VIT
Vellore Institute of Technology

Continuous Assessment Test 2 October 2023

Programme	: B.Tech. CSE & Specialization	Semester	: Fall 2023-24
		Code	: BCSE308L
Course	: Computer Networks	Slot	: F2 + TF2
Faculty	: Dr. Pradeep Kumar TS, Dr.T.Subbulakshmi, Dr. Muthumanikandan V	Class Nbr	: CH2023240100688, CH2023240100687, CH20232240101172
Time	: 1 ½ Hours	Max. Marks	: 50

Answer all Questions

1. Identify the flow control mechanisms from the following frame and acknowledgement order and draw individual flow diagrams for all the three flows along with description

    F - Frames A - Acknowledgements

    Flow1 - F1 A1 F2 A2 F3 A3 F4 A4 F5 F5 A5

    Flow 2 - F1 A1 F2 A2 F3 A3 F4 F5 A5 F6 A6 F7 F8 A8 F4 F4 F4 A4 F7 F7 A7

    Flow 3 - F1 A1 F2 A2 F3 A3 F4 F5 A5 F6 A6 F7 F8 A8 F4 A4 F5 A5 F6 A6 F7 F8 A8 F7 A7 F8 A8

    Consider the frame sending time is 3 sec and the acknowledgement time is 2 sec. Assume any other relevant values   **15**

    - Calculate the total time required to send all the above frames in every flow control mechanism
    - Calculate the extra time taken by the frames in every flow control mechanism if the timer waits for one more sec and then resends the frame for maximum of three times if the ack is not received

2. If every 4th packet being transmitted is lost and if we have to send 8 packets then calculate the number of transmissions required individually from sender and receiver required for (i) Go-Back-N protocol and (ii) Stop and Wait protocol.   **10**

3. You are a network administrator responsible for subnetting an IP address space for a medium-sized organization. Your organization has been assigned the IP Classful address block 202.168.10.0/24, and you need to create subnets to accommodate the following requirements:
    1. Subnet A: 100 hosts.
    2. Subnet B: 50 hosts.
    3. Subnet C: 30 hosts.
    4. Subnet D: 20 hosts.   **10**

    Design a subnetting scheme for the organization that efficiently utilizes the IP address space and meets the specified requirements. Provide the following details for each subnet:
    - The subnet mask.
    - The range of valid IP addresses within the subnet.
    - The network and broadcast addresses.
    - The total number of IP addresses in the subnet.

4. Consider the organization has some computers to assign with IPs and the ISP has allocated the classful addressing IP 181.244.0.0. The student needs to use the notation 181.244.0.0/18 to further divide them into subnets within the organization. Find the following

- The IP address of the 30th Computer in the third subnet and the subnet mask for the third subnet
- The IP address of the 200th Computer in the second subnet and the number of hosts in the second network
- The first usable IP address of the fourth network and the special / broadcast address of the fourth network

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5. Consider the third block of the class C addressing is used for Private addresses and mapped to the Public IPs with the first block of Class B with the appropriate NAT table for packet transfer within and outside an organization. Draw the NAT table with a minimum of 5 entries.

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(Deemed to be University under section 3 of UGC Act. 1956)
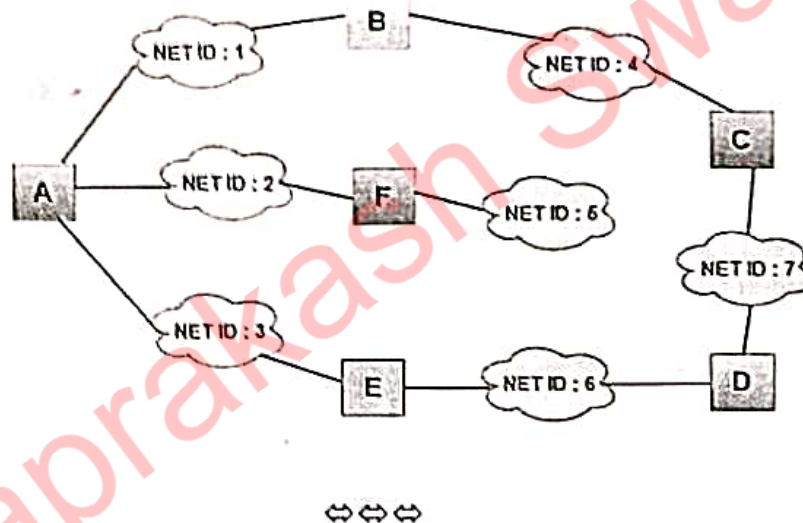
Continuous Assessment Test II – October 2023

