BHARATHIDASAN ENGINEERING COLLEGE
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DEPARTEMENT OF EEE ENGINEERING

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Degree / Branch : **B.E / EEE.**

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Sub. Code & Name : **CS3353 C PROGRAMMING & DATA STRUCTURES**

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Sl. No	Units	Part – A No. of Questions		Part – B No. of Questions	
		From	To	From	To
1	Unit - I	1	25	1	22
2	Unit – II	1	28	1	18
3	Unit – III	1	35	1	18
4	Unit – IV	1	24	1	16
5	Unit - V	1	22	1	15

Faculty Sign. (Prepared By)

HOD Sign. (Verified By)

Principal

QUESTION BANK

UNIT-1

C PROGRAMMING FUNDAMENTALS 9

Data Types – Variables – Operations – Expressions and Statements – Conditional Statements – Functions – Recursive Functions – Arrays – Single and Multi-Dimensional Arrays.

PART-A

1. **What is Recursive Function? APR/MAY-2024**
2. **When is the Ternary Operator used? APR/MAY-2024**
3. **What is the role of associativity in prioritizing the operators? APR/MAY-2023**
4. **Define Recursion. APR/MAY-2023**
5. **What will be the output of following Program? NOV/DEC-2022**

```
#include<stdio.h>
Intmain ()
{
Float x=0.1;
If(x==0.1)
Printf (“IF”);
Elseif(x==0.1f)
Printf(“ELSE IF”);
Else
Printf(“ELSE”);
}
```

4. Differentiate between Prefix &Postfix increment Operator. NOV/DEC-2022

5.List difference between While & Do-while. NOV/DEC-2021

6.State the rules for naming a variable in C language.NOV/DEC-2021

7.Give examples for Recursive Function & write on how it suits the task. NOV/DEC-2021

8.What do you mean by variables in ‘C’? APR/MAY-2019

9.How to create a two dimensional array & n-dimensional array? APR/MAY-2019

10.Write the basic structure of C programs. APR/MAY-2019

11. List the primary data types in C.NOV/DEC-2018

12.What is a Recursive Function? NOV/DEC-2018

13.List out the features of Arrays.

14.What is meant by pass by value & pass by reference?

15.How to create Enumeration constants?

16.Differentiate between Expression & Statement in C.

17.Define float array of size 5 & assign 5 values to it.
18.Differentiate between Break & Continue statement.
19.Differentiate between Character & string.
20.Write the syntax for Function Declaration?
21.List out expression code for Two-dimensional array.
22.Differentiate between One-dimensional &Two-dimensional array.
23.Differentiate between Switch () & nested-if statement.
24.List out the various types of C operators.
25.What is a Global variable and local variables?

PART-B

1.(a)(i) Why we used functions in C Languages. Give Examples. (6) APR/MAY-2024
(ii)Write both iterative & Recursive functions in C to evaluate a^b. (7) APR/MAY-2024

(b)(i) What are the different types of control statements? Explain with examples? APR/MAY-2024
(ii)Write a C program that computes the sum of following series in n terms.
$1-x^2/2! +x^4/4! -x^6/6! +$……. APR/MAY-2024

2.What is Looping? Explain Entry-controlled & Exit-controlled loops available in 'C' with appropriate sample C programs? APR/MAY-2023

3.What is an array? List the various types of arrays. Elaborate on array with an example? APR/MAY-2023

4.(i). Write a program using control structure if…..else that examine the value of an integer variable called rating and print one of the following messages,NOV/DEC-2022
"Not recommended"-if the value of rating is less than 2
"Recommended"-if the value of rating lies between 2 and 4
"Highly recommended"-if the value of rating is above 4

(ii)Define Recursive Function in C and write a program to print the numbers from 1 to 5 using recursive function.

5.(i)Predict the output of following and state the reason

```
Intmain()
{
Inti=0;
While(I<=4)
{
Printf("%d",I);
```

```
If(i>3)
Gotoinside_foo;
I++;
}
Getchar();
Return 0;
}
Voidfoo()
{
Inside_foo:
Printf("PP");
}
```

(ii). Explain multi-way selection "Switch…. case" statement implemented in C.

