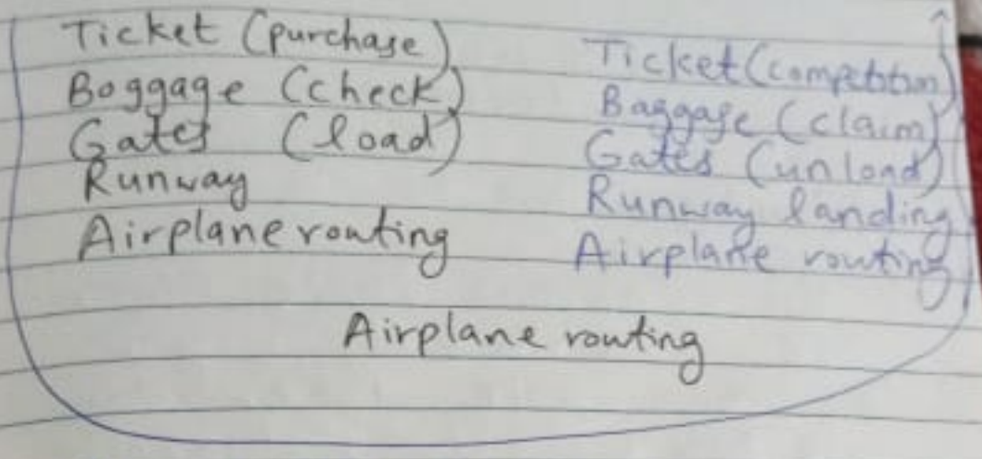
Sir Ghassan Hasnain

"Data Communication and Networks"

(Q.1)
(Answer)

One way to describe this system might to be describe the series of actions you take (or ~~order~~ other take for you) when you fly on an airline. You purchase your ticket. Check your bags go to the gate and eventually get loaded onto the plane. The plane takes off and is routed to its destination after plane land. You de-plane at the gate and clim your bags. if the trip was bad you complain about the flight to the ticket (getting nothing for your effort) This Scenario is shown in figure

Syed Danish Ali
I.d=14712



Already we can see some analogies here with computer networking. you are being shipped from source to destination by the airline, a packet is shipped from sourcehost to destination host to interanet. in a horizontal manner the above figure can be shown as

Ticket (purchase) Ticket competetion
Baggage (check) Baggage (claim)
Gates (load) Gates (unload)
Runway Runway landing
Airplane routing Airplane routing
Airplane routing

(3)

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(Q.2)
(Answer)

- Advantages:-

1) By combining these layers the functionality is performed by a single layer and overhead is reduced.

2) it reflects the real-life separation of application from the top-downward sector of the OSI model.

3) Higher Bandwidth as number of layer is reduced.

- Disadvantages:-

1) There will be security issues as the Network security and Application security will open of a single point which may expose our network open to our network.

2) More function need to be performed by single layer

3) Can make reasoning about the architecture of network system less effective.

(4)

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(Q.3)
(Answer)

Computer A:-

Content of segment at transport layer

| Data | header |

Content of packet at Network layer

| A | B | Data | Header |

Content of frame at Data link layer.

| 4246 | A | D | m | n | Data | H_2 | T_2 |

(5)

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Computer D:-

Content of segment at Transport layer.

| Data | Header |

Content of packet at Network layer.

| A | D | Data | Header |

Content of Frame at Data link layer.

| 8082 | A | D | m | n | Data | H_2 | T_2 |

Date / /

(6)

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(Q.4)
(Answer).

(a) $SNR(dB) = 10 * \log_{10}(SNR)$

$SNR = 10^{(SNR(dB)/10)}$

$SNR = 10^{(30/10)}$

$SNR = 10^3 = 1000$

As we know that

Capacity = bandwidth * $\log_2(1+SNR)$

$= 15KHz * \log_2(1+1000)$

$= 15KHz * \log_2(1001)$

Capacity $= 15KHz * 9.97$

Capacity $= 149.55$ Kbps

(b) $SNR(dB) = 10 * \log_{10}(SNR)$

$SNR = 10^{(21/10)}$

$SNR = 10^{0.2} = 1.6$

We know that

Capacity = bandwidth * $\log_2(1+SNR)$

Capacity $= 100KHz * \log_2(1+1.6)$

Capacity $= 100KHz * \log_2(2.6)$

$= 100KHz * 1.38$

Capacity $= 138$ Kbps.

(7)

(c) $SNR(dB) = 10 * \log_{10}(SNR)$

$SNR = 10^{(10/10)}$

$SNR = 10^1 = 16$

Capacity $= 0.5\,MHz * \log_2(1+16)$

$= 0.5\,MHz * \log_2(11)$

$= 0.5\,MHz * 3.46$

Capacity $= 1.73\,Mbps$.

(8)

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(2.5)
(Answer)

Using Nyquist Equation

$C = 2 * B * \log_2 M$.

We have $C = 4800$ bps

$\log_2 M = 8$, Because a signal element coincides a 4-bit words

Therefore, $C = 4800 = 2B = 8$.

$16B = 4800$.

and we have $B = 300$ Hz.

(2.6)

(Answer)

Here number of bits = 8 bit, and bit duration = 8ns.

Bit rate = 8 bit / 8ns

Bit rate = 1 bit/ns.

Bit rate = $1 * 10^9$ bit/sec)

Bit rate = 1 Gbps

(9)

(2.7)

(Answer)

Capacity = bandwidth * $\log_2(1+SNR)$

Capacity = 40 Mbps and bandwidth = 6 MHz

putting in above equation

40 Mbps = 6 MHz * $\log_2(1+SNR)$

$40 * 10^6$ bps = $6 * 10^6$ Hz * $\log_2(1+SNR)$

$\log_2(1+SNR) = 40/6$

$\log_2(1+SNR) = 6.67$

$1+SNR = 2^{6.67}$

$1+SNR = 102$

$SNR = 102-1$

$\boxed{SNR = 101}$

(2.8)
(Answer).

Frequencies = 20 to 40 kHz
bandwidth = 40 kHz = -20 kHz

Bandwidth = 20 kHz
Amplitude = 10v for the lowest and the Highest signals.

30 v for the 30 kHz.

(10)