

Roll No.

--	--	--	--	--

Paper Code:

TIT 402 / TCS 410

TMC 401 / TMI 403

Mid Semester Examination 2018

B.Tech (IT/EC) / MCA / M.Sc. (IT) IV Semester

Data Structure using 'C' language

Time: 1:30 Hours

8

MM: 50

Note:

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

Section A

Attempt all questions. Each question carries one mark

Q1.

(1X5=5 Marks)

a) Write overflow conditions for circular queue(Array implementation).

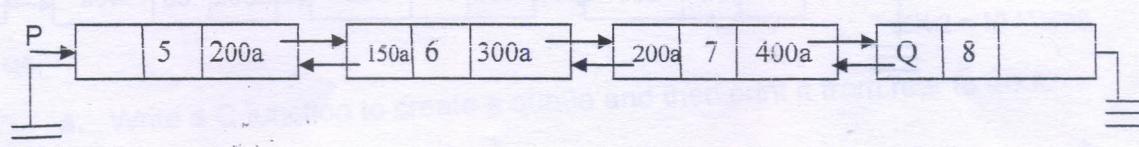
b) What will be output of following code?

```
void main()
{
    int a=3, *x, *y, b=2, c;
    x=&b;
    y=&a
    *y=*y+*x;
    *x=*y+*x+b;
    c= *x+*y;

    printf("%d %d %d", a,b, c);
}
```

c) Attempting to delete a node in empty link list results in \_\_\_\_\_ (Fill in the blank)

d) What is the value of P and Q in following linked list



e) In a singly linked list backtracking is not possible

(True /False)

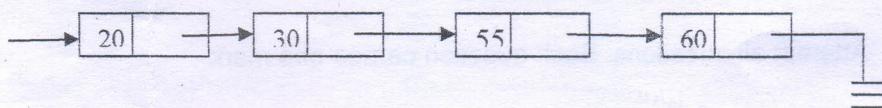
Attempt any Five parts.

(3X5=15 Marks)

Q2.

- a) Given the sequence of numbers: 13, 52, 95, 26, 38  
Write the sequence after the 3<sup>rd</sup> iteration of bubble sort.

- b) Write code to search and update a node having info 55 from following linked list.  
First node of linked list is pointed by a pointer Q.



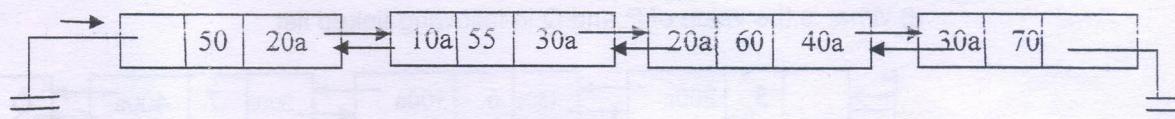
- c) Write steps to find complexity of following code in terms of Big Oh notation.

```
int n=10;
for(i=1; i<=n; i++)
{
    x++;
    for(j=1; j<=n; j++)
    {
        y++;
    }
}
```

- d) Differentiate between linked list and an array.

- e) Write down algorithm for pop operation in stack (using linked list)

- f) Write steps to insert a node between second and third node. First node is pointed by pointer P.



## Section – B

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

**Q3.**

(5X 2 = 10 Marks)

- a. Write down an algorithm to serve operation in queue (Using linked list).
- b. Assume that we have two doubly linked lists having addresses D1 and D2. Write a C function to add first linked list after second linked list.
- c. Write C function to implement push operation using double pointer.

**Q4.**

(5X2=10 Marks)

- a. Write a C function to create a dynamic array and store N elements in it. Then print 2<sup>nd</sup> repeating element from it.
- b. Write a C function to implement the selection sort. Illustrate the functionality of selection with the following input sequence: (2, 1, 36, 44, 10, 13, 19, 14, 29, 25).
- c. Create a singly linked list by inserting node in the left hand side. Input a key then count all those nodes having information greater than given key.

**Q5.**

(5X 2 = 10 Marks)

- a. Write a C function to create a queue and then print it from rear to front.
- b. Write C function to create a doubly linked list by inserting nodes such that linked list remains in ascending order.
- c. Consider following infix expression:  $z = (a - b) \% d - (e * f) + (g ^ h)$  then draw an expression tree for it and then find prefix expression.

Roll No. ....