6.Define Array. Explain how it declared, initialized & accessed by specifying in corresponding syntax.

7. Define Loop. Write the syntax of any two loop statements in C. NOV/DEC-2022

8. Discuss about pre-processor directive with suitable example program. NOV/DEC-2021

9.Write a C program to perform Matrix Addition & Matrix Multiplication. NOV/DEC-2021

10.Explain in detail about pass by value & pass by reference.APR/MAY-2019, NOV/DEC-2021

11.Explain the various data types in 'C'. APR/MAY-2019, NOV/DEC-2018

12.Discuss in detail various types of operators in 'C' language along with its priority. APR/MAY-2019

13.(i).Explain the various need of arrays: APR/MAY-2019
(ii) Declaration of Array and Accessing an array element.

14.Write a C program for Swapping two numbers and changing the value of a variable using pass by reference. NOV/DEC-2018

15.Explain in detail about Recursive Function with Factorial of given number. NOV/DEC-2018

16.Write a C -Program to Re-order in one-Dimensional array of numbers in descending order. NOV/DEC-2018

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

18.Discuss in detail about Constants, Expressions & statements in C

19.Explain about the various decision making and branching statements.

20.Write short notes on the following:

(a) for loop

(b)While loop

(c)Do…while loop

21.Write a c program in following:

(i) To check whether given number is Palindrome or not.

(ii) To generate first n numbers in Fibonacci series.

22.Write a function program in all data types with suitable example programs.

UNIT-II C PROGRAMMING - ADVANCED FEATURES 9

Structures – Union – Enumerated Data Types – Pointers: Pointers to Variables, Arrays and Functions – File Handling – Preprocessor Directives.

PART-A

1.State the usage of the Union in C. APR/MAY-2024

2. Write short notes on 'enum'. APR/MAY-2023

2.What is the role of pointers in call by reference.APR/MAY-2023

3.DefineEnumerated Data type.NOV/DEC-2022

4.State the purpose of Conditional compilation.NOV/DEC-2022

5.List some of pointer manipulations allowed in C language. NOV/DEC 2021

6.Define pointer. How will you declare it? APRIL/MAY 2019

7. What are preprocessor directives? APRIL/MAY 2019, APR/MAY-2024

8.What is meant by preprocess directives and list out few examples? NOV/DEC 2018

9.Show the difference between Structure and union NOV/DEC 2018

10.Express the operations that can be performed on pointers.

11.What is an arithmetic?

12.What is a void pointers?

13.How to create enumeration Data types?

14.Why is pointer arithmetic not applicable on void pointers?

15.Identify the use of Pointer.

16.Discover the meaning of C pre-processor.

17. Assess the meaning of function pointer.

18. What is an array of pointer?

19. Mention the advantage of pass by reference.

20. What is structure? Write the syntax for structure.

21. Write the various operations on structure.

22. Write the use of size operator on structure.

23. What is a nested structure?

24. How type def is used in structure?

25. Interpret the term Union in C.

26. What is mean by Self-referential structures.

27.Discover the meaning of Array of structure.

28.What is structure? Write the syntax for structure.

PART-B

1.(a). Write a C Functions to perform following operations with two-dimensional arrays. APR/MAY-2024

(i). Reading any two-dimensional array elements. (3)

(ii). Find the sum of odd & even array elements. (3)

(iii). Finding Maximum & Minimum of array elements. (4)

(b). Explain the structure, Nested Structure & self-Referential structure with examples. APR/MAY-2024

2.(a) (i) What is the significance of 'structure' in language C? Explain in detail with an example program (7).
(ii) Enumerate the difference between structures and unions. (6) APR/MAY-2023

(b). (i) Explain the procedure to pass an array as argument to a function with an example program. (7)
(ii) Write brief notes on preprocessor directives. (6)

3(i). Differentiate between Structure and Union. (5) NOV/DEC-2022
(ii). Explain the various text file opening modes and their meaning in' C'. (4)
(iii). With an example, show how to define a structure, create a structure variables and initialize it. (4)

