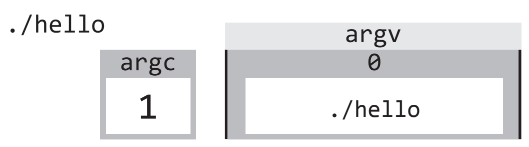
CS50 Command-Line Interaction

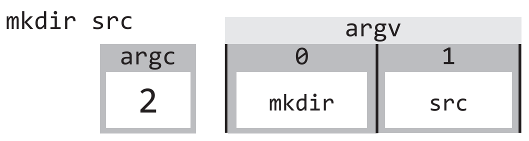
Overview

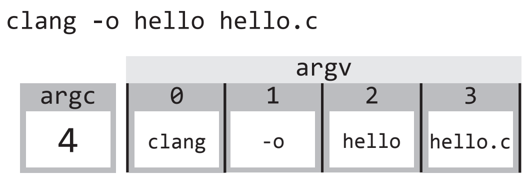
When running a program from the command line, you've generally executed a command like `./program_name` at the command line. C also allows you to specify a program's **command-line arguments**, which allows the person running the program to pass arguments into the `main` function of the program by specifying the arguments at the command line. This offers an alternative means of providing input to a program beyond just requesting input while a program is running, such as with `get_string()`.

Key Terms

- command-line arguments







argc, argv

Many of the command-line programs that you have likely called before (`make`, `cd`, `clang`, `mkdir`) all take command line arguments. In C, command line arguments are passed into the main function as inputs. However, we've previously written our `main` functions to take no arguments (`void`).

To accept command line arguments, we can revise the `main` function to take two arguments: `argc`, an integer, and `argv`, an array of `string`s.

`argc`, which stands for "argument count", represents the number of arguments passed into through the command line. Each word (separated by spaces) counts as its own argument, and the calling of the program itself (e.g. `./hello`) counts as an argument.

`argv`, which stands for "argument vector", is the actual array representing the arguments themselves. Each value in the array is a `string`.

If you were to look at `argc` and `argv` when calling a program with no arguments, like calling `./hello`, `argc` would be 1 (because the calling of the program is the only argument). `argv`, on the other hand, would be an array consisting of just one element: the string `"./hello"` stored at index `0`.

If you were to look at `argc` and `argv` when calling a program that does have arguments, like calling `mkdir src`, `argc` would be 2, since two arguments are passed in via the command line, and `argv` would be an array with two elements: the string `"mkdir"` stored at index `0`, and the string `"src"` stored at index `1`.

Using Command Line Arguments

Shown to the right is an example of a program which accepts command line arguments. Notice on line 4 that the definition of the `main` function has changed to include the arguments `argc` and `argv`. No size of `argv` is specified on line 4, so that any array, regardless of its size, can be passed into the `main` function.

Inside of `main` function, the program loops through the array, starting at index `0`, and incrementing so long as `i < argc`. It's important to stop there, because the largest index of `argv` that you can access is `argc - 1` (since arrays are zero-indexed). During each iteration, the program prints out the value of `argv` at index `i`.

The result of the program is that each of the program's command line arguments is printed on a new line.

```
 1  #include <cs50.h>
 2  #include <stdio.h>
 3
 4  int main(int argc, string argv[])
 5  {
 6      for (int i = 0; i < argc; i++)
 7      {
 8          printf("%s\n", argv[i]);
 9      }
10  }
```