

Array And Strings

Course Title :- Structured Programming Language Sessional

Course Code :- CSE-122 [SECTION-B]

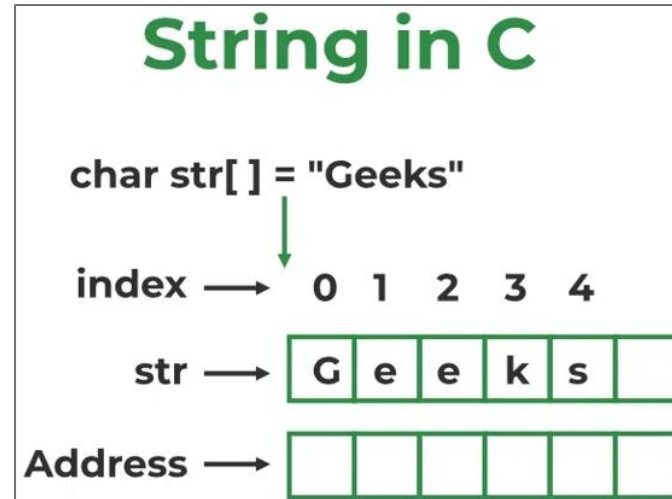
Level Term: 1-II-A(G1) & 1-II-B(G3,G4)

Outlines

- ✓ Strings In C [Character Array]
- ✓ Standard C Library – String.H Functions
- ✓ C Programs Of Strings
- ✓ Online Judge Problems
- ✓ Exercise Problems

Strings in C [Character Array]

- ✓ A String in C programming is a sequence of characters terminated with a null character '\0'.
- ✓ The C String is stored as an array of characters.
- ✓ The difference between a character array and a C string is that the string in C is terminated with a unique character '\0'.



[1] String Declaration

//method-1

char string_name[size];

Ex: Char Subject[50]

There is an extra terminating character which is the Null character ('\0') used to indicate the termination of a string that differs strings from normal character arrays.

//method-2

int length;

scanf("%d", &length);

char str[length];

[2] String Initialization	[3] String Access [How to print a character array?]	[4] String Update [How to Modify a character array?]
1. Assigning a String Literal without Size char str[] = "GeeksforGeeks";	<pre>for(i =0 ; i < strlen(name); i++){ printf(“%c”, name[i]); }</pre>	name[0]='m';
2. Assigning a String Literal with a Predefined Size char str[13] = "GeeksforGeeks";	<pre>for(i =0 ; i < 13; i++){ printf(“%c”, name[i]); }</pre>	name[0]='m';
3. Assigning Character by Character with Size char str[14] = { 'G','e','e','k','s','f','o','r','G','e','e','k','s','\0'};	<pre>for(int i=0; i<13; i++){ printf("%c", str[i]); }</pre>	str[1]='x';
4. Assigning Character by Character without Size char str[] = { 'G','e','e','k','s','f','o','r','G','e','e','k','s','\0'};	<pre>for(int i=0; i< strlen(str); i++){ printf("%c", str[i]); }</pre>	str[3]='x';
5. Assigning using User Input int length; scanf(“%d”, &length); char name[length]; for(i = 0; i<length; i++){ scanf(“%c”, &name[i]); }	5. Assigning using User Input for(i = 0; i<length; i++){ printf(“%c”, name[i]); }	name[strlen(name)-1]='c';
6. String Input using scanf int length; scanf(“%d”, &length); char name[length]; scanf("%[^\\n]s", str);	6. String Input using scanf printf("%s",str);	name[strlen(name)-1]='x';

❑ Standard C Library – String.h Functions

Function Name	Description
<u>strlen(string_name)</u>	Returns the length of string
<u>strcpy(s1, s2)</u>	Copies the contents of string s2 to string s1.
<u>strcmp(str1, str2)</u>	Compares the first string with the second string. If strings are the same it returns 0.
<u>strcat(s1, s2)</u>	Concat s1 string with s2 string and the result is stored in the first string.
<u>strrev()</u>	The given string which is needed to be reversed.
<u>strlwr()</u>	Converts string to lowercase.
<u>strupr()</u>	Converts string to uppercase.
<u>tolower()</u>	Converts string to lowercase.
<u>toupper()</u>	Converts string to uppercase.
Assignment:- Find Other Functions For Strings!	