Programme	:	B.Tech. (CSE)		Semester	:	Fall'23-24
Course	:	Computer Networks		Code	:	BCSE308L
				Slot	:	C2+TC2
Faculty	:	Dr. Deepa Nivetika, Dr. Neelanarayanan V, Dr. Kanchana Devi V		Class Nbr	:	CH20232401009014 CH20232401000902 CH20232401011181
Time	:	90 Minutes		Max. Marks	:	50

Answer **ALL** the questions

Q.No. Sub. Sec.	Questions	Marks
1.	Imagine Station A has sent a 7 bit data word 1100011 using single bit error detection and correction technique and Station B has received a Codeword _____. Use even parity to show the codeword received from Station A. Also, prove that there is no error in the received code word.	10
2.	Consider 210.16.215.0/25 is one of the address allotted to an organisation. The organisation has four departments A, B, C and D. Total number of addresses allotted to department A is 32, B is 32, C is 32 and D is 32. i. Specify the subnet mask. [1 Mark] i. Specify the subnet address for each department. [3 Marks] ii. Specify the host address range for each department. [3 Marks] iii. Specify the broadcast address for each department. [3 Marks]	10
3.	Frames are generated at node A and sent to node C through node B. Between A and B sliding window protocol is used with a window size of 3. Between B and C stop and wait is used. Show the method of transmission that takes place between the nodes in diagramatic representation. List out the merits and demerits of two protocols.	10
4.	Consider the given figure. Three stations want to transmit their information using common transmission medium without any collision. But, during data transmission collision happens as shown in the given figure. i. Identify the type of the protocol used in the above figure. Also, state the reason for	10

the collision. [4 Marks]

ii.   Suggest an alternative protocol which can reduce the rate of collision with a help of detection mechanism. Elucidate the same in detail with a diagram. [6 Marks]

Consider the given Autonomous System (AS) with A to F routers. Each router in the AS send their records to their neighbor routers. Each router will update their routing tables upon receiving the records. Identify and explain the routing and show the final routing table of all the routers A, B, C, D, E and F.
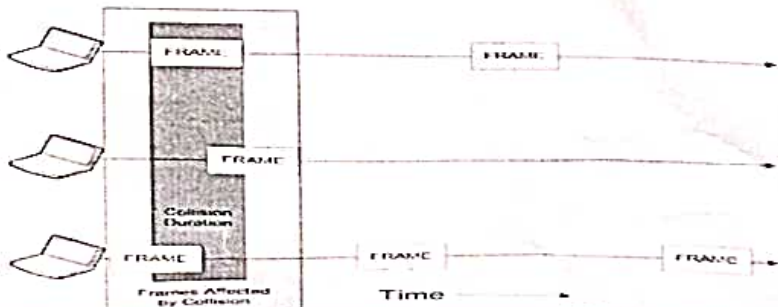

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Continuous Assessment Test(CAT) – II - APRIL 2024

Programme	:	B.Tech (CSE)	Semester	Winter Semester 2023-24
Course Code & Course Title	:	BCSE308L - Computer Networks	Class Number	CH2023240501838 CH2023240501847 CH2023240501840 CH2023240503359
Faculty	:	Dr. Kanchana Devi V, Dr. Karmel A, Dr. Anusha K, Prof. Priyanka Mishra	Slot	D2+TD2
Duration	:	90 minutes	Max. Mark	50

Answer all questions

Q. No	Sub Sec.	Description	Marks
1.	i)	Identify the suitable number of redundant bits required for a Hamming code error correction technique for detecting the errors in 7 bits data word. Discuss the same with appropriate reasoning, why other number of redundant bits are not suitable. [3 Marks]	(10)
	ii)	Compute the Code Word for the given Data Word 1110110 using Hamming Code Technique. [7 Marks]	
2.		Consider the initial Link State DataBase (LSBD) table of a network given below.	(10)

LSBD	A	B	C	D	E	F	G
A	0	1	2	1	∞	5	∞
B	1	0	1	∞	∞	∞	∞
C	2	1	0	2	3	∞	∞
D	1	∞	2	0	2	3	4
E	∞	∞	3	2	0	∞	1
F	5	∞	∞	3	∞	0	3
G	∞	∞	∞	4	1	3	0

Find the shortest path in the least cost tree to reach A to G using link state routing approach

