

COL 100 Lab 11

I semester 2016-17
Week 11, 2016

Objective

To be able to write C programs involving the concept of pointers.

Instructions

1. After 1 hour 45 minutes has passed, your codes will be checked. Whatever you have completed till this point will be recorded. Anything that you complete later will not be recorded.
2. If you complete an assignment later, can ask the TAs of your lab session any problems and doubts that you face. There is no need to show the TA your code if there is no problem in it.
3. You cannot attend any lab session other than your allotted session, without informing the TA of the session you are attending. This too is permitted only for genuine reasons.
4. Also, you will not get the attendance, if you do not attend your own lab session, nor will your performance be noted. (Even if you fill up the attendance sheet it will not be updated later.)

Programs

- Press **Ctrl + Alt + T** to open a terminal.
- `cd` to the directory COL100.
- In this directory, create another folder, called lab6
- `cd` to lab6

NOTE: Add *printf* statements to see the flow of control of your code. It will also help you to find out the error, if there is any.

1) Write a C program to swap three elements in cyclic order using call by reference.

Enter the three elements a, b and c respectively:

1

2

3

Value before swapping:

a = 1

b = 2

c = 3

Value after swapping:

a = 3

b = 1

c = 2

2) Write a program to obtain the determinant of a 3X3 matrix using pointers. The use of pointer would be to access the individual elements of the matrix which would be required for the determinant calculation.

If you wish to calculate determinant of 3×3 matrix then formula will be something like below :

Say 3×3 matrix is :

$$A = \begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix}$$

Sample 3×3 Matrix

Then its determinant will be like below:

$$|A| = a \cdot \begin{vmatrix} e & f \\ h & i \end{vmatrix} - b \cdot \begin{vmatrix} d & f \\ g & i \end{vmatrix} + c \cdot \begin{vmatrix} d & e \\ g & h \end{vmatrix}$$

Determinant of 3×3 matrix

Note : | | denotes determinant . That means 3 x 3 matrix has been broken into 3 small determinants

To calculate determinant of 2x2 matrix:

$$A = \begin{bmatrix} a & b \\ c & d \end{bmatrix} \quad |A| = ad - bc$$

Determinant of 2x2 matrix

3) Write a program which performs the following tasks:

- initialize an integer array of 10 elements in main()
- pass the entire array to a function modify()
- in modify() multiply each element of array by 3 – return the control to main() and print the new array elements in main().

4) Write a program to reverse the strings stored in the following array of pointers to strings:

```
Input is : char *s[ ] = {
    "To err is human..",
    "But to really mess things up...",
    "One needs to know C!!"
} ;
```

The reversed string should look like this:

```
S[]={ "One needs to know C!!",
    "But ti really mess things up..."
    "To err is human.."
}
```

HOMEWORK ASSIGNMENTS:

5) Write a program to count the number of vowels and consonants in the following array of pointers to strings. The program should also account for the upper and lower case alphates and keep a count of each.

```
char *str[ ] = { "We will teach you how to...",
    "Move a mountain",
    "Level a building",
    "Erase the past",
    "Make a million",
    "...all through C!" } ;
```

6) Write a program to sort a list of strings in alphabetical order , using an array of pointers. Also try to do the same using a 2D array and try to understand the difference.

Eg: If the input string is : Kamal Vijay Arun Bob

The sorted string is : Arun Bob Kamal Vijay