

Roll No.

TMC-402

M. C. A. (FOURTH SEMESTER) END SEMESTER EXAMINATION, 2019 COMPUTER GRAPHICS AND ANIMATION

Time : Three Hours

Maximum Marks : 100

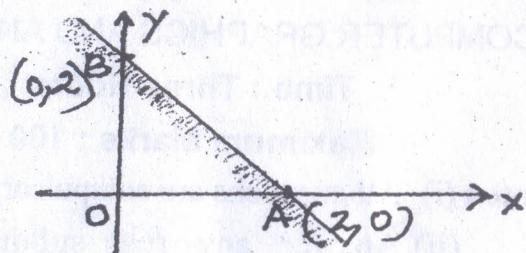
- Note :** (i) All questions are compulsory.
(ii) Answer any *two* subquestions in each main question.
(iii) Total marks for each main question are **twenty**.
1. Attempt any *two* parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$
- (a) Give the Bresenham's line generating algorithm for $(0 < m < 1)$.
- (b) Digitize circle $x^2 + y^2 = 100$ in octant $(45^\circ \leq \theta \leq 90^\circ)$ using midpoint circle generating algorithm. Plot points on Cartesian graph.
- (c) Discuss the scan line polygon fill algorithm.

(2)

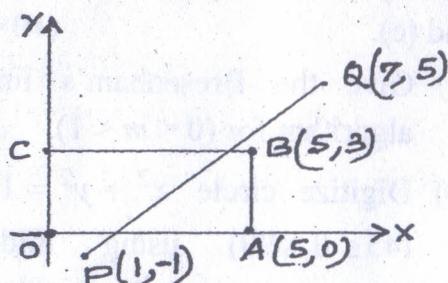
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2. Attempt any two parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$

- (a) Find the reflection of a triangle A (3, 1), B (5, 2) and C (8, 4) object about the line $y = -x + 2$ (AB).



- (b) Use Liang Barsky algorithm to clip the line shown in Figure.



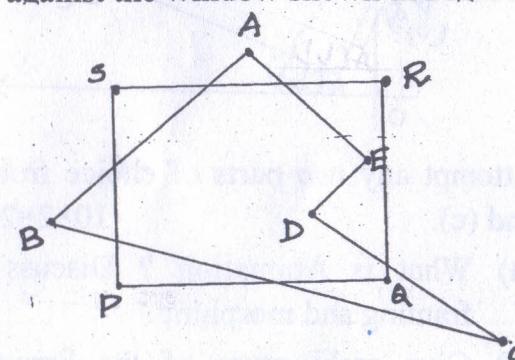
- (c) Give depth buffer algorithm for elimination of hidden surface. Why removal of hidden surface is required?

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3. Attempt any two parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$

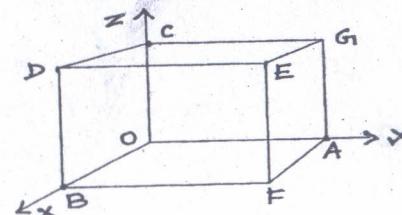
- (a) Find the equation of Bezier curve which passes through (0, 2) and (9, 6) and controlled through (2, 10) and (4, 8).
 (b) Use the Sutherland-Hodgeman polygon clipping algorithm to clip the polygon against the window shown in Figure.



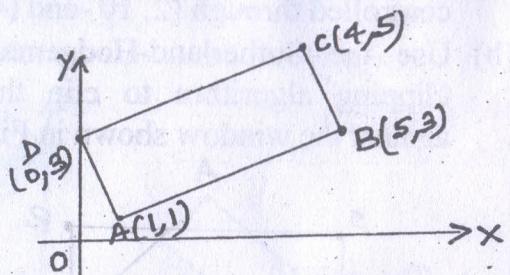
- (c) Write a short note on Bezier surface.

4. Attempt any two parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$

- (a) The unit cube shown in Figure is projected on the XY plane. What will be the perspective projection with $d = 05$, where d is distance from the view plane?



- (b) What are shading methods ? Discuss the Phong shading.
- (c) Find viewing transformation which transform window shown if figure on to normalized device screen as a viewport.



5. Attempt any two parts of choice from (a), (b) and (c). $(10 \times 2 = 20$ Marks)

- (a) What is Animation ? Discuss the key framing and morphing.
- (b) Give architecture of the Frame Buffer. Define Aliasing and Anti-Aliasing, how long would it take to load a 640×1024 frame buffer with 8-bit per pixel, if 10^2 bits can transfer per second ?
- (c) What are Fractals ? Discuss fractal dimension and Koch curve and formation of Sierpinaski gasket.

