
C
Data Types, Functions, Arrays, Pointers and Structures
72 hrs.
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iSpring
1 / 27
00:00 / 00:00

Module Duration

72 Hrs.

S. No.	Topic	Duration (in hrs.)
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2	Datatypes, Storage Classes	15
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9	Compiling, Debugging and Environmental Setup	3

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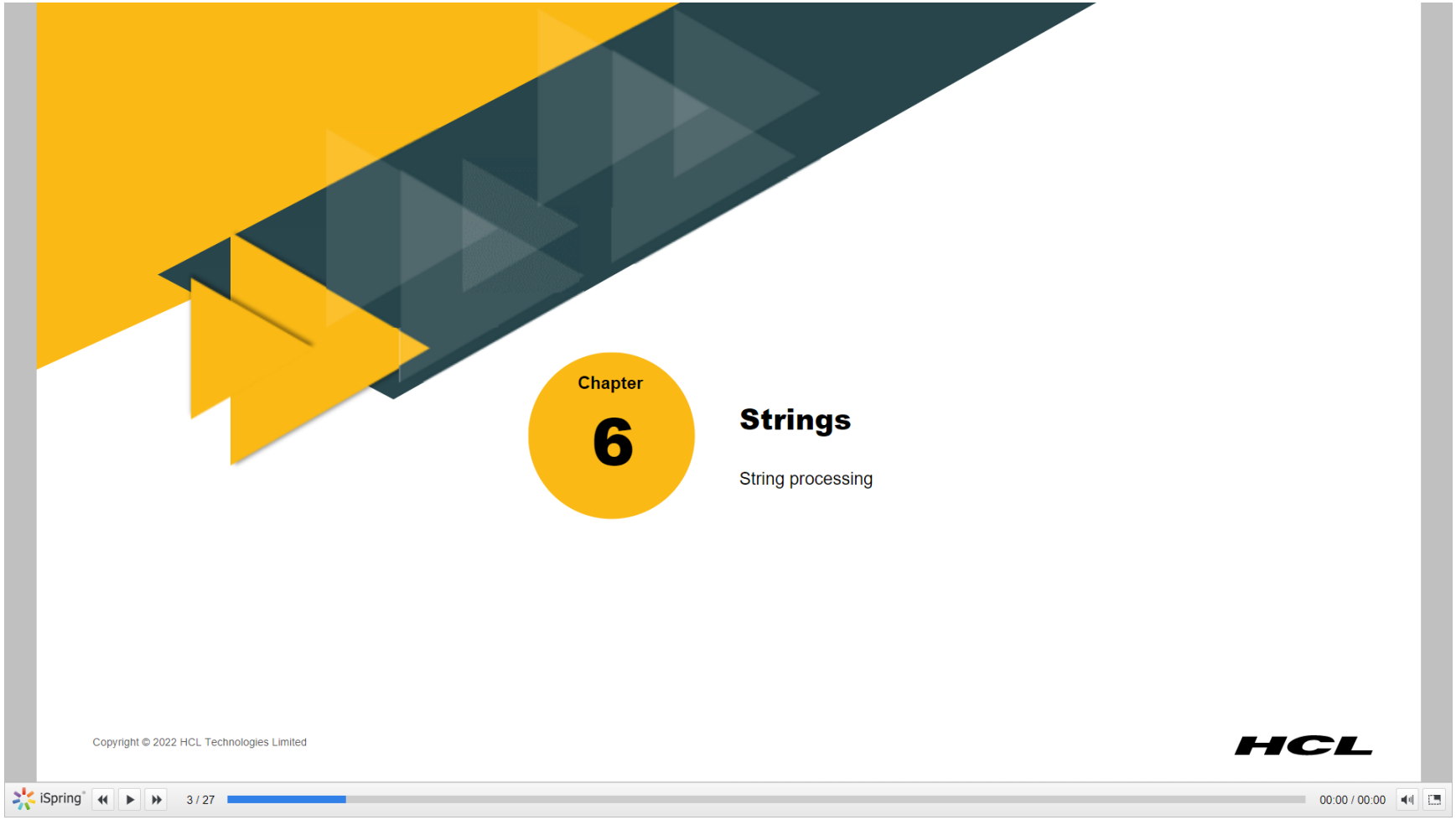
Chapter
6
Strings
String processing
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Learning Objectives

This topic provides an introduction to **C Programming Language.**

Students completing the **session** would know:

- Revisiting string
- string.h
- Sample code using function
  strchr, strcat , strcmp, strlen, strstr etc.
- Sample Programs

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Topic Coverage

Topics
Revisiting string
string.h
String functions Like strchr, strcat , strcmp, strlen, strstr
Example

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Discussion on C Language

Discussion Point

- What are Strings in C Language?
- What are the limitations of strings in C Language?

