



## How does sizeof() work for char\* (Pointer variables)? [duplicate]

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I have a C code:

```
char s1[20];
char *s = "fyc";
printf("%d %d\n", sizeof(s1), sizeof(s));
return 0;
```

It returns

20 8

I'm wondering how does the 8 come from, thanks!

C

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edited Jun 25 '13 at 13:30



[haccks](#)

86.7k • 20 • 130 • 221

asked Jun 25 '13 at 13:06



[cloudyFan](#)

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**marked** as duplicate by [alk](#), [Hasturkun](#), [Grijesh Chauhan](#), [Jens Gustedt](#), [interjay](#) Jun 25 '13 at 13:40

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What platform are you compiling on? – [Mgetz](#) Jun 25 '13 at 13:08

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`sizeof(s1)` is the size of the array in memory, in your case 20 chars each being 1 byte equals 20.

`sizeof(s)` is the size of the pointer. On different machines it can be a different size. On mine it's 4.

To test different type sizes on your machine you can just pass the type instead of a variable like `printf("%zu %zu\n", sizeof(char*), sizeof(char[20]));`.

It will print 4 and 20 respectively on a 32bit machine.

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edited May 15 '15 at 7:35

answered Jun 25 '13 at 13:09



[Nobilis](#)

5,380 • 21 • 49

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13

`sizeof` an array, on the other hand, outputs the size of the array, in this case,  $20 \times \text{sizeof}(\text{char}) = 20$

One more thing, you should use `%zu` for `size_t` type in `printf` format.

```
printf("%zu %zu\n", sizeof(s1), sizeof(s));
```

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[edited Jun 25 '13 at 13:16](#)

answered Jun 25 '13 at 13:09



Yu Hao

98.5k ● 22 ● 173 ● 225

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6



8 is the size of a pointer, an address. On 64 bit machine it has 8 bytes.

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answered Jun 25 '13 at 13:09



Adam Stelmaszczyk

15.6k ● 3 ● 54 ● 99

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5



The `sizeof` operator returns the size of a **type**. The operand of `sizeof` can either be *the parenthesized name of a type* or an *expression* but in any case, the size is determined from the type of the operand only.

`sizeof s1` is thus strictly equivalent to `sizeof (char[20])` and returns 20.

`sizeof s` is strictly equivalent to `sizeof (char*)` and returns the size of a pointer to `char` (64 bits in your case).

If you want the length of the C-string pointed by `s`, you could use `strlen(s)`.

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[edited Jun 25 '13 at 17:12](#)

answered Jun 25 '13 at 13:10



zakinstar

9,022 ● 1 ● 29 ● 49

`sizeof` can very well be used to evaluate the size of a **variable**: `char c[2]; printf("%uz", sizeof(c));` is correct C and returns 2. But probably it's just the wording you use, that made write this comment. – [alk](#) Jun 25 '13 at 14:41

1

@alk What I meant is that the `sizeof` operator is either applied to an *expression* or a parenthesized name of a type. when it's applied to an expression, it's the type inferred from this expression that is used by the compiler to determine the value of the `sizeof`. The fact that the expression is a variable or a literal is not relevant since it's only the type of the expression that is used, not the value. I will rephrase to make my point more clear. – [zakinstar](#) Jun 25 '13 at 16:38

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2



If you are on a 64 bit computer, the memory addresses are 64 bit, therefore a 64 bit (8 bytes x 8 bits per byte) numeric value must be used to represent the numeric pointer variable (`char*`).

In other words, `sizeof()` works the same way for pointers as for standard variables. You just need to take into account the target platform when using pointers.

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answered Jun 25 '13 at 13:13



Chris Hajduk

31 ● 3

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

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