Boston University
College of Arts and Sciences
Computer Science Department

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CAS CS-101 (B1) / Fall 1997

Introduction to Computers

Tue & Thu: 3:30pm-5:00pm, Stone B-50

Overview:

CS-101 is a general introduction to computers and their applications that assumes no previous knowledge of the subject. CS-101 introduces computers and their uses in the arts and sciences – what they are, how they work, how they can be programmed, what they can and cannot do. My philosophy in teaching this section of CS-101 is to emphasize the basic concepts underlying computers and computation, and not just the know-how. This course is for people who read about such topics as VLSI or WWW and want to understand them, for people who need to have data processed on the job, and for people who see the computerization of our society and ask about the meaning of it all.

Instructor: Prof. Azer Bestavros

As the instructor for this course, and in addition to offering the class lectures, I am responsible for the selection of topics, preparation of homework assignments, preparation and administration of tests, and overall supervision of Teaching Fellow, Lab Tutors, and Graders.

- **Office:** MCS 276
- **Email:** best@bu.edu
- **Web:** http://www.cs.bu.edu/faculty/best
- **Phone:** 353-9726
- **Office Hours:** Tue 2:00pm–3:30pm & Wed 4:00pm–5:30pm, or by appointment

Teaching Fellow: Jaehee Yoon

The primary responsibilities of the Teaching Fellow (TF) are to run the discussion sections and to hold office hours to assist students in digesting the materials covered in the lectures and/or the discussion sections. In addition, the TF is responsible for the direct supervision of Graders.

- **Office:** TBA
- **Email:** jaeheey@cs.bu.edu
- **Web:** http://www.cs.bu.edu/students/grads/jaeheey
- **Phone:** TBA
- **Office Hours:** TBA

Lab Tutors:

Lab Tutors are Teaching Fellows that provide hands-on assistance to students in the CS Unix/Mac Teaching Labs (in the basement of the MCS building). Since Lab Tutors act as resources for the laboratory component of many sections/classes, their role is to help you with general questions about the software you will use in the lab; you should *not* expect them to help you with homework assignments. The Lab Tutors hours will be posted regularly in the CS Teaching Labs.

Required Textbook and On-Line Web Resources:

- [**CC**] *Computer Confluence,* by George Beekman, Addison Wesley Longman, 1997. This is the main (required) textbook for the class. It gives a clear, concise, and interesting overview of the history of computing, computer hardware and software, computer networks, and telecommunications, as well as illuminating discussions of many important issues that arise from living with computers. Included with the book is a CD that supplements the text with much helpful and informative multimedia material. An additional supplement to the text is the web site: http://www.aw.com/bc/cc, which provides unlimited opportunities to explore many of the text's topics in greater depth on the World Wide Web. This text is available at the BU Bookstore in Kenmore Square; it will be used throughout the semester. Make sure to buy the textbook ASAP. The bookstore often runs out of copies within few days of the start of the semester.
- [**WR**] *Web Resources.* A collection of on-line lecture notes and reading materials will be available from the Course Home Web Page. The materials on these Web Pages will complement the textbook and, thus, constitute an integral part of the required readings.

Optional References: You do not need to buy these!

- [**CU**] *Computing Unbound: Using Computers in the Arts and Sciences* by David A. Patterson, Denise S. Kiser, and D. Neel Smith, W. W. Norton & Company. This textbook offers a balanced introduction to computers with some emphasis on algorithmic thinking and programming.
- [**GI**] *Great Ideas in Computer Science* Second Edition by Alan W. Biermann, MIT Press 1997. This textbook offers a smooth introduction to Computer Science (not just computers). It places quite a bit of emphasis on algorithms for numeric and symbolic processing.
- [**IE**] *Internet Essentials,* Third Edition, by Patrick Clancy, Que E&T, 1997. This short text gives a number of detailed examples of connecting to the Internet, using email, downloading information, accessing and searching the World Wide Web, and using the Unix operating system. It may prove helpful with a number of homework exercises. This text is available at the BU Bookstore. Please be forewarned that the second edition of this text is quite different from the third edition.
- [**AM**] *Approaching the Macintosh: A guide to learning Macintosh software* by Tao, Berner, Elliott, Chu, Fernandez, Finkelstein, and Frost, Second Edition, Addison-Wesley.

Lectures:

- You are responsible for *all* the materials covered in the lectures **including any topics not** in the textbook.
- Class participation and questions are very welcome during the lectures. There is no such thing as a "stupid question". Failure to ask a simple question might result in the inability to follow the rest of the lecture.
- Up to 10 minutes at the beginning of every class will be devoted to answering questions related to topics discussed in previous lectures. This is a particularly good time to ask if you have questions.

