1 Introduction

This document provides class information for CS61c. It supplements the material presented during the first lecture (and available in the lecture slides), and the information supplied on the course webpage: www-inst.eecs.berkeley.edu/~cs61c/. See the course webpage for teaching assistant contact information and for the course calendar with lecture notes and all other course handouts.

The CS 61 series is an introduction to computer science, with particular emphasis on software and on machines from a programmer’s point of view. The first two courses considered programming at a high level of abstraction, introducing a range of programming paradigms and common techniques. This course, the last in the series, concentrates on machines and how they carry out the programs you write.

In CS 61C, we are concerned not so much with the process of writing a computer program, but rather with how the computer carries out a program. That is, the main topic in this course is the structure of a “logical machine”—not the actual electronic circuits, but the computational operations that those circuits carry out. To make these ideas concrete, you will study in some detail the machine language of a particular computer, the MIPS R2000 processor. In real life, you might never actually write a program in machine language, but for us it serves as a vehicle for teaching about computer architecture.

2 Instructor

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Office Hours: M,W 2-3

My office hours are primarily for short questions and administrative problems. I am happy to make appointments for longer periods of time if you feel you need it. Please don’t be shy; I would rather see you as soon as you don’t understand something than right before the exam. Please don’t ask about individual administrative problems in lecture; I need to be in my office to have access to our files.

3 Do You Belong Here?

CS 61B is a prerequisite for CS 61C, but can be waived if you have prior programming experience in the C, C++, or Java language. For our purposes in this course, C, C++, and Java are equivalent, because our emphasis here is on low-level operations.
4 Course Materials

We will be using the third edition of Patterson and Hennessy’s Computer Organization and Design book (“COD”). We won’t use the entire book, which goes into a lot of detail about hardware organization beyond the scope of 61C. The same text will also be useful to you in a later architecture course (CS 152). (Don’t get Computer Architecture: A Quantitative Approach by the same authors; it is intended for a graduate course!).

We are also requiring The C Programming Language (second edition) by Kernighan and Ritchie (“K&R”).

Course materials will also be posted on the class website: www-inst.eecs.berkeley.edu/~cs61c/.

5 Enrollment—Laboratory and Discussion Sections

In addition to the lectures Monday, Wednesday, and Friday, the course consists of a one hour discussion section and a two hour lab section per week, along with some additional unscheduled lab time. If you are enrolled, you have a scheduled lab section that meets in 271 Soda and a discussion section in a classroom. The discussion/lab sections are run by student Teaching Assistants (TA); each TA will handle enrollment for his sections. As you noticed, the lab and discussions sessions are linked; if you registered for a lab section you automatically got placed in the corresponding discussion section, or vis versa. This linkage in intentional, as we want you to meet with the same teaching assistant for both lab and discussion.

If you are not currently registered for the course (but presumably on the waitlist) you need to get registered in a lab and discussion section as soon as possible. We have opened up three new lab and discussion sections to accommodate everyone on the waitlist. If you can’t get into the sections that you desire, register for a different one, and then try to switch later (more on this topic below).

You must have a computer account on the 61C course facility. You must set up your account this week because that is how we know who is really in the class. Account forms will be distributed at your first lab session. If for some reason you don’t get an account form, see Sue DeVries or Cindy Palwick in 385 Soda to get your account. The first time you log in, you will be asked to type in your name and SID. Please follow the instructions carefully. You must get your account and log into it no later than 4pm Friday 1/20 so that we have an accurate class count.

Most of you have personal computers and may want to do the course work at home. This will be possible for some assignments but probably not for others, because of special software you’ll need (although, of course, you can connect to the lab computer from home). In any case, though, you must get a class account even if you intend never to use it.

If you are not currently registered for the course, you must add it using Tele-BEARS. If you are not a regular Berkeley undergraduate, then you probably need a signature on a form admitting you to the course. I expect that we will be able to admit all qualified applicants, we won’t be sure about this until after everyone has picked up class accounts. Therefore, we will not sign your add form until the second week of classes. Meanwhile, you should get your computer account and begin doing the course work on the assumption that you will be admitted. You should choose a lab and corresponding discussion section and start attending. Check on schedule.berkeley.edu for sections that have space. If you show up at a full section the TA will ask you to attend a different one.