## TMC-402

### M. C. A. (FOURTH SEMESTER) MID SEMESTER EXAMINATION, 2018 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 :  
 $(1 \times 5 = 5 \text{ Marks})$ 
  - (a) The reflection of point P (3, 4) about the line  $y = 0$  is (4, 3). (True/False)
  - (b) When rotate point P (3, 3) about origin through an angle  $+ 45^\circ$  the new position will be (0, 3). (True/False)
  - (c) Colour penetration technique is used for colour generation. (True/False)
  - (d) In the DDA algorithm when slope ( $m < 1$ ) the increment 1 will be given to y value. (True/False)

(2)

TMC-402

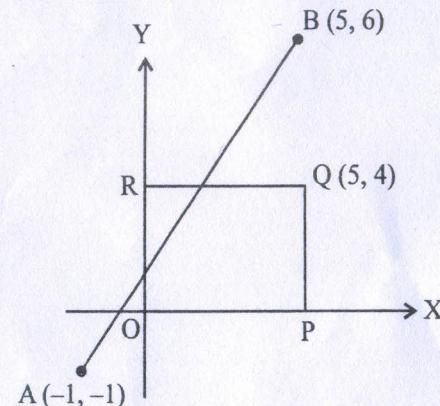
- (e) The recursive equation for decision parameter of Mid Circle algorithm is, when  $d_p > 0$  is  $d_{p+1} = d_p + 4x_p + 6$ .
2. Attempt any five parts :  $(3 \times 5 = 15 \text{ Marks})$
- Find four points on line segment connecting points (2, 6) to (10, 15).
  - Discuss one anti Aliasing techniques.
  - Discuss scalar triple product of vectors.
  - Find pixels on computer screen for line from (4, 4) to (14, 10) using DDA algorithm.
  - Discuss working of CRT.
  - What will be point P (4, 5) after scaling about origin with scaling factor  $S_x = 1.0$  and  $S_y = .50$  ?

### Section—B

3. Attempt any two parts of choice from (a), (b) and (c).  $(5 \times 2 = 10 \text{ Marks})$
- What is the View Port Transformation operator.
  - Find the  $60^\circ$  rotation of the triangle ABC about origin in anticlockwise direction, where the co-ordinates of A, B and C are (1, 1), (6, 2) and (4, 5) respectively.
  - Define Aliasing and Antialiasing. How long would it take to load a  $1024 \times 1024$  frame buffer with 12 bit per pixel, if  $10^3$  bits can transfer per second ?

(3)

4. Attempt any two parts of choice from (a), (b) and (c).  $(5 \times 2 = 10 \text{ Marks})$
- Give Bresenham's Circle generation algorithm.
  - Digitize line from (12, 14) to (22, 20) using Bresenham's algorithm, Plot points on Cartesian graph.
  - Use the Liang Barsky algorithm to clip the line shown in Figure :



5. Attempt any two parts of choice from (a), (b) and (c).  $(5 \times 2 = 10 \text{ Marks})$
- Show that equation  $ax + by + cz + d = 0$  represents a plane.
  - Give architecture of the Frame Buffer.
  - Discuss Flood Fill filling method of polygons.

Roll No. ....

**TMC-403**

**M. C. A. (FOURTH SEMESTER)**  
**MID SEMESTER EXAMINATION, 2018**

**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. State True-False : (1×5=5 Marks)
  - (a) The protection of information from unauthorized disclosure is known as integrity.
  - (b) Symmetric cipher uses single key.
  - (c) Confusion hides the relationship between plaintext and ciphertext.
  - (d) Masquerading is a confidentiality attack.
  - (e) In DES key generator uses 16-bit cipher key.

2. Attempt any *five* parts : (3×5=15 Marks)
- Define Confidentiality.
  - Differentiate block cipher and stream cipher.
  - Differentiate diffusion and confusion.
  - Types of P boxes.
  - Explain multiplicative cipher.
  - Explain digital signatures.

**Section—B**

3. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)
- Explain the following terms :  
Snooping and Masquerading
  - Define and explain at least *five* security services.
  - Differentiate Specific and Pervasive security mechanisms. Explain at least *three* mechanisms of each category.
4. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)
- What various attacks are possible on network ? Explain each.
  - Encrypt and decrypt the message "MESSAGE IS VERY SECURE" using Affine cipher, where key = (15, 10).

- (c) Explain the first and final thought of Fiestel design.
5. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)
- Encrypt and decrypt the message "BALLOON IS BLACK", using Playfair cipher.
  - Explain the S-DES structure with its complete architecture.
  - Explain the concept of HILL cipher with the help of an example.

Roll No. ....

