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| **DHANALAKSHMI SRINIVASAN COLLEGE OF ENGINEERING AND TECHNOLOGY** |  |
| **DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING** |



**EC8393 FUNDAMENTALS OF DATASTRUCTURES IN C**

UNIT-1

PART-A

1 Distinguish between high level language and low level

 language.

2 Compare the Compiler and Interpreter.

3 Define programming language.

4 Tell the use of return type of printf() & scanf().

5 Assess what operation is performed when the %f, %e and %g format specifies are used to display the value.

6 What is a variable?

7 Compare and contrast the prefix and postfix forms of the ++ operator.

8 Distinguish the terms Break and Continue.

9 Name the use of EOF.

10 Explain the various form of looping statement.

11 Create a C code to print the text “Data Structures” using the arrays.

12 Write the syntax of array declaration with an example.

13 Identify the purpose of null statement.

14 Analyze the need of null character at the end of string.

15 Discuss the types of I/O statements available in C.

16 How would you initialize the size of an array.

17 Show the declaration of a string.

18 Identify the features of array.

19 Show the c code that narrates the difference between do-while and while loop.

20 Write a program using conditional operators to determine

PART-B

1 Explain the constants, expressions and statements in C.

2 i ) Compare various types of operators in C.

ii) List and explain the various data types in C

3 Describe the structure of a C program with an example.

4 i) Write a Program to find the area and circumference of a circle with radius r.

ii) Write a program to find the sum of first 100 integers.

5 i) Write a C program to find whether the given year is leap year or not.

ii) Write a C program to find whether the given number is palindrome or not using C.

6 Compose a program to narrate about ‘for’, ‘while’ and ‘do while’ looping statements.

7 i)Assess C code for the reverse of a number.

ii) Write a C program to determine the roots of quadratic equation.

8 i)Summarize the need of array variables. Describe it with respect to arrays. Declaration of array & initialization.

ii)Demonstrate a Program to reorder a one dimensional array.

9 What is a two dimensional array explain its initialization?

10 i) Develop a C program for performing Matrix operations.

ii) Identify and explain the various ways of reading and writing string in c.

11 Distinguish Two dimensional and one dimensional array andexplain it with example. And initialize it with example.

12 Write and explain a C program to find the given number is palindrome or not without using string function.

13 Write Short note on the following with examples

 i) String and character array .

 ii) String input & output.

14 Analyze the various string functions with example.

UNIT-2

PART-A

1 Define the term user-defined function

2 Support your views on a function call with example.

3 Invent the meaning of default arguments and command line

 arguments.

4 Develop the function declaration and definition with example.

5 List out the use of library function.

6 Show the declaration of pointer along with definition.

7 What is pointer arithmetic?

8 Define void pointer and null pointer.

9 Examine the term recursive function.

10 Evaluate the meaning of function pointer.

11 What is term structure?

12 Perform various operations that make use of structure.

13 Find the use of operator on structure.

14 Distinguish Structure and array.

15 Illustrate the need of typedef.

16 Apply your view on the term Union in C

17 Discuss the operators used to access the structure members.

18 Extend your views about malloc and calloc.

19 Compare the types of memory allocation.

20 Summarize on initializing Unions.

PART-B

1 i)Interpret function declaration and function definition.

 ii) Summarize examples for the above.

2 i) Compose a C program on computation of Sine series.

 ii)Formulate the applications of recursive function.

3 Analyze and write a C program to demonstrate the scientific calculator using built-in functions.

4 List out the operations performed by pointers with example.

5 Explain in detail about i) Array of pointers.

 ii) Passing arrays to functions.

6 i) What is fixed argument functions? Explain.

 ii) What is a variable argument function? Explain.

7 i)Criticize on changing the value of a variable using pass by reference.

 ii) Evaluate the program for swapping of two numbers.

8 i)Develop the code for preparing student mark statement.

 ii) Build your understanding about functions and structures.

9 Explain the structure with data member of various types and declare two structure variable. Write a program to read data into these and print the same. Define structure.

10 Examine about structures and its operations.

11 i)Tell about self-referential structures.

ii) Define the process of accessing the structure member through pointer using dynamic memory allocation.

12 i)When is array of pointers used in structure? Narrate it.

 ii)Show how to use Union inside structure with example.

13 i) Apply your understanding on preparing a code for employee payroll.

 ii) Develop the need of structured data type.

14 Distinguish Unions and structures along with programming examples.

UNIT-3

PART-A

1 Where do we use data structures how it is classified?

2 Name ADT operations.

3 Summarize linear data structures and Nonlinear data structures.

4 List the different types of linked list.

5 Contrast between array and linked list

6 Analyze the term single linked list.

7 How to create a new node, give with an example?

8 Discuss the use of header pointer and null pointer.

9 Apply your understanding about dummy header.

10 Develop the circular linked list.

11 Define push and pop operations

12 When did you use the stack in computer system?

13 Compare stack and queue.

14 Examine the conditions that are followed in the array implementation of queue.

15 Compare and contrast stack and queue and give its application.

16 Analyze any two data structures used in operating system.

17 Write about prefix, infix and postfix notations.

18 Compose the following expressions into postfix and prefix forms.

 A+B\*(C-D)(P-R).