4.(i).Write a C program to find the sum of diagonal elements of given matrix. (5)
(ii). Define Macro. Write Macro to find the area of rectangle and use it in C program.
(iii). Write a C program to find the largest element in an array using Pointers. (4)

5.Explain the concept of using structure within a structure. Give a suitable example. NOV/DEC 2021

6.What is an array of pointers and what is pointer to an array? Explain in detail with example APRIL/MAY 2019

7.Demonstrate about pointers to structures, array of structures and nested structures. APRIL/MAY 2019

8. How to Accessing the structure member through pointer using dynamic memory allocation. APRIL/MAY 2019

9.Explain about the structures and its operations. NOV/DEC 2018

10.Write a C program using structures to prepare the students mark statement. NOV/DEC 2018

11. Write short note on union NOV/DEC 2018

12.Describe about pointers and their operations that can be performed on it.

13. Explain in detail about function pointers.

14. Discuss about preprocessor directive with example program.

15.Describe about the functions and structures.

16.Write a C program using structures to prepare the employee pay roll of a company.

17.Write a C program to read the details of book name, author name and price of 200 books in a library and display the total cost of the books.

18. Explain with an example the self-referential structure.

UNIT-III LINEAR DATA STRUCTURES 9

Abstract Data Types (ADTs) – List ADT – Array-Based Implementation – Linked List – Doubly- Linked Lists – Circular Linked List – Stack ADT – Implementation of Stack – Applications – Queue ADT – Priority Queues – Queue Implementation – Applications.

PART-A

1.What are Abstract Data Types? APR/MAY-2024

2.State the Applications of Queue. APR/MAY-2024

3.List the advantages of linked list. APR/MAY-2023

4.Name any four applications of queue in the field of computer applications. APR/MAY-2023

5. Define priority queues and its application. NOV/DEC-2022

6.List few operations of doubly linked list. NOV/DEC-2022

7.State the overflow condition while performing push() operation. NOV/DEC 2021

8.Define queue and What are the operations of a queue ADT? NOV/DEC 2021

9.Define Stack. APRIL/MAY 2019

10. What are the operations of the stack? APRIL/MAY 2019NOV/DEC 2018

11.What are the ways of implementing linked list? NOV/DEC 2018

12.Explain prefix, Infix, postfix expression NOV/DEC 2018

13.What is a data structures?

14. What is an static and dynamic data structures ?

15. How data structures are classified?

16.Differentiate linear and non-linear data structure.

17.Mention the advantage of ADT.

18. Define List ADT

19.List down the applications (or) operations of List.

20. Write the structure of stack ADTs?

21. Mention the demerits of linked list

22.What are the operations performed in list?

23. List down the applications of List.

24.How the operations performed on list implementation of stack?

25. What are the applications of stack?

26. Write the algorithms for rear operations?

27. What is the output of the programs given below?

```
#include <stdio.h>
main()
```

```
{
int a = 20, b = 10, c = 15, d = 5;
int e;
e = (a+b) * c / d;
printf("Value of (a + b) * c / dis: %d\n", e);
}
```

28.What are the types of queue?

29. Write the structure of queue ADTs.

30. How the queue is implemented by list?

31. What are the applications of queue?

32. Write the algorithms for push operations?

33. What are enqueue and dequeue operations(or) queue operation?

34.What is meant by push and pop operation.

35. What is TOP element.

PART-B

1.Explain the Stack ADT. State & Explain the different Representation of stack with example. APR/MAY-2024

2.Explain the procedure for converting an infix expression to postfix expression using a stack. Convert the following infix expression into postfix expression.
X*(w+y/2*x^(4+x)) and evaluate the obtained postfix expression using the values (x=1, y=2, w=3). APR/MAY-2024

3.(a).(i).Write and explain the algorithms of Enqueue and Dequeue operations of Queue. APR/MAY-2023
(ii).Write short notes on Doubly Linked list with few operations.

