SIR SYED UNIVERISTY OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF INFORMATION TECHNOLOGY
MID TERM EXAMINATION 2018, BATCH 2018, 2ND SEMESTER
COMMUNCATION SKILLS (CS-201)

DATE: 16th August 2018 MAX MARKS: 30
TIME: 1 ½ HOUR

Mibran

INSTRUCTIONS:
Attempt all questions. Be precise, relevant and legible in your answers.

Q1: Following sentences violate principles of communication. Identify which principle is missing and provide the revised version of the following sentences. (5)

i. You are rejected. We cannot offer you this job. courtesy.
ii. Since the task is lengthy and time consuming, you may not complete it right now. It is OK to keep it aside and even take it home as long as you want but do not keep it more than two weeks. Consize.
iii. Your application cannot be considered because it was incomplete. (complete)
iv. The request for the concession in fee you submitted cannot be approved. courtesy.

OR

Discuss "Communication is the life-blood of an organization."

Q2: Describe the 'Process of Communication' along with the flow chart. Also mention the two possible points where communication breakdown occurs. (5)

Q3: Identify one possible communication barrier in the following situations and suggest some ways to overcome them. (5)

i. You need to introduce your new product to the audience who has no technical background of your field. Lack of awareness, Failure to comm.
ii. A manager who uses a directive and authoritarian leadership style and employees are not able to share their views. Barrier in Superior, Attitude in Superior.

3b: Describe the following and provide one example for each flow of communication.

i) Downward
ii) Upward
iii) Horizontal

(2) Sender → Encoding → Message → Medium → Draft → Feedback

(1) T.C.S. clarity. Consize Con-crete Correct Coherent comple. Courtesy. Final meeting & reasons

(3) Pure Evolution. In-attention Loss of transmition. Undue reliance on written words. Distrust of comm. Failure to communicate. Barrier in Policy. Bias in Rules & Regulations. Status Rank. Complexity.

1

(10)

Q4a: What do the following statements mean?

a) Japanese Person: I was shocked to see a New-York yellow cab driver who was talking to a passenger seeing directly into the eyes. It's really surprising to see Americans making direct eye-contact even with the strangers.

b) Bill Gates 'disrespects' South Korean president with casual handshake. with one hand in his pocket.

Q4b: What meaning/ messages do the following non-verbal messages communicate? Specify the category for each as well. Kinesics,

i. A student moves nervously here and there during the presentation

ii. During the meeting, you see a member repeatedly takes out his cell phone and checks it. ~~Flat~~ facial expression.

iii. A person who comes for an employment interview wearing Jeans and T-shirt.

iv. A candidate does not keep a steady/direct eye contact with the interviewer. eyecontact

v. You enter the cafeteria to join your friends. One of the friends you had an argument with two days ago sees you and immediately goes out of the cafeteria without looking towards you.

(5)

Q5: Explain the difference between: (Any Two)

i) International and National Communication.

ii) Bridgers and Dead Enders.

iii) Oral and written Communication

iv) Kinesics and Proxemics

SIR SYED UNIVERSITY OF ENGINEERING & TECHNOLOGY

1st Semester C.S, Mid Term Examination 2018

(Batch 2018)

Calculus & Analytical Geometry (MS-103)

Date: March 1st , 2018

Time Allowed: $1\frac{1}{2}$ Hours

Mibran

MaximumMarks: 30

Instruction:-Attempt all questions in sequence

Question 1: ..... *10 marks*

a) Evaluate by using De Moivre's Theorem $\left(\frac{\sqrt{3}-i}{\sqrt{3}+i}\right)^6$

b) Prove that $\cos iz = \cosh z$ *or* $\sin\theta = \frac{e^{i\theta}-e^{-i\theta}}{2i}$

Question 2: ..... *10 marks*

a) Discuss the derivability of $f(x) = x^2$ *at* $x=3$ *or*
Find the extreme values of the function given by $f(x) = x^3 + 6x^2 + 5$

b) Find the equations of tangent and normal lines for the curve $y^2 = 2x^2 + 1$ *at (1,2) or*
Verify Rolle's theorem and find c , if $f(x)=x^2 - 3x + 2$ *on [1 , 2]*

Question 3: ..... *10 marks*

a) Verify mean value theorem and find c , where $f(x)=x^3 - x$ *on [0 , 2]*

b) Using Cauchy's mean value theorem and find c for the functions $f(x)=2x$ *, and* $g(x)=x^2$ *on [1 , 3]*

SIR SYED UNIVERSITY OF ENGINEERING & TECHNOLOGY

2nd Semester C.S, Mid Term Examination 2018

(Batch 2018)

Differential Equation & Linear Algebra (MS-105)

Date: August 15th, 2018

Time Allowed: $1\frac{1}{2}$ Hours

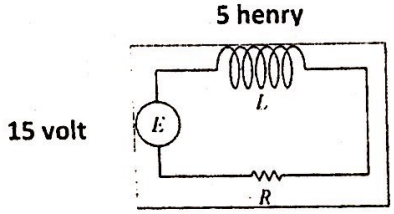
MaximumMarks: 30

Instruction :- Attempt all questions

Question 1: *10marks*

a) *When a sandwich is removed from an oven, its temperature is measured at* 200^0F. *Three minutes later its temperature is* 150^0F. *The room temperature is* 60^0F. *how long will it take to cool off to a temperature of* 80^0F.

