

Programming with Functions

PART II

August 1, 2010

Warm-Up! Question 1.

Program Heap and Stack

The Magic Behind the Compiler

Any sufficiently advanced technology is indistinguishable from magic.

Arthur C. Clarke's Third Law of Prediction

Simple	A simple example of the stack in action.
Automatic Variables	How the compiler keeps all those variable and parameter names straight.
Value and Reference	Call by value and call by reference examples.
Recursive Functions	An extreme case of compiler voodoo with variable names.
Predictable Garbage	GARBAGE != RANDOM, about $\frac{1}{4}$ of Internet security holes are due to this fact.

Storage Class & Scope

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Storage Class Describes where a variable is stored in application memory. Regions of memory include: the stack, the heap, and CPU registers.

Scope The “visibility” and lifetime of a variable at different points in a program’s code-path.

Variable Type		Lifetime	Scope
(auto)	Function Parameters	Transient	Local to { }
	Function Variables	Transient	Local to { }
Global Variables		Permanent	Global

Global Variables

Global Variables accessible by all the functions in a source file.

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Try question 2.

Practice, practice, practice, ...

Try questions 4–10.

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