Q. No	Sub Sec.	Description	Marks
3.		Consider the given figure. Three devices want to transmit their information using common transmission medium without any collision. But, during data transmission collision happens as shown in the given figure.	(10)

		i)	Find out the type of the protocol used in the above figure. Also, state the reason for the collision. [4 Marks]	
		ii)	Suggest an alternative protocol which can reduce the rate of collision. Elucidate the same in detail with a diagram. [6 Marks]	
		i)	Find the Class, Network ID and Host ID for the below given IP addresses: a. 127.10.55.120 [1 Marks] b. 201.23.0.160 [1 Marks]	
		ii)	Consider the given figure. Identify and explain the technique which helps the Host B to inform the host A of any frames lost or damaged in transmission. • Suggest an alternative technique with neat diagram for the same purpose. [4 Marks]. • Highlight the differences between both the techniques. [4 Marks] 	(10)
			The Service provider granted a block of addresses starting with 162.35.10.0/16 to the VIT. Assume that education institute is having three branches so it needs to create 3 subnets as follows, The Vellore VIT branch with 100 addresses The Chennai branch with 70 addresses The AP branch with 35 addresses	(10)
		i)	Help the administrator to design the sub networks with the slash notation for each subnet [8 Marks]	
		ii)	Find out how many addresses are still available after these allocations [2 Marks]	

**********All the best *************

Continuous Assessment Test (CAT) – II – APR 2024

Programme	:	B.Tech (Computer Science and Engineering)	Semester	:	Winter 2023-2024
Course Code & Course Title	:	BCSE308L Computer networks	Class Number	:	CH2023240501649 CH2023240501656 CH2023240501661
Faculty	:	Dr Neelanarayanan Dr Punitha K Dr Swaminathan A	Slot	:	E2+TE2
Duration	:	One and Half Hours (90 Minutes)	Max. Mark		50

General Instructions:
- Write only your registration number on the question paper in the box provided and do not write other information.
- Use statistical tables supplied from the exam cell as necessary
- Use graph sheets supplied from the exam cell as necessary
- Only non-programmable calculator without storage is permitted

Answer all questions

1. Assume fixed-length bit-strings of length 9 where only some bit-string sequences are allowable in the encoding scheme. Assume that the bit-strings in blue are the allowed codewords and those in gray are the ones that aren't. The following diagram elucidates the assumption. **10**

000000000 000000001 000000011 000000111 000001111 000011111 000111111 001111111 011111111 111111111

(Blue)   ( )   ( )   (Blue)   ( )   ( )   (Blue)   ( )   ( )   (Blue)

i.	What is the hamming distance of this encoding scheme?	[2 Marks]
ii.	Is the encoding scheme efficient? Justify your answer.	[4 Marks]
iii.	How many bit flips can be detected?	[2 Marks]
iv.	How many bit flips can be corrected?	[2 Marks]

2. An ISP is granted a block of addresses starting with 190.100.0.0/16. The ISP needs to distribute these addresses to three groups of customers as follows: **10**

  a. The first group has 64 customers; each needs 256 addresses
  b. The second group has 128 customers; each needs 128 addresses
  c. The third group has 128 customers; each needs 64 addresses
  d. Design the sub-blocks and find out how many addresses are still available after these allocations

**3.** A router has the following entries in the routing table: **10**

Address / Mask	Next hop
135.46.0.0/22	Interface 0
135.46.60.0/22	Interface 1
192.53.40.0/23	Router 1
Default	Router 2

What does the router do, if a packet with the following destination address arrives?

    a.   135.46.63.10
    b.   135.46.57.14
    c.   135.46.52.2
    d.   192.53.40.7
    e.   192.53.56.7

| 4 | Consider two links, (A,B) and (B,C), with propagation delays of d1 and d2, respectively. Assume that host A sends M packets to host C using a sliding window flow control protocol with a window of size W.
 a)   How much does it take to send all packets from A to C when the flow control protocol is implemented end-to-end between A and C?   [5 Marks]
 b)   How much does it take to send all packets from A to C when the flow control protocol is implemented on each link instead of end-to-end?   [5 Marks] | 10 |

