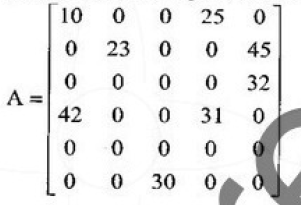
**MODULE-1**

1. Define Data structures, Give its classifications (Jan 2018)
2. Define structures with examples (Jan 2018)
3. Define pointers, Give advantages and disadvantages of pointers (Jan 2018)
4. Write a program to i) reverse a string ii) concatenate two strings (Jan 2018)
5. Explain dynamic memory allocation in detail (Jan 2018)
6. Define Data structure, List and explain data structures operation (Jan 2019)
7. Write the bubble sort algorithm (Jan 2019)
8. List and explain in detail three types of structures used to store the strings (Jan 2019)
9. Explain dynamic memory allocation (Jan 2019)
10. Explain about representation of two-dimensional array in memory (Jan 2019)
11. What do you mean by string matching? Let P and T be the strings with length R and S respectively and are stored as arrays with one character per element. Write a pattern matching algorithm that finds index P in T. Also discuss about the algorithm(Jan 2019)
12. What is an algorithm? Explain the criteria that an algorithm must satisfy(Jan 2017)
13. Write the function to sort integers using selection sort algorithm (Jan 2017)
14. Consider two polynomials(Jan 2017)
15. 
16. Write the knuth morries pratt pattern matching algorithm and apply the same to search the pattern abcdabcy in the text abcxabcdabxabcdabcdabcy(Jan 2017)
17. Write the fast transpose algorithm to transpose the given sparse matrix.Express the given sparse matrix as triplets and find its transpose(Jan 2017)



1. Write a c program with an appropriate structure definition and variable declaration to read and display information about 5 employees using nested structures. Consider the following fields like Ename, Empid, DOJ (Date,Month,Year)and Salary (Basic, DA, HRA). (July 2017)
2. Give ADT of sparse matrix and show with a suitable examples sparse matrix representation storing as triplets. Give a sample transpose function to transpose sparse matrix(July 2017)
3. What is a polynomial? what is the degree of the polynomial? Write a function to add two polynomials(July 2017)
4. List and explain the functions supported by C for dynamic memory allocation (July 2017)
5. Write a c program to concatenate Fname and Lname of a person without using any library function (July 2017)
6. Differentiate between structures and unions (July 2018)
7. Explain with example i) Insertion and ii) deletion in an array (July 2018)
8. Suppose each student in a class of 25 students is given 4 tests, assume the students are numbered from 1 to 25, and the test score assigned in the 25X4 matrix called SCORE. Suppose Base (SCORE)=200, w=4 and the programming language uses row=major order to store this 2D array, then find the address of 3rd test of 12th student that is SCORE (12,3). (July 2018)
9. List and explain any 4 functions supported in C for dynamic memory allocation with examples (July 2018)
10. Consider two polynomials

With a diagram show that these polynomials are stored in a 1D array (July 2018)

1. With an example illustrate that product of 2 matrices may not be sparse. Also write a C function for matrix multiplication of 2 sparse matrices (July 2018)

**MODULE-2**

1. Define stack. Implement push and pop functions for stack using arrays (Jan 2018)
2. Write postfix expression form of the following expression: (Jan 2018)

i)((6+(3-2)\*4)5+7) ii)A$B$C\*D

1. Define queue. Implement Qinsert and Qdelete functions for queues using arrays (Jan 2018)
2. Define Recursion. Write Recursive program for i) factorial of a number ii) tower of Hanoi (Jan 2018)
3. Define stack, write the procedure for two basic operations associated with the stack (Jan 2019)
4. write a short note on priority queues (Jan 2019)
5. Define recursion. What are the properties of recursive procedure? Write the recursive procedure for i) tower of Hanoi ii) factorial of a number (Jan 2019)
6. Define queue? Write QINSET and QDELETE procedure for queues using arrays (Jan 2019)
7. write the postfix form of the following expression (Jan 2019)

