

Mid Semester Examination 2010

B.Tech (EC/IT) MCA IV Semester

Data Structure using 'C' language.

Time: 1:30 Hours

MM: 50

Note:

- (i) This question paper contains two sections.
- (ii) Both sections are compulsory.

Section A

Attempt all questions. Each question carry one mark

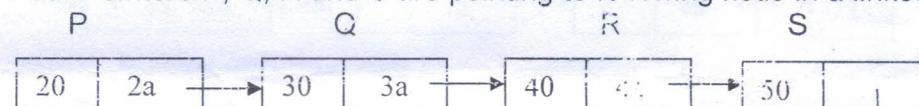
Q1.

(1X5=5 Marks)

- a) What will be the output of the following program?

```
main()
{ int a=0, *ptr=NULL, b=3, c=4;
  a = 5;
  ptr = &a;
  b = a + 4;
  c = c+*ptr;
  printf("%d %d %d", a, b, c);
}
```

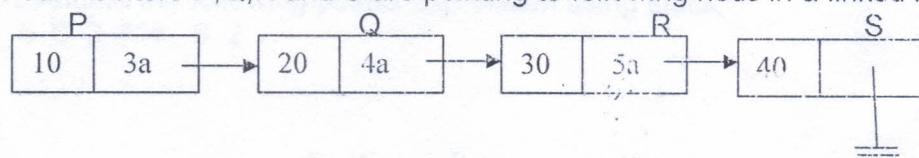
- b) Four Pointers P, Q, R and S are pointing to following nodes in a linked list.



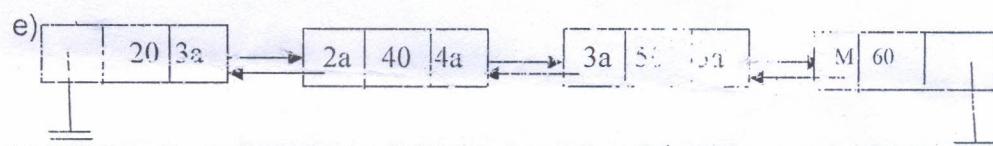
Write steps to delete a Node pointed by a pointer R.

- c) If maximum size of a circular queue is 10. If Front=8 and Rear=2 find total number of elements in the circular queue.

- d) Four Pointers P,Q,R and S are pointing to following nodes in a linked list.



Write steps to insert a Node pointed by a pointer M in between nodes pointed by R and S.



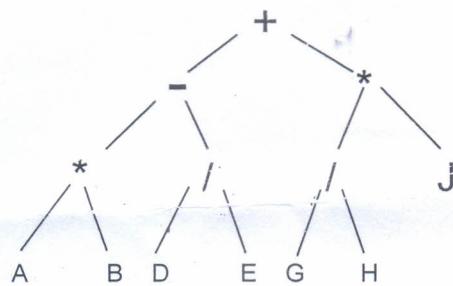
What will be the address pointed by M?

Attempt any Five parts.

(3X5=15 Marks)

Q2.

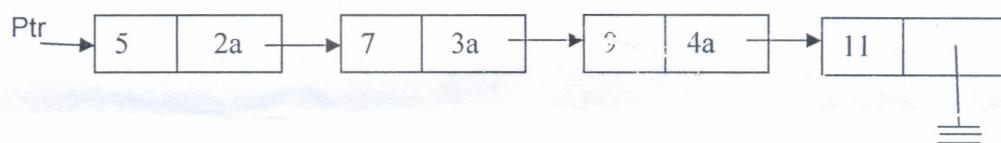
a) Write prefix expression from the given expression tree.



b) Write a C function to INSERT a node in a singly Circular linked list using double Pointer.

c) Assume that we have a singly linked list. First node of that linked list is pointed by a pointer Ptr. Write c function to count total number of nodes in it.

d) Consider the following linked list.



Write a C function to print this linked list in reverse order that is 11, 9, 7, and 5.

e) Create a dynamic array for N elements.

f) Evaluate the following postfix expression using stack,
5 6 2 * + 6 2 / -

Section – B

Each question contains three parts a, b & c. Attempt any two parts of choice from each question.

