Daffodil International University

Department of Computer Science and Engineering
Faculty of Science & Information Technology
Final Examination Semester: Summer 2017
Course Code: CSE 231 (DAY)
Course Title: Microprocessor and Assembly Language
Course Teacher: ALL

Time: 2 hours **Full Marks: 40**

Answer any four of the following questions. Figures in the right-hand margin indicate full marks.

1. a) Explain how *LOOP* instruction works in assembly language? Write with examples. 2

   b) Write a program that do the followings, 6
   - i) If AX contains a negative number, put -1 in BX;
   - ii) if AX contains 0, put 0 in BX;
   - iii) if AX contains a positive number, put 1 In BX

   c) Write down the purpose of AL and DL registers in assembly I/O processing. 2

2. a) Give the assembly instructions to do each of the followings: 4.5
   (i) Clear the MSB and LSB of BL, leaving the other bits unchanged.
   (ii) Complement the MSB of BX, leaving the other bits unchanged.
   (iii) Set the 4rd and 5th bits of AX, leaving the other bits unchanged.

   b) Write an assembly language program to count the number of 0 bits in BX, without changing BX. Put the answer in AX and display it. 3.5

   c) Suppose AL contains B1H and CF= 1. Give the new contents of AL after each of the following instructions is executed. Assume the preceding initial conditions for each part of this question. 2
   (i) SHR AL,1
   (ii) RCR AL, CL if CL contains 2

3. a) Explain with figure, what will happen when a procedure call instruction is executed? 4

   b) Suppose that AX=1234H, BX=5678H, CX=9ABCH and SP=0001H. Give the contents of AX, BX, CX and SP after executing the following instructions: 4

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PUSH AX
PUSH BX
POP CX
PUSH AX
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   c) What is a procedure? Give example. 2

4. a) What are the differences between signed and unsigned multiplication? 2

   b) Write a program to read a line of text from the user and display the text in reverse. 5
   Sample Input: Hello World
   Sample Output: dlroW olleH

   c) Write assembly code for each of the high level language assignment statements: 3
   - a. A = C X A – 7 / B
   - b. B = (A – B) X (B / 10)

5. a) Prompt the user to enter a line of text. On the next line, display the capital Letter entered that comes first alphabetically. 5

   b) Give assembly instructions to do the following : 5
   Multiply the value of BL by 8 using only addition operation.

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Department of Computer Science and Engineering
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Final Examination Semester: Summer 2017
Course Code: CSE 233 Course Title: Data Communication
Course Teacher: All

Time: 2 hours **Full Marks: 40**

Answer **All** of the following questions.
Figures in the right-hand margin indicate full marks.

a. Draw the graph of the Differential Manchester, 2B/1Q and MLT-3 scheme using the following data streams, assuming that the last signal level has been positive. 5.0

00110011001100110

b. What is the result of scrambling the sequence 110110000000001 using one of the following scrambling techniques? Assume that the last non-zero signal level has been positive. 4.0

i. B8ZS
ii. HDB3

c. How many invalid (unused) code sequences can we have in 5B/6B encoding? How many in 3B/4B encoding? 1.0

a. Draw the constellation diagram for the following cases. Find the peak amplitude value for each case and define the type of modulation (ASK, FSK, PSK, or QAM). The numbers in parentheses define the values of I and Q respectively. 3.0

i. Two points at (3, 0) and (4, 0).
ii. Two points at (4, 0) and (-4, 0).
iii. Four points at (2, 2), (-2, 2), (-2, -2), and (2, -2).
iv. Two points at (0 , 3) and (0, -3).

b. We need to send data 3 bits at a time at a bit rate of 3 Mbps. The carrier frequency is 10 MHz. Calculate the number of levels (different frequencies), the baud rate, and the bandwidth. Draw the bandwidth for it. 3.0

c. Find the bandwidth for the following situations if we need to modulate a 8-KHz Data. 2.0

i. AM
ii. Narrowband and wideband PM

d. An analog signal has a bit rate of 8000 bps and a baud rate of 1000 baud. How many data elements are carried by each signal element? How many signal elements do we need? 2.0

a. Show the contents of the five output frames for a synchronous TDM multiplexer that combines four sources sending the following characters. Note that the characters are sent in the same order that they are typed. The fourth source is silent. 2.0

i. Source 1 message: HI
ii. Source 2 message: HELLO
iii. Source 3 message: BYE
iv. Source 4 message:

b. Four l-kbps connections are multiplexed together. A unit is 1 bit. Find 3.0

i. The duration of 1 bit before multiplexing,
ii. The transmission rate of the link,
iii. The duration of a time slot, and
iv. The duration of a frame.

c. Suppose three friends X, Y and Z are thinking about opening a Telephone company. They are planning to implement FDM for their multiplexing procedure. They thought of combining 20 voice channels at the first stage to create a **Group**, then joining 10 Groups together and form a **Super-group**. These 10 Groups are separated by guard bands of 50Hz each. In the third step 12 Super-groups are combined to form a **Master-group**. In this stage total 0.12MHz is as guard band. Finally, 8 Master-groups are connected together to form a **Jumbo-group**. Now after multiplexing find out the total bandwidth requirement for the telephone company. Explain using an appropriate figure. Here the three friends know that each voice channel requires 4KHz. 5.0

a. What is the Hamming distance for each of the following? 3.0

i. d(10000,00000)
ii. d(10101,10000)
iii. d(11111,11111)
iv. d(000,000)