b) *Calculate the current* **i**, *at any time t, in the circuit below if the initial current is zero.*



Question 2: *10marks*

a) *Solve :* $3x(xy-2)dx+(x^3+2y)dy=0$

b) *Find the solution of Bernoulli's equation* $\frac{dy}{dx}+\frac{1}{x}y=xy^4$

Question 3: *10marks*

a) *Solve:* $\frac{d^4y}{dx^4}+\frac{d^3y}{dx^3}-7\frac{d^2y}{dx^2}-\frac{dy}{dx}+6y=0$

b) *Find echelon form of the matrix* $\begin{pmatrix}2 & 3 & 4 & 5\\ 3 & 4 & 5 & 6\\ 4 & 5 & 6 & 7\\ 9 & 10 & 11 & 12\end{pmatrix}$

Sir Syed University of Engineering and Technology, Karachi

3th Semester BS(CS/ I.T) Examination – 2019(Batch 2018)

Discrete Mathematics/Structures

Mibran

Date: 25/01/2019 **Max. Marks: 30**
Note: Attempt all questions carry equal marks **Time: 1.5 hrs.**

Q1) The following diagram is a much simplified version of the famous mathematical "15 puzzle", Shown in two positions. Each square with a number in it is a little chip of plastic and the blank square is an empty space. A move consists of shifting one of the adjacent plastic chips into the empty space. You are given the game in the configuration on the left (initial state). The goal is to get it into the configuration on the right (goal state). You can probably solve this game in your head, but the purpose here is to develop a general approach using the concept similar as the graph theory. Define a state of the game, and try to mention what it means for two states to be adjacent. Draw the associated state diagram (state graph). Use it to show that winning the game is possible (or impossible, whatsoever). What is the minimum number of moves needed to win (if winning is possible)?

1	
2	3

INTIAL STATE

3	
1	2

GOAL STATE

Q2) a) Use truth table to show that (p ∧ q) ∨ (~ p ∨ (p ∧ ~q)) is a tautology. Sorry true

b) Use truth table to show that (p ∧ ~q) ∧ (~p∨q) is a contradiction Sorry false.

Q3) Use truth table to determine the argument form

If at least one of these two numbers is divisible by 6, then the product of these two numbers is divisible by 6.

Neither of these two numbers is divisible by 6.

∴ The product of these two numbers is not divisible by 6.

Q4) How can this English sentence be translated into a logical expression?

a) "You cannot ride the roller coaster if you are under 4 feet tall unless you are older than 16 years old."

b) "You can access the Internet from campus only if you are a computer science major or you are not a freshman."

Q5) In a school, 100 students have access to three software packages A, B and C , 28 did not use any software, 8 used only packages A, 26 used only packages B , 7 used only packages C, 10 used all three packages, 13 used both A and B

(i) Draw a Venn diagram with all sets enumerated as for as possible.
Label the two subsets which cannot be enumerated as x and y, in any order.

(ii) If twice as many students used package B as package A, write down a Pair of simultaneous equations in x and y.

(iii) Solve these equations to find x and y.

(iv) How many students used package C?

...THE END!...

2018-CS-8

Sir Syed University of Engineering and Technology

Department of Computer Science

3rd Semester Mid Term Examination-2019(Batch 2018)

Data Structures and Algorithms (CS-212)

Time permitted: 1.5 Hr
Note: Attempt All Questions.

Date: 23/01/2019
Total Marks: 20
Time : 9.00AM to 10.30

Mibran

SECTION-A

Q:1(Answer any 5 questions in 2/3 Lines). [5 Marks]

a) Which Searching Technique is more efficient, Linear search or Binary search. Justify your answer with proper reasoning.
b In order to improve the efficiency of Algorithm, which case of complexity we are interested in, best case or worst case. justify your answer why.
c) Differentiate between Arrays and Linked List.
d) While comparing two different Algorithms, what are the Pre-conditions we should kept in mind.
e) Explain briefly Best case, Worst Case, Average Case and Asymptotic Complexity.
f) Write down the Complexity of Linear Search, Binary Search, Bubble sort, Selection sort, Insertion Sort and Merge sort.

O(n) O(log n).

SECTION-B

Q:1(a) Create a linked list of Patients stored in Linear Arrays 'BED' and 'LINK' having size n=12 in Alphabetical Order. Patients occupied the 'BED' are : (Fields,Nelson,Samuels,Green,Lane, Adams ,Maxwell,Kirk,Dean) [5 Marks]

The Available Space in the Linear Array 'BED' may be linked as BED[10] is the first available bed, BED[2] is the next available bed and BED[6] is the last available bed BED[6] has null pointer in the next pointer Field.

(b) Also show the changes in Pointer fields after the following changes:
1. Hughes is put in Bed 10, the first available bed.
2. Hughes should be inserted into the List between Green and Kirk.
3. Dean should be deleted from the list.

