

Passing Command Line Arguments

If you are working in a command line environment such as UNIX, Linux, or the DOS prompt, it might be helpful to write programs that take arguments from the command line. For example, suppose we have a program called `sum`, which takes two numbers as command line arguments and displays their sum. We could enter the following command at the operating system prompt:

```
sum 12 16
```

The arguments, which are separated by a space, are 12 and 16. Because a C++ program starts its execution with function `main`, command line arguments are passed to `main`. Function `main` can be optionally written with two special parameters. These parameters are traditionally named `argc` and `argv`. The `argc` parameter is an `int`, and the `argv` parameter is an array of `char` pointers. Here is an example function header for `main`, using these two parameters:

```
int main(int argc, char *argv[])
```

The `argc` parameter contains the number of items that were typed on the command line, including the name of the program. For example, if the `sum` program described above is executed with the command `sum 12 16`, the `argc` parameter will contain 3.

As previously mentioned, the `argv` parameter is an array of `char` pointers. In the function header, the brackets are empty because `argv` is an external array of unknown size. The number that is stored in `argc`, however, will be the number of elements in the `argv` array. Each pointer in the `argv` array points to a C-string holding a command line argument. Once again, assume the `sum` program is executed with the command `sum 12 16`. The elements of the `argv` array will reference the items on the command line in the following manner:

```
argv[0] = "sum"  
argv[1] = "12"  
argv[2] = "16"
```

Before we look at the code for the `sum` program, let's look at Program L-1. It is a simple program that simply displays its command line arguments. (The program is named `argdemo.cpp`.)

Program L-1 (argdemo.cpp)

```
// This program demonstrates how to read
// command line arguments.
#include <iostream>
using namespace std;

int main(int argc, char *argv[])
{
    cout << "You entered " << (argc - 1)
    cout << " command line arguments.\n";
    if (argc > 1)
    {
        cout << "Here they are:\n";
        for (int count = 1; count < argc; count++)
            cout << argv[count] << endl;
    }
    return 0;
}
```

Example Session on a UNIX System with Example Input Shown In Bold

```
$ argdemo Hello World [Enter]
You entered 2 command line arguments.
Here they are:
Hello
World
$
```

Now, let's look at the code for the sum program.

Program L-2 (sum.cpp)

```
// This program takes two command line arguments,
// assumed to be numbers, and displays their sum.
#include <iostream>
#include <cmath>          // Needed for atof
using namespace std;

int main(int argc, char *argv[])
{
    double total = 0;

    if (argc > 1)
    {
        for (int count = 1; count < argc; count++)
            total += atof(argv[count]);
        cout << total << endl;
    }
    return 0;
}
```

Example Session on a UNIX System with Example Input Shown In Bold

```
$ sum 12 16 [Enter]  
28  
$ sum 1 2 3 4 5 [Enter]  
15  
$
```