Roll No.

TMC-403

**M. C. A. (FOURTH SEMESTER)
END SEMESTER EXAMINATION, 2019**

**NETWORK SECURITY AND
CRYPTOGRAPHY**

Time : Three Hours

Maximum Marks : 100

- Note :**(i) All questions are compulsory.
(ii) Answer any *two* sub questions in each main question.
(iii) Total marks for each main question is twenty.

1. Attempt any *two* parts of choice from (a), (b) and (c). (10×2=20 Marks)
- (a) Explain the various security services defined by ITU-T. Which security service(s) are guaranteed when using each of the following methods to send mail at the post office ?
- (i) Regular mail
(ii) Regular mail with delivery conformation

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- (iii) Regular mail with delivery and recipient signature
 - (iv) Certified mail
 - (v) Registered mail.
- (b) A small private club has only 100 members. Answer the following questions :
- (i) How many secret keys are needed if all members of the club need to send secret message to each other ?
 - (ii) How many secret keys are needed if everyone trusts the president of club ? If a member needs to send a message to another member, he first sends it to the president; the president then sends the message to the other member.
 - (iii) How many secret keys are needed if the president decides that the tow members who need to communicate should contact him first ? The president then creates a temporary key to be used between the two. The temporary key is encrypted and sent to both members.
- (c) Explain the various types of Cryptanalysis attacks. Some archaeologists found a new script written in an unknown language.

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The archaeologists later found a small tablet at the same place that contains a sentence in the same language with the translation in English. Using the tablet, they were able to read the original script. What type of attack did the archaeologists use ?

2. Attempt any *two* parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$

(a) Encrypt the message "this is an exercise" using the following cipher. Ignore the space between words. Decrypt the message to get the plaintext :

- (i) Vigenere cipher with key : "dollars"
- (ii) Autokey cipher with key = 7

(b) Use a brute-force attack to decipher the following message enciphered by Amit using an additive cipher. Suppose that Amit always uses a key that is close to his birthday, which is on the 13th of the month :

NCJAEZRCLASJLYODEPRLYZRCLAS
JLCPEHZDTOPDZQLNZTY

(c) What is double DES ? What kind of attack on double DES make it useless ? What is triple DES ? What is triple DES with two keys ? What is triple DES with three keys ?

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3. Attempt any two parts of choice from (a), (b) and (c). (10×2=20 Marks)
- (a) Explain why modes of operation are needed if modern block ciphers are to be used for encipherment. Explain the various modes of operations.
- (b) Find the result of the following :
- (i) $15^{18} \text{ mod } 17$
 - (ii) $145^{102} \text{ mod } 101$
 - (iii) $16^{-1} \text{ mod } 323$
 - (iv) $\phi(80)$
 - (v) $\phi(100)$
- (c) Explain the RSA key generation algorithm. For given $p = 19$, $q = 23$ and $e = 3$, find n , $\phi(n)$ and d .
4. Attempt any two parts of choice from (a), (b) and (c). (10×2=20 Marks)
- (a) Answer the following questions :
- (i) Explain the Diffie-Hellman key exchange algorithm with an example.
 - (ii) A message has 2000 characters. If it is supposed to be encrypted using a block cipher of 64 bits, find the size of the padding and the number of blocks.

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- (b) Explain the design criteria for hash function. Explain the SHA-1 algorithm.
- (c) Explain the Digital Signature Standard (DSS) key Generation, Verification and Signing algorithm.
5. Attempt any two parts of choice from (a), (b) and (c). (10×2=20 Marks)
- (a) Explain how we can achieve confidentiality, integrity and authentication in Pretty Good Privacy (PGP).
- (b) What is IPsec ? Explain the structure of the Authentication Header (AH) and Encapsulating Security Payload (ESP).
- (c) Write short notes on the following :
- (i) BOTNET
 - (ii) HONEYPOT
 - (iii) Types of IDS

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

COMPILER CONSTRUCTION

Time : Three Hours

Maximum Marks : 100

Note :(i) All questions are compulsory.

