



Indian Institute of Information Technology Sri City, Chittoor
(An Institute of National Importance under An Act of Parliament)

Name: DSA Lab

Duration: 3Hrs

Lab Assignment: 03

Total Marks: 20

INSTRUCTIONS:

1. Please carefully read all questions and there is no choice.
2. Submit single .c file for the all the assignment problems. ***Remove the comments from the code before submitting the file.***
 - a. Name the file as follows: **S2020xxxxxA3.c** (YourRollNoA3.c) for the solution for problems.
3. Do NOT zip. Just attach the .c files directly to your submission in common Google classroom. Not following instructions leads to heavy penalty.

Q1. Write a C program to search an element in a given array (do not use scanf()), where the elements are arranged in

- a. Unsorted order
- b. Sorted order- ascending

What will be the complexity of both the search? (write as comments)

[4]

Q2. As discussed in class the INSERT algorithm checks the last element for vacancy and pushes down all the elements to create vacancy for new element to be inserted. But an array may be empty (or has vacancy) at some j^{th} location. Modify the INSERT algorithm such as the number of push down in array is reduced (comment the modified algorithm).

Write a C program to implement the MODIFIED INSERT algorithm (do not use scanf()).

[5]

Q3. A multiplication table is a matrix of order $m \times n$ where an entry in i -th row and j -th column is product of $x \times y$, where x and y are the numbers in i -th row and j -th column respectively. Figure shows an example of multiplication table from 3 to 7.

	3	4	5	6	7
3	9	12	15	18	21
4	12	16	20	24	28
5	15	20	25	30	35
6	18	24	30	36	42
7	21	28	35	42	49

Write a C program to display a multiplication table of any $x \times y$ given by user.

[5]

Q4. A Magic square is a square matrix of integers such that the sum of every row, the sum of every column and sum of each diagonal are equal. Such a magic square is given in the figure below.



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4	15	14	1
9	6	7	12
5	10	11	8
16	3	2	13

a). Write a program to read a set of integers for a square matrix and then decide whether the matrix represents a magic square or not. [2]

b). Write a game as follows: [4]

(i) Read the size of square matrix, $N \times N$

(ii) Display the square matrix (now it is blank) of $N \times N$

(iii) Allow the player to insert data into the matrix as displayed (you should give a chance to user to confirm the entry and to alter the previous entries, if desire).

(iv) After the completion of all the entries from the player, count the score as follows:

Score=0 (zero) if it is not a magic square. Otherwise, score = $T+P*100$, where T is the time required in seconds and P is the number of alteration of entries.

The player's performance will be judged by minimum score achieved, other than zero.