Q:2(a) [2.5 Marks]

Consider the given Array input by the user and search key num= 2 in array . Code Linear search and Binary Search Algorithm in C++, Also explain in ½ line which one is more efficient Algorithm and justify why ?

2 5 7 10 12 13 23 25 34 47 61 101

10	101	13	47	61	23	25	12	34	7	5	2
0	1	2	3	4	5	6	7	8	9	10	11

Q:2(b) [2.5 Marks]

Suppose stack is allocated N=6 memory cells and initially stack is empty or in other words,TOP=0, Find the output of the following module :

1. Set AAA := (2*5*3)+3-2. and BBB := (4*5-1)-6.
2. Call PUSH(STACK,AAA)
   Call PUSH(STACK,4)
   Call PUSH(STACK,BBB + (2 * 3 * 4 - 1)
   Call PUSH(STACK, 9)
   Call PUSH(STACK, AAA+BBB)
   Call POP(STACK,ITEM)
3. Write : ITEM.

$\frac{0+11}{2} = 5.5 = 5$

$\frac{0+4}{2} = 2 = 2$

$\frac{0+1}{2} = 0.5 = 0$

Q:3(a) [5 Marks]

Assume five different values of Array (E.g. : N=15, N=30,N=45,N=60 ,N=75), Now find out the computational steps in Bubble Sort, Selection Sort, Insertion sort and Merge Sort in tabular form.

Also Draw **Line Graph of Time and Space** to show the Growth rate of each Sorting Technique in graphical form.

(b) Assume five different values of Array (E.g. : N=25, N=50,N=75,N=80 ,N=95), Now find out the computational steps in Linear Search and Binary Search in tabular form.

Also Draw **Line Graph of Time and Space** to show the Growth rate of both searching Techniques in graphical form

K.E == M.E

K.E > M.E

K.E < M.E

2018-CS-040.

SIR SYED UNIVERSITY OF ENGINEERING AND TECHNOLOGY

SPRING SEMESTER EXAMINATION 2019

COMPUTER SCIENCE DEPARTMENT

ORGANIZATIONAL BEHAVIOR

3rd SEMESTER BATCH-2018

TOTAL MARKS: 30

DATE: 22-01-2019

TIME: 1.5 HOURS Mibran

ATTEMPT ANY FIVE QUESTIONS OF THE FOLLOWING QUESTIONS, ALL CARRY EQUAL MARKS

Q1(a): State and explain the organizational behavior. /5

(b): What are the disciplines contributing towards organizational behavior.

Q2(a): Define learning. /5

(b): What is the role of learning theories in understanding and changing the individual?

Q3(a): State and explain diversity. /5

(b): Describe how university manage diversity effectively.

Q4(a): What do you understand by the term perception? /5

(b): What are the three factor that influence perception in individual.

Q5(a): State and explain the management role. /5

(b): How can manager shape employee's behavior?

Q6(a): Discuss the term attitude. /5

(b): Explain three types of work-related attitude in organization.

(½)

Sir Syed University Of Engineering and Technology
Department of Computer Science
Midterm Examination-2019
3rd Semester Batch-2018
OBJECT ORIENTED PROGRAMMING

Time allowed: 1.5 Hrs. **Date: 24 January 2019**
Answer All Questions **Total Marks: 20**

Question _no1: (Attempt All) Mibtan **[12Marks]**

a) Explain the purpose of the Common Language Runtime (CLR) in .NET Framework with example.
b) Why do we use static keyword? Also explain in C# why should main method be static?
c) Describe the principles of object-oriented programming with suitable example.
d) Why an object is the manifestation of a class, explain with suitable example?
e) An access modifier restricts the access of a class, constructor, data member and method in another class. Explain why?
f) What is the main difference between default and parameterized class constructors explain with an example?

OR

Explain how we can implement the read-only property in C#.

Question _no2: **[08 Marks]**

Create an inheritance hierarchy containing base class **Account** and derived classes **Savings-Account** and **Checking-Account** that inherit from class Account.

Base Class Account:

- Base class *Account should include* data members like name, address and account_balance.
- The class should provide a constructor that receives an initial balance and uses it to initialize the data member. The constructor should validate the initial balance to ensure that it is greater than or equal to 0.0. If not, the balance should be set to 0.0, and the constructor should display an error message, indicating that the "initial balance was invalid".
- The class should provide three functions. The function Deposit() should add an amount to the current balance. The function Withdraw() should withdraw amount from the account balance and ensure that he debit amount does not exceed the account balance. If it does, the balance should be left unchanged and the function should print the message "Debit amount exceeds account balance". Function get Balance() should return the current balance.

Derived class Saving-Account:

- Derived class Savings Account should inherit the functionality of the class Account, but also include a data member interest-rate of type double indicating the interest rate (percentage).
- Savings Account's constructor should receive the initial balance, as well as an initial interest_rate for the Savings Account.

- Savings Account should provide public method Calculate-Interest() that returns a double value indicating the amount of interest earned by an account. The function Calculate-Interest() should determine this amount by multiplying the amount by the interest rate.