4.(i).Write and explain the algorithms for operations of stack. APR/MAY-2023
(ii).With appropriate problems explain any one application of queue.

5.(a).Define ADT & list the advantages of same .(5) NOV/DEC-2022
(ii).Devise an algorithm to perform push & pop operations in a stack. (4)
(iii).List the advantages & disadvantages of representing a group of items in linked list. (4)

6.(i).Convert the infix Expression (X-Y/(Z+U)*V) into postfix expression.
(ii).What is an postfix expression?Give an one examples.
7.Explain about Singly Linked List with example. NOV/DEC 2021

8.Write the algorithm to perform front and rear operation in a queue. NOV/DEC 2018 ,NOV/DEC 2021

9.Explain queue ADT with an examples. NOV/DEC 2021

10.Explain Various operations of Circular Linked list. NOV/DEC 2021

11.Discuss any two applications of stack with relevant example. NOV/DEC 2021

12.Explain the various operations of the list ADT with examples, application APRIL/MAY 2019

13.Explain how to evaluate arithmetic expressions using stacks APRIL/MAY 2019

14.Explain Stack ADT and its operations NOV/DEC 2018

15.Explain array based implementation of stacks

16. Explain the applications of queues.

17.Write the program for insert and delete operations for stack and explain it.

18.Write the program for insert and delete operations for queue and explain it.

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UNIT –IV NON-LINEAR DATA STRUCTURES (8+1)

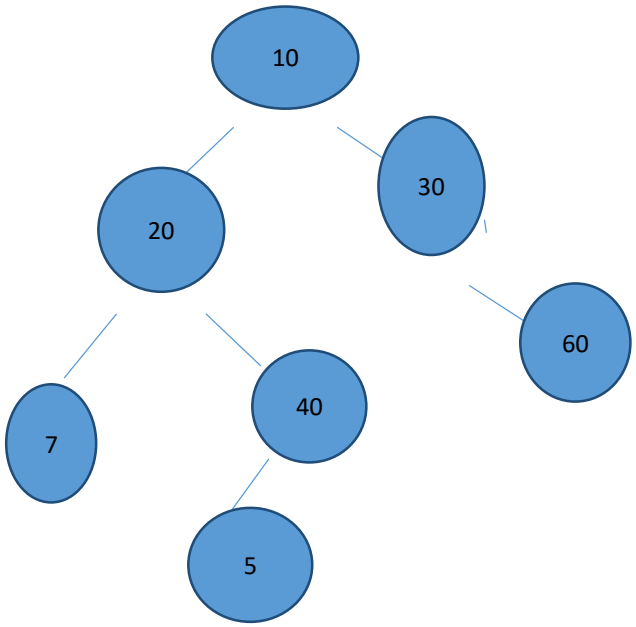
Trees – Binary Trees – Tree Traversals – Expression Trees – Binary Search Tree – Hashing - Hash Functions – Separate Chaining – Open Addressing – Linear Probing– Quadratic Probing – Double Hashing – Rehashing.

PART-A

1. What is meant by rehashing Necessary? APR/MAY-2024

2.What is an Expression Tree? APR/MAY-2024

1. **Convert the infix Expression to Postfix:(A-B/C) * (D/E-F) APR/MAY-2023**
2. **What is Rehashing? When is it Preferred? APR/MAY-2023**
3. **Write the Post-order Traversal & In-order Traversal for below trees: NOV/DEC-2022**



4. **Define Separate Chaining. NOV/DEC-2022**
5. **What is binary search tree? NOV/DEC 2018 NOV/DEC 2021**

6.Write the application of tree? NOV/DEC 2021

7. How collision is handled in Hash table. Give example. NOV/DEC 2021

8.Define tree? APRIL/MAY 2019

9.Explain binary tree traversal with an example. APRIL/MAY 2019

10.Explain binary search tree with an example. NOV/DEC 2018

11.What are the collision resolution methods? APRIL/MAY 2019NOV/DEC 2018

12.Define binary tree?

13. Define full binary tree?

14. Define complete binary tree?

15.List the operation of tree traversal.

