

C++ LAUNCHPAD



CODING
BLOCKS

Lecture-6,7

Arrays

- Character Arrays
- 2D Arrays

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Doubts ?

Character Arrays!

Character Array Basics

- `char str[100];`
- `char str[4] = { 'A', 'B', 'C', 'D' };`
- `char str[] = { 'A', 'B', 'C' };`
- `char str[] = "Welcome";`
- `char str[8] = "Welcome";`

So what are strings?

- In C/C++ we use a character array to simulate strings.
- By convention, a string is a sequence of characters followed by a null character.
- Null character is a special character whose ascii value is 0 and its representation is `'\0'`
- In the previous slide example 4 and 5 are valid strings.

Printing a character array

- cout command treats characters address differently.
- If you give it any other type of address it will just print the address
- But if you give it an address of type character it will print characters byte by byte starting from that byte till it finds a byte which stores null character.
- It doesn't care about the allocated space.

Lets see it with some code.



Reading a string.

- We can read character by character from the screen and keep adding to an array till we find our delimiter which in most cases is '\n' and append 0 character to the end of the array.
- `cin.getline`

cin.getline

- `cin.getline(char BA[], int max_space);`
- `cin.getline(char BA[], int max_space, char delimiter);`

`max_space` is the available space starting from the passed address.

`delimiter` is the character which specifies the end of the string. By default it is `'\n'`.

`cin.getline` would automatically add `'\0'` at the end.

Since end of the string can be checked by looking for null character(`'\0'`) we don't need the number of elements in the array

Lets do some problems!

- Calculate Length of the String
- Check if a string is palindrome or not

Time to Try ?

- Input two strings A and B and appends B to A.
- Read N strings from a user and print the largest string.

Again – We can only initialize the array and not assign!
So if you want to update the string, you need do it character by character.

Always remember to append null character at the end of the string after any operation.

Time to try ?

- Write a program to reverse a string.
- Given a string rotate it by n characters. e.g. if the string is CodingBlocks and n =3 then the output should be cksCodingBlo
- Write a function to check if two strings are permutations of each other.
- Write a program to print all pairs

2 D Arrays

2 D Arrays Declaration/Initialization

- `int array1 [2][3];`
- `int array2[2][3] = {{1,2,3}, {4,5,6}};`
- `Int array[][4] = {{1,2,3,4}, {4,5,6,7}, {8,9,10}};`
- `char array3[3][2] = {{ 'A', 'B'}, { 'C', 'D'}, { 'E', 'F' }};`
- `char array4[][4] = {"abc", "def", "efg", "hig"};`

Accessing an array

- 2-D array can be visualized as a matrix with N rows and M Columns.
- First element is 0,0 and last is N-1, M-1
- To access jth element of ith row [considering i and j are 0 based] we can use `arr[i][j]` where arr is the name of the array.

Lets write some

- Read a matrix and find a number in it.
- Wave Print
- Spiral Print

Time to try?

- Write a program to find whether a number is present or not in a sorted(both row and column wise) 2-D array

How is it stored?

Depending on the architecture it could be either stored as:

- Column Major Form
- Row Major Form – Most common!

Array of strings!

- We simulated a string by a 1-D character array.
- Similarly we can simulate a list of strings by 2-D character array.
- `char stringlist[10][100];`
- Above can store max 10 strings each of maxlength 100.
- And each string can be accessed by `stringlist[i]`.

Initializing array of strings!



Lets see an example.

- Given a list of strings and word S. Check if S exists in the list or not.

Time to try?

- Read N words and sort them lexicographically.
- Write a program to create a matrix of alternate rectangles of O and X

For N = 5;

00000

0XXX0

0X0X0

0XXX0

00000

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Thank You!

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