C Strings

Topics : C
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In C programming language, a string is an array of characters that is terminated by a null character ('\0'). Strings in C are represented by the `char` data type, and are used to store and manipulate text.

To declare a string in C, you need to use the `char` data type and an array of characters. The basic syntax for declaring a string is as follows:

```
char string_name[size];
```

Here, `string_name` is the name of the string and `size` is the size of the array. For example, to declare a string named `message` that can hold up to 50 characters, you would use the following code:

```
char message[50];
```

To initialize a string in C, you can use a string literal enclosed in double quotes. For example, to initialize the `message` string with the value "Hello, world!", you would use the following code:

```
char message[] = "Hello, world!";
```

You can also initialize a string using an array of characters. For example, to initialize the `message` string with the value "Hello", you would use the following code:

```
char message[] = {'H', 'e', 'l', 'l', 'o', '\0'};
```

You can access individual characters in a string using their index. For example, to print the first character of the `message` string, you would use the following code:

```
printf("%c\n", message[0]);
```

This prints the first character of the `message` string, which is 'H'.

You can also use various string manipulation functions in C to perform operations on strings. Some commonly used string functions in C are:

- `strlen`: Returns the length of a string.
- `strcpy`: Copies one string to another.
- `strcat`: Concatenates two strings.
- `strcmp`: Compares two strings.

Here's an example program that uses some of these functions:

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

int main() {
    char message[] = "Hello, world!";
    int length = strlen(message);
    char copy[50];
    strcpy(copy, message);
    strcat(copy, " Goodbye!");
    int result = strcmp(message, copy);
    printf("Length: %d\n", length);
    printf("Copy: %s\n", copy);
    printf("Result: %d\n", result);
    return 0;
}
```

This program first declares a string named `message` and initializes it with the value "Hello, world!". It then uses the `strlen` function to determine the length of the string, and stores the result in an integer variable named `length`.

Next, the program declares a new string named `copy`, and uses the `strcpy` function to copy the contents of the `message` string to the `copy` string. It then uses the `strcat` function to append the string " Goodbye!" to the `copy` string.

Finally, the program uses the `strcmp` function to compare the `message` and `copy` strings, and stores the result in an integer variable named `result`. The program then prints the length of the `message` string, the contents of the `copy` string, and the result of the comparison.