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Reg. No. :



Question Paper Code : 80116

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Third/Fourth Semester

Electronics and Communication Engineering

EC 8393 — FUNDAMENTALS OF DATA STRUCTURES IN C

(Common to Medical Electronics/Biomedical Engineering/Electronics and Telecommunication Engineering)

(Regulation 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write the basic structure of C programs.
2. What is a static variable? Give an example.
3. Define a pointer and initialize it.
4. What are preprocessor directives? List any two pre-processor directives.
5. How an n-dimensional array is represented?
6. Define: Stack. List its operations.
7. What is a tree and sub trees?
8. What is a graph and vertices?
9. How binary search works?
10. What is a overflow condition in hash table?

PART B — (5 × 13 = 65 marks)

11. (a) (i) Examine the various data types in C with an example. (6)
(ii) List all the operators in C with an example for each. (7)

Or

- (b) (i) How two-dimensional arrays are created in C? Write a C program to generate a population survey having citizen's records stored as a collection of year-wise population. (7)
(ii) List the various string handling functions and write C code of your own to perform any two operations in it. (6)

12. (a) Illustrate pass by value and pass by reference in functions with an example. (13)

Or

- (b) Illustrate the representation of structures and unions for an employee record having empid, emp-name, DOB, basicpay, allowances, deductions, grosspay and netpay. Examine their memory allocation. (13)
13. (a) What is a linked list? Examine the various types of linked list creations with their operations in C. (13)

Or

- (b) How expression evaluation is done using stacks? Illustrate it with an example. (13)
14. (a) What is a binary tree? Examine all the binary tree traversals with an example. (13)

Or

- (b) Examine any one of the graph traversal algorithms with an example. (13)
15. (a) Apply bubble sort and selection sort algorithms to sort a given set of numbers. (13)

Or

- (b) How 2-way merge sort helps in sorting a given set of numbers in an efficient manner? Evaluate it for the following list :
30, 10, 49, 34, 69, 12, 96, 53, 2, 43, 80 (13)

PART C — (1 × 15 = 15 marks)

16. (a) Analyze the functionality of hash tables and hashing functions in storing and retrieving data efficiently. (15)

Or

- (b) Write a program that takes an array of pointers to store a two dimensional array and perform matrix multiplication using it. (15)

Reg. No. :

Question Paper Code : 25077

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Third Semester

Electronics and Communication Engineering

EC 8393 – FUNDAMENTALS OF DATA STRUCTURES IN C

(Common to: Electronics and Telecommunication Engineering)

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the primary data types in C.
2. What are the string operations defined in C?
3. Define - Preprocessor directives and list out a few examples.
4. Differentiate between structures and unions.
5. What are the pros and cons of arrays and linked list?
6. What are the operations of a stack?
7. Define Binary search tree.
8. What is the advantage of having hashing compared to other traditional data structures?
9. Differentiate — Internal with external sorting.
10. How to take care of an overflow problem in hashing?

PART B — (5 × 13 = 65 marks)

11. (a) (i) Write a C program to get two strings and display the result of at least 5 possible string operations. (7)

(ii) Write a C program to get a 4 digit number and display the reverse of the same number. (6)

Or

(b) Write a C program to find the following, where A, B and C are the matrices whose orders are $M \times N$, $M \times N$ and $N \times N$ respectively. $A = A + B * C$.

12. (a) (i) Differentiate the data types, structures with unions. (7)

(ii) Write a C program to get 10 student details using structures from the user and display these details on the screen. (6)

Or

(b) (i) Write a C program to get two numbers and exchange these numbers using pass by value and pass reference. (7)

(ii) Write a C program to find the factorial of a given number using recursive functions. (6)

13. (a) (i) Write a C program to perform all the operations of the Stack. (7)

(ii) Explain the evaluation of the expression using the stack in Infix notation.

Or

(b) Write a procedure to perform polynomial addition using linked lists.

14. (a) Write a C program to insert set of numbers in a binary search tree and display the content of the same with in-order traversal.

Or

(b) Explain - Set representations and Union-Find operations with suitable examples.

15. (a) Write a C program to sort the following set of numbers using a quick sorting algorithm. Find the time complexity of the same. Give the trace of the algorithm for the following given set of numbers. 10, 100, 50, 75, 25, 150, 125, 115, 175, 110. (13)

Or

(b) Write a procedure to search for a number among the given set of numbers using Linear and binary search algorithms and compare and contrast both with an example including time complexity. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Sort the following numbers using Merger sort algorithm. 11, 8, 55, 22, 33, 27, 62, 35, 71. Obtain the worst case and average case time complexity. (16)

Or

(b) Explain the Breadth First Search (BFS) with a suitable example. (16)



9. Show the arrangement of the elements 5, 1, 8, 3, 9, 2 at the end of the second pass when sorting using bubble sort.
10. Show how many comparisons are required to search for the element '10' in the list : 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 using linear search and binary search. What are the elements compared with in both the cases ?

PART - B

(5×13=65 Marks)

11. a) Describe the various operators in C with examples and the associativity.
(OR)
b) Describe the decision making, branching and looping statements in C.
12. a) Explain recursion and write a C program to print the first 'n' numbers in the Fibonacci series using recursion.
(OR)
b) Explain structures and write a C program using structures to store the roll_num, name, marks in 10 subjects of 100 students. Calculate the grade of each student and print the student information. The grades are calculated as follows :

Letter Grade	Grade Points	Marks Range
O (Outstanding)	10	91 - 100
A+ (Excellent)	9	81 - 90
A (Very Good)	8	71 - 80
B+ (Good)	7	61 - 70
B (Average)	6	50 - 60
RA	0	<50

13. a) Explain with suitable diagrams how to represent and add two polynomials using linked lists.
(OR)
b) Explain how expressions can be evaluated using stacks and write an algorithm for the same.
14. a) Write algorithms to insert and delete elements in a binary search tree represented using arrays.
(OR)
b) Write algorithms to perform depth first and breadth first traversal on graphs.

15. a) Write an algorithm to sort 'n' numbers using merge sort. Trace the algorithm for the numbers 38, 27, 43, 3, 9, 82, 10 and show the order in which they are processed.

(OR)

- b) Write an algorithm to sort 'n' numbers using quick sort. Trace the algorithm for the numbers 44, 33, 11, 55, 77, 90, 40, 60, 99, 22, 88, 66 and show the order in which they are processed.

PART - C

(1×15=15 Marks)

16. a) Given an array of integers write a C program to find the closest value to the given number. Array may contain duplicate values and negative numbers.

Example : Array : 5, 2, 6, 8, 7, 6, 8, 9

Target number : 5

Output : 5

Target number : 11

Output : 9

Target Number : 4

Output : 5

(OR)

- b) Given a singly linked list, write an algorithm to remove the duplicates in the linked list.