CSCI S-51
Introduction to Computer Science II
1999 Harvard Summer School
Syllabus

Dr. Robert L. Walton **June 28, 1999**

Note: This course is essentially the same as Harvard College course CS 51, and counts identically towards a Harvard degree. It is a bit more rigorous and compressed than CS 51. The introductory courses for computer science majors at Harvard are CS 50 (take CSCI S-111 in the summer school), CS 51 (take this course), and CS 121 (a theory course with no summer school equivalent). CSCI S-51 is a time-demanding course, and should not be co-scheduled with other time-demanding courses or activities.

Instructor: Dr. Robert L. Walton
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495-7929 (e-mail is much better)
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Assistant Instructor: Jason Carroll, jecarrol@fas.harvard.edu

Grader: Dennis Feehan, feehan@fas.harvard.edu

Lectures: 11am-12noon, Science Center 102b: see schedule.

Sections: 7:30-9pm, Science Center 116: see schedule.

Office Hours: Immediately after class or section by appointment made at the end of that class or section, or other times by e-mail appointment.

CSCI S-51 E-mail Help Line: lib51@fas for any instructor.

CSCI S-51 Web Page: `www.fas.harvard.edu/~lib51/summer99/`

Help for logging in, basic UNIX, editors, mailers; but NOT compilers, NOT programming languages, and NOT anything specific to CSCI S-51:

Science Center User Services, Room B-14, 495-9000

Week	Date	Lecture Topic	Assignment Section / Due
1	6/28	Introduction	
	6/29	Pure LISP, Arithmetic	0: Section
	6/30	Symbolic Data	0: UNIX Introduction
	7/1	Procedure Abstraction	1: Section
	7/2	Iteration and Macros	
2	7/5	Holiday	1: Recursion
	7/6	Symbolic Algebra	
	7/7	Rational Expression Algebra	
	7/8	Propositional Calculus	2: Section
	7/9	Game Search	
3	7/12	Search	2: Propositional Calculus
	7/13	Logic Programming	3: Section
	7/14	Computer Architecture	
	7/15	Intro to Assembly Language	
	7/16	Midterm Review	3: Search (long asst.)
4	7/19	Midterm	
	7/20	More Assembly Language	
	7/21	Calls and Tail Recursion	4: Section
	7/22	A Memory Allocator	
	7/23	RE's and NDFA's	4: Assembly Language
5	7/26	Intro to C++	5: Section
	7/27	More C++, Interpreters	
	7/28	Recursive Descent Parsing	5: NDFA's
	7/29	Compilation	6: Section
	7/30	DFA's and Lexical Analysis	
6	8/2	LISP Objects in C++	6: Recursive Descent Parsing
	8/3	Ditto	7: Section
	8/4	LISP Objects in Meta-Lisp	
	8/5	Meta-Lisp II	7: Lexical Scanning
	8/6	Meta-Lisp III	8: Section
7	8/9	Invited Lecture	
	8/10	Invited Lecture	8: LISP Evaluator
	8/11	Garbage Collection	9: Section
	8/12	Invited Lecture	
	8/13	Invited Lecture	9: Garbage Collection
7+	8/14	(Saturday)	
7++	8/15	(Sunday)	Late Assts ($\geq$20% Penalty)
8	8/16	Final Review	Final is Wed. 8/18, 9:15 AM

REQUIRED BOOK:

Graham, Paul   ANSI Common Lisp
Prentice-Hall 1996 (0-13-370875-6)

For learning COMMONLISP at the very beginning of the course.

HIGHLY RECOMMENDED BOOKS:

Hahn, Harley   Harley Hahn's Student's Guide to UNIX
McGraw Hill, 1996 (0-07-025492-3)

For learning what you need to know about UNIX. If you are not familiar with UNIX, buy this promptly.

Johnsonbaugh and Kalin   Object-Oriented Programming in C++
Prentice-Hall 1995 (0-02-360682-7)

For learning C++ right after the midterm exam. You only need this if you do not already have a good C++ book.

