

II B.Tech. I Semester Supplementary Examinations, May -2005
DATA STRUCTURES THROUGH C
(Common to Mechanical Engineering, Mechatronics, Metallurgy & Material
Technology, Production Engineering and Aeronautical Engineering)
Time: 3 hours Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. Write a C program to replacing substring with another string
2. Formulate insertion and deletion algorithm for a Queue which is represented by a circular list.
3. (a) Write a C Program to convert a postfix expression into infix expression.
(b) Transform the following postfix expression to infix A B C + D E F - + \$
4. (a) Write and explain algorithms to insert and delete an element to and from a circular queue respectively.
(b) Given the circular queue with front (F)=6 and Rear(R)=2, give the values of R and F after each operation in the sequence: insert, remove, remove, insert, remove.
5. (a) Differentiate between complete binary tree and strictly binary tree.
(b) Write an algorithm and C program for post order traversal of a tree
6. (a) Write relative merits and demerits of different graph representations.
(b) What is spanning tree? When is it called a minimum spanning tree?
7. Write an iterative function for binary search method and trace it. Write a suitable example.
8. Write a C program to implement quicksort

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1. Write a C program to find the trace of the given matrix(sum of diagonal elements)
2. Write an algorithm to perform each of the following operations to a linked list.
 - (a) Concatenate two lists
 - (b) Delete the nth element from a list
3.
 - (a) Write a C Program to convert a postfix expression into infix expression.
 - (b) Transform the following postfix expression to infix $A \ B \ C + D \ E \ F - + \$$
4.
 - (a) Define queue. Explain how to represent queues in terms of arrays and Linked lists
 - (b) A queue is maintained in an array, and F and R are the front location and rear location of the queue respectively. Obtain a formula for N, the number of elements in the queue in terms of F and R.
 - (c) Explain the difference between general queue and circular queue
5.
 - (a) Who sketches of different traversal methods of trees.
 - (b) Write C function for creating empty tree and for insertion and deletion Operations
6.
 - (a) Write C program to create an empty graph, to enter graph information and to have output from graph.
 - (b) Write a C program to breadth first search of a graph.
7. Write an iterative function for binary search method and trace it. Write a suitable example.
8.
 - (a) Write an algorithm for selection sort
 - (b) Sort the following numbers using selection sort and give the required steps.
96,31,27,42,34,76,61,10,4

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1. Write a C program to replacing substring with another string
2. (a) Define linked list. Write an algorithm to insert and delete a node in linked list
(b) Discuss the applications of linked lists
3. Define recursion. What are the properties of recursive definition .
 - (a) Write a recursion definition of $a + b$, where a and b are nonnegative integers, in terms of the successor function succ , defined as
succ(x)
int x;
{

return (x++);
}
(b) Write a recursive algorithm to compute the product of the elements of the array
4. (a) Define queue. Explain how to represent queues in terms of arrays and Linked lists
(b) A queue is maintained in an array, and F and R are the front location and rear location of the queue respectively. Obtain a formula for N, the number of elements in the queue in terms of F and R.
(c) Explain the difference between general queue and circular queue
5. Write a C program to show basic operations on a tree.
6. What are different graph traversal methods. Explain them with neat sketches.
7. Write a C program for implementing the binary search and search for a given number in the stack.
8. Write an algorithm for bubble sort and sort the following using bubble sort
85,12,108,27,91,4,72

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1. Write a C program to print the upper triangular of a given matrix
2. (a) Formulate an algorithm that will change the INFO field of the K th node of a linked list value given by Y.
(b) Formulate an algorithm which will perform a deletion operation.
3. (a) Write a C Program to convert a postfix expression into infix expression.
(b) Transform the following postfix expression to infix A B C + D E F - + \$
4. It is required to split a queue into two queues so that all the elements in odd positions are in one queue and those in even positions are in another queue. Write an algorithm SPLITQ() to accomplish this. Assume that queue is maintained in an array.
5. (a) Describe different types of trees.
(b) Write a C program to implement Binary tree.
6. What are different graph traversals. Implement one using C language
7. (a) Compare and contrast the advantages of various searching mechanisms
(b) Write a recursive C function for binary search method.
8. Write an algorithm for bubble sort and sort the following using bubble sort
85,12,108,27,91,4,72