Q3.

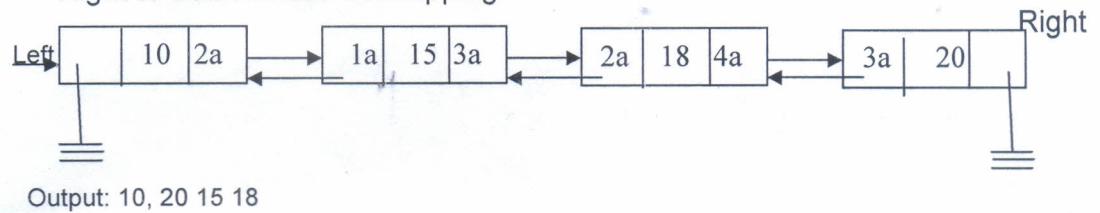
(5X 2 = 10 Marks)

- Write a C function to INSERT a node in a priority queue using double pointer.
- Write an algorithm to serve a node from a queue using double pointer.
- Write an algorithm to convert an infix expression to postfix expression using stack.

Q4.

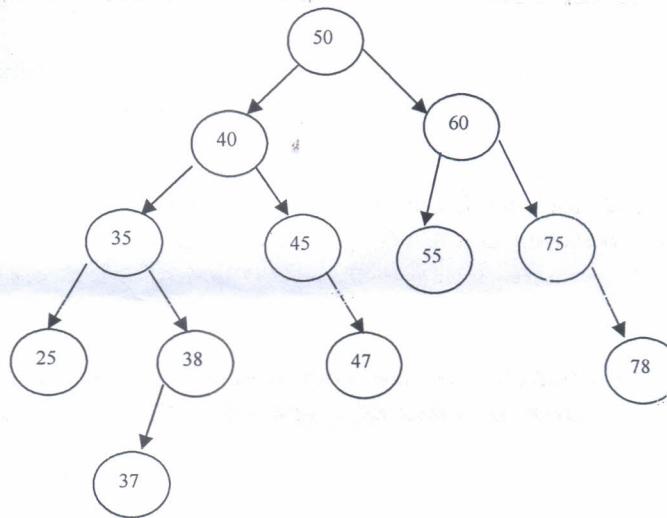
(5X 2 = 10 Marks)

- a. Write a C function to print following doubly linked from Left to Right and Right to Left without overlapping.



- b. Assume that we have a singly linked list. First and last nodes are pointed by pointer F and L respectively. Write a C function to insert a node before first node and after last node in that linked list.

- c. Write steps to delete a node with information 35 from the given binary search tree ,then redraw the tree after deleting node.



Q5.

(5X 2 = 10 Marks)

- a. Assume that we have a singly linked list. First node of the linked list is pointed by pointer P. Write a C function to search a node in that linked list, if found update its information by 500.

- b. Draw an expression tree with following expression $A^*B/(D-E)-F^2$.

- c. Write a C function to implement POP operation in stack using double pointer.

Roll No.

TMC-402

M. C. A. (FOURTH SEMESTER)

MID SEMESTER EXAMINATION, 2019

COMPUTER GRAPHICS AND ANIMATION

Time : 1 : 30 Hours

Maximum Marks : 50

Note : (i) This question paper contains two Sections.

(ii) Both Sections are compulsory.

Section—A

1. Check the statements for True/False :

($1 \times 5 = 5$ Marks)

- (a) The reflection of point P (3, 4) about the line $y = x$ is (4, 3). (True/False)
- (b) When rotate point P (3, 3) about origin through an angle $+30^\circ$ the new position will be (0, 3). (True/False)
- (c) The boundary fill algorithm is applicable if the boundary of polygon is in single colours. (True/False)

(2)