❑ String programs using built-in functions()

```
int main(){  
    ///string length  
    char word[] = "abcdef";  
    printf("%d\n", strlen(word));  
    ///copy string from s1 to s2  
    char s1[] = "hello world";  
    char s2[] = "computer engineering";  
    strcpy(s2,s1);  
    strcpy(s1, "I love coding");  
    printf("%s %s\n", s1, s2);  
    ///strcat(): add to string  
    strcat(s1,s2);  
    printf("%s\n", s1);  
    ///strlwr(), strupr()  
    char a[]="ARGENTINA";  
    char b[]="brazil";  
    printf("%s %s\n", strlwr(a), strupr(b));  
    printf("%s %s\n", strrev(a), strrev(b));  
}
```

Output:

6

I love coding hello world

I love codinghello world

argentina BRAZIL

anitnegra LIZARB

String	H.W.	Recommended Tutorial
1. Taking input & output		Introduction to String String Input and display String Display string character-wise code: String Input & Output
2. Copy string1 to string2	Assignment	Copy One String to Another
3. Merge two string		Slide
4. Linear search		Slide
5. Sort a string [ascending]	Assignment	https://ideone.com/1fXYAH
6. Count vowel, consonant and other in a string	Assignment	https://ideone.com/GTdYih
7. Check two string is same or not	Assignment	Compare two string
8. Check string is Palindrome or not		Slide
9. Reverse of a string		Slide
10. Compare two string to find Lexicographically smallest string		Slide

1. String Traversal / taking input and output

```
#include<stdio.h>
```

```
int main()
```

```
{
```

```
    int n;
```

```
    printf("Size of String: ");
```

```
    scanf("%d", &n);
```

```
    printf("Input: ");
```

```
    char str[n];
```

```
    for(int i=0; i<n; i++)
```

```
    {
```

```
        scanf("%c", &str[i]);
```

```
    }
```

```
    printf("Output: ");
```

```
    for(int i=0; i<n; i++)
```

```
    {
```

```
        printf("%c", str[i]);
```

```
    }
```

```
}
```

Size of String: 6

Input: keeper

Output: keeper

3. Add/Concatenate two strings

```
int main(){
```

```
    char str1[100], str2[100];
```

```
    int n,m;
```

```
    printf("String 1 Size: ");
```

```
    scanf("%d", &n);
```

```
    printf("Enter String 1: ");
```

```
    for(int i=0; i<n; i++){
```

```
        scanf(" %c", &str1[i]);
```

```
    }
```

```
    //getchar();
```

```
    printf("String 2 Size: ");
```

```
    scanf("%d", &m);
```

```
    printf("Enter String 2: ");
```

```
    for(int i=0; i<m; i++){
```

```
        scanf(" %c", &str2[i]);
```

```
    }
```

```
    //getchar();
```

```
    char add[n+m+1];
```

```
    for(int i=0; i<n; i++){
```

```
        add[i] = str1[i];
```

```
    }
```

```
    for(int i=0; i<m; i++){
```

```
        add[i+n] = str2[i];
```

```
    }
```

```
    for(int i=0; i<n+m; i++){
```

```
        printf("%c", add[i]);
```

```
    }
```

```
}
```

String 1 Size: 5
Enter String 1: abcde
String 2 Size: 4
Enter String 2: efgh
abcdeefgh

4. Linear Search in String:

```
int main(){
    char str[100];
    int n,m;
    printf("String Size: ");
    scanf("%d", &n);
    printf("Enter String : ");
    for(int i=0; i<n; i++){
        scanf(" %c", &str[i]);
    }
    getchar();
    printf("Enter Character to Search: ");
    char p;
    scanf("%c", &p);
    for(int i=0; i<n; i++){
        if(str[i] == p){
            printf("Found at index %d", i+1);
            return 0;
        }
    }
    printf("Not found");
}
```

String Size: 5

Enter String : abcde

Enter Character to Search: d

Found at index 4

8. Palindrome checking of a string

```
int main(){
    char str[100];
    int n,m;
    printf("String Size: ");
    scanf("%d", &n);
    printf("Enter String : ");
    for(int i=0; i<n; i++){
        scanf(" %c", &str[i]);
    }
    getchar();
    int first = 0;
    int last = n-1;
    while(first < last){
        if(str[first] != str[last]){
            printf("Not a Palindrome");
            return 0;
        }
        first++;
        last--;
    }
    printf("Palindrome");
}
```

