International Islamic University Chittagong
Center for General Education (CGED)

Mid-term Assessment, Autumn-2021

Course Code: URIH – 4701
Course Title: A Survey of Islamic History and Culture

Full Marks: 20   Time: 3:00 Hours

Answer **any two** of the following questions.
[All questions are of equal value]

1. Explain the basic features of the *Khilafah* mentioning the duties and responsibilities of a Khalifah. How do you relate it with the concept of "good governance" in the modern state?

2. Evaluate the contributions of *Khalifah* Abu Bakr (R) and Khalifah Umar (R) in the expansion of the Muslim Empire and the establishment of the rule of law in Islamic *Khilafah* during their reign.

3. Give an outline of the administrative structure during the Khulafah-i-Rashedeen. How is modern administration indebted to the contribution of four pious Khalifahs?

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International Islamic University Chittagong
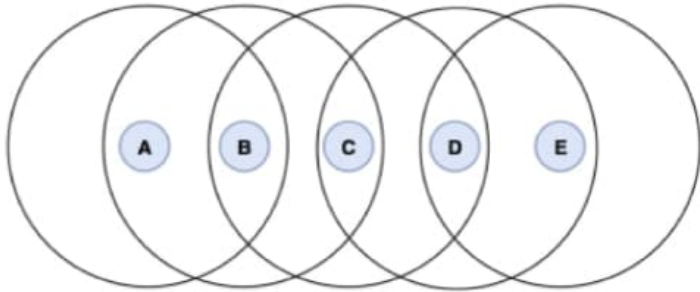## Department of Computer Science and Engineering
B. Sc. in CSE Midterm Assignment, Autumn 2021
Course Code: CSE 3633   Course Title: Computer Networks
*Total marks: **30(Written 21 + Viva 9)***
*Time: **2** hours **30** minutes for **exam** + **30** minutes for **submission***
[Answer all The questions. The figures in the right hand margin indicate full marks.]

		P	CO	DL
1.				
	Compare and contrast the followings: i. ISO-OSI and TCP/IP ii. ATM and TCP/IP iii. IEEE802.3 and IEEE802.11 iV. Connection Oriented and Connectionless v. Protocol and Service	7	1	1
2.				
	Suppose all the stations of a network are using shared bandwidth of 3YID bps to transmit the frames. The average frame size is YID bits. What would be the throughput if all the stations together produce 1YID frames per second in a pure aloha network and in a slotted aloha network? Find the frame rate in both systems in order to achieve the maximum throughput? Here Y is the last digit of your ID.	7	2	3
3.	What are the hidden node problems and exposed node problems of wireless networks? Using the following wireless network explain with the timing diagram how does IEEE802.11 protocol solve the above problems. Name the nodes with the alphabet from your name instead of A,B,C,D and E i.e. for the name ABDULLAH the nodes would be A,B,D,U and L. 	7	2	2

Note:
There are six levels in cognitive domain (here C means *cognitive*)
C1 = Remember (R)
C2 = Understand (U)

International Islamic University Chittagong
Department of Computer Science and Engineering
7th Semester B.Sc. in CSE Mid Term Assignment Autumn-2021
Course Code: CSE-4741   Course Title: Computer Graphics

Total Marks: 21   **Time: 3 hours**

Answer all questions. Figures in the right margin indicate full marks.

==For all questions, assume X and Y are the last two digits of your ID. If X or Y is Zero, replace it by 9.==

			Marks	CO	DL
1	a)	"Computer graphics is all about making practical simplifications in order to portray objects in a way that is feasible and that meets the artist's goals as well as possible". For each of the factors you list above, how might you simplify them to make them easy to compute?	2	CO2	C2
	b)	Describe RGB color model. If we use 2-bytes pixel values in a 32-bit lookup table representation. Similarly, if we use 2-byte pixel values in direct coding representation. What are the differences you will find on both images?	3	CO4	C3
	c)	Write down the working principle of CRT monitor?	2	CO1	C1