Students sometimes ask whether section attendance is required or optional. Our expectation is that you will attend all class sessions, but you are adults and we are not going to police your attendance.
However, sections may discuss some details not covered in lecture, and there will be specific assigned work in the lab sections. Furthermore, your work in the lab must be checked off by your TA. The discussion and lab sections are your best opportunity to ask questions and learn interactively. Finally, it is in your interest for your TA to know who you are.

6 Human Resources

The instructors and the TAs who teach the discussion/lab sections are also available to answer questions. You may drop in during office hours, make appointments for other times, or communicate with us by electronic mail.

For technical questions about the homework or about the computer facility, or administrative questions such as missing homework grades, send electronic mail to your particular TA or reader. You can also send mail to the instructor about technical questions, but if it’s about grades we’ll just refer you to your TA.

There is an electronic bulletin board system that you can use to communicate with other 61C students. We expect that your will use the newsgroup regularly. For information on connecting to the newsgroup see inst.eecs.berkeley.edu/connecting.html#news.

Here are a few rules of general newsgroup etiquette: (1) Do not post messages in which you quote all of someone else’s long message and then add "Me too!" at the bottom. (2) Don’t be sarcastic. If you’re angry, wait until tomorrow to post your message. (3) Do not post or mail chain letters! You will certainly lose your Berkeley computer account.

Please do not send electronic mail to every student individually! Use the newsgroup instead.

Tutoring services are provided by Eta Kappa Nu (HKN), the EECS honors society, at 2-7346 or e-mail to hkn@hkn. They have an office in 345 Soda.

7 Computer Resources

The computing laboratory in 271 Soda consists of SunRay terminals connected to a server named nova.cs.berkeley.edu.

The lab in 271 Soda is normally open until 6:30pm, but you can get in after that with a cardkey. These will be available in a week or so after the class membership settles down.

If there are no free workstations, please feel free to ask anyone who is not doing course work to leave. In particular, game playing is not permitted. We are relying on social pressure to discourage abuse (such as stealing the chairs or monopolizing a workstation for six hours during prime time to play chess). Therefore, do not feel embarrassed to apply such pressure.

If you have a home computer, you may wish to use your class account remotely. You’re on your own for whatever connectivity software your computer requires.

8 Computer Community Spirit

If you live in a dorm or other concentrated student housing, you have already learned that any facility shared by a large group of people is fertile ground for practical jokes. You’ve also learned that selfishness in the use of common facilities can lead to a lot of bad feeling. Computers are no different. For
example, there is only a finite amount of file storage space. If you fill it up with digitized pictures of all
your friends, other people can’t get their homework done.

The form you sign when you get your computer account says that it is for your use only, and
for course work only. We are not unreasonably strict in enforcing this rule. Nobody minds if you
occasionally play a computer game late at night, if it’s the kind that doesn’t wreck the keyboards or
mice through repeated high-speed banging on one button. Nobody will object even if you occasionally
bring a friend to play the game with you, or if you write an occasional English paper on this facility
instead of the official English Department computers. But if you are asked to give up the terminal by
someone who wants to do course work and refuse, or if you get on the weekly list of “disk hogs” and
we find six other people’s files in your directory, that’s unacceptable. Remember, you and your fellow
students are the ones who suffer from such selfishness; the faculty and staff have other computers to
work on.

9 Homework and Programming Assignments

Parts of this course are still under development, so there may be some changes in the details that follow,
but here’s the plan as of now:

There will be 15 homework assignments during the term. (The first week’s is posted on the website
and is due next Wednesday). Each week’s assignment will be due Wednesday of the following week
at 5pm. The purpose of the homework is for you to learn the course material, not to prove that you
already know it. Therefore, the weekly homeworks are not graded on performance; you get full credit
(two points per week) for any reasonable effort, and half credit for some effort. There will also be
five longer assignments, called projects, involving C programming, assembly language programming,
circuit design, and CPU and Cache simulation. The projects are graded for correctness and clarity.
You may do the homework assignments in a group, however, everyone must turn in their own work.
Projects must be done entirely by yourself. All of the assignments and projects for the semester will be
posted online.

All homework assignments (and projects) will be submitted electronically as described in the assig-
ment handouts.