Derived class Checking-Account:

- Derived class CheckingAccount should inherit the functionality of the class Account, but also include a data member fee-charged of type double indicating the fee charged per transaction.

- CheckingAccount's constructor should retrieve the initial balance, as well as a parameter indicating a fee amount.

- CheckingAccount should provide a public function IsFeeCharged() that returns a Boolean value indicating whether the fee amount is charged or not. If the transaction is successful then only fee must be charged. If the transaction is cancelled then the fee must not be charged.

After defining the classes in this hierarchy, write a program that creates objects of each class and tests their functions.

Note: *You are allowed (and encouraged) to add more details to each of the account types but any additional detail must be justified.*

Sir Syed University of Engineering and Technology, Karachi
Department of computer Science
4th Semester B.S.(CS) Examination – 2019(Batch 2018)

MIDTERM

Probability and Statistics

Mibram

Course Instructor	:Ahsan Masroor	Total Marks: 30
Course Title	: Probability and Statistics	Duration: 1.5 Hours
Semester	: fall-2019	Batch: Batch 2018
Date	: 29-7-2019	Paper Timing:9:10.30

Note: Attempt all questions
Marks and estimated time are mentioned against each question.

Question No. 1	Time: 20 minutes	06 Marks

An irate customer called the Dollar Day Mail Order Company 40 times during the last two weeks to see why his order had not arrived. Each time he called, he recorded the length of time he was put "on hold" before begin allowed to talk to a customer service representative.

Time on Hold, in minutes									
1	5	5	6	7	4	8	7	6	5
5	6	7	6	6	5	8	9	9	10
7	8	11	2	4	6	5	12	13	6
3	7	8	8	9	9	10	8	9	9

Min

Max.

Construct a Frequency Distribution for the given number of classes. Include the class boundaries, the midpoints, the relative frequencies, and the cumulative frequencies, draw frequency polygon and histogram.

Question No. 2	Time: 20 minutes	06 Marks

The A. C. Nielsen Company publishes information on the TV-viewing habits of Americans in Nielsen Report on Television. A sample of 20 people yielded the weekly viewing times, in hours, displayed in Table.

25	41	27	32	43
66	35	31	15	5
34	26	32	38	16
30	38	30	20	21

5, 15, 20, 21, 25, 26, 27, 30, 31, 32, 34, 35, 38, 41, 43, 66.

I. Obtain the Five-Number summary for these data.
II. Identify Potential outliers, if any.
III. Construct a Box plot.
IV. Coefficient of Quartile Deviation
V. Coefficient of Range

Question No. 3	Time: 20 minutes	06 Marks

A. A data consisting 25 values has a mean 12.7 later on checking, It is discovered that a number 24 was misread as 42 to the 25 observations. Find the correct mean.

B. The following are the scores by batsmen A and B in a series of one day matches.

Batsmen(A)	12	15	8	73	7
Batsmen(B)	47	12	76	48	4

Calculate mean and standard deviation of the scores.
Using a suitable relative measures of dispersion, decides which batsmen has more consistent scores.

Question No. 4	Time: 15 minutes	Marks 06

A. Determine the measurement level

Variable	Nominal	Ordinal	Interval	Ratio	level
Height					
Zip code					
Letter grade					
IQ score					
Height					
Age					
Temperature					

B. Raj score 85 in Discrete Mathematics ,while the class average was 80 with standard deviation of 5.William score 70 in his class, while class average was 60 with standard deviation 6 who score better with respect to their class.

Question No. 5	Time: 15 minutes	Marks 06

A. From the information given below , calculate coefficient of skewness.
Mean =22.3 , mode=19.2 and standard deviation=9.86

B. Calculate mean deviation from mean and mean deviation from median in the following data and verify that $M.D(\bar{X}) < M.D(\tilde{X})$

Classes	2 --4	4 -- 6	6-- 8	8 -- 10	10-- 12
freq	2	3	6	2	1

THE END!

SIR SYED UNIVERSITY OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE
4th Semester, Mid Term Examination Fall 2019, Batch 2018

INTRODUCTION TO OPERATING SYSTEM

Date: 01-07-2019 **Max Marks: 20**
Time Allowed: 1.5 hrs
NOTE: Attempt all Questions. Time is limited, be precised with your answers.
You have got only two choices, Give up or Give it All. Choose the better one!

Question # 1: Mihan **(2)**

Most operating systems are designed for general-purpose computation. A proposal has been put forth for an OS that is optimized for running math-intensive programs. In MathOS, the kernel includes system calls for many useful mathematical operations, such as matrix arithmetic, Bessel functions, Euclidean distance, etc. These system calls are written in highly optimized assembly language for maximum performance. Is this concept for MathOS a good idea? Explain why or why not.

Question # 2: **(2)**

Write a multithreaded program that calculates various statistical values for a list of numbers. This program will be passed a series of numbers on the command line and will then create three separate worker threads. One thread will determine the average of the numbers, the second thread will determine the maximum value, and the third thread will determine the minimum value.