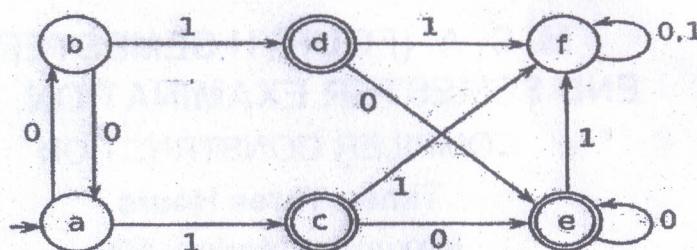
- (ii) Answer any *two* sub questions in each main question.
- (iii) Total marks for each main question are **twenty**.

1. Attempt any *two* parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$
 - (a) Define one pass, two pass and cross compiler. Also, write and explain two buffer algorithm. **(CO1)**
 - (b) Why ambiguity in the grammar is not desirable ? Consider the grammar G (NT , T , P , E), where the set of production is given as $P : S \rightarrow S\alpha | \alpha S | \epsilon$. Show that grammar G is ambiguous. **(CO2)**

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- (c) Write and explain a program in LEX to implement the following Deterministic Finite Automaton (DFA): (CO1, CO2)



2. Attempt any two parts of choice from (a), (b) and (c). (10×2=20 Marks)

- (a) Define Recursive Descent Parser (RDP). Also, write an algorithm to implement RDP for the productions $P : S \rightarrow a A$, $A \rightarrow a | b$ of grammar G (NT, T, P, S). (CO2, CO3)

- (b) Draw and describe LL (1) parsing table for the set of production $P : S \rightarrow A a$, $A \rightarrow BD$, $B \rightarrow b | \epsilon$, and $D \rightarrow d | \epsilon$. (CO2, CO3)

- (c) Draw and describe canonical set of LR (0) items for the grammar G (NT, T, P, S), where the set of production P is defined as $P : S \rightarrow AA$, $A \rightarrow aA | b$. (CO2, CO3)

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3. Attempt any two parts of choice from (a), (b) and (c). (10×2=20 Marks)

- (a) Consider the set of productions of Context Free Grammar (G) is given as $P : S \rightarrow Aa$, $A \rightarrow Bb$, $B \rightarrow Ba$, $A \rightarrow \epsilon$ and $B \rightarrow \epsilon$. Check that the grammar G, is LALR(1) compatible or not. (CO2, CO3)

- (b) Define Semantic Analysis. Write and explain Syntax Directed Translation (SDT) to check type of a variable in an expression. Also, write the output of the following syntax directed translation (SDT) for the string "x x x x y z z": (CO4)
 $S \rightarrow x\ x\ W\ \{\text{PRINT}("1");\}$
 $| y\ \{\text{PRINT}("2");\}$
 $W \rightarrow Sz\ \{\text{PRINT}("3");\}$

- (c) Write and explain a context free grammar (G) to implement basic arithmetic operations. Also, write a program in YAAC to parse valid arithmetic expressions. (CO4)

4. Attempt any two parts of choice from (a), (b) and (c). (10×2=20 Marks)

- (a) Write and explain a program in YAAC to validate the syntax of "for loop". (CO4, CO5)

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- (b) Describe intermediate code generation phase of compilation process. In addition, write the intermediate code (in three address coding system) for the following programming segment : (CO4)

```
while (x <= y){  
    x = x + 2;  
}  
y = x;
```

- (c) Write steps of LR (0) parsing algorithm to parse the string "aabb" for the following parse table : (CO3)

(The parsing table is base on the productions P : S → AA, A → aA | b.)

	Action			GoTo	
	a	b	\$	A	S
*0	S3	S4		2	1
1			ACCEPT		
2	S3	S4		5	
3	S3	S4		6	
4	R3	R3	R3		
5	R1	R1	R1		
6	R2	R2	R2		

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5. Attempt any two parts of choice from (a), (b) and (c). (10×2=20 Marks)

- (a) Consider the following procedure, which is written in C programming language :

(CO5)

```
void fun (int a, char b)  
{  
    int array [5];  
    float y;  
    y = array [0] + a;  
}
```

Draw and describe memory layout for activation record of the procedure "fun()".

- (b) Draw an explain Directed Acyclic Graph (DAG) for the following expression :

(CO6)

$a + a * (b - c) + (b - c) * d.$

- (c) Write short notes on the following : (CO6)

- (i) Live variable analysis
- (ii) Copy propagation

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MCA (FOURTH SEMESTER)
End Semester Examination 2019
Software Engineering

Time: Three Hours

MM: 100

Note:

- (i) All questions are compulsory.
- (ii) Answer any two sub questions in each main question.
- (iii) Total marks for each main question is twenty.

