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Passing variable number of arguments to a C++ function



Contributed by **SaswatPadhi** On 18th May, 2009

This is an article on *Passing variable number of arguments to a C++ function in C++*.

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Many of us might have wondered at sometime or the other about how to pass a **variable** number of arguments to C++ functions : something like a `printf` function. I don't know how many are aware of this, so I decided to post an article on this topic.

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Background

When a function is declared, the data-type and number of the passed arguments are usually fixed at compile time. But sometimes we require a function that is able to accept a variable number of arguments. The data-type and/or number of the passed arguments are provided at the run-time.

1
g+1

Through this article, I will try to show you how to create a C function that can accept a variable number of arguments.

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The secret to passing variable number and type of arguments is the `stdarg` library. It provides the `va_list` data-type, which can contain the list of arguments passed into a function.

The `stdarg` library also provides several macros : `var_arg`, `va_start`, and `va_end` that are useful for manipulating the argument-list.

Functions of the macros :

- (1) `va_start` is a macro used to initialize the argument list so that we can begin reading arguments from it. It takes two arguments : (a) the `va_list` object which stores the passed arguments, and (b) the last named argument, after which the number of arguments is variable.
- (2) `va_arg` is the macro used to read an argument from the list. It takes two parameters: (a) the `va_list` object we created, and (b) a data type. `va_arg` returns the next argument as this type.
- (3) `va_end` is a macro that cleans up our `va_list` object when we're done with it.

The code

I will clarify the concept with 2 examples.

Example 1 : A function accepts variable arguments of known data-type

(A simple average function, that takes variable number of arguments)

Code: C++

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```

float avg( int Count, ... )
{
    va_list Numbers;
    va_start(Numbers, Count);
    int Sum = 0;
    for(int i = 0; i < Count; ++i )
        Sum += va_arg(Numbers, int);
    va_end(Numbers);
    return (Sum/Count);
}

int main()
{
    float Average = avg(10, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9);
    printf("Average of first 10 whole numbers : %f\n", Average);
    return 0;
}

```

Output of the above code is :

Average of first 10 whole numbers : 4.000000

Example 2 : A function accepts variable arguments of unknown data-type

(A simple print function, that takes variable number and variable type of arguments)

Code: c++

```

{
    va_list Arguments;
    va_start(Arguments, Format);
    double FArg;
    int IArg;
    for(int i = 0; Format[i] != '\0'; ++i )
    {
        if (Format[i] == 'f')
        {
            FArg=va_arg(Arguments, double);
            printf("Caught a float : %.3lf\n",FArg);
        }
        else if (Format[i] == 'i')
        {
            IArg=va_arg(Arguments, int);
            printf("Caught an integer : %d\n",IArg);
        }
    }
    va_end(Arguments);
}

int main()

```

Output of the above code is :

Caught an integer : 1
 Caught an integer : 2
 Caught a float : 12.120
 Caught an integer : 3
 Caught an integer : 4

Hope this article will be useful to you.

Thanx for reading it ! 😊

Good bye and take care !

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**shabbir**

Go4Expert Founder



19May2009,08:39

#2

Here is a practical example of it

[OutputDebugString with variable number of arguments](#)

**shabbir**

Go4Expert Founder



3Jun2009,09:38

#3

Nomination this Article for [Article of the month - May 2009](#)

**debleena_doll2002**

Ambitious contributor

5Jun2009,21:49

#4

By any way map is based on tree only. so what is great in that you are returning as pointer only.

**SaswatPadhi**

~ БОЯИ ТО СОЗ ~



5Jun2009,22:10

#5

Can anyone kindly explain to me, what the above post means and how is it (if at all) related to my article ?! ???

PS: I searched for the words "map" and "tree" on this page and found one result each : obviously in the post above. ☹

**LenexFinlay**

Banned

11Jun2009,13:05

#6

unction arguments

Information may be passed to functions via the argument list, which is a comma-delimited list of expressions. PHP supports passing arguments by value (the default), [passing by reference](#), and [default argument values](#). [Variable-length argument lists](#) are also supported, see also the function references for [func_num_args\(\)](#), [func_get_arg\(\)](#), and [func_get_args\(\)](#) for more information.

Example #1 Passing arrays to functions

```
<?php
function takes_array($input)
{
    echo "$input[0] + $input[1] = ", $input[0]+$input[1];
}
?>
```

**SaswatPadhi**

~ БОЯИ ТО СОЗ ~



11Jun2009,13:13

#7

Passing arrays as arguments to functions and passing "variable number" of arguments are two **different** things.

But, in PHP also, we can pass variable number of arguments to a func. May be I'll write an article on it later.

**shabbir**

Go4Expert Founder



17Jun2009,18:56

#8

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**mayjune**

Invasive contributor



18Jun2009, 14:39

#9

awesome article....i wish they taught stuff like these in college...they teach you only what you already know...or you can know on your own with a little effort... sigh....

**SaswatPadhi**

~ БОЯИ ТО С08Э ~



18Jun2009, 17:06

#10

Quote:

Originally Posted by **mayjune**

awesome article....i wish they taught stuff like these in college...they teach you only what you already know...or you can know on your own with a little effort... sigh....

Glad that you liked it. You can just vote for it.

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