Question # 3: **(2)**

We wish to schedule three processes P1, P2 and P3 on a uni-processor system. The priorities, CPU time requirements and arrival times of the processes are as shown below.

Process	Priority	CPU time required	Arrival time (hh:mm:ss)
P1	*10 (highest)*	*20 sec*	00:00:05
P2	9	10 sec	00:00:03
P3	8 (lowest)	15 sec	00:00:00

What are the turnaround times of P2 using preemptive and non-preemptive priority-based scheduling respectively?

Question # 4: **(2)**

A multiprocessor with eight processors has 20 attached tape drives. There is a large number of jobs submitted to the system that each require a maximum of four tape drives to complete execution. Assume that each job starts running with only three tape drives for a long period before requiring the fourth tape drive for a short period toward the end of its operation. Also assume an endless supply of such jobs.

a. Assume the scheduler in the OS will not start a job unless there are four tape drives available. When a job is started, four drives are assigned immediately and are not released until the job finishes. What is the maximum number of jobs that can be in progress at once? What is the maximum and minimum number of tape drives that may be left idle as a result of this policy?

b. Suggest an alternative policy to improve tape drive utilization. What is the maximum number of jobs that can be in progress at once? What are the bounds on the number of idling tape drives?

Question # 5: **(3)**

Consider a set of five hard real-time system tasks activated simultaneously at time t = 0. The computation times and deadlines of these tasks are given below:

a. Is there a feasible Earliest Deadline First (EDF) schedule for this set of tasks?

b. If we add the precedence constraints described below, is there a feasible schedule?

$\tau1 \rightarrow \tau2$ $\tau1 \rightarrow \tau3$
$\tau2 \rightarrow \tau4$ $\tau2 \rightarrow \tau5$

	τ_1	τ_2	τ_3	τ_4	τ_5
C_i	2	2	1	3	4
d_i	3	5	2	12	12

Question # 6: (3)

Consider the following snapshot of a system with five processes (P1, P2, P3, P4, P5) and four resources (R1, R2, R3, R4). There are no current outstanding queued unsatisfied requests.

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Currently Available Resources

R1	R2	R3	R4
2	1	2	0

	Current Allocation				Max Need				Still Needs			
Process	R1	R2	R3	R4	R1	R2	R3	R4	R1	R2	R3	R4
P1	0	0	1	2	0	0	3	2	0	0	2	0
P2	2	0	0	0	2	7	5	0	0	7	5	0
P3	0	0	3	4	6	6	5	6	6	6	2	2
P4	2	3	5	4	4	3	5	6	2	0	0	2
P5	0	3	3	2	0	6	5	2	0	3	2	0

a. Is this system currently deadlocked, or can any process become deadlocked? Why or why not? If not deadlocked, give an execution order.

b. If a request from a process P1 arrives for (0, 4, 2, 0), can the request be immediately granted? Why or why not? If yes, show an execution order.

Question # 7: (3)

Assume you have a system with three processes (X, Y, and Z) and a single CPU. Process X has the highest priority, process Z has the lowest, and Y is in the middle. Assume a priority-based scheduler (i.e., the scheduler runs the highest priority job, performing preemption as necessary). Processes can be in one of five states: RUNNING, READY, BLOCKED, not yet created, or terminated. Given the following cumulative timeline of process behavior, indicate the state the specified process is in AFTER that step, and all preceding steps, have taken place. Assume the scheduler has reacted to the specified workload change. For all questions in this Part, use the following options for each answer:

A. RUNNING **B.** READY **C.** BLOCKED **D.** Process has not been created yet **E.** Not enough information to determine OR None of the above

1. Process X is loaded into memory and begins; it is the only user-level process in the system. Process X is in which state?
2. Process X calls fork() and creates Process Y. Process X is in which state?
3. The running process issues an I/O request to the disk. Process X is in which state?
4. The running process calls fork() and creates process Z. Process X is in which state? Process Y is in which state?
5. The previously issued I/O request completes. Process X is in which state?

Question # 8: (3)

Consider any positive integer n and apply the following algorithm:

$$n = \begin{cases} n/2, & \text{if n is even} \\ 3 \times n + 1, & \text{if n is odd} \end{cases}$$

When this algorithm is continually applied, all positive integers will eventually reach to 1. For example, if n = 35, the sequence is 35, 106, 53, 160, 80, 40, 20, 10, 5, 16, 8, 4, 2, 1

Write a C program using the fork() system call that generates this sequence in the child process. The starting number will be provided from the command line. For example, if 8 is passed as a parameter on the command line, the child process will output 8, 4, 2, 1. Because the parent and child processes have their own copies of the data, it will be necessary for the child to output the sequence. Have the parent invoke the wait() call to wait for the child process to complete before exiting the program. Perform necessary error checking to ensure that a positive integer is passed on the command line.

Good Luck!

Sir Syed University of Engineering & Technology, Karachi.
Department of Computer Science
Mid Term Examination, 2019
4th Semester, Batch 2018

Theory OF Automata & Formal Languages

2018-CS-040.