String Size: 6

Enter String : aabbaa

Palindrome

9. Reverse a String

```
int main() {
    char str[100];
    int n,m;
    printf("String Size: ");
    scanf("%d", &n);
    printf("Enter String : ");
    for(int i=0; i<n; i++){
        scanf(" %c", &str[i]);
    }
    getchar();

    for (int i = n-1; i ≥ 0; i--) {
        printf("%c", str[i]);
    }
}
```

String Size: 5
Enter String : abcde
edcba

10. Lexicographically smallest string

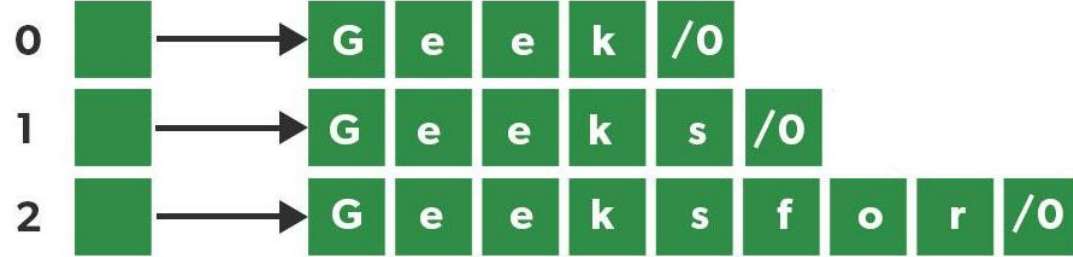
```
int main() {
    char str1[100], str2[100];
    printf("Enter String 1: ");
    scanf("%s", str1);

    printf("Enter String 2: ");
    scanf("%s", str2);

    for(int i=0; i< strlen(str1); i++)
    {
        if(str1[i] < str2[i])
        {
            printf("String-1 < String-2");
            return 0;
        }
    }
    printf("String-1 ≥ String-2");
}
```

Enter String 1: abcd
Enter String 2: abz
String-1 < String-2

2D character array



// C Program to print Array of strings

```
#include <stdio.h>
int main(){
    char arr[3][12] = {"Geek", "Geeks", "Geekfor"};
    printf("String array Elements are:\n");
    for (int i = 0; i < 3; i++) {
        printf("%s\n", arr[i]);
    }
}
```

❑ Online Judge Problems

CodeForces

<https://codeforces.com/group/MWSDmqGsZm/contest/219856/problem/A>

<https://codeforces.com/group/MWSDmqGsZm/contest/219856/problem/C>

<https://codeforces.com/group/MWSDmqGsZm/contest/219856/problem/E>

<https://codeforces.com/group/MWSDmqGsZm/contest/219856/problem/G>

<https://codeforces.com/group/MWSDmqGsZm/contest/219856/problem/I>

<https://codeforces.com/group/MWSDmqGsZm/contest/219856/problem/O>

<https://codeforces.com/group/MWSDmqGsZm/contest/219158/problem/P>

Solve This Problems

```
int main() {
    char arr[] = "GeeksQuiz";
    printf("%s", ?);
}
```

```
int main(){
    char arr[6] = { 'G', 'e', 'e', 'k', 's', '\0' };
    int i = 0;
    while (arr[i]) {
        printf("%c", arr[i++]);
    }
}
```

```
int main() {
    char p[]="geeksquiz";
    char t;
    int i,j;
    for(i=0,j=strlen(p);i≠j;i++,j--) {
        t=p[i];
        p[i]=p[j-i];
        p[j-i]=t;
    }
    printf("%s",p);
}
```

```
int main(){
    char str1[] = "GeeksQuiz";
    char str2[] = {'G', 'e', 'e', 'k', 's', 'Q', 'u', 'i', 'z'};
    int n1 = sizeof(str1)/sizeof(str1[0]);
    int n2 = sizeof(str2)/sizeof(str2[0]);
    printf("n1 = %d, n2 = %d", n1, n2);
}
```

```
int main(){
    char str[20] = "GeeksQuiz";
    printf ("%d", sizeof(str));
}
```

```
int main (){
    char a [6] = "world";
    int i, j;
    for (i = 0, j = 5; i < j; a [i++] = a [j--]);
    printf ("%s\\n", a);
}
```

```
int main(){
    char str[] = "%d %c", arr[] = "GeeksQuiz";
    printf(str, 0[arr], 2[arr + 3]);
}
```