Q1. Attempt any two parts of choice from a, b and c. (10x2=20 Marks)

- a. Explain CASE tools, with their relevance and importance in Software Development.
- b. Explain the SEI Capability Maturity Model (CMM). How is it different from ISO 9001?
- c. Describe Software Engineering Process Model in detail?

Q2 Attempt any two parts of choice from a, b and c. (10x2=20 Marks)

- a. Explain Software Requirements Engineering Process and also describe characteristics of good SRS?
- b. Explain BASIC COCOMO Estimation Model. Estimate efforts, development time and person deployed for each of the project category i.e. organic, semi detached and embedded for 320 KLOC project?
- c. (I) Explain goals of software testing and describe different phases and activities of STLC.
(II) Describe Software MAINTENANCE and maintenance activities?

Q3. Attempt any two parts of choice from a, b and c. (10X2=20 Marks)

- a. Describe major soft risks and explain Software Risk Management Process and strategies?
- b. Explain the McCabe's Cyclomatic Complexity Process, calculate cyclomatic complexity using all three methods using a decision to decision graph?
- c. Explain Strong Cohesion and Weak Coupling is the desired property of a good software design.

Q4. Attempt any two parts of choice from a, b and c. (10x2=20 Marks)

- a. In what terms Rapid Application model (RAD) is different from incremental Model (INM)? Explain in detail?
- b. Describe black-box testing and white-box Testing and explain at least one technique of both testing.
- c. Describe Software Reverse-engineering Process and Software Re-engineering Process?

Q5. Attempt any two parts of choice from a, b and c. (10x2=20 Marks)

- a. Explain The Verification And Validation process in software development and software testing?
- b. Describe the role and responsibilities of software tester in software development process and challenges faced by him/her?
- c. Explain the terms Regression Testing, Integration Testing, Mutation Testing and User Acceptance Testing.

Roll No.

TMI-401

M. SC. (IT) (FOURTH SEMESTER) END SEMESTER EXAMINATION, 2019 DESIGN AND ANALYSIS OF ALGORITHMS

Time : Three Hours

Maximum Marks : 100

Note :(i) All questions are compulsory.

(ii) Answer any *two* sub questions in each main question.

(iii)Total marks for each main question are **twenty**.

1. Attempt any *two* parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$

(a) Write down the short notes on any *two* of the following :

- (i) Asymptotic Notations
- (ii) Heap Sort Algorithm
- (iii) Complexity of Insertion sort

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- (b) Compare the order of growth of functions $7n \log n$, n^2 and 5^n .
- (c) What is Red Black Tree ? Prove that a red-black tree with n internal nodes has height at most $2 \log(n+1)$.
2. Attempt any two parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$
- (a) What is Assignment Problem ? Solve the given assignment problem using Branch and Bound techniques.

	F ₁	F ₂	F ₃	F ₄
J ₁	2	4	1	7
J ₂	9	6	8	3
J ₃	3	9	7	5
J ₄	8	2	4	6

- (b) Discuss the breadth first search technique; explain with help of an example.
- (c) Prove that if $t_1(n) \in O(g_1(n))$ and $t_2(n) \in O(g_2(n))$, then show that :

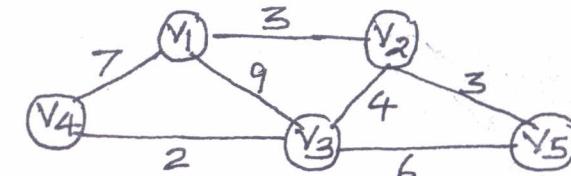
$$t_1(n) + t_2(n) \in O$$

$$\{\max(g_1(n), g_2(n))\}$$

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3. Attempt any two parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$
- (a) If $n \geq 1$, then for any n key B tree T of height h and minimum degree $t \geq 2$
$$h \leq \log_t \left(\frac{n+1}{2} \right).$$
- (b) Give the Prim's algorithm to find minimal spanning tree is given connected weighted graph.



- (c) Give the algorithm to solve the N-queen problem using backtracking approach. Is solution possible for $N=2$?
4. Attempt any two parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$
- (a) Discuss the Depth first search technique. Write a procedure to decrease a key in binomial heap.
- (b) With working modulo $q = 11$, how many spurious hits does the Rabin Karp matcher encounter in the text $T = 56234782653589$ when looking for pattern $P = 82$.

