Reg. No. :

Question Paper Code : X 10357

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020/
APRIL/MAY 2021
Third/Fourth Semester
Electronics and Communication Engineering
EC 8393 – FUNDAMENTALS OF DATA STRUCTURES IN C
(Common to : Biomedical Engineering/Electronics and Telecommunication
Engineering/Medical Electronics)
(Regulations 2017)

Time : Three Hours   Maximum : 100 Marks

Answer ALL questions

PART – A   (10×2=20 Marks)

1. What are the key features in C programming language ?

2. Differentiate while and do-while statement.

3. Can you subtract pointers from each other ? State the reason.

4. How is the size of union decided by compiler ? Give example.

5. What are the operations that can be performed on Queue.

6. Describe what is Node in linked list ? And name the types of linked lists.

7. Define array. Name its types.

8. Give the adjacency matrix of the following graph (Figure – 1).
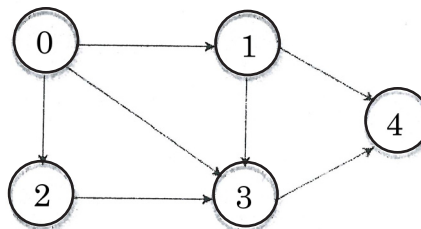

Figure – 1

9. Define Hash function.

10. Compare and contrast linear and binary search.

PART – B   (5×13=65 Marks)

11. a) i) Explain the various types of If statement with syntax and example.   **(6)**

    ii) Read an integer from user and check whether the given number is positive, negative or zero until user doesn't want to exit.   **(7)**

(OR)

   b) i) Write a C program to read N strings from user. And sort them in lexicographical order.   **(6)**

    ii) Discuss about the various types of operators with example.   **(7)**

12. a) i) Write a function to find the factorial of a number using recursion.   **(6)**

    ii) Write a program to demonstrate swapping of two values using call by value and call by reference method.   **(7)**

(OR)

   b) i) Enumerate pre-processor directives and write a program of your choice to illustrate any two directives.   **(4)**

    ii) What is the purpose of using storage class in C ? Explain its types.   **(5)**

    iii) Compare and contrast Structures and Union.   **(4)**

13. a) i) Write a C program to implement a LIFO list that grows and shrinks dynamically.   **(7)**

    ii) Convert the following Postfix expression to infix expression   **(3)**
    A B * C / D E + F G H / * – +

    iii) Find the value of the following postfix expression. Show stack contents step by step output.
   54 6 + 7 4 – * 9 / 35 15 + +   **(3)**

(OR)

   b) i) Given two sorted linked lists L1 and L2. Exemplify and write the functions to compute L1∩L2 and L1∪L2.   **(10)**

    ii) State the advantages of linked list over arrays.   **(3)**

14. a) i) Write C functions to perform deletion in Binary search tree (include all the cases). **(5)**

    ii) Construct a binary search tree for the values M, Q, O, H, K, F, G, P, J, R. **(5)**

    iii) Give the pre order and post order traversal of the resultant binary search tree. **(1½+1½)**

                                    (OR)

   b) Consider the following graph. In what order will the nodes be visited using Breadth first search and Depth first search ? And give the routine for the same. **(13)**
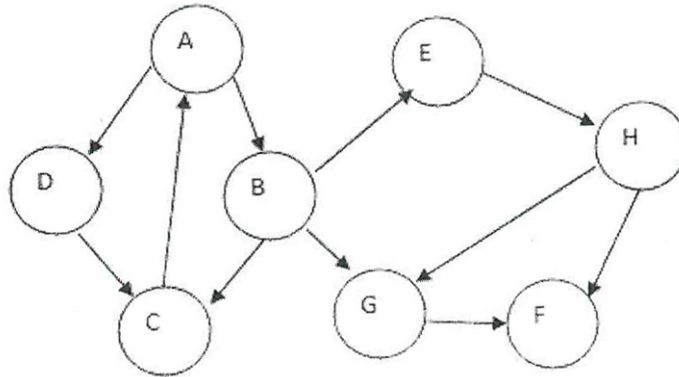
15. a) i) Write a function to perform Merge sort. Give example. **(8)**

    ii) Give the routine for insertion sort. Sort the following sequence using insertion sort 3, 10, 4, 2, 8, 6, 5, 1. **(5)**

                                    (OR)

   b) Consider a hash table with 9 slots. The hash function is h(k) = k mod 9. The following keys are inserted in the order 15, 38, 8, 5, 20, 33, 14, 30. Draw the contents of the hash table when the collisions are resolved by

      1) Chaining
      2) Linear probing
      3) Double hashing. The second hash function h2(x) = 7 – (x mod 7). **(13)**

                    PART – C   **(1×15=15 Marks)**

16. a) Write a program to calculate the net salary of an employee with the structure members as Name, Emp.id, Basic Pay, Da (10% basic pay), Ta (12% of basic pay). Create a pointer pointing to array of 10 employees. Write a display function to display the employee who is getting the highest salary based on their annual income using pointers. Also write an update function – use structure pointer as function argument and modify the annual income by deducting IT. **(15)**

                                    (OR)

   b) Write a routine to implement two stacks using single array. **(15)**

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