What is the minimum hamming distance among the above 4? Based on the value of the minimum hamming distance, find out how many errors can be detected?

b. In guided media we have seen different types of cables. Which of them transmits data in form of light wave? Describe how this cable works. Also, describe its advantages over the others. 4.0

c. What is the position of transmission medium in OSI Layer? What is the significance of twisting in twisted pair cable? 3.0

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Final Examination, Summer 2017

Course Code: CSE 234 **Course Title:** Numerical Methods

Sec: All **Course Teachers:** All

Time: 2.0hours **Total marks: 40**

Answer any five from the following six questions:

1. a) What is numerical integration? Derive the general formula for numerical integration. 4

   b) Find an approximate value of $\int_0^5 \frac{dx}{1+x^2}$ by Simpson's 1/3 rule of integration where the no. of ordinates is 7. 4

2. Evaluate the following integral both numerically by Simpson's 3/8 rule, Weddle's rule and analytically using 12 equidistant sub-intervals and find percentage error. 5

$$\int_0^1 e^{-x^2}\,dx$$

3. Given IVP $\frac{dy}{dx} = xy + y^2$, $y(0) = 1, h = 0.1$. Find the value of y approximately for $x = 0.2$ by Runge-Kutta method of four order four in two steps. 8

4. a) What is system of linear equations? Write down the condition when SLEs converge to its solutions. 2

   b) Solve the following system of equations by Gauss-Seidel iteration method. 6

$$2x + y + 4z = 12$$
$$8x - 3y + 2z = 20$$
$$4x + 11y - z = 33$$

5. a) Explain curve fitting with graphical presentation? 3

   b) Use the method of least squares to fit a straight line to the following data. 5

x	0	5	10	15	20
y	7	11	16	20	26

   Estimate the value of y when x=25.

6. Decompose the matrix A =LU where L and U has as usual meaning and solve the system AX=B 8

where $A = \begin{bmatrix} 1 & 1 & 1 \\ 2 & -1 & 3 \\ 3 & 1 & -1 \end{bmatrix}, X = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$ and $B = \begin{bmatrix} 3 \\ 16 \\ -3 \end{bmatrix}$

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Final Examination **Semester**: Summer 2017

Course Code: CSE 235 (DAY)

Course Title: Introduction to Bioinformatics

Course Teacher: All

Date: 26/08/2017

Time: 2 Hours **Full Marks: 40**

QUESTION No. 5 is COMPULSORY. From Question 1, 2, 3 and 4 answer any three. Figures in the right-hand margin indicate full marks.

1. (a) State differences between Denaturation and Annealing with proper figure. [2]
   (b) Describe Plasmid and BAC with proper figure. [2]
   (c) Describe the Sanger Sequencing method with proper figure. [6]

2. (a) Perform **Local Alignment** on the following sequences - 'TACTAA', 'TAATA' [Gap = -2, Mismatch = -1, Match= 1] [6]
   (b) Write all the possibilities for enumerating the value of a single cell for aligning 3 sequences using Dynamic Programming in MSA. [4]

3. (a) Find out selectivity and sensitivity for query = 'C' and outcome = 'CCG' from the following database - [3]

A	T
T	A
C	G
C	C
G	A

(b) Calculate hash table for - [7]

Query Sequence = "*JUSTICELEAGUE*",

Target Sequence = "*LEAGUEOFASSASSINS*" [K=1]

4. (a) Draw the Markov State Diagram and find out probability of the following sequences using Markov Chain Model - [5]

i) P (AGCGTT)

ii) P (CCAGTG)

Start	A	C	G	T
A	.3	.21	.28	.21
C	.32	.30	.08	.30
G	.25	.24	.30	.21
T	.18	.24	.29	.29

(b) Define Homolog, Ortholog and Paralog genes with Proper figure and example. [3]

(c) Find out the best score for the following two sequences [2]

Seq1 = 'ATTA' Seq2 = 'ATA'

[match = 1, mismatch = -1, gap = -2]

5. (a) Suppose, 4-sided dices are used in a Casino. If a dice is 4 sided, it can have values 1, 2, 3 or 4 on the top. Dices used by this casino are sometimes fair and sometimes loaded. A customer went to this casino and played dice for 3 consecutive times. The outcome he got was = 421.

Now design the Hidden Markov Model for this scenario and find out the probability for the following -

i. Loaded, Fair, Loaded

ii. Fair, Fair, Loaded

[Fair -> Loaded = 0.15, Loaded -> Fair = 0.45, Pr(4 in Loaded Dice) = 0.4, Pr(3 in Loaded Dice) = 0.3] [5]

(b) For the above scenario, find the combination **most likely** to have produced the observed sequence. [5]