

HARVARD School of Engineering and Applied Sciences

### THE UNOFFICIAL GUIDE TO

# **COMPUTER SCIENCE** @ HARVARD

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### What is CS?

We like to say that CS teaches you how to think more methodically and how to solve problems more effectively. As such, its lessons are applicable well beyond the boundaries of CS itself.

But CS is also, more generally, the study of information. How do you represent it? With what methods (aka algorithms) can you process it?

Perhaps the most liberal answer, though, is that CS "has no exclusive domain of its own, and that its importance comes from the problems to which it is applied." And therein lies the excitement. CS empowers you with tools and ideas that can be applied to practically any domain of interest to you, both in college and beyond.

### What is CS not?

Contrary to popular belief, CS is not really about programming, even though you do learn how to program. Programming languages are tools that Computer Scientists use or create in order to solve problems of interest to them.

#### How do I minor in CS?

Take any four courses numbered 50 or higher. See page 8 for popular choices. See **Computer Science** under **Secondary Fields** in the Handbook for Students.

#### How do I concentrate in CS?

Take at least two of CS50, CS51, and CS61; take CS121 and another "theory" course; take four technical electives; and take Math 21a and 21b. See **Computer Science** under **Fields of Concentration** in the Handbook for Students.

# Can I switch from my current concentration to CS?

Yes, so long as you still have time to satisfy the requirements. Even David J. Malan '99, who now teaches CS50, didn't take his first CS course until his sophomore year, when he switched from Government to CS.

#### Does CS require a thesis?

No, not for non-Honors or Honors, but for High Honors and Highest Honors, it's ordinarily expected. See **Computer Science** under **Fields of Concentration** in the Handbook for Students.

#### Is a thesis just a big program?

Nope, a thesis is a research paper. You might end up writing one or more programs in order to evaluate your ideas, but those programs are ordinarily means to an end, not an end in themselves.

#### How do I graduate with Honors in CS?

Take six technical electives instead of four and have a concentration GPA in the top half of your class. See **Computer Science** under **Fields of Concentration** in the Handbook for Students.

#### How do I graduate with High Honors in CS?

High Honors are decided by faculty vote. You must ordinarily exhibit "superior performance in an ambitious set of advanced courses or an excellent thesis" to be considered. See **Computer Science** under **Fields of Concentration** in the Handbook for Students.

#### How do I graduate with Highest Honors in CS?

Highest Honors are awarded by faculty vote. You must ordinarily write an "outstanding thesis" to be

considered. See **Computer Science** under **Fields of Concentration** in the Handbook for Students.

### Is CS part of the Mind, Brain, and Behavior Program?

Yes. See **Computer Science** under **Fields of Concentration** in the Handbook for Students.

#### Do any CS courses count for Gen Ed?

Yes. To satisfy Empirical and Mathematical Reasoning, you can take CS1, CS50, CS171, or QR48. To satisfy Culture and Belief, you can take CS105. (Note that CS1 and EMR12 do not count toward a primary or secondary in CS.)

### Should I concentrate or minor in CS even if I don't want to be a programmer?

Yes! CS concentrators head off in all sorts of directions after graduation. See **Figure 1** for titles that alumni since 1984 now hold. See **Figure 2** for fields in which alumni since 1984 can now be found.



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Figure 2: Fields in which alumni since 1984 can now be found.

## Should I concentrate or minor in CS even if I don't want to work in tech?

Yes! CS empowers you to solve problems in all sorts of domains. Here's where alumni since 1984 can be found:

033 Asset Management · 2Wire Inc. · AAA Northern California, Nevada, Utah · Ab Initio Software Corporation · Accenture · Accel Partners · Accenture · Access Global Partners · Action Verb LLC · Active Endpoints, Inc. · Acumen Fund · AdNectar · Adobe Systems · Aegon · Agile Communications, Inc · Agilex Technologies · AIG · Akamai Technologies · Alliance Growth Equities · Alverno College · Amazon.com · Amdocs · American Express · Andera, Inc. · Angelo, Gordon · Apple, Inc. · AQR Capital Management · Aravo Solutions · AristoDigital · Asprova Corporation · AT Kearney Inc · Athenahealth, Inc. · Authoria, Inc. · Autodesk Inc · Autonomy · Bain Capital · Bainwood Huang & Associates · Barclays Capital · BBN Technologies · Beaver Lakefront Resort, Inc. · Bee North, LLC · Bellevue Hospital Center · Bessemer

Venture Partners · Big Tent Design · Bingham McCutchen · Blackhorse Asset Management · Bloomberg, LP · Blue Cross Blue Shield of North Carolina · BlueCrest Capital Management Ltd · Booz Allen Hamilton · Boston Consulting Group · Boston Harbor Ship Yard and Marina #F3 · Boston University · Briar Rose LLC · Bridgewater Associates · Bronto Software, Inc · Building Educated Leaders for Life · CA, Inc. · California State University - Hayward · Caltech · Cambridge Semantics · Cardozo School of Law · Carnegie Mellon University · Children's Hospital · Ciplex.com · Citigroup · ClearNow, Inc. · Clever Machine · Cliff Island Software · CNA Insurance · CoBu Technology · Code Red · Cognex Corp · Colorado Technical University - Kansas City · Columbia Presbyterian Hospital · Columbia University/Harlem Hospital Center · CommonMind LLC · Computational Models Inc · Computer Partners Inc · Congregation B'nai Torah · Contra Costa Community College District · Council on Spiritual Practices · Credit Suisse · Credit Suisse First Boston · CrossTech Group · CTB/ McGraw-Hill · Cuil · D. E. Shaw & Co. · Daiwa Securities America · Dangermarc Studios · Daniel's Jewelers ·