## TMC-404

### M. C. A. (FOURTH SEMESTER) MID SEMESTER EXAMINATION, 2018

#### 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. Choose the correct answer. (1×5=5 Marks)

(i) Select the machine independent phase of a compiler :

- (a) Lexical analysis
- (b) Syntax analysis
- (c) Intermediate code generation
- (d) All of the above

(ii) Which of the following is not stored into symbol table at the time of its initialization ?

- (a) Keywords
- (b) Variables
- (c) Operators
- (d) All of the above

- (iii) In some programming language, L denotes the set of letters and D denotes the set of digits. An identifier is permitted to be a letter followed by any number of letters or digits. The expression that defines an identifier is :
- $(L \cdot D)^*$
  - $(L + D)^*$
  - $L(L \cdot D)$
  - $L(L + D)^*$
- (iv) In a compiler, ..... checks every character of the source text.
- The lexical analyzer
  - The syntax analyzer
  - The code generator
  - The code optimizer
- (v) Which of the following is not bottom up parser ?
- Recursive Descent
  - LL(0)
  - SLR (1)
  - LALR(1)
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.
- What is compiler ? Also, write various phases of compilation process.
- Describe Macro Expansion and File Inclusion preprocessor directives.

**Section—B**

- Attempt any two parts of choice from (a), (b) and (c). (5×2=10 Marks)
  - Write and explain “Two-Buffer Algorithm” used by lexical analyzer.
  - Write a LEX program to translate lower case characters to upper case characters.
  - White spaces between two lexeme should be removed.
- Attempt any two parts of choice from (a), (b) and (c). (5×2=10 Marks)
  - Define Bootstrapping of Compiler. Also, show the bootstrapping of ML-to-x86 compiler that runs on x86 machine.
  - Show the Lexical Analysis, Syntax Analysis and Semantic Analysis of the following expression :  
POSITION = INITIAL + RATE\*60.

- (b) Write and explain Context Free Grammar (CFG). Also explain the steps to remove ambiguity from a given grammar.
- (c) For the following grammar, find the associativity and precedence of \$, # and @ operators :

$$A \rightarrow A \$ B \mid B$$

$$B \rightarrow B \# C \mid C$$

$$C \rightarrow C @ D \mid D$$

$$D \rightarrow d$$

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

- (a) Define regular expressions. Also, explain how regular expression can be used to represent tokens for various programming language.
- (b) Write and explain Top-Down and Bottom-Up Parsing.
- (c) Remove left recursion from the grammar having the following productions :

$$S \rightarrow (L) \mid X$$

$$L \rightarrow L, S \mid S$$

**Mid Semester Examination 2018****MCA IV Semester****Software Engineering**

Time: 1:30 Hours

MM: 50

Note:

(i) This question paper contains two sections.

(ii) Both sections are compulsory.

**Section – A****Q1. State True or False.**

(1 X 5 = 5 Marks)

- a) Software is set of programs.
- b) Reusing software increases reliability and safety
- c) Software quality means cost effectiveness only.
- d) Testing software can not remove all possible errors.
- e) Availability of a software can be calculated by  $[MTTF] / [MTTF+MTTR]$

**Q2. Attempt any five parts.**

(3 X 5 = 15 Marks)

- a) Define software Engineering as per IEEE?
- b) What do you mean by software Quality?
- c) Describe the challenges faced by software engineers?
- d) Describe the Agile Project Management Scrum Model?
- e) Why software documentation is necessary in software Development process?
- f) Define extreme programming (XP), why it is so effective?

**Section – B*****Each question contains three parts a, b & c. Attempt any two parts of choice from each question.*****Q3.**

(5 X 2 = 10 Marks)

- a. Describe the software process and its phases? Why only mature development processes bring expected results?
- b. Describe software Requirements engineering and define briefly requirements elicitation techniques and tools?
- c. Explain software testing, illustrate software testing process with V-shape Model?

Q4.

(5 X 2 = 10 Marks)

- a. What are the benefits of developing the Incremental Model? Explain the suitability of the INM Model in today's scenario?
- b. Describe why Boehm's spiral process model is called meta model? Explain the merits of Spiral Model?
- c. What is capability maturity model (CMM)? Explain its structure and its importance in software industry?

Q5.

(5 X 2 = 10 Marks)

- a. Define functional and non-functional requirements of a real time software project, with examples?
- b. Describe data flow diagram (DFD) tool and its importance? Draw a level -1 DFD for the electricity bill generation of an customer?
- c. Describe the role and responsibilities of a software engineer?