Discussion Sections:

- Discussion sections are smaller classes conducted by the teaching fellow.
- You must register for one of the discussion sections (namely, B2, B3, B4, B5, B6, and B7) offered in conjunction with this course. The following is the time and place for CS-101(B1) section meetings:

Section	Time				Place
B2	Mon	10:00am	-	11:00am	B31
B3	Wed	1:00pm	-	2:00pm	B33
B4	Wed	4:00pm	-	5:00pm	B33
B5	Fri	12:00N	-	1:00pm	B31
B6	Tue	12:00N	-	1:00pm	B31
B7	Mon	4:00pm	-	5:00pm	B31

- In addition to answering your questions concerning topics covered in the lectures and/or addressed in the homework assignments, some new materials will be covered **only in the sections** (and not in the lectures).
- You are responsible for *all* the topics covered in the discussion sections. For more information, contact the teaching fellow.

Topical Overview:

The topics covered in lectures, discussion sections, reading materials, and homework assignments could be grouped into the following four broad categories.

Computer Anatomy *(5 lectures; 2 homeworks)***:** In this category, the focus will be on demystifying the manner in which computers operate through an understanding of the computer's basic building blocks, peripherals, and technologies.

Computer Software *(7 lectures; 2 homeworks)***:** In this category, the focus will be on understanding the concepts underlying the design and implementation of software systems with a particular emphasis on algorithmic thinking. A cursory introduction to programming languages and the software development cycle will be given.

Computer Applications *(4 lectures; 4 homeworks)***:** In this category, the focus will be on gaining a working knowledge of four of the most important computer applications, namely: (1) desktop publishing, (2) spreadsheet, (3) database, and (4) internet applications. The bulk of the work in this category will be done through hands-on homework assignments.

Computer Science *(7 lectures; 2 homeworks):* In this category, the focus will be on developing an appreciation for the "science" of computing. In particular, we will look at a small number of problems that illustrate fundamental (*i.e.* technology-independent) notions and concepts that are common to computing systems in general and to software systems in particular.

Relationship between Lectures, Sections, and Textbook:

- Much of the material covered in the lectures will complement the textbook material and the material covered in the discussion sections (*i.e.* the material necessary to tackle the laboratory assignments). For topics not covered adequately in the textbook [CC], I will be providing abridged on-line lecture notes on the World Wide Web. These notes will not necessarily be a complete transcript of the lectures and thus will not be enough to understand the topics covered in class. Therefore, you are advised not to miss the lectures!
- As explained above, the textbook and the lectures are complementary. While the textbook provides a somewhat broader (*i.e.* more introductory) treatment of the various topics, the lectures will attempt to provide a somewhat deeper treatment of *a small subset* of these same topics. For example, when examining modem communication, the textbook does not go into much depth regarding the difference between analog signals and digital signals. This treatment will be provided in the lectures. Other examples of in-depth coverage in the lectures include the treatment of binary number systems, the design and operation of computer arithmetic and logic circuitry, the notions of algorithm complexity, etc.
- The relationship between the discussion sections and the textbook and lectures is more straightforward. The discussion sections will be concerned with coverage (or review of) the material necessary to tackle the laboratory assignments and problem sets. While coverage of new "concepts" will be minimal in the discussion sections, coverage of "how to" for the various software packages and other system functionalities (*e.g.* UNIX walkthroughs, Macintosh GUI walkthroughs, etc.) that you have to master in the laboratory assignments will be covered in the discussion section (and not in the lectures).
- You are responsible for all topics/subjects covered in the lectures and discussion sections, in addition to the assigned readings from the textbook. And, since the topics covered in the lectures and discussion sections will (to a large extent) be complementary to the material in the textbook, reading and mastering the information in the textbook will not be enough to secure a good grade in this class.
- Finally, beware that the topics covered in the lectures and discussion sections of CS-101 (B1) as well as the homework assignments and tests are *very different* from those covered in other sections of CS-101 (taught by other instructors).

Places You Should Know About:

- Main Terminal Room in the basement of the MCS building: This room contains a large number of workstations from which you can log in to your CSA account. You will need to do this to read your CSA email, and to do the assignments for the Unix and internet parts of the course. This room is open 24 hours a day.
- Consulting Services Help Desk at the far end of the main terminal room (on the left as you start down the hallway): This is the place to go only with questions concerning the ACS computers and general Unix. They do not answer

questions about the Macintoshes, the CSA computer, your homework, or HTML. (For those questions, you must ask your teacher, your class teaching fellow, or the teaching fellow on duty in the CS lab.) Hours of operation for the Consulting Services Help Desk are posted on the door.