A+(B\*C\_D/E F)\*G\*II

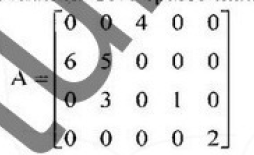
1. write a short note on Ackermann’s function (Jan 2019)
2. write the algorithm to implement the stack using dynamic array whose initial capacity is 1 and array doubling is used to increase stacks capacity (that is dynamically reallocate twice the memory) whenever an element is added to a full stack. Implement the operations-push, pop and display(Jan 2017)
3. write the algorithm for tower of Hanoi (Jan 2017)
4. write a note on Ackermann’s function (Jan 2017)
5. List the advantages of linear queue and explain how is it resolved in circular queue. Give the algorithm to implement a circular queue with suitable example (Jan 2017)
6. convert the infix expression ((a/(b-c+d))\*(c-a) to postfix expression. Write a function to evaluate the postfix expression and trace the given data a=6, b=3,c=1,d=2,e=4. (Jan 2017)
7. Define stack and write the ADT of stack. Implement push and pop functions for stack using arrays with Stack Full and Stack Empty conditions (July 2017)
8. What is an input restricted double ended queue? Implement the same with the supporting functions (July 2017)
9. Write the postfix form of the following expression using stack: (July 2017

i)(a+b)\*d+e/(f+a\*d)+c ii) ((a/(b-c+d))\*(c-a)\*c)

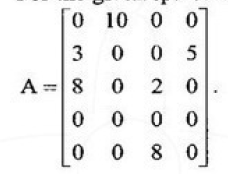
1. write a function to evaluate a postfix expression and trace the same for the expression ab/c-de\*+ac\* where a=6, b=3,c=1,d=2,e=4. (July 2017)
2. Explain with suitable example how would you implement circular queue uding dynamically allocated arrays (July 2017)
3. write an algorithm to evaluate a postfix expression, Evaluate the following postfix expression abc+\*de/- where a=5, b=6,c=2,d=12,e=4(July 2018)
4. Write an Algorithm for Ackermann’s function, Evaluate A(1,2) using Ackermann function(July 2018)
5. with a neat diagram explain ONE-WAY list representation of a priority queue (July 2018)
6. Describe how you could model a maze where 0 represents open paths and 1 represents barriers. What move are permitted in the matrix model? Provide an example MAZE together with its allowable moves and table of moves(July 2018)

**MODULE-3**

1. Write the following functions for single linked list: i) Reverse the list ii) concatenate two list (Jan 2018)
2. Write the functions insert\_front and delete\_front using doubly linked list (Jan 2018)
3. Write an algorithm to add two polynomials (Jan 2018)
4. Define sparse matrix, Give sparse matrix representation of linked list for a given matrix (Jan 2018)



1. Write the following algorithms for singly linked list: (Jan 2019)
   1. Inserting ITEM as the first node in the list
   2. Deleting the node with the given ITEM of information
2. Write the node structure for linked representation of polynomial. write the function to add two polynomials represented using linked list(Jan 2019)
3. Write the function to perform the following: (Jan 2019)
   1. Inverting a singly linked list
   2. Concatenating the singly linked list
   3. Finding the length of the circular list
4. Write a note on header linked list Explain the widely used header list with diagram (Jan 2019)
5. For a given sparse matrix write the diagrammatic linked list representation (Jan 2019)



1. Give a node structure to create a singly linked list of integers and write functions to perform the following: (Jan 2017)
   1. Create list
   2. Assume the list contains 3 nodes with data 10,20,30. Insert node with data 40 at the end of the list
   3. Insert a node with data 50 between the nodes having data values 10 and 20
2. What is the advantage of doubly linked list over singly linked list? illustrate with an example (Jan 2017)
3. For a given sparse matrix write the diagrammatic linked list representation (Jan 2017)
4. Write the function for singly linked list with integer data to search an element in the first (Jan 2017)
5. Write a node structure for linked list representation of polynomial. Explain the algorithm to add two polynomials (Jan 2017)
6. Give the node structure to create a linked list of integers and write C functions to perform the following: (July 2017)
   1. Create three nodes list with data 10,20 and 30.
   2. Insert a node with data value 15 in between the nodes having the data values less than 10 and 20
   3. Delete the node whose data is 20
   4. Display the resulting singly linked list
7. Write a node structure for linked list representation of polynomial? Explain the algorithm to add two polynomials represented using linked list(July 2017)
8. List out the differences between the singly linked list and doubly linked list. Illustrate with example the following operations on a doubly linked list(July 2017)
   1. Inserting a node at the beginning
   2. Inserting at the intermediate position
   3. Deleting of a node with a given value
   4. Search a key element
9. Write a function for singly linked list with integer data to search an element in the list that is unsorted and a list that is sorted (July 2018)
10. Given 2 singly linked list LIST1 and LIST2 write an algorithm to form a new list LIST3 using concatenation of the lists LIST1 and LIST2(July 2018)