19 Evaluate the value of the expression ab+c\*d using stack.

20 Show how ADT representation is used to evaluate arithmetic expression?

PART-B

1 Explain array based implementation of list with example.

2 Discuss in detail about linked list ADT with example.

3 List and explain the Queue ADT operation for insertion and deletion routine in linked list.

4 i)Write the concept of pointer implementation and cursor implementation.

 ii) Show a function to test whether a linked list is empty using cursor implementation.

5 i) Give the outline about the application of stack.

 ii)Explain in detail about Circular linked list.

6 Describe about the implementation stack using linked list.

7 Access the ADT operation for insertion and deletion routine in stack using array implementation.

8 Develop the array and linked list implementation of queue operation

9 i) Outline the applications of queue.

 ii) Compare stack and queue.

10 Analyze and evaluate the postfix expression 2 4 + 3 \* 1 5 - 8 3 + \* -.

11 Write a procedure to convert an infix expression a+b\*c+(d\*e+f)\*g postfix notation.

12 i) List the process of postfix valuation with an example.

 ii) List and define the balancing symbols with example.

13 Develop the process of conversion from infix expression to postfix using

 stack.

14 Examine an algorithm to add and subtract two polynomials P1 and

 P2.

UNIT-4

PART-A

1 Compose the term height and depth of the tree.

2 Identify the number of trees possible with 3 nodes?

3 Define Binary tree and list its properties?

4 What are the two methods of binary tree implementation?

5 Identify the differences between binary search with linear search.

6 List the applications of binary tree.

7 Assess the different type of tree traversal.

8 Name the type of binary tree.

9 Compose the term equivalence relation.

10 Explain about union operation.

11 Label the different types of union.

12 Define Graph and Acyclic graph.

13 Compare and contrast in-degree and out degree of the graph.

14 Construct an acyclic graph.

15 List the different ways of representing graph.

16 Analyze the two traversal strategies used in traversing graph.

17 Illustrate the Differences between path and Cycle of the graph.

18 Compare DFS and BFS.

19 Explain the tree and graph.

20 Access about connected components.

 PART-B

1 Write short note on the following terms related to tree:

 i) Path

 ii) Degree

 iii) Level

 iv) Leaves

 v) Child

 vi) Height

2 Apply your understanding to explain about binary search tree and draw the binary search tree for the following input list 25,75,15,50,66,33,44. Trace an algorithm to delete the nodes 25, 75,44 from the tree.

3 Examine the various tree traversal and predict a binary tree with Preorder:ABCDEFGHI and Inorder:BCAEDGHF .

4 Describe the two applications of tree with a neat example.

5 Conclude the types of tree traversal methods? Explain it example and deduce a routine for each of them.

6 i) Illustrate your understanding by finding the inorder, preorder and postorder form for the following graph:

 ii) Show some applications of trees.

7 Analyze in detail the implementation of Binary Search Tree and perform its operations.

8 Analyze and explain the dynamic equivalence problem.

UNIT-5

PART-A

1 Explain about sorting.

2 Label the two main classifications of sorting based on the source of data.

3 Analyze the applications of external and internal sorting.

4 What is the purpose of quick sort.

5 Assess the advantage of merge sort.

6 Define median three partitioning.

7 Compare divide and conquer technique with merge sort.

8 What is the purpose of insertion sort.

9 Summarize about merge sort.

10 List the advantages of merge sort.

11 Analyze the key characteristics of binary search.

12 Compare the linear search with binary search.

13 Name the techniques used to choose the pivot element for quick sort.

14 Analyze the term hashing.

15 Identify the advantage of merge sort.

16 Create algorithm for insertion sort.

17 Support your views about insertion sort with example.

18 Trace the steps of insertion sort 12, 19, 33, 26, 29, 35, 22. Construct the total number of comparisons made during sorting.

19 Identify the time complexity of quick sort and binary search.

20 Plan and rearrange the following numbers 45, 22,6,77,47,8 using insertion sort.

PART-B

1 Illustrate the correct sequence 3, 1, 4,7,5,9,2,6,5 using Insertion sort with routine.

2 Elaborate about insertion sort with example and code.

3 Analyze and explain an algorithm for quick sort with example.

4 Summarize quick sort algorithm and trace the following list of numbers: 90,77,60,99,55,88,66, 10.

5 Explain Merge sort routine and trace the following numbers 1, 13,

 24, 26, 2, 15, 27, 38.

6 Show an algorithm for merge sort and give its worst case, best case and average case analysis.

7 Evaluate the linear search & binary search algorithm in detail with an example for each.

 8 i) Identify the differences between linear search algorithm and binary search algorithm.

 ii) Experiment it with an example.

9 Explain C Program to implement the linear search technique with an example. (13)

10 Analyze your view about bubble sort technique with suitable example.

11 Briefly tell about on Hashing and overflow handling.

12 Describe binary search algorithm and search the element 22 from the given list 2,7,14,4,17,5,19,8,22,9,25,12,27,14,28,33.

13 Develop the technique insertion sort for the following 9, 7, 6, 15, 16,

5, 10, 2 5, 26, 18, 11 .

14. Analyze the algorithm for

i) Quick sort. ii)Insertion sort.