- The CS Mac Lab in MCS B28, on the right side down the hallway off the main terminal room: This lab has Macintosh computers, printers, and a TA (Terminal Assistant) who can answer questions about the Mac assignments. Hours of operation are posted on the door.
- The CS Terminal Room in MCS B24 adjacent to the Mac Lab: You will register for your computer account here, and you can also use the workstations in this room to read your CSA email and to do assignments for the UNIX and internet parts of the course. There is a TA in this room as well who can answer your questions. Hours of operation are posted on the door.
- The PC Support Center in MCS B19: This is where you should go with any questions or problems concerning a personal computer—either Macintosh or PC. In particular, you can find out how to get a PC "talking to" the BU computers via modem. Hours of operation are posted on the door.

Other Miscellaneous Issues:

- Owning a personal computer (a Macintosh or a PC) is **not required** for this class. However, if you do own one, then parts of the Lab Work required for this class can be done on your machine. You are encouraged to do so.
- Throughout the course, you will be working with ClarisWorks applications for word processing, drawing, painting, spreadsheets, and databases. All the personal computers in the CS Mac Lab have the ClarisWorks software installed. If you plan on using your own Mac or PC, then you need to have (or will need to purchase) ClarisWorks—or other similar software for word processing, "draw" graphics, "paint" graphics, spreadsheets, and databases.
- Please notice that we (the course staff) cannot promise any support for setting up your personal computer hardware or software. Please keep this in mind if you choose to use your personal computer to solve the problem sets.
- You will need two to three $3\frac{1}{2}$ inch Double-sided, High-density, floppy disks for your Macintosh Lab assignments. They must be either unformatted, formatted for Macintosh (if you plan to use your own Mac or one of the machines in the CS Mac Lab), or formatted for PC, if you plan to use your own PC. You can buy these at a number of stores—the nearest ones being University Computers (on Commonwealth Ave, just before the BU Bookstore), Campus Convenience (on Commonwealth Ave, next to Warren Towers) and Radio Shack (across Commonwealth Ave from Marsh Chapel).

Homework Assignments:

- Homework assignments constitute the heart of this course. It is only by doing the homework that you really learn the material. There will be approximately 9-10 homework assignments handed out throughout the semester. Homework Assignments will be worth 40% of the final grade.
- Homework assignments are designed to help you understand the materials covered in lectures, in sections, and in assigned readings. Most of the problems in the homework assignments will be hands-on exercises on the computer.
- Homework assignments will be fairly long, each taking an average of 3 to 4 hours to complete, although the time required will vary quite a bit from student to student and assignment to assignment. Always allow more time than you think you will need!
- Discussion sections are your chance to get help and hints on the homework assignments. They also offer an opportunity to ask questions in a smaller, more intimate setting than a huge lecture hall.
- Homework assignments will be handed out at the end of class meetings. Extra copies will be left in one of the handouts box, labeled "CS-101(B1) / Handouts", in the hall outside of MCS 137.
- Homework assignments are to be handed in using the slotted homework box, labeled "CS-101(B) / Homework Inbox", in the hall outside of MCS 137 by 5:00 pm on the day they are due. Even if late, do not hand in your homework in the class or during office hours. Do not hand in your homework by slipping them under the office door of the instructor or the TF.
- There will be a hefty penalty of 25% for a homework handed in one class late, and of 50% for a homework handed in two classes (*i.e.* one week) late. No homework will be accepted if late for more than one week. There will be **no** exceptions to this policy, other than for religious holidays and certified medical excuses. In such cases, extensions will be granted only if (and until) the homework solutions are posted (about 1 week after the original due date).
- Homework assignments will be graded and returned to you. Grades will not be changed, except in the case of a calculation or grading error. days (one week) late.

Exams:

- ◇ There will be **a midterm exam** on Tuesday, October 21^{st}, from 3:30pm to 5:00pm. This exam will be worth 20% of the final grade, and will cover the material presented from the beginning of the semester and until October 19, 1995.
- ◇ There will be a **final exam** on Friday, December 19^{th} from 12:30pm to 2:30pm. This exam will be worth 40% of the final grade, and will cover the material offered *throughout* the semester.
- ◇ Please mark the exam dates on your calendar (and remember them when you make your holiday travel plans!) There will be *absolutely* **no** make-up exams, except for medical emergencies. In that respect, I will not accept blue slips from Health Services; you must justify your medical problem with a letter from a doctor, specifying the period of time during which you were unable to attend one of the two exams.

Course Grade:

- ◇ The course grade will be broken down as follows:
  - **40%** Homework assignments
  - **20%** Midterm exam on 10/21/1997
  - **40%** Final exam on 12/19/1997
- ◇ There will be **no incompletes** in this course except for reasons of dire illness shortly before the end of the course, and only if a significant amount of work has been completed (*e.g.* attending lectures, handing in most homework assignments, and attending the midterm).