TMC-402

- (d) In the DDA algorithm when slope ($m > 1$) the increment 1 will be given to y value.
(True/False)
- (e) The recursive equation for decision parameter of Mid Circle algorithm is, when $d_p < 0$ is $d_{p+1} = d_p + 4x_p + 3$.
(True/False)
2. Attempt any five parts : (3×5=15 Marks)
- Find five points on line segment connecting points (2, 2) to (10, 14).
 - How much time is spent scanning across each row of pixels during refresh on a raster system with resolution of 640×480 and refresh rate of 30 frame per second ?
 - Discuss vector triple product of vectors.
 - Find pixels on computer screen for line from (10, 4) to (20, 8) using DDA algorithm.
 - Discuss working of CRT.
 - If $R(\theta)$ is the rotation operator about origin, then show that :
$$R_1(\theta), R_2(\theta) = R(\theta_1 + \theta_2) = R_2(\theta).R_1(\theta)$$

(3)

TMC-402

- (c) Write the steps and sequentially for sending an email from a@abc.com to b@xyz.com.
3. Attempt any two parts of choice from (a), (b) and (c). (5×2=10 Marks)
- Discuss flood fill algorithm.
 - Find the reflection of a triangle A (3,4), B (5,7) and C (8,6) about the line $y = x - 1$.
 - Discuss the Shearing. Find the transformation equations for shearing about both the axes in 2-dimension.
4. Attempt any two parts of choice from (a), (b) and (c). (5×2=10 Marks)
- Give Midpoint Circle Generation Algorithm. Why is it named Midpoint Circle algorithm ?
 - Find the rotation of the triangle ABC about point (3, 3), where the co-ordinates of A, B and C are (3, 3), (6, 6) and (9, 4) respectively.
 - Discuss Cohen-Sutherland line clipping algorithm.

(4)

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5. Attempt any *two* parts of choice from (a), (b) and (c). $(5 \times 2 = 10 \text{ Marks})$

(a) Show that equation $ax + by + cz + d = 0$ represents a plane.

(b) Write a short note on Viewing Transformation.

(c) What is homogenous co-ordinate system ? Discuss the case of successive scaling.

Roll No.

TMC-403

M. C. A. (FOURTH SEMESTER)
MID SEMESTER EXAMINATION, 2019

**NETWORK SECURITY AND
CRYPTOGRAPHY**

Time : 1 : 30 Hours

Maximum Marks : 50

Note :(i) This question paper contains two Sections.

(ii) Both Sections are compulsory.

Section—A

1. Fill in the blanks : (1×5=5 Marks)
 - (a) The Multiplicative inverse of 9 in Z_{26} is
 - (b) An attacker impersonates somebody else, is known as
 - (c) When plaintext is divided into groups of characters/bits of certain length, it is known as

(2)

TMC-403

- (d) When the sender/receiver of a message later denies that he has sent/received the message, known as
- (e) S-DES key generator uses bit cipher key.
2. Attempt any five parts : $(3 \times 5 = 15 \text{ Marks})$
- What are the goals of Network Security ?
 - What is the difference between a monoalphabetic cipher and a polyalphabetic cipher ?
 - Differentiate diffusion and confusion.
 - Types of P boxes.
 - How many permutations are used in a DES cipher algorithm ? How many permutations are used in the round key generator ?
 - Explain the final design of Feistel Cipher and also prove it.
 - The encryption key of transposition cipher is (3, 2, 6, 1, 5, 4). Find the decryption key.

(3)

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Section—B

3. Attempt any two parts of choice from (a), (b) and (c). $(5 \times 2 = 10 \text{ Marks})$
- List and briefly define categories of passive and active security attacks.
 - List and briefly define types of cryptanalytic attacks based on what is known to the attacker.
 - What are the differences between message confidentiality and message integrity ? Can you have confidentiality without integrity ? Can you have integrity without confidentiality ? Justify your answer.
4. Attempt any two parts of choice from (a), (b) and (c). $(5 \times 2 = 10 \text{ Marks})$
- Which security mechanism(s) are provided in each of the following cases ? Justify your answer :
 - A university demands student identification and password to let students log into the university server.
 - A professor refuses to send students their grades by e-mail unless they provide student identification, they were preassigned by the professor.