16.. Define tree and its terminologies.

17. Explain binary tree with an example

18. Briefly explain application of tree give an example.

19.Define hashing function.

20. What is meant by rehashing?

21. What is meant by separate chaining?

22. Define linear probing.

23. What is meant by quadratic probing?

24. Define double hashing

PART-B

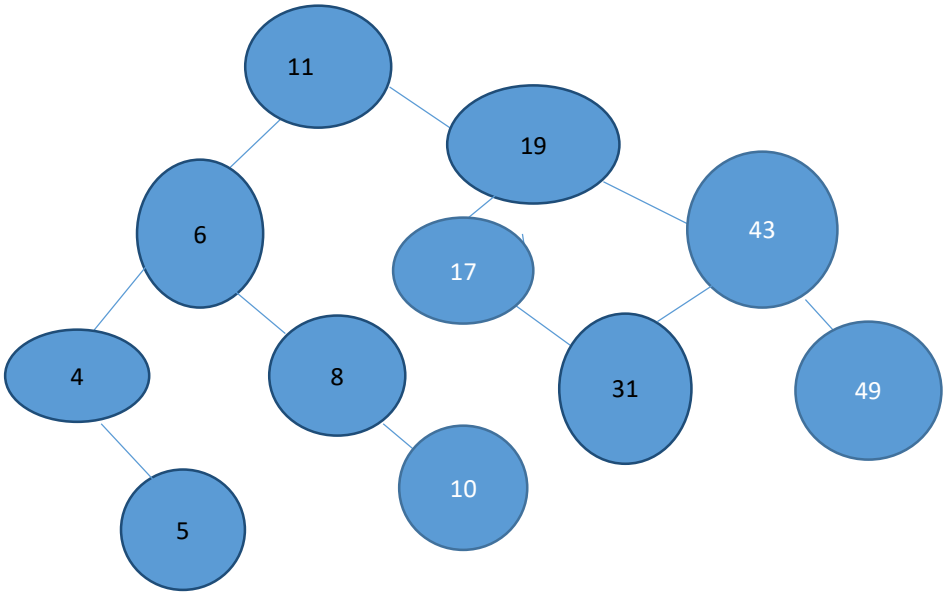
1.State & Explain array linked implementation of binary search tree with pseudo code with an example. APR/MAY-2024

2.Consider the Binary Search Tree. Perform the following functions: APR/MAY-2024

(i). Determine the results of in-order, pre-order & post –order traversals. (4)

(ii). Insert the nodes 12,22, 33,44 & 55. (4)

(iii). Demonstrate the deletion of nodes 43. (5)



3.(i).What is a Tree Traversal? Explain various methods of Traversals. APR/MAY-2023

(ii).Construct an Expression tree for the expression (p+r*q)+((s*t+u)*v).what would be the output of in-order, pre-order and post-order traversals are done. APR/MAY-2023

4.(i).What is a Hash Function? Explain the concept of hashing with example.

(ii).Construct BST for the following:{20,30,10,40,50,20,30,60} APR/MAY-2023

5.(i).Define Double Hashing & list the advantages of the same.(5) NOV/DEC-2022

(ii). Compare Separate Chaining with Open Addressing.(4)

(iii).State the properties of Binary Trees. (4)

6.(i).Write an algorithm to determine whether a binary tree is complete. (5) NOV/DEC-2022

(ii). Give an algorithm to count the number of nodes in a binary tree. (4)

(iii). Devise an algorithm to insert a node in a existing binary search tree. (4)

7.Explain binary search tree with an example. NOV/DEC 2018 NOV/DEC 2021

8. Write short notes on hashing? explain various collision resolution techniques. APRIL/MAY 2019 NOV/DEC 2021

9. Discuss about Expression Tree give the examples NOV/DEC 2021

10.Explain binary tree traversal with an example. APRIL/MAY 2019

11.Define tree and its terminologies with suitable sketch diagrams.

12.Explain binary tree with an example.

13.Briefly explain application of tree give an example.

14.Explain in detail about separate chaining.