2	a)	During scan-converting a line using Bresenham algorithm, what will be the changes for following conditions:
		   i) Slope=0
		   ii) Slope>0
		   iii) Slope<0
			3	CO3	C3

	b)	"Displaying smoothly drawn curves on a pixelated display can produce horribly jagged edges". What are the aliasing effects? How can we solve these problems?	2	CO2	C2
	c)	"It is difficult to discuss the graphics pipeline without discussing the use of buffers – the color buffers, depth buffer, accumulation buffer, stencil buffer and so on." Why is there such an emphasis on buffers such as these in the standard graphics pipeline?	2	CO3	C3
3	a)	i) Find the matrix that represents the rotation of an object by 45° about the the point (h,k). ii) What are the new coordinates of the point A(8, Y) after the rotation about B(X, 4)?	3	CO4	C4
	b)	Describe the steps to find mirror reflection of a point about a line. Give necessary example.	1	CO1	C2
	c)	Find the new coordinates of the pyramid O(7,7), P(2,X), Q(Y,3), R(3,1) after (i)it has been expanded thrice its size about Q. (ii) reduced to half its size about Q.	3	CO4	C4

International Islamic University Chittagong
Department of Computer Science and Engineering
B. Sc. in CSE Midterm Examination, Autumn 2021
Course Code: CSE-4743   Course Title: Computer Security
Total marks: 21
*Time: **2.5 hours** for **exam** + **30** minutes for **submission***
Set-A-Odd Matric numbers

			CO	PO
1				
(a)	An intruder has broken into your company's IT infrastructure. He has disrupted your IT services. However, your system has the mechanisms in place that recoded the digital footprint of the attacker. Which security concept implemented in your system enabled you to record the footprint of the attacker: (A) Confidentiality, (B) Privacy, (C) Integrity, (D) Accountability, (E) Authenticity? Explain the reasons behind your answer.	3	1	1
(b)	Why Traffic analysis is classified as a passive attack?	2	1	1
(c)	Explain selective field connection integrity with suitable figure.	2	1	1
2			1	1
(a)	In Symmetric and Asymmetric cryptography only the key needs to be kept secret not the algorithm. Explain the reasons.	2.5	1	1
(b)	What is the role of the cryptanalyst in a Symmetric key cryptographic model?	1.5	1	1
(c)	Which English ciphertext is easier to break: A ciphertext made with substitution cipher or a ciphertext made with transposition cipher?	3	1	1
3			1	1
(a)	Differentiate between link encryption and end to end encryption.	3	1	1
(b)	Describe the role of session keys and master keys in a key distribution scenario.	2	1	1
(c)	Why are IDs and Nonces encrypted during key distribution?	2	1	1

International Islamic University Chittagong
Department of Computer Science and Engineering
B. Sc. in CSE Midterm Examination, Autumn-2021
Course Code: CSE-4745 Course Title: Numerical Methods
Section: 7AM +7BM
Total marks: 21   Time: 2 hours 30 minutes for exam + 30 minutes for submission

[Answer all the questions. Figures in the right hand margin indicate full marks.]

1.				CO	DL
	a)	Why *Numerical Methods* subject is essential to read in *Computer Science?*	1	CO1	C1
	b)	*Numerical Methods* are used in *Aeronautics,* how?	1	CO1	C2
	c)	Write short notes on the followings: i) absolute error, ii) error propagation.	2	CO1	C2
	d)	If *simulation* or *modeling* step is not taken then what types of problems in selecting numerical methods arise?	2	CO2	C3
	e)	Why the quantity of *desired accuracy* in *Numerical Methods* taken so small?	1	CO1	C1
2.					
	a)	Suppose you have an equation to solve by Newton-Raphson method. How the *initial value* can be taken?	1	CO1	C2
	b)	Find a root from the following equation by Newton-Raphson method: $x^2 - 7x + 10 = 0$	2	CO2	C2
	c)	Find a root from the following equation by Regula-Falsi method method: $x^2 - 8x + 15 = 0$	2	CO2	C2
	d)	Do you think *synthetic division* is a *normal division*? Show your arguments.	2	CO1	C1
3.					
	a)	When *Newton's Forward* and *Newton's Backward* formula will be used in Interpolation and why?	1	CO1	C1
	b)	Find the value of 'y' when $x = 4$ from the following table by Newton's formula:	2	CO2	C2
	c)	Find the value of 'y' when $x = 37$ from the following table by Central Difference formula:	2	CO2	C2
	d)	When Gauss forward or backward formula will be used, why?	2	CO1	C1

