More on Functions

9-24-2003

Opening Discussion

- Do you have any questions about the quiz?
- What did we talk about last class?

Local Variables, Arguments, and Scope

- A very important concept to understand when programming with functions is the scope of variables. This term is used to describe the section of a program over which a variable name can be used.
- Arguments to a function have a scope through the function.
- Variables in a function have scope in the block they are declared in.
- When a variable passes out of scope its value is generally lost.

Global Variables

❚ Variables can also be declared outside of any function. These variables are called global variables and have a scope through the entire program.

❚ Using global variables is considered poor programming practice because they can lead to fragile code. Global variables can be changed anywhere in the program which means anything can mess them up.

Static Variables

❚ C has a keyword called static that gives you some of the memory capabilities of global variables, without the downfall of being generally accessible.

❚ The value of a static variable is "remembered" between calls to a function but it can still only be used in that one function.

Pass by Value

❚ There are two types of "semantics" most programming languages use for passing arguments: pass by value and pass by reference. What we are looking at at this point is pass by value.

❚ When an argument is passed by value, the function gets a complete copy of the value and any changes are made to its personal copy. They don't impact the calling code at all.

The Stack

- One thing that can help in understanding local variable scope and pass by value is to understand the underlying mechanism, the stack, the computer uses.
- When a function call is made, the computer grabs just enough memory for storing what it needs on the stack. When it returns, that memory is freed and later function calls can use it.

More Coding

- So now we will write some code that displays some more uses of functions and the new concepts that we have talked about today. We can also look at some math functions that are handy to know about in case you need to do something bigger than addition or multiplication in your code.

Minute Essay

- Functions as we have described them with pass by value semantics have limitations. What might those limitations be?
- Next Monday there is a test. I'd like to have a review session before that. For me, Friday afternoon is probably the ideal time.