Start each assignment and project as early as possible! Also, please complete the reading assign-
ment for each lecture before the lecture. For example, you should read Chapters 1–4 of K&R before
the lecture of Monday, 1/23. Also, read Chapter 1 of P&H as soon as possible this week, and sections
3.1 and 3.2 (exclude Fig 3.1) of P&H before Friday of this week.

10 Recording of Lectures

Lectures will be webcast live, recorded and archived. Also, this semester we will be participating in a
pilot pod-casting program on campus. This service will start a couple of weeks into the semester and we
will have more information later. Our preference is that you attend lectures live so that you can interact
with the instructors and other students. However, we realize that you will have occasional scheduling
conflicts. Also, you might find it useful to view past lectures for review. See webcast.berkeley.edu and
follow the links to CS61c for more information on how to connect.
11 Lost and Found

When people bring us found items from lecture or lab, we take them to the CS office, 387 Soda. Another place to check for lost items is the campus police office in Sproul Hall.

12 Testing and Grading

The grading policy of the course has these goals: It should encourage you to do the course work and reward reasonable effort with reasonable grades; it should minimize competitiveness and grade pressure, so that you can focus instead on the intellectual content of the course; and it should minimize the time we spend arguing with students about their grades. To meet these goals, your course grade is computed using a point system with a total of 200 points:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
<th>Total</th>
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<tbody>
<tr>
<td>homeworks</td>
<td>15 * 2</td>
<td>30</td>
</tr>
<tr>
<td>labs</td>
<td>15 * 1</td>
<td>15</td>
</tr>
<tr>
<td>projects</td>
<td>5 * 10</td>
<td>50</td>
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<tr>
<td>midterms</td>
<td>2 * 30</td>
<td>60</td>
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<tr>
<td>final</td>
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<td>45</td>
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<td>TOTAL</td>
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The homeworks will be graded two points each for effort. Projects are graded 10 points each on correctness and clarity.

There will be two midterms (during the sixth and fourteenth weeks of the semester) and a final during the last week of classes. The exams will be open book, open notes. In the past, some students have complained about time pressure, so we’ll hold the midterm exams in the evening (at 7pm) instead of during the lecture hour. Our goal will be to write one-hour tests, but you’ll have two hours to work on them. In general, tests concentrate on the material that has been covered up to and including the week before the test. In this course, the later topics depend on the early ones, so you mustn’t forget things after each test is over!

A score of 180 or more is an A+; 175 is A; 170 is A−; and so on down by steps of 5, to 125 points for a D−. This grading formula implies that there is no curve; your grade will depend only on how well you, and not on how well everyone else does. (If everyone does exceptionally badly on some exam, we may decide the exam was at fault rather than the students, in which case we’ll adjust the grade cutoffs as we deem appropriate. But we won’t adjust in the other direction; if everyone gets an A, that’s great.)

If you believe we have misgraded an exam, return it to your TA with a note explaining your complaint. Only if you are unable to reach an agreement with the TA should you bring the test to us. (Of course we want to be fair about correcting actual errors in the grading of your test. But you’ll probably find us less sympathetic about pleas for greater partial credit for wrong answers.) By University policy, final exams may not be regraded. They may be viewed at times and places to be announced.

Incomplete grades will be granted only for dire medical or personal emergencies that cause you to miss the final, and only if your work up to that point has been satisfactory.
13 Cheating

Since the textbook exercises are largely the same from one semester to the next in this course, you may be tempted to turn in the official published solutions collected by a friend who’s already taken the course. Don’t do it. Not only would that be dishonest, but also, *doing the homework is the main way you learn in this course*. Read the published solutions *after* you struggle with each problem yourself. If you find yourself in a position where you are unable to complete the homework, we prefer that rather than copying the solution or turning in someone else’s work, that you turn in nothing and take a zero on that assignment.

We hope that you will work cooperatively with your friends *before* the exams to help each other prepare by learning the ideas and skills in the course, however during the test and for projects you’re on your own. The EECS Department Policy on Academic Dishonesty says, “Copying all or part of another person’s work, or using reference materials not specifically allowed, are forms of cheating and will not be tolerated.” (61C tests are open-book, so reference materials are okay.)

In our experience, nobody begins the semester with the intention of cheating. Students who cheat do so because they fall behind gradually, and then panic at the last minute. Some students get into this situation because they are afraid of an unpleasant conversation with an instructor if they admit to not understanding something. We would much rather deal with your misunderstanding *early* than deal with its consequences later. Even if the problem is that you spent the weekend in a drunken orgy instead of doing your homework, please overcome your guilt feelings and ask for help as soon as you need it.