RECOMMENDED BOOKS ON LANGUAGES AND TOOLS:

Use these for reference or enlightenment; <u>not</u> required.

Bentley, Jon   Programming Pearls
Addison-Wesley 1986 (0-201-10331-1)

Gives examples of how to program intelligently.

Teale   C++ IOStreams Handbook
Addison-Wesley 1993 (0-201-59641-5)

Reference book on C++ I/O Streams.

Ellis and Stroustrup   The Annotated C++ Reference Manual
Addison-Wesley 1992 (0-201-51459-1)

Reference book on C++.

Kane and Heinrich   MIPS RISC Architecture
Prentice-Hall 1994 (0-13-590472-2)

Reference books on the MIPS Computer's Architecture.

Steele, Guy L. COMMON LISP: The Language
Digital Press 1984 (093237641X)

Reference book on COMMONLISP. There is also a second edition that includes many more features, but none used in this course.

Stroustrup, Bjarne The Design and Evolution of C++
Addison-Wesley 1994 (0-201-54330-3)

History of C++, and rationale for its features. Will probably become a classic.

Brooks, Jr., Frederick P. The Mythical Man-Month
Addison-Wesley 1995 (0-201-83595-9)

Classic book on the difficulties of writing large pieces of software.

OTHER BOOKS ON LANGUAGES AND TOOLS:

Just in case some of the above are not available; not required.

Wilensky, Robert COMMON LISPcraft
W.W. Norton & Co. 1986 (0-393-95544-3)

An alternative to Graham's book for learning COMMONLISP.

Lippman and Lajoie C++ Primer, 3rd edition
Addison-Wesley 1998 (0-201-82470-1)

An alternative to Johnsonbaugh and Kalin's book for learning C++.

Pohl, Ira C++ for C Programmers, 2nd edition
Benjamin-Cummings 1994 (0-8053-3159-X)

Another alternative to Johnsonbaugh and Kalin's book for learning C++.

Plauger, P. J. The Draft Standard C++ Library
Prentice-Hall 1995 (0-13-1117003-1)

Reference book for standard C++ libraries that are not generally available yet.

Stroustrup, Bjarne The C++ Programming Language, 2nd ed.
Addison-Wesley 1994 (0-201-53992-6)

Yet another alternative to Johnsonbaugh and Kalin's book for learning C++.

RECOMMENDED BOOKS ON SPECIAL TOPICS:

Text books for courses that follow this, plus a few reference books; not required.

Mitchell, John C. Foundations for Programming Languages
MIT Press 1996 (0-262-13321-0)

A text for both undergraduate and graduate courses on the theory of programming languages, with a good but advanced treatment of symbolic algebra in Chapter 3.

Pereira and Shieber Prolog and Natural Language Analysis
CLSI 1987 (0-937073-18-0)

An introduction to logic programming and its use in natural language understanding.

Russel and Norvig Artificial Intelligence
Prentice Hall 1995 (0-13-103805-2)

A text for courses on artificial intelligence. Includes first order logic and logical inference.

Roberts, Fred S. Applied Combinatorics
Prentice Hall 1984 (0-13-039313-4)

A text for courses on combinatoric mathematics for computer scientists. Includes discussion of the Fibonnaci and binomial coefficient functions.

Jones and Lins   Garbage Collection
John Wiley 1996 (0-471-94148-4)

Reference book that investigates garbage collecting in depth.

Cormen, Leiserson and Rivest   Introduction to Algorithms
MIT Press 1990 (0-262-03141-8)

A text for courses on algorithms such as sort.

Schneier, Bruce   Applied Cryptography
John Wiley 1996 (0-471-11709-9)

A comprehensive reference book on cryptography algorithms. Includes use of modulo arithmetic for public key encryption in Chapter 11 and Section 19.3.

Motwani and Raghavan   Randomized Algorithms
Cambridge University Press 1995 (0-521-47465-5)

A text for graduate courses on algorithms that use random numbers.