Instructions & Duration

- The participants will discuss their knowledge on C Programming Language.

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Revisiting string

scanf("%[^\n]%*c",a); // get a whole sentence

- Revisiting string
- string.h
- String functions
- Example

- String: array of characters
  terminated by NULL character '\0'

- String in/output:
  printf("%s",data), scanf("%s",data)

- string.h :
  collection of functions for string manipulation

- No standard operators for string assignment and comparisons!
  (remember: strings are a type of arrays)

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String.h

- Revisiting string
- string.h
- String functions
- Example

string. **h is** the header in the C standard library for the C programming language which contains macro definitions, constants and declarations of functions and types used not only for **string** handling but also various memory handling functions

Few functions of this:

- char * strcat (char *, const char *);
- int strcmp (const char *, const char *);
- char * strrchr (const char *, int);
- size_t strlen (const char *);
- char * strstr (const char *, const char *);

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String.h

- Revisiting string
- string.h
- String functions
- Example

- char * strrchr (const char *, int);
- char * strcpy (char* destination, const char* source);
- char *strcat(char *destination, const char *source);

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Sample code to understand string functions

- Revisiting string
- string.h
- String functions
- Example

```
#include <stdio.h>
#include <string.h>
int main() {
char str1[100] = "first part", str2[] = "second part";
strcat(str1, str2);
puts(str1);
puts(str2);
return 0;}
```

The strcat() function concatenates the destination string and the source string, and the result is stored in the destination string.

Including string.h header file That contains declaration of all functions

.

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Sample code to understand string functions

- Revisiting string
- string.h
- String functions
- Example

- int strcmp (const char* str1, const char* str2);

- strcmp("abcd", "abCd"); =32
- strcmp(“abcd”, “abcd”) ; =0
-
- The strcmp() compares two strings character by character.
- If the first character of two strings is equal, the next character of two strings are compared. This continues until the corresponding characters of two strings are different or a null character '\0' is reached.

Return	ValueRemarks
0	if both strings are identical (equal)
negative	if the ASCII value of the first unmatched character is less than second
positive	if the ASCII value of the first unmatched character is greater than second.

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Sample code to understand string functions

- Revisiting string
- string.h
- String functions
- Example

char* strcpy(char* destination, const char* source);

```
char str1[20] = "C programming";
 char str2[20] = "hello";
 // copying str1 to str2
 strcpy(str2, str1);
 puts(str2);
```

Output:
C programming

- The strcpy() function copies the string pointed by source (including the null character) to the destination.
- The strcpy() function also returns the copied string.

- **Note:** When you use strcpy(), the size of the destination string should be large enough to store the copied string. Otherwise, it may result in **undefined behavior**.

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Sample code to understand string functions

- Revisiting string
- string.h
- String functions
- Example

size_t strlen(const char *);

```
char a[20]="Program";
 char b[20]={'P','r','o','g','r','a','m','\0'};
// using the %zu format specifier to print size_t
printf("Length of string a = %zu \n",strlen(a));
printf("Length of string b = %zu \n",strlen(b));
```

Output:
Length of string a = 7
Length of string b = 7

The strlen() function takes a string as an argument and returns its length.

The returned value is of type size_t (the unsigned integer type).

Note that the strlen() function doesn't count the null character \0 while calculating the length.

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Sample code to understand string functions

- Revisiting string
- string.h
- String functions
- Example

char * strstr (const char *haystack, const char *needle);

```
char haystack[20] = “HCLMadurai";
char needle[10] = “Madurai";
char *ret;    ret = strstr(haystack, needle);
printf("The substring is: %s\n", ret);
```

Output:
The substring is: Madurai

The C library function **char *strstr(const char *haystack, const char *needle)** function finds the first occurrence of the substring **needle** in the string **haystack**. The terminating '\0' characters are not compared.

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Sample code to understand string functions

- Revisiting string
- string.h
- String functions
- Example

char * strchr (const char *, int);

```
const char str[] = "http://www.hcltss-lms.com";
 const char ch = '.';
char *ret;   ret = strchr(str, ch);
 printf("String after %c is :  %s", ch, ret);
```

Output:
String after . is : .hcltss-lms.com

The C library function **char *strchr(const char *str, int c)** searches for the first occurrence of the character **c** (an unsigned char) in the string pointed to by the argument **str**.