Instructions: Attempt Any Five Quesstions. Question 1 is compulsory.

Date: 03-08-2019
Max. Marks: 30
Time Allowed:1.5 Hours

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Q#1. Make the Regular Expression and Draw their DFA's for the following statement for $\Sigma = \{a,b\}$? [10]

a> L1 = {aa, aba, abba, aaa,abbaa.....} start with a & a.

b> All words that contains babb as substring.

c> All words that start with bb and ends with ba

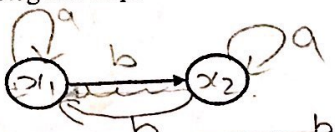
d> L2 = {ε, bb,abb,bba,bbabb.....} δ.

e> All words that start with b and having atmost three character length.

[5]

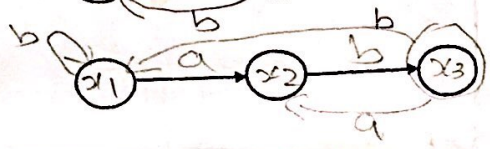
Q#2. Write the Regular Expression for the following DFA's?

A)



$a^* + (a^* b a^* b a^*)^*$

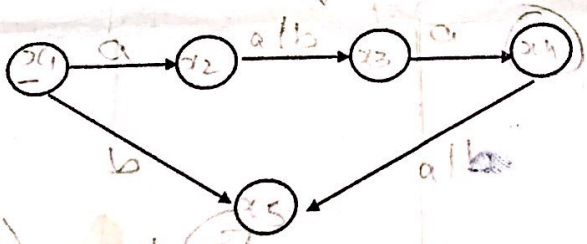
B)



~~starts with a~~ ends with ab

$(a+b)^* a.b$.

C)



a(a+b)a(a+b) + b(a+b)* + a+

a(a+b)*a(a+b). a/b

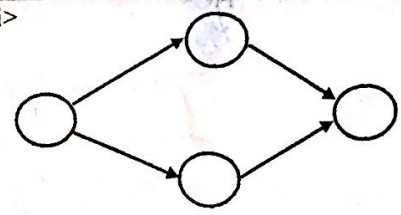
Q#3. Make the NFA for the following R.E expression and draw the parse tree for one valid and one Invalid word for each? [6]

a> (a+b)* bbab (a+b)*
b> (ab)(a+b)*(aab)
c> (aaba)(ab)*

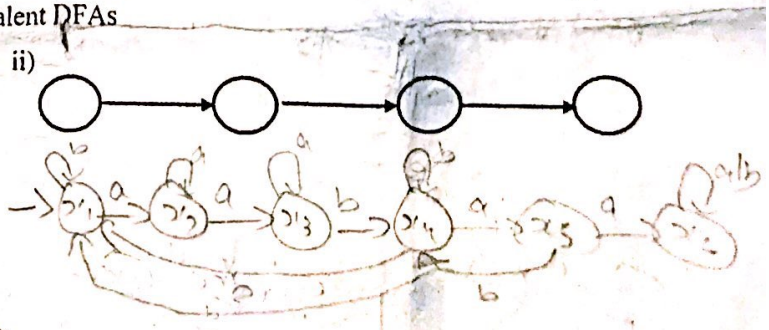
Q#4. Attempt Part A or Part B [6]

A) Convert the following NFA's into equivalent DFAs

i>



ii)



B) Draw the DFA for the following?

i> All words that start with bab and ends with ba are valid
ii> All words that contain aabaa as a substring are valid
iii> All words that ends with aab are valid.

aabaa

aabaa
aabbaab

Q#5. Explain the concept of Automata in Computer? Include the 5 tuple in answer with example? [3]

2018

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Sir Syed University of Engineering & Technology
5th 3rd Semester, Batch 2018 Mirbaz

Q.1. (a) If $\pi = 3.141592654$ first round the value of π into four decimal places to find the value of Error, Relative Error and Percentage Error. **(5)**

Q.1. (b) Consider the function $f(x) = \cos x$ near $x_0 = 0$

(a) write the Taylor polynomial $p_5(x)$

(b) Compute $p_5(0.1)$ **(3+2)**

Q.2. (a) Consider the function $f(x) = e^x - 2 - x$ [0, -2.4] Perform five iteration of the False Position method. **(5)**

Q.2. (b) Consider the function $f(x) = x^3 - 3x - 2$ start with $x_0 = 2.1$ Perform five iteration of the Newton Raphson method. **(5)**

Q.3. (a) Consider the system, where $A = \begin{bmatrix} 4 & 2 & 1 \\ 2 & 5 & -2 \\ 1 & -2 & 7 \end{bmatrix}$, Find only LU Factorization. **(5)**