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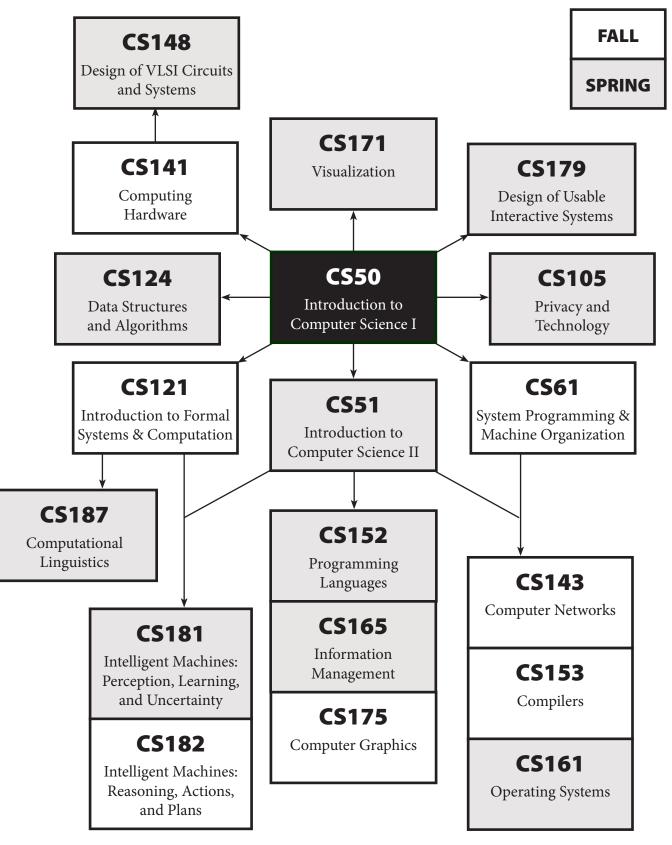


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#### What paths can I follow after CS50?

It's ultimately up to you, but here are some popular routes. Do consult the Courses of Instruction for official prerequisites.



# What courses should I take if I want to minor in CS?

It's up to you, but here are some popular choices. Graduate-level (200-level) courses are also allowed!

#### Popular among "those less comfortable"

- CS 50: Introduction to Computer Science I
- CS 105: Privacy and Technology
- CS 171: Visualization
- CS 179: Design of Usable Interactive Systems

#### Popular among "those more comfortable"

- CS 51: Introduction to Computer Science II
- CS 61: Systems Programming and Machine Organization
- CS 121: Introduction to Formal Systems and Computation
- CS 161: Operating Systems

#### Popular among students interested in finance

- CS 50: Introduction to Computer Science I
- CS 51: Introduction to Computer Science II
- CS 181: Intelligent Machines: Perception, Learning, and Uncertainty
- CS 182: Intelligent Machines: Reasoning, Actions, and Plans

#### Popular among students interested in life sciences

- CS 50: Introduction to Computer Science I
- CS 51: Introduction to Computer Science II
- CS 124: Data Structures and Algorithms
- CS 171: Visualization

#### Popular among students interested in math

- CS 50: Introduction to Computer Science I
- CS 51: Introduction to Computer Science II
- CS 121: Introduction to Formal Systems and Computation
- CS 124: Data Structures and Algorithms

### Popular among students who want to manage technical projects

- CS 50: Introduction to Computer Science I
- CS 105: Privacy and Technology

- CS 124: Data Structures and Algorithms
- CS 165: Information Management

### Popular among students interested in solving problems efficiently

- CS 50: Introduction to Computer Science I
- CS 51: Introduction to Computer Science II
- CS 121: Introduction to Formal Systems and Computation
- CS 124: Data Structures and Algorithms

#### Popular among students interested in hardware

- CS 50: Introduction to Computer Science I
- CS 61: Systems Programming and Machine Organization
- CS 141: Computing Hardware
- CS 148: Design of VLSI Circuits and Systems

### Popular among students interested in programming languages

- CS 51: Introduction to Computer Science II
- CS 61: Systems Programming and Machine Organization
- CS 152: Programming Languages
- CS 153: Compilers

#### Popular among students interested in networks

- CS 50: Introduction to Computer Science I
- CS 51: Introduction to Computer Science II
- CS 143: Computer Networks
- CS 144r: Networks Design Projects

#### Popular among students interested in graphics

- CS 50: Introduction to Computer Science I
- CS 51: Introduction to Computer Science II
- CS 171: Visualization
- CS 175: Computer Graphics

### Popular among students interested in speech recognition

- CS 50: Introduction to Computer Science I
- CS 51: Introduction to Computer Science II
- CS 182: Intelligent Machines: Reasoning, Actions, and Plans
- CS 187: Computational Linguistics