Table for 3. b):

x	3	5	7	10	11	13	15
y	12.34	23.67	45.87	46.99	52.00	54.68	57.88

Table for 3. c):

x	30	33	36	39	42	45	48
y	34.67	45.67	56.88	76.88	88.99	94.00	99.99

END

Answer each of the following three questions.

You **must** write your own solutions. Copying solutions from someone else and/or showing your solutions to anyone else constitute serious academic misconduct and will be heavily punished. Your broader mastery over the topics will be assessed rather than a mechanical check for the correct answers. Together with viva-voce, the goal of the assessment is to figure out the thought-process you employ as you seek to solve the problems. Conceptual clarity and technical ingenuity are valued. It is essential that you write in a standard, no-nonsense style. Make sure that your handwriting is quite neat/legible, and you upload a single PDF in very good shape.

Question 1: 4+1.5+1.5 marks

(a) Suppose you deposit \$1000 into an investment fund today, then \$990 at the end of the first month from now, \$980 at tne end of the second months from now, and so on. Given that the average rate of return on investment is 0.3% per month, how long will it take to save \$5,000?

or

We begin with two large glasses. The first glass contains a litre of water, and the second contains a litre of lemon juice. We pour 1/3 of a litre from the first glass into the second, stir up the juice/water mixture in the second glass, and then pour 1/3 of a litre of the mix back into the first glass and repeat this pouring back-and-forth process a total of n times.

   i. Describe a closed-form formula for the amount of juice in the first glass after n back-and-forth pourings.

   ii. What is the limit of the amount of juice in each glass as $n \to \infty$?

(b) Find a closed form of the following sum $S = \displaystyle\sum_{j=3}^{n}\sum_{k=4}^{n} \frac{j+k-2}{(j-2)(k-3)}$.

(c) Find a closed form of the following sum $S = \displaystyle\sum_{k=4}^{n} \frac{7+k^2}{k-2}$.

Question 2: 5+2 marks

(a) Find a closed form solution for the following recurrence:

$$T_1 = 7$$
$$T_n = 2T_{n-1} + 7 \quad (n \geq 2)$$

(b) We say that a bitstring, *i.e.*, a string made of binary digits, is free of 11, if it does not contain two 1's next to each other. Examples of such 11-free bitstrings are 01, 010, 1010101010, and 00001000, whereas neither of the two bitstrings 1011001 and 01000110 is 11-free.

For any integer $n \geq 1$, how many 11-free bitstrings are there with length n? (Hint: find an appropriate recurrence.)

Question 3: 2×1.5+2×2 marks

(a) Deduce the generating functions corresponding to each of the following sequences (do any two):

  i. $\langle 0, 0, -1, -4, -9, -16, -25, \cdots \rangle$ ii. $\langle 2, -1, 2, -1, 2, -1, 2, \cdots \rangle$ iii. $\langle 5, 2, 5, 2, 5, 2, 5, 2, \cdots \rangle$

(b) Figure out the solutions for the following problems (*any two*), while showing the steps you followed.

  i. If x_k, $i = 1, 2, \cdots n$, are positive (i.e., $x_k > 0$) integers, then how many different solutions does the equation

$$x_1 + x_2 + \cdots + x_n = m$$

have when it is given that $m \geq n$?

  ii. A certain system requires its accounts to have passwords that are *alphaneumeric* and are at least 6 characters but no longer than 9 characters. In addition, there has to be at least one uppercase letters and at most two digits. How many different passwords are there with the given criteria?

  iii. In how many different ways you can place *two white pawns, one white knight* and *one white rook* on a chessboard so that no two pieces share any columns?