

Roll Number: _____

Thapar Institute of Engineering and Technology, Patiala

Department of Computer Science and Engineering

BE CSBS (1st Semester) MST

UCT203: Data Structures and Algorithms

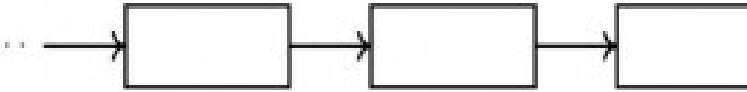
21st March 2024

Time: 02 Hours;

MM: 25

Name of Faculty: Dr. Rinkle Rani

Instruction: Attempt all questions in sequence.

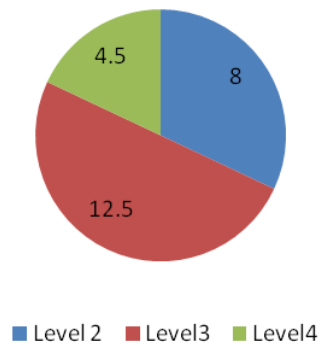
| Q No. | Questions | Marks | CO | BL |
|-------|--|-------|-----|----|
| Q 1. | a) Write a recursive algorithm for binary search and apply the same on the following sequence. 3, 5, 8, 14, 18, 23, 38, 57, 74, 90 Required Item =5 | (4) | CO2 | L2 |
| | b) Convert the following infix expression into the postfix expression using stack as an intermediate structure. $p + (y * z - (a / b - g) * m) * x$ | (2) | CO1 | L3 |
| Q 2. | a) Write the sequence of steps (Algorithm) to delete last node from a circular header singly linked list. Illustrate your change of pointers with diagram. | (4) | CO1 | L2 |
| | b) Let p be a pointer as shown in the figure in a single linked list.  Write sequence of statements to swap the two nodes next to p in the above linked list. | (3) | CO1 | L3 |
| Q 3. | a) Write an algorithm/program that finds the largest element in a two-dimensional integer array using a single loop. | (3.5) | CO1 | L3 |
| | b) Write algorithm/program for divide and conquer Quick sort. Apply your logic on a sequence of elements to arrange them in ascending order. Show the explicit use of stacks and location of pivot during all the intermediate steps. | (4) | CO2 | L3 |
| Q 4. | Assume the list contains n elements ($n \geq 2$) in the following questions. a) How many times is the comparison in statement S1 made? b) What is the minimum and the maximum number of times statements marked S2 get executed? c) What is the significance of the value in the integer pointed to by j when the function completes? | (4.5) | CO1 | L4 |

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Node *remove-duplicates (Node* head, int *j)
{
    Node *t1, *t2; *j=0;
    t1 = head;
    if (t1 != NULL)
        t2 = t1 ->next;
    else return head;
    *j = 1;
    if(t2 == NULL) return head;
    while (t2 != NULL)
    {
        if (t1.val != t2.val) -----> (S1)
        {
            (*j)++;
            t1 -> next = t2;
            t1 = t2; -----> (S2)
        }
        t2 = t2 ->next;
    }
    t1 -> next = NULL;
    return head;
}

```

Bloom's Level wise Marks Distribution



Course Outcome wise Marks Distribution (MST)