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Sample code to understand string functions

- Revisiting string
- string.h
- String functions
- Example

char * strrchr (const char *, int);

```
const char str[] = "http://www.hcltss-lms.com";
const char ch = '.';
char *ret;   ret = strrchr(str, ch);
printf("String after %c is :  %s", ch, ret);
```

Output:
String after . is : .com

The C library function **char *strrchr(const char *str, int c)** searches for the last occurrence of the character **c** (an unsigned char) in the string pointed to, by the argument **str**

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Sample code to understand string functions

- Revisiting string
- string.h
- String functions
- Example

void * memchr (const void *str, int c, size_t n)

```
const char str[] = "http://www.hcltss-lms.com/";
const char ch = '.';
char *ret;
ret = memchr(str, ch, 10);
printf("String after |%c| is - |%s|\n", ch, ret);
ret = memchr(str, ch, 11);
printf("String after |%c| is - |%s|\n", ch, ret);
```

Output:
String after |.| is - |(null)|
String after |.| is - |.hcltss-lms.com/|

The C library function **void *memchr(const void *str, int c, size_t n)** searches for the first occurrence of the character **c** (an unsigned char) in the first **n** bytes of the string pointed to, by the argument **str**.

Note:This function returns a pointer to the matching byte or NULL if the character does not occur in the given memory area

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Sample code to understand string functions

- Revisiting string
- string.h
- String functions
- Example

char * strtok (char *str, const char *delim)

```
char str[80] = "This is - http://www.hcltss-lms.com/ - website";
const char s[2] = "-";
char *token;
 /* get the first token */
token = strtok(str, s);
/* walk through other tokens */
while( token != NULL )
{      printf( " %s\n", token );
token = strtok(NULL, s);   }
```

Output:
This is
http://www.hcltss
lms.com/
website

The C library function **char *strtok(char *str, const char *delim)** breaks string **str** into a series of tokens using the delimiter **delim**.

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Exercise

- Revisiting string
- string.h
- String functions
- Example

- Given a string name, we have to find the initials of the name

- Write a c program to display the following
- Input : prabhat kumar singh
- Output : P K S (15mins)

```
#include <stdio.h>

int main()
{
    char str[100];
    scanf("%[^\n]%*c", str);

    int i = 0;
    printf("%c ", str[i] - 32);
    while (str[i] != '\0') {
        if (str[i] == ' ') {
            str[i+1] -= 32;
            printf("%c ", str[i+1]);
        }
        i++;
    }
}
```


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Discussion on C Language

Discussion Point

- How much important is string processing ?
- Which library is for String processing in c?
- How all functions work in string.h?
- Make a program in which use all these and explore other features available,

Instructions & Duration

- The participants will discuss their knowledge on C Programming Language.

15 Min

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Summary

- Most things in a program are string based so string processing is very important .
- Ways to manipulate string
  - strlen- returns the length of string
  - strcat - combines two string
  - strcmp - compares two string returns +,0,-
  - strcpy –replaces the the data with paramètres value
  - strstr – finds one string in other string

Multiple Choice Questions

1. If the two strings are identical, then strcmp() function returns

a) 0

b) 1

c) Some positive value

d) Some negative value

2. The library function used to find the last occurrence of a character in a string is?

a) strnstr()

b) laststr()

c) strrchr()

d) strstr()

Multiple Choice Questions

3. Which of the following function is used to find the first occurrence of a given string in another string?

a) strchr()

b) strrchr()

c) strstr()

d) strnset()

4. What is a String?

a) An array of Integers with 0 as the last element of array.

b) An array of Characters with null character as the first element

c) array of Characters with null terminated

d) String is a Data Type in C

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Multiple Choice Questions

5. Which of the following function is correct that finds the length of a string?

a)

```
int xstrlen(char *s)
{
    int length=0;
    while(*s!='\0')
    {    length++; s++; }
    return (length);
}
```

b)

```
int xstrlen(char *s)
{
    int length=0;
    while(*s!='\0')
        length++;
    return (length);
}
```

c)

```
int xstrlen(char s)
{
    int length=0;
    while(*s!='\0')
        length++; s++;
    return (length);
}
```

d)

```
int xstrlen(char *s)
{
    int length=0;
    while(*s!='\0')
        s++;
    return (length);
}
```

Cue Card for Assimilation Check

Question Number	Correct Answer	Slide Number
1	a	Slide 12 (strcmp function)
2	c	Slide 9 (strrchar)
3	c	Slide 9 (strstr)
4	c	Slide 8 (Revisiting string)
5	a	Slide 7 (Genaral)

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References

- https://pubs.opengroup.org/onlinepubs/7908799/xsh/string.h.html
- http://www.cplusplus.com/reference/cstring/

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