

C â 6-Month Course

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What is C?

C is the language most operating systems, compilers and embedded devices are still written in. It gives you almost nothing for free â no garbage collector, no built-in strings, no safety net â which is exactly why learning it teaches you how memory, pointers and the machine underneath every other language actually work.

What you'll learn

- Understand pointers, the stack and the heap well enough to explain them, not just use them
- Implement core data structures â lists, stacks, trees â from scratch, with no library
- Manage memory manually without leaking it, and catch bugs with valgrind
- Read a Makefile and build a multi-file C project from the command line

6-month curriculum

Month 1: Foundations

Learn the syntax and the mental model C runs on.

- Variables, types and operators
- Control flow and functions
- Compiling with gcc
- Reading compiler errors

Month 2: Arrays & Strings

Work with raw data the way C actually represents it.

- Arrays and multi-dimensional arrays
- C strings and string.h
- Command-line arguments
- Scope and storage duration

Month 3: Pointers & Memory

The core skill C is taught for.

- Pointers and pointer arithmetic
- malloc, calloc, realloc, free
- structs and typedef
- Common memory bugs and how to spot them

Month 4: Data Structures

Build the structures other languages give you for free.

- Linked lists
- Stacks and queues
- Binary trees
- Testing your own data structures

Month 5: Systems Basics

Move from a single file to a real, buildable project.

- File I/O
- The preprocessor and macros
- Makefiles and multi-file projects
- Debugging with gdb and valgrind

Month 6: Capstone Project

Build something real with everything so far.

- Design a small CLI tool or interpreter
- Error handling without exceptions
- Memory-leak-free by design
- Ship and document the project