

Table of Contents

1. Introduction	1-1	Arguments and Locals	4-8
What You'll Learn	1-2	Global Variables	4-9
Survival Tips	1-3	Modules	4-10
Course Information	1-4		
Surfing the Web	1-5		
2. An Introduction to C	2-1	5. Arrays	5-1
Dissecting hello.c	2-2	Printing a Histogram	5-2
Computing the Sum from 1 to n	2-3	Dissecting hist.c	5-3
Dissecting sum.c	2-4	Multidimensional Arrays	5-4
Expression Evaluation	2-5	Printing a Stem-and-Leaf Plot	5-5
Another Example: Printing a Random Pattern	2-6	Dissecting stem.c	5-6
Dissecting pattern.c	2-7	Passing Arrays to Functions	5-7
For More Information	2-9	6. Strings	6-1
3. More About C	3-1	Printing Repeated Words	6-2
Types	3-2	Dissecting double.c	6-3
Constants	3-3	Implementing String Handling Functions	6-4
Variables	3-4	Arrays of Strings	6-5
Expressions	3-5	Dissecting shuffle.c	6-6
Precedence and Associativity	3-6	Command-Line Arguments	6-7
Assignments	3-7	Testing random()	6-8
Increment/Decrement	3-8	7. The TOY Machine	7-1
Idiomatic C	3-9	Inside the Box	7-2
Statements	3-10	Memory	7-3
Conditional Expressions	3-12	Basic Cycle	7-4
4. Functions and Modules	4-1	Digression: Number Systems	7-5
Computing ex	4-2	Conversions	7-6
Dissecting ex.c	4-4	Boolean Functions	7-7
Scope (a.k.a. Visibility)	4-6	Machine Arithmetic	7-8
		Two's-Complement Arithmetic	7-9

8. TOY Instructions	8-1	13. Structures	13-1
Format 1 Instructions	8-2	Fields	13-2
Format 2 Instructions	8-3	Arrays of Structures	13-3
Format 3 Instructions	8-4	Pointers to Structures	13-4
Jump Instructions	8-5	Typedefs	13-6
Example: Bit Twiddling	8-6	Putting it all Together: Card Shuffling Revisited	13-7
Example: Polynomial Evaluation	8-7		
9. Branches and Loops	9-1	14. Dynamic Memory Allocation	14-1
Example: Computing Fibonacci Numbers	9-3	Allocating Memory at Runtime	14-2
Manipulating Addresses, a.k.a. Pointers	9-4	Deallocating Memory	14-3
Function Linkages	9-6	Sizeof	14-4
Simulating TOY	9-8	Dynamic Arrays	14-6
		Dissecting sort2.c	14-7
		Common Errors	14-9
10. Recursion	10-1	15. Dynamic Data Structures	15-1
Divide and Conquer	10-2	Lists	15-2
Binary Search	10-3	List Headers	15-3
Number Conversion	10-4	A Simple List Module	15-4
Pitfalls	10-5	Implementing the List Module	15-5
Memo Functions	10-6	Sorting Revisited	15-7
Changing Recursion to Iteration	10-7	Other Kinds of Lists	15-8
11. Quicksort	11-1	16. Writing Efficient Programs	15-1
Partitioning	11-2	Use a Better Algorithm	15-2
Quicksort in Action	11-3	Searching	15-3
Implementing Recursive Functions	11-5	Cost of Binary Search	15-5
		Inserting Names	15-6
12. Pointers	12-1	insert in Action	15-7
Pointer Operations	12-2	Searching in Binary Trees	15-9
Indirection	12-3	Searching, cont'd	15-10
Pointers and Arrays	12-4	Printing Trees	15-11
Pointers and Array Parameters	12-5	Inserting in Binary Trees	15-12
Arrays of Pointers	12-7		
Common Errors	12-8		

17. Analysis of Algorithms 17-1

Sublist Sum Problem	17-2
A Simple Brute-Force Solution	17-3
Profiling	17-4
A Better Algorithm	17-5
Profiling the Better Algorithm	17-6
The Optimal Algorithm	17-7
Summary	17-8

18. Elementary Systems Programming 18-1

Compilation Pipeline	18-2
Linking	18-4
Loading	18-5
Assembly Language	18-6
Programming in TAL	18-7
Object Code	18-8
Linking	18-10
Loading	18-12
Separate Compilation	18-13

19. Compilers 19-1

Lexical Analysis	19-2
Syntax Analysis	19-3
Parsers	19-4
Code Generation	19-5
A Simple Compiler	19-6
Lexical Analysis	19-7
Parsing	19-8
Reverse Polish Notation	19-9
Code Generation	19-10
The Main Program	19-11

20. Operating Systems 20-1

Multiprogramming	20-2
------------------	------

Reentrant Programs	20-3
Virtual Memory	20-4
Paging	20-5
Size of Virtual Memory	20-7
File Systems	20-8
UNIX File System	20-9
File Layout	20-10
Typical Medium-Size File	20-11

21. Regular Expressions 21-1

egrep	21-2
Formal Languages	21-5
Finite State Automata	21-6
'Bounce' Filter	21-7
Simulating FSAs	21-8
FSAs Can't 'Count'	21-9

22. Hard Problems 22-1

The Traveling Skibum Problem	22-2
Unsolvable Problems	22-3
The Halting Problem	22-4
More Integers or Reals?	22-6
Implications	22-7

23. Viruses and Secret Messages 23-1

Infection Routes	23-2
Detecting Viruses	23-3
Fingerprints	23-4
Fingerprints on the Internet	23-5
Cryptography	23-6
Public-Key Cryptosystems	23-8
RSA Public-Key Cryptosystem	23-9
RSA Decryption	23-11
PGP	23-12