15.Explain open addressing with examples.

16.Explain the rehashing techniques with examples.

UNIT-V SORTING AND SEARCHING TECHNIQUES

Insertion Sort – Quick Sort – Heap Sort – Merge Sort –Linear Search – Binary Search.

PART-A

1. **What are the Limitations of Linear Search? APR/MAY-2024**
2. **What is The Fundamentals concept of Merge Sort? APR/MAY-2024**
3. **What is output of selection sort after second iteration for the number sequence:15,5,43,7,25,11. APR/MAY-2023**
4. **Is linear search is better than binary search? Why? APR/MAY-2023**
5. **What is the Worst Case Runtime of insertion sort & specify the scenario? NOV/DEC-2022**
6. **List the disadvantages of Linear Search.**

5. State the use of pivot in Quick sort. NOV/DEC 2021

6.What is binary search? APRIL/MAY 2019

7.What do you mean by internal and external sorting? NOV/DEC 2018

8.Define sorting

9. Mention the types of sorting

10. How the insertion sort is done with the array?

11. What are the steps in quick sort?

12.What are the advantages of insertion sort

13.Define searching

14.Mention the types of searching

15.What is meant by linear search?

16.Applications of linear and binary search?

17. What is the time complexity on binary search?

18. What is the time complexity on insertion sort?

19. What is the time complexity on merge sort?

20. What is the time complexity on linear search? .

21. Define Heap sort?

22. What is meant by Merge sort?

PART-B

1.Explain the basic idea behind insertion sort & how it works. Illustrate with pseudo code with suitable example. APR/MAY-2024

2. Distinguish between Min heap & Max heap. Show how Heap sort process the input 142,543,123,65,453,879,572,434,111,242,311 and 102. APR/MAY-2024

3. (i) Sort the following values using quick sort: (9) APR/MAY-2023
35,40,45,50,55,30,25,20,15
Illustrate each step of the sorting process.
(ii) Write and explain the algorithm of linear search.(4)

4. (i) Explain about the sorting algorithm that works based on divide and conquer technique. APR/MAY-2023

(ii) What are the advantages of linear search over binary search? Justify your observation with an example. (6)

5.(i). List the steps for sorting the following numbers using merge sort. (5) {38,27,43,3,9,82,10} NOV/DEC-2022
(ii). Perform heap sort on the following array of elements {9,7,5,11,12,2,14,3,10,6} and produce the step by step procedure. (4)

(iii). Implement Binary Search on the following set of items {12,18,23,25,29,32,35.40,58,66} and key =18.

6.(i)Differentiate between Linear search and Binary search. (5) NOV/DEC-2022

(ii). Write an algorithm to perform quick sort for a sequence of elements.
(iii). Explain the working principle of insertion sort with an example.

7.Difference between linear and binary search. NOV/DEC 2018 NOV/DEC 2021

8.Discuss about Insertion sort with examples. NOV/DEC 2021

9.Discuss how does Divide and Conquer strategy help in sorting Numbers. NOV/DEC 2021

10.Explain merge sort given examples? APRIL/MAY 2019NOV/DEC 2018

11.Explain quick sort with an example and write routine program. NOV/DEC 2018

12.Explain the sorting algorithms with one suitable examples

13.Explain the searching algorithms

14.Write a C program to perform searching operations using linear and binary search

15.Explain the Heap sort with an examples.

PART-C

1.Given input {4371,1323,6173,4199,4344,9679,1989} and a Hash Function h(x)=X (mod 10), show the resulting: (UNIT-IV)

(i) Separate Chaining Hash Table.
(ii) Open Addressing Hash Table using Linear Probing.
(iii) Open Addressing Hash Table using Quadratic Probing.
(iv) Open Addressing Hash Table with second Hash function h2(x)=7-(x mod 7).

2.Sort the sequence 4,6,8,2,9,5,1,7 and 3 using the following:
(i) Merge Sort. (UNIT-V)
(ii) Quick Sort (Picking the first Element as the Pivot)

*****************ALL THE BEST MY DEAR STUDENTS********************