Q.3. (b) Apply Jacobi method to solve the system starting at $(x_0, y_0, z_0) = (1, 1, 1)$ Perform three iteration. **(5)**

$$x - 5y - z = -8$$
$$4x + y - z = 13$$
$$2x - y - 6z = -2$$

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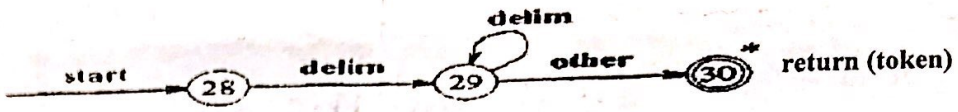
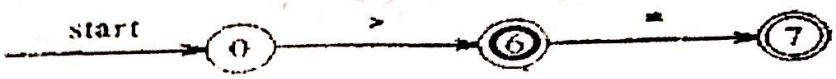
Q .1.(a) Discuss the interaction between the lexical analyzer, parser and the symbol table. Support your answer with the help of a block diagram. **(2.5)**

Q.1.(b) Identify the error / mistake in the following transition diagrams. Give logical reasons. **(2.5)**

(i)



(ii)



Q.2. Write Context free grammar that could parse the following code and clearly identify the terminals which are used in the grammar. **(5.0)**

```
int main()
{
int num1, num2;
int maximum, minimum,
int (int num1, int num2)
{
if (num1>num2)
        return num1;
else
        return num2;
}
printf("Enter any two numbers: ");
scanf("%d%d", &num1, &num2);
maximum = max(num1, num2); // Call maximum function
minimum = min(num1, num2); // Call minimum function
printf("\nMaximum = %d\n", maximum);
printf("Minimum = %d", mininum);
return 0;
}
```

Q.3(a) Identify the lexemes that make up the tokens in the following program . Give reasonable attribute values for the tokens: **(2.5)**

```
num1 = input('Enter first number: ')
num2 = input('Enter second number: ')
sum = float(num1) + float(num2)
print('The sum of {0} and {1} is {2}'.format(num1, num2, sum))
```

Q.3(b) Make a regular expression and a transition diagram for all signed numbers. **(2.5)**

Q.4(a) Consider the following grammar **(2.5)**

R→ (T) | s
T→ T,R |R

(i) What are the terminals , non terminals and start symbol in the above grammar?

(ii) Derivate the given sentence:

(s,((s,s),(s,s)))

Q.4 (b) Consider the grammar **(2.5)**

S→ aSbS , bSaS' ε

Show that this grammar is ambiguous for the given string **abab?**

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Q#1: Performance is inversely related to delay. When you use the Internet, which of the following applications are more sensitive to delay? **(03)**

a. Sending an e-mail
b. Copying a file
c. Surfing the Internet

Q#2: Suppose N packets arrive simultaneously to a link at which no packets are currently being transmitted or queued. Each packet is of length L and the link has transmission rate R. What is the average queuing delay for the N packets? Also Discuss the situations in which circuit and packet switching perform better. Compare these on the basis of bandwidth utilization of the link. **(03)**

Q#3: Design a Network with two hosts with user agents and two mail servers on both sides. Indicate where application layer protocols are used on this network, why do HTTP, FTP, SMTP, and POP3 run on top of TCP rather than on UDP?**ALSO** discuss If the data link layer can detect errors between hops, why do you think we need another checking mechanism at the transport layer?**(03)**

Q#4: Draw a hybrid topology using Bus and Star topologies and describe how data will be transmitted in this network, also explain in detail how single point of failure can create a catastrophe in this network. **(03)**

Q#5: A single frequency sine wave is not useful in data communications. If we had only One frequency sine wave to convey a conversation over the phone, it would make no sense and carry no information. Write down the concept of composition and decomposition of signals in Time and Frequency domains. Also Draw a sine wave with A=5v, f=4,$\phi=90^0$**(03)**

Q#6: Consider an e-commerce site that wants to keep a purchase record for each of its customers. Describe how this can be done with cookies. Also explain the concept and working of web cache at internetwork. **(03)**

Q#7: Consider a highway that has a tollbooth every 1000 kilometers. Suppose that cars travel on the highway at a rate of 1000 km/hour. Suppose next that 10 cars, traveling together as a caravan, follow each other in a fixed order.. Also suppose that each tollbooth services a car at a rate of one car per 12 seconds, and that it is late at night so that the caravan's cars are the only cars on the highway. Finally, suppose that whenever the first car of the caravan arrives at a tollbooth, it waits at the entrance until the other nine cars have arrived and lined up behind it. How much time does it take the cars to lined up before the second toll booth. **(02)**

END OF PAPER

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Q.1. (a) What types of instructions are available to implement jump instructions in the Intel x86 microprocessor based systems? Also differentiate between the terms inter-segment and intra-segment jumps. **(02)**

Q.1. (b) Convert the following instructions in the 8088/86 Assembly language. **(02)**

```
void main (void)
{
int AL = 0;
int BX;
for ( BX = 10;  BX > 0;  BX - - )
AL = AL + 1;
}
```

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Q.2. (a) Explain the terms downward compatibility and upward compatibility with respect to microprocessor based systems. **(02)**

Q.2. (b) Assume that the value of Data Segment (DS) register is **678BH**. To access a given byte of data at physical memory location **7783FH**, does the data segment cover the range where the data is located? If not, what changes need to be made? **(02)**

Q.3. (a) List all the addressing modes that are available in the 8088/86 microprocessor with one example of each. **(02)**

Q.3. (b) Consider five decimal numbers **64, 79, 23, 56,** and **95**. Write the 8086/88 Assembly language program to find the highest and lowest number. **(02)**

Q.4. (a) What convention is used in the Intel x86-based systems to store data in the physical memory? **(02)**

Q.4. (b) Provide the physical memory locations, where each register will be stored, after execution of the following 8086/88 Assembly language instructions. **(02)**

```
PUSH BX
PUSH AX
PUSH DX
```

Consider the values of SS = 0105H, SP = 0008H, AX = 1234H, BX = 74F1H, and DX = 9275H.

