# CSB101: Problem Solving and Computer Programming

## LAB 9:String, Pointer & Function call by reference

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Instructions:
A) Save your lab.doc as LAB_no_RollNo.doc.  At the end of lab you need to submit your all programs along with the output.
-- LAB_No_Roll_No_2hr.doc for  lab task executed duing the lab
-- LAB_No_Roll_No_complete.doc for Full solution of the Lab assignment ( It should contain all lab assignemnt/problems)
B) Use/paste the snapshot of the steps followed along with result/s.
C) Mention your observation/comment after results in the doc.
D) Along with the doc/pdf file you need to upload your c program filles with following nomenaculture.
-- LAB_No_Prob_No.c
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**Objective(s):** To be familiar with  String, Pointers and Function call by reference in C

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**PART A : Conceptual Questions**

1. Write a program that read your name and then displays the ASCII Value of each character in your name on a separate Line.

2. Write a program to read multiple line of text until a ~ is entered using scanset concept.

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Enter a string, terminate with a tilde ~)...
I am in NITD.
NITD is in Delhi.
NITD Hello ~ Hellooo

I am in NITD.
NITD is in Delhi.
NITD Hello
[root@localhost ~]#
```

3. Write a program to read multiple lines of text until a * is entered. Then count the number of characters, words, and lines in the text.

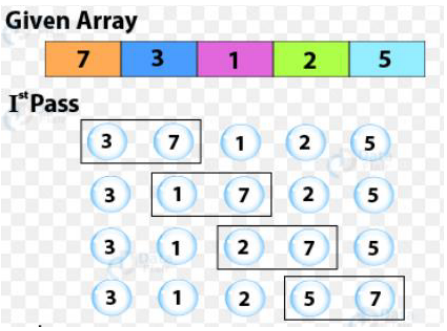
4. Write a program to print *Hello NITD!!* using pointers.

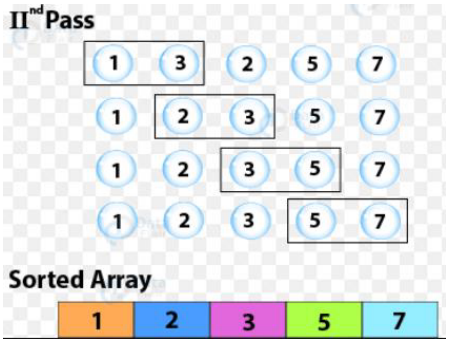
5. Write a program to find the sum of all the elements of an array using pointers.

6. Write a program to sort the name of the students. Take the count of students from the users.

7. Take the marks of your last semester subjects as an input. Determine the maximum and minimum scores using

- Bubble Sort



8. Write a function, **using int pointers (int*)**, to take an int array ( output of previous question) and another number as parameter. Function shall search the number (taken as second parameter) in the array (taken as first parameter)and return the index of the first occurrence of this number in the array. If the input number is not present in the array then return -1.

- Linear Search
- Binary Search

Display the number of comparison carried out in each methods

| **Sample input** | **Sample output** |
|---|---|
| 12 45 87 45 12, 87 | 2 |
| 89 34 23 54 11, 55 | -1 |

9. Write a program to enter a text. Then enter a pattern and count the number of times the patterns is repeated in the text.

**SAMPLE OUTPUT**

Enter the string: She sells sea shells on the sea shore
Enter the pattern : sea
PATTERN FOUND 2 Times

**10**: Write a program that takes nouns and forms their plurals on the basis of these rules:

a. If noun ends in “y”, remove the “y” and add “ies”.
b. If noun ends in “s”, “ch”, or “sh”, add “es”.
c. In all other cases, just add “s”.

Print each noun and its plural. Try the following data:
chair dairy boss circus fly dog church clue dish

**PART B : Exploratory Problem :** Curve Fitting

11. Curve Fitting to fit a straight line to a given set of data points using **Least Square Method**. If data is in terms of two variables x and y then finding an expression of the type y = f(x) which fits the givens data is called curve fitting.

Assume that the given data consists of n points with values of x and y given as $(x_1, y_1), (x_2, y_2) \ldots\ldots (x_n, y_n)$

By method Least Squares the data fits to a straight line Assume that the given data consists of n points with values of x and y given as $y = mx + b$

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Step 1: Calculate the mean of the $x$ -values and the mean of the $y$ -values.

$$\overline{X} = \frac{\sum_{i=1}^{n} x_i}{n}$$

$$\overline{Y} = \frac{\sum_{i=1}^{n} y_i}{n}$$

Step 2: The following formula gives the slope of the line of best fit:

$$m = \frac{\sum_{i=1}^{n} (x_i - \overline{X})(y_i - \overline{Y})}{\sum_{i=1}^{n} (x_i - \overline{X})^2}$$

Step 3: Compute the $y$ -intercept of the line by using the formula:

$$b = \overline{Y} - m\overline{X}$$

Step 4: Use the slope $m$ and the $y$ -intercept $b$ to form the equation of the line.

If only two points are given then it is a unique line.

Write a program for fitting a straight line through a set of points $(\boldsymbol{x_i}, \boldsymbol{y_i}), \boldsymbol{i = 1 \ldots \ldots, n}$

**Hint :** The straight line equation is y = mx + b, and the value of m and b are given by

$$m = \frac{n * (x[i] * y[i]) - (x[i]) * (y[i])}{n * (x[i] * x[i]) - (x[i] * x[i])}; \quad b = \left(\frac{1}{n}\right) * (y[i] - m * x[i]);$$

All summations are from 1 to n.

**SAMPLE OUTPUT :** Input : n = 5

| X | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Y | 14 | 27 | 40 | 55 | 68 |

m = 13.6, b = 0

Y=13.6 X + 0, Represent a given set of points by the best possible straight line

Enter the value of X to find the Value of Y.

X=5

Y= 68 is the predicted value for X= 5

**Help :** link

**Observation /Comments:**