Because you will be submitting all your work (except for exams) electronically, it is easy for us to run software that checks your solutions to those of other students and other semesters. The software we use is fairly sophisticated in its ability to catch copying. For instance, simply changing variable names in a program will still get caught. In fact, usually the effort that you must take to fool the checking software would be more than just completing the assignment in the first place.

If we find that you have cheated on a homework assignment, you will receive a −4 on that assignment. If we catch you cheating on an exam or project you will receive a zero, or depending on the circumstances, an F in the course. For repeated instances of cheating we will refer you to the Office of Student Judicial Affairs.

14 Lateness

A project that is not turned in by the deadline may be turned in, up to two days late. These late projects will count for 2/3 of the earned score. No credit will be given for late homeworks, or for projects turned in after two days from the deadline. Please do not beg and plead for exceptions. If some personal crisis disrupts your schedule one week, don’t waste your time and ours by trying to fake it; just be sure you do the next week’s work on time.

By the way, if you wait until the last minute to do the project, you will probably experience both a shortage of available workstations and unusually slow computer response.

15 Switching Sections

If you would like to switch to a different lab or discussion section, you need to do so by your lab session of the second week of classes. Keep in mind that lab sections and discussion sections are linked. So
if you are going to make a change you will need to change both your lab and your discussion section. (Again, the reason that the two are linked is so that you have the same TA for both lab and discussion).

There are two ways that you can switch to a different section. During the first week of classes, you can use telebears to check for space in the sections of your choice. Space may have opened up since last you looked as someone else may have moved out. If space is available, you should switch using telebears. Your other option is to find someone from the sections of your choice to move out to make room for you. They might be willing to trade directly with you, or perhaps you can arrange a multi-way switch. In any case, it is up to you to negotiate the trade. Probably the easiest way to set up an exchange is to post to the newgroup. Once you find a person to trade with (or multiple people, in the case of a multi-way trade), you need to notify all the affected TAs (either by email or in person).

### 16 Questions and Answers

**Q:** I am registered for this course, and I’m planning to do the homework on my home computer. Do I still have to pick up a class account and log in by Friday to stay in the class?

**A:** Yes.

**Q:** I am a transfer student, and I’m pressed for time to fit in all my graduation requirements. I know how to program in assembler. Do I really have to take 61C?

**A:** Probably. 61C covers many topics not currently covered in Community College. However, if you took a similar course at a four year university, you have covered the correct set of topics. Mike Clancy, in 779 Soda, is in charge of approving substitution of courses taken elsewhere.

**Q:** I’m not registered How do I know which discussion/lab section to attend?

**A:** Your need to register as soon as possible. Space is still available in sections. If you can’t get into the one of your choice, you might be able to switch later.

**Q:** I need my extension form signed this week in order to satisfy my employer, or my school, or somebody. Can’t you let me in early?

**A:** We’re sorry, but we have to get an accurate class count first. Most likely, if you are qualified, you will be allowed in but we are not permitted to accept extension students (except through the Reentry Program) until all regularly enrolled undergraduates are in.

**Q:** What’s your advice on surviving this course?

**A:** Two things: Do the reading and assignments early, and ask for help as soon as you don’t understand something.

**Q:** I got the Nobel prize last year, and my uncle is Chancellor of Berkeley. Do I still have to use my class account by Friday to stay in the class?

**A:** Yes.
Q: I am disabled and need special facilities or arrangements to do the course work. What should I do about it?

A: If you need special arrangements about class attendance, taking tests, etc., we will be glad to accommodate you; please take the initiative about letting us know what you need. For example, if you want to take tests separately, that’s fine, as long as you ensure that we’ve worked out the arrangements before the test. The Disabled Students Program (ext. 2-0518) has voice response terminals from which blind students can connect to our computers. **If English is not your native language,** and you have trouble understanding the course materials or lectures for that reason, please ask for help about that too.

Q: I don’t like (or have a conflict with) my pre-assigned discussion/lab section. Can I switch?

A: Yes, but read the section above on switching sections.

Q: What should we call you?

A: If you would like to be formal, “Professor” is fine (as most people don’t remember how to pronounce my last name.). “John” is perfectly OK with me.