Q.5. (a) List all the status flags that are available in the Intel x86 based system? **(02)**

Q.5. (b) Show all the flags that will be affected after execution of the following instructions. **(02)**

```
MOV AL, 0F4H
ADD AL, 0CH
```

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Q.1. **(05)**

Translate below said requirement of ADB Company into Entity Relationship Diagram:

(i) The company is organized into departments. Each department has a unique name, a unique number, and a particular employee who manages the department. We keep track of the start date when that employee began managing the department. A department may have several locations.

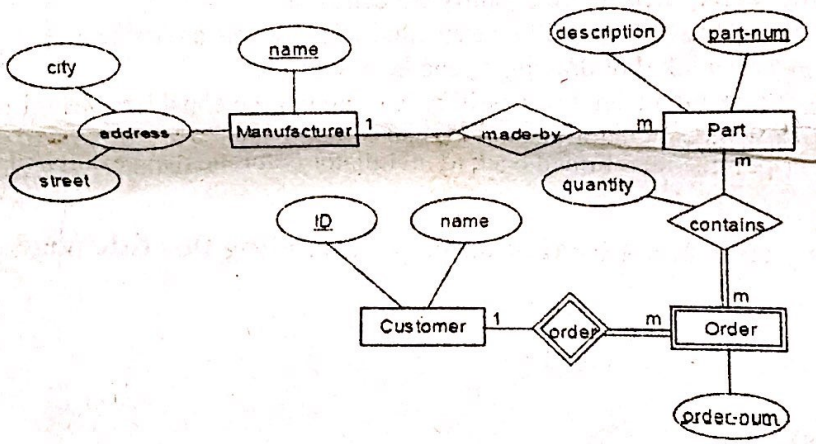
(ii) A department controls a number of projects, each of which has a unique name, a unique number, and a single location.

(iii) We store each employee's name, social security number, address, salary, gender, and birth date. An employee is assigned to one department but may work on several projects, which are not necessarily controlled by the same department. We keep track of the number of hours per week that an employee works on each project. We also keep track of the direct supervisor of each employee.

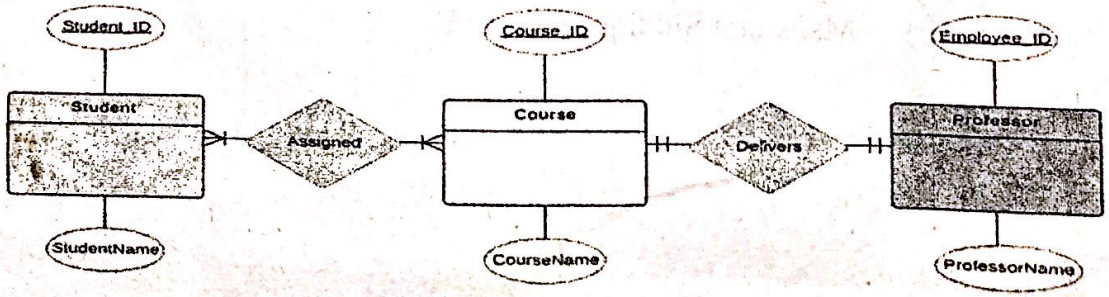
(iv) We want to keep track of the dependents of each employee for insurance purposes. We keep each dependent's first name, gender, birth date, and relationship to the employee.

Q.2. Convert ERD into Relational model: **(03)**

(Q.2. a)



(Q.2. b) **(02)**



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Q.3. Consider following schema: Mibran **(06)**

Student{sid, sname, srollno ,sbatch, sclass, ssec, scontactno}

Teacher{tid, tname,tdesignation, tcontactno,tsalary , temail}

Course{cid, cname , ccredithour,ccode,cprerequisite}

i. Write a query to create above tables and insert a record in each table.
ii. Select all the students of batch 2018 group by their classes and sections.
iii. List of teachers who are either lecturer or junior lecturer and find their average salaries.
iv. List complete details of all courses that have course code like HS.
v. Select all courses which prerequisite is same as of Object Oriented Programming course.
vi. Delete all the records against students whose contact numbers are not available.

Q.4.Briefly answer the following: **(04)**

i. Define the factors due to which DBMS approach is prioritized over File based system?
ii. What does Participation Constraints specify? What are the two types of participation constraints?
iii. A weak entity depends on the strong entity. But does it have its own primary key and is there a specific relation between strong and weak entity? Explain.
iv. Why the Data Independence is necessary. Discuss Logical and Physical Data Independence.