(4)

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- (iii) A bank requires the customer's signature for a withdrawal.
- (iv) A university server disconnects a student if he/she is logged into the system for more than two hours.
- (b) Suppose N people want to communicate with each of $N - 1$ other people using symmetric key encryption. All communication between any two people, i and j , is visible to all other people in this group of N and no other person in this group should be able to decode their communication. How many keys are required in the system as a whole? Now suppose that public key encryption is used. How many keys are required in this case? Justify your answer.
- (c) Using this Playfair matrix :

M	F	H	I/J	K
U	N	O	P	Q
Z	V	W	X	Y
E	L	A	R	G
D	S	T	B	C

encrypt this message : "Must see you over Cadogan West".

(5)

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5. Attempt any *two* parts of choice from (a), (b) and (c). $(5 \times 2 = 10 \text{ Marks})$

- (a) Use a brute-force attack to decipher the following message. Assume that you know it is an affine cipher and that the plaintext "ab" is enciphered to "GL" :

XPALASXYFGFUKPXUSOGEUTKCD
GFXANMGNVS

- (b) Given 10 bit key $K = 1010001010$. Determine K_1, K_2 where :
- $$P_{10} = 3\ 5\ 2\ 7\ 4\ 10\ 1\ 9\ 8\ 6$$
- $$P_8 = 6\ 3\ 7\ 4\ 8\ 5\ 10\ 9$$
- by using SDES key generation method.
(Make any other necessary assumptions if required).

- (c) Encrypt the message "INFORM EACH PERSON THAT ATTACK TONIGHT", using double keyed transposition cipher with the $K_1 = [4\ 1\ 5\ 3\ 6\ 2]$ and $K_2 = [3\ 6\ 4\ 1\ 2\ 5]$.

Roll No.

TMC-404

**M. C. A. (FOURTH SEMESTER)
MID SEMESTER EXAMINATION, 2019
COMPILER CONSTRUCTION**

Time : 1 : 30 Hours

Maximum Marks : 50

- Note :** (i) This question paper contains two Sections.
(ii) Both Sections are compulsory.

Section—A

1. Write True-False : (1×5=5 Marks)
 - (a) Target assembly code is produced during compilation process. (True/False)
 - (b) Preprocessed source code cannot be given as an input to the compiler. (True/False)
 - (c) Compiler for "C" language is based on bottom up parsing techniques. (True/False)
 - (d) In context of syntax analysis, the context free grammar should be ambiguous. (True/False)
 - (e) Synthesis phase of compiler takes intermediate code as an input. (True/False)

(2)

TMC-404

2. Attempt any *five* parts : (3×5=15 Marks)
- Define the pros and cons of programming in Assembly Language.
 - Write the key differences between Interpreter and Compiler.
 - Describe the application of Linker and Loader.
 - Describe Cross Compiler.
 - Draw and describe the transition diagram for real number.
 - Describe Macro Expansion and File Inclusion preprocessor directives.

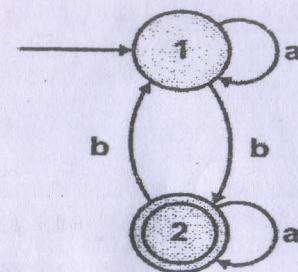
Section—B

3. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)
- What is compiler ? Also, explain the various phases of compilation process.
 - Write and explain "Two-Buffer Algorithm" that is used by lexical analyzer.
 - Define Bootstrapping of compiler. Also, show the bootstrapping of ML-to-x86 compiler that runs on x86 machine.

(3)

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4. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)
- Remove left recursion from the grammar having the following productions :
- $$S \rightarrow (L) | X$$
- $$L \rightarrow L, S | S$$
- Explain Deterministic Finite Automaton (DFA). Also, explain the steps to find out regular expression for the following DFA :



- Write a LEX Program to recognize identifiers in input file. Also, draw the transition diagram for the Identifier.
5. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)
- Write and explain Recursive Descent Parser (RDP) for the grammar having productions, $S \rightarrow aSb|c$.

(4)

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(b) Write and explain Recursive Descent Parser (RDP) for the grammar having productions, $S \rightarrow aAb$, $A \rightarrow c|d$.

(c) Write and explain Context Free Grammar (CFG). Also explain the steps to remove left recursion.

(d) (a) Find domain by using one dimensional
(b) M