- (c) Explain class P, NP and NP complete problems. Give a non-deterministic algorithm for clique decision-problem.
5. Attempt any *two* parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$
- What are approximation algorithms ? Give an approximation algorithm for vertex cover problem.
 - What is Max flow-Min cut theorem ? Give Ford-Fulkerson algorithm to maximize the flow in flow network.
 - Compute the minimum number scalar multiplication required to find the product of matrices A (4×5), B (5×6) and C (6×3) using D. P. P. Approach, also give optimal parenthesization scheme.

May 25, 2019
(9:30 -12:30)

Roll No.

TMI-402

**M. SC. (IT) (FOURTH SEMESTER)
END SEMESTER EXAMINATION, 2019**

ADVANCE JAVA PROGRAMMING

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

- (ii) Answer any *two* sub questions in each main question.
- (iii) Total marks for each main question is **twenty**.
1. Attempt any *two* parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$

- (a) What is the use of Thin driver a java program ? Explain concept of Jdbc-Odbc bridge. **(COE1)**
- (b) What are the different types of execute methods used in jdbc api ? **(COE1)**
- (c) What is the use of Prepared Statement Interface ? Write a program to insert an image into database table assuming table exists. **(COE1)**

(2)

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2. Attempt any *two* parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$

(a) What is the use of Result Set Metadata Interface ? Write a program where we can rollback uncommitted data of database table. $(\text{COE}1)$

(b) What is the use of JSP in MVC Pattern ? Write about all the scripting elements. $(\text{COE}2)$

(c) What is the use of bean class in JSP page ? Write a complete program using use Bean tag. $(\text{COE}2)$

3. Attempt any *two* parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$

(a) What is the use of servlet over CGI ? Define and explain lifecycle of servlet. $(\text{COE}2/\text{COE}5)$

(b) How can we handle get and post requests of an user ? Write a program to show the use of ServletConfig in init method. $(\text{COE}2)$

(c) What is the role of deployment descriptor file ? Write a program of servlet with all necessary steps to execute it. $(\text{COE}2)$

(3)

4. Attempt any *two* parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$

(a) What is Object Rational Mapping ? How can we select data from a table using hibernate ? $(\text{COE}4)$

(b) How applet execution is different from servlet execution ? What is session in hibernate ? $(\text{COE}4)$

(c) What is the use of JSP in mvc patterns ? Write and explain the different scripting elements in order to create a page. $(\text{COE}3)$

5. Attempt any *two* parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$

(a) Define and explain EJB architecture. What are stateless and state full session beans ? $(\text{COE}5)$

(b) What are different MVC Patterns ? What is the role of web.xml and config.xml in execution of a struts application ? $(\text{COE}5)$

(c) Define an explain struts architecture. Is there any use of servlet concept in building a struts application, if yes, how ? $(\text{COE}5)$

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Roll No. _____

Paper Code: TIT 402 / TCS 410
TMC 401 / TMI 403

End Semester Examination 2019

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

Data Structure and File organization

Time: Three Hours

MM: 100

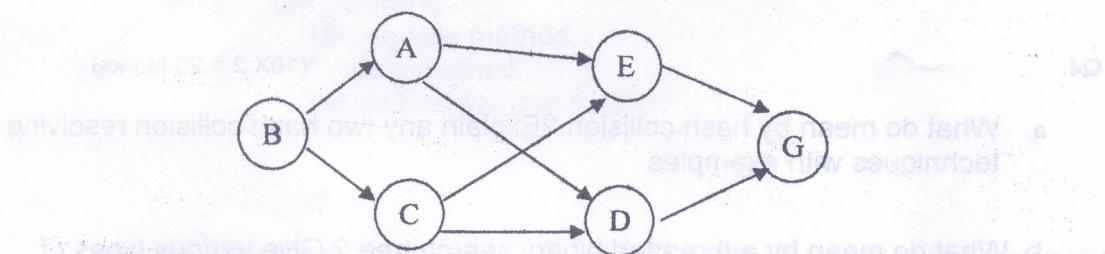
Note:

- (i) All questions are compulsory.
- (ii) Answer any two sub questions in each main question.
- (iii) Total marks for each main question is twenty.

Q1.