Academic Code of Conduct and Policy on Collaboration:

- ◇ In addition to the normal and well-understood strictures against cheating on exams, altering transcripts, and etc., there are other varieties of academic misconduct described in the Academic Conduct Code of Boston University which you must be aware of when working on assignments. The most relevant sections (B, F, and I) of the Academic Code for the assignments in this class are as follows:
  - *Plagiarism. Any attempt by a student to represent the work of another as his or her own. This includes copying the answer of another student on an examination or copying or substantially restating the work of another person or persons in any oral or written work without citing the appropriate source, and collaborating with someone else in an academic endeavor without acknowledging his or her contribution.*
  - *Knowingly allowing another student to represent your work as his or her own.*
  - *Submitting the same work in more than one course without the consent of the instructors involved.*
- ◇ There is nothing wrong in principle about discussing the topics covered in the course with your friends and colleagues. However, there are severe consequences to copying their solutions. Very soon you will find out that it is easy to copy solutions electronically from other people. This is nothing less than **plagiarism** and will be punished accordingly. Computers are double-edged swords. They make copying extremely easy, but they also make detecting such incidents possible! If you are caught cheating in a test or a homework, you will **automatically receive an F** and the matter may be reported to CAS Academic Conduct Committee, who recommends sanctions to the Dean of the College. Handing in your own assignment a day or two late will affect your grade *far less* than turning in a copy of someone else's work on time!

About the Instructor:

Azer Bestavros received his S.M. and Ph.D. degrees from Harvard University in 1988 and 1992, respectively. He is a Computer Science faculty member at Boston University, where he conducts research on Real-Time Computation and Communication Systems and on Large-Scale Networked Information Systems. Professor Bestavros has co-edited two books on real-time databases and has authored or co-authored in excess of 60 refereed technical publications. He is currently the editor-in-chief of the Newsletter of the IEEE-CS TC on Real-Time Systems and the PC Chair of the IEEE Real-Time Technology and Application Symposium. Professor Bestavros' course offerings include his popular Introduction to Computer Science course (CS-101), the introductory (CS-450) and advanced (CS-550 and CS-551) Computer Architecture courses, in addition to various seminars on Real-Time and Networked Information Systems. Prof. Bestavros is the Faculty Advisor of the ACM Student Chapter at BU. He is a member of BU's Center for Computational Science. He chairs the College's Natural Science Curriculum Committee and serves on the University's Educational Technologies Committee.

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Syllabus

Class	Topic	Readings
9/02	Apropos: Computer taxonomies, technologies, and generations	CC:1
9/04	Computer Anatomy: Hardware, Software, and Middleware	CC:2,3
9/09	Computer Software: Applications, Operating Systems, and User Interfaces	CC:4
9/11	Computer Software: UNIX/Mac Operating Systems and User Interfaces	WR
9/16	Computer Software: From bits and bytes to files and directories	WR
9/18	Computer Applications: Word Processing (Guest Lecturer)	CC:5
9/23	Computer Anatomy: The Internet and its protocols (SMTP, HTTP, FTP)	CC:9,10
9/25	Computer Applications: Email, Newsgroups, and the WWW	CC:9,10
9/30	Computer Software: Putting one's expertise into an algorithm	CC:11
10/02	Computer Software: From an algorithm to a program	CC:11
10/07	Computer Software: Case Study #1 — Algorithms for searching	WR
10/09	Computer Software: Case Study #2 — Algorithms for sorting	WR
10/16	Apropos: Conclusion and Review	
10/21	Midterm Exam in Stone B-50 (in class from 3:30pm to 5:00pm)	
10/23	Computer Applications: Calculation, Visualization, and Simulation	CC:6
10/28	Computer Anatomy: Information in the analog and digital worlds	WR
10/30	Computer Science: Binary number representation	WR
11/04	Computer Science: Computer arithmetic using 0's and 1's	WR
11/06	Computer Anatomy: From transistors to logic gates	WR
11/11	Computer Anatomy: From logic gates to adders and multipliers	WR
11/13	Computer Applications: Databases, information retrieval and data mining	CC:8
11/18	Computer Science: Concurrency and replication in distributed systems	WR
11/20	Computer Science: Complexity of algorithms and computability	WR
11/25	Computer Science: Zero-knowledge proofs and other fascinating topics	WR
12/02	Computer Science: Security through cryptography and authentication	WR & CC:15
12/04	Computer Science: Artificial Intelligence (Guest Lecturer/Movie)	CC:12
12/09	Apropos: Living with computers	CC:13,14,16
12/11	Course conclusion, evaluation, and review	
12/19	Final Exam in Stone B-50 (from 12:30pm to 2:30pm)	

** Changes to this schedule will be announced if need be.*