**MODULE-4**

1. What is a tree?Explain the following(Jan 2018) Binary tree

Strictly Binary tree

Complete Binary tree

Skewed binary tree

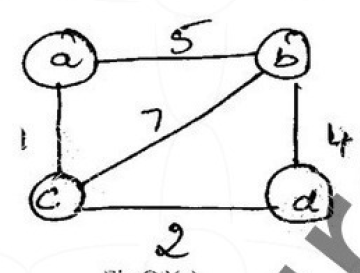
Almost complete binary tree

Degree of a binary tree

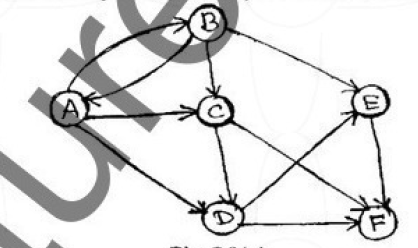
1. Given in-order sequence DJGBHEAFKIC and post-order sequence: JGDHEBKIFCA construct binary tree and give pre-order traversal (Jan 2018)
2. Explain threaded binary tree in detail (Jan 2018)
3. Write function to insert an item into an ordered binary search tree (duplicate items are not allowed) (Jan 2018)
4. What is a tree? write the routines to traverse the given string using (Jan 2019)
   1. Pre-order traversal
   2. In-order traversal
   3. Post-order Traversal
5. Define binary search tree. write the recursive search and iterative search algorithm for a binary search tree(Jan 2019)
6. Write the routine for: (Jan 2019)
   1. Coping the binary trees
   2. Testing for equality of binary trees
7. List the rules to construct the threads, write the routines for in-order traversal of a threaded binary tree (Jan 2019)
8. What is a tree? with suitable example define i) Binary tree ii)Levels of binary tree(Jan 2017) iii)Complete Binary tree(Jan 2017)
9. Write the routines to traverse i) In-order, Pre-order and Post-order traversal (Jan 2017)
10. What is a binary search tree? Write an Algorithm to implement the recursive search or iterative search for a binary search tree(Jan 2017)
11. Write the routines for i) Create a binary tree ii)Testing for equality of binary trees(Jan 2017)
12. For the given data draw a binary search tree and show the array and linked representation of the same 100,85,45,55,110,20,70,65.
13. Draw a binary tree for the following expression 3+4\*(7-6)/4+3.Traverse the above generated tree using in-order, pre-order and post-order, also write function in C for each one
14. What is the advantage of threaded binary tree over binary tree? Explain the construction of threaded binary tree for 10,20,30,40,50.

**MODULE-5**

1. Define Graph. Give adjacency matrix and Adjacency linked list for a given weighted graph in Fig (Jan 2018)



1. Write an algorithm for breadth first search and depth first search (Jan 2018)
2. Write an algorithm for Radix sort (Jan 2018)
3. Explain Hashing in detail (Jan 2018)
4. Write an algorithm for an insertion sort. Also discuss about the complexity of insertion sort (Jan 2019)
5. Write an algorithm for i) Breadth first search ii) Depth first search (Jan 2019)
6. Define graph. Explain in detail about directed graphs(Jan 2019)
7. Explain in detail about static and dynamic hashing (Jan 2019)
8. What is Graph? Give the matrix and adjacency list representation of Graphs(Jan 2017)
9. Write an algorithm for bubble sort, trace the algorithm for the data (Jan 2017)30,20,10,40,80,60,70(Jan 2017)
10. Explain open addressing and chaining used to handle overflow in hashing (Jan 2017)
11. Explain directory less dynamic hashing (Jan 2017)
12. Briefly explain basic operation that can be performed on a file. Explain indexed sequential file organization (Jan 2017)
13. Define Graph. Write the difference between graph and tree. For the given graph show the adjacency matrix and adjacency list representation of the graph(July 2017)



1. What are the methods used for traversing a graph? Explain with any one example(July 2017)
2. Write a C function for insertion sort. Sort the following list using insertion sort (July 2017)50,30,10,70,40,20,60(July 2017)
3. What is collision? What are the methods to resolve collision? Explain linear probing with an example(July 2017)
4. State and explain WARSHALLS algorithm with an example(July 2018)
5. Write an algorithm for insertion sort. Apply insertion sort, showing the various passes to sort the array A, where A=[77,33,44,11,88,22,66,55] (July 2018)
6. Write a short notes on hashing ?Explain any three popular HASH functions(July 2018)
7. What do you understand by the term file organization? Briefly Summarize any 3 widely used file organization techniques(July 2018)