(2X 10 = 20 Marks)

a. Give memory representation of following graph.



b. Write applications of Huffman's algorithm. Using Huffman's algorithm encode following signal.

b b a a b c a d c c b d a d a d c c d a e e a

c. What are balance factors for an AVL tree? Write the steps for balancing a Non AVL tree. Draw an AVL tree with following data 5,4,1,11,16,3,7,8.

Q2.

(2X 10 = 20 Marks)

a. Write a C function to sort an array using quick sort. Also Show the steps of sorting on the following set of elements:

115, 213, 114, 210, 118, 313, 414, 611, 511.

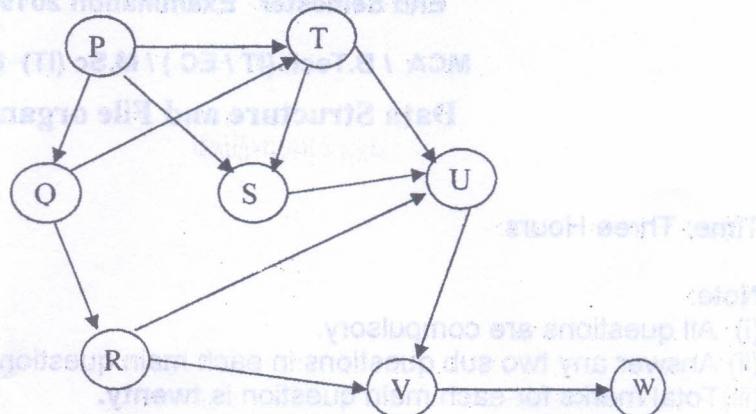
b. Explain index sequential file organization and relative file organization.

c. Draw an expression tree from the following infix expression,
 $(A+B)%C - (D - E) / F * G \% H ^ M$ and then find prefix and postfix from that tree.

Q3.

(10X 2 = 20 Marks)

- a. Write name and apply a graph traversal technique to find a path from P to W so that in between there are minimum number of nodes.



- b. Write a C function to create a binary search tree and then count all nodes having both children.

- c. Write a C function to create doubly linked list by inserting nodes in such a way so that linked list remains in ascending order(Use double pointer).

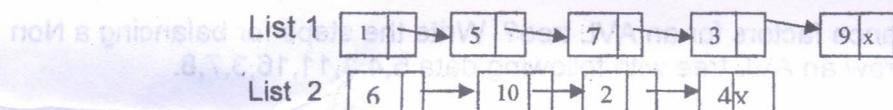
Q4.

(10X 2 = 20 Marks)

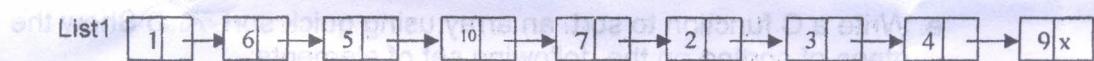
- a. What do mean by hash collision ?Explain any two hash collision resolving techniques with examples

- b. What do mean by a threaded binary search tree ? Give various types of threaded binary search tree.

- c. Given two singly linked lists .Write C program to insert nodes of second list into first list at alternate positions of first list.



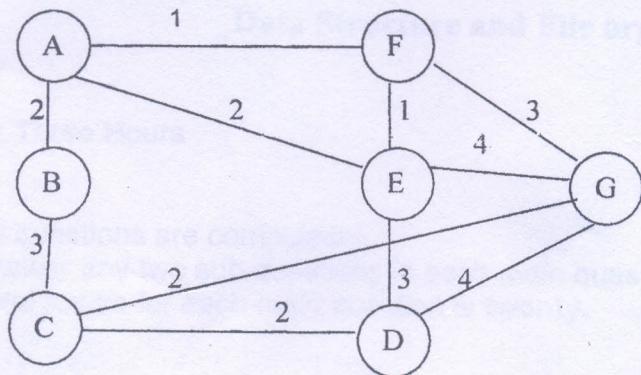
After insertion of nodes from list 2 , the list 1 should become as follows



Q5.

(10X 2 = 20 Marks)

- a. Given the following connected graph, extract the Minimum Spanning Tree using Kruskal's algorithm. Show the intermediate steps.



- b. Explain following

- i) Mid-square method
- ii) Folding method
- iii) Division remainder method

- c. Write applications of B - tree. Draw the B - tree of order 4 which is created by inserting the following data arriving in sequence: 3, 14, 15, 6, 17, 2, 1, 21, 12, 31, 55, 16.