| 5 | For the following network, | 10 |
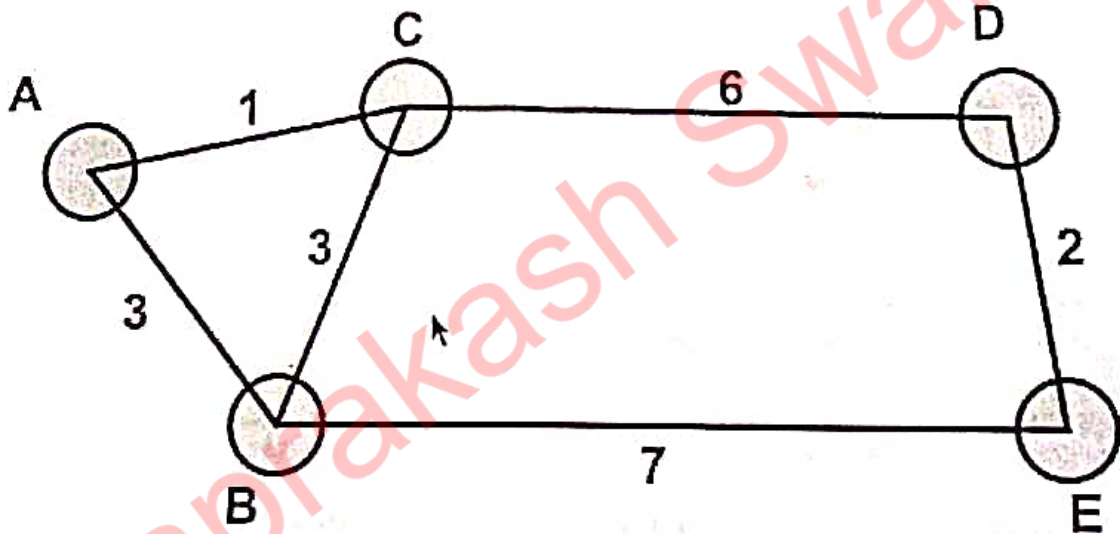
an empty routing tree generated by Dijkstra's algorithm for node A (to every other node) is shown below. Fill in the missing nodes and indicate the order that each node was added and its associated cost.

***********All the best*************

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Continuous Assessment Test II – March 2023

mme	: B. Tech (CSE and its Specializations)	Semester	:	Winter'22-23
e	: Computer Networks	Code	:	BCSE308L
		Slot	:	G2+TG2
y	: Dr. PRASAD M Dr. AMRIT PAL Prof. SAHAYA BENI PRATHIBA Dr. S A AMUTHA JEEVAKUMARI Prof. NOEL JEYGAR ROBERT V Dr. RENJITH Prof. RAJESH KUMAR	Class Nbr	:	CH2022235001301 CH2022235001271 CH2022235001268 CH2022235000944 CH2022235001270 CH2022235001302 CH2022235000943
	: 90 Minutes	Max. Marks	:	50

Answer ALL the questions

Sub. Sec.	Questions	Marks

Consider streams of 32 bits 11110100 00101111 01001001 10101100 need to be transmitted from a sender to a receiver. Equal size sections are used to transmit the data and the redundant bits. Illustrate the complete transmission process for the above-mentioned bit stream using checksum. **10**

Suppose you want to send an 8-bit data sequence 10110101 over a communication channel using a Hamming code with even parity.

i. A. Determine the number of parity bits required to create a Hamming code for this message. [1 Mark]

B. Calculate the Hamming code for the message, including the parity bits. [2 Marks]

C. Suppose that during transmission, a bit is flipped from 1 to 0 or 0 to 1. Calculate the received message and determine the bit that was flipped in transmission. [2 Marks]

D. Use the Hamming code to correct the error in the received message and retrieve the original message. [2 Marks]

ii. What are some practical applications of the Hamming code in modern computing and communication systems? How might these applications be affected by advances in technology and changes in user needs? [3 Marks]

Two neighbouring nodes P and Q use a Selective Repeat ARQ protocol with window size 9. Frames 0, 1, 2, 3, 4 and 5 are sent. For each of the following separate scenarios, discuss the significance of the receiving of,

    a. An ACK 5 [2 marks]   10
    b. An ACK 3 [2 marks]
    c. A NAK 2 [2 marks]
    d. A NAK 4 [2 marks]
    e. An ACK 6 [2 marks]

As ISP is granted a block of addresses starting with 10.0.0.0/8. The ISP needs to distribute these addresses to four groups of customers as follows:

    a. VIT research centre has 64 centres; each centre has 512 addresses
    b. VIT engineering has 32 branches; each branch needs 1024 addresses
    c. VIT law has 16 divisions; each division has 512 addresses   10
    d. VIT arts and science have 32 branches; each branch has 256 addresses

    i.   Design the subblocks and give the details for each subblock. [8 Marks]
    ii.   Find out how many addresses are still available after these allocations. [2 Marks]

    i.   In an IPv4 datagram, the value of the total length field is $(00A0)_{16}$ and the value of the header length (HLEN) is $(5)_{16}$. How many bytes of the payload are being carried by the datagram? [4 Marks]

    ii.   In an IPv4 datagram, the value of the header-length (HLEN) field is $(6)_{16}$. How   10 many bytes of options have been added to the packet? [4 Marks]

    iii. A datagram is carrying 1024 bytes of data. If there is no option information, find the value of the header length field. Also, calculate the value of the total length field. [2 Marks]

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