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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 Tweet 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.

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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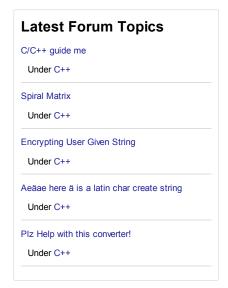
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```
float avg( int Count, ... )
{
    va_list Numbers;
    va_start(Numbers, Count);
    int Sum = 0;
    for(int i = 0; i < Count; ++i )
        Sum += va_arg(Numbers, int);
    va_end(Numbers);
    return (Sum/Count);
}
int main()
{
    float Average = avg(10, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9);
    printf("Average of first 10 whole numbers : %f\n", Average);
    return 0;
}</pre>
```

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 : %.31f\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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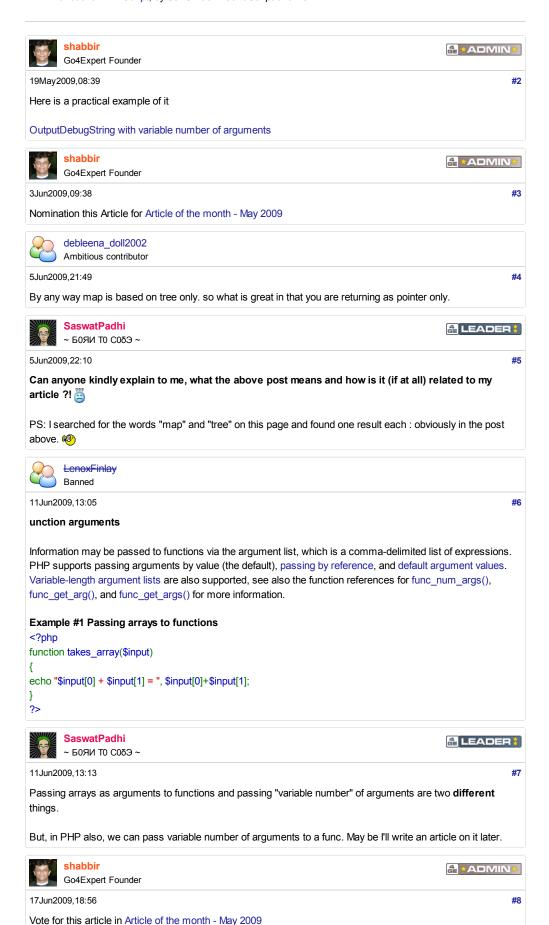
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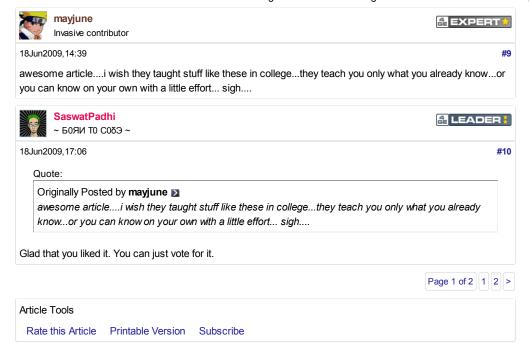
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