CS 100
Computational Thinking
Fall 2012

Welcome!

You have used computers your whole life. Mostly you don't even think about it. Computers are in your phone, your iPod, your Kindle, your TV, your car (it has several, unless it's an antique) and on and on. Most devices with an on/off switch contain computers. And they continue to be more widely used — planes can fly without pilots, vehicles can park themselves and help the driver avoid collisions, social media like Facebook and Twitter add features every month that allow new forms of interaction.

That list probably contains no surprises for you — it describes how the world is. You're doing just fine with today's technology. Luckily, this class isn't about how the world is. The world will change. ***This class is about what you need to know for the world that hasn't yet arrived, and which you will help create — regardless of your chosen major or intended career.***

What does this course offer you?

In this course, you will gain the basic level of understanding of computers and computation that we think ***all*** college graduates should have — to be prepared to create the future. In the last century, competence was defined by the three Rs: reading, writing and arithmetic. They were required to pursue a professional career in ***any*** discipline. This is the 21st century, and it's clear that computing is an inescapable part not only of our professional work, but also of our society. So think of understanding and skills of computing as a fourth 'R', necessary for any discipline. ***After this class, you will have many of the skills you need to be prepared to work with new technologies of the future.***

How are you going to accomplish this?

By learning to control the computer through a simple programming language, you will develop skills that will enable you to deal with general issues on the computer — in any area.

Why do you have to "learn to program", when you may never program again in your life? Programming is actually the ***simplest way to deal with a computer, and to understand what it is doing***. In comparison, other applications you use (Photoshop, Word, Facebook, Picasa, etc.) are much more complex. We want you to start with a simpler model, one more in your control, to gain the basic understanding of how computers work. Then, in

the future, no matter what new application you use, you can apply that knowledge to figure it out and make it work for you.

OK, but what exactly does that mean?

Here are some of the things you will be able to do after completing this course:

- Explain how computer programmers analyze problems and develop algorithms to solve them
- Develop your own algorithms to solve problems
- Express algorithms in a programming language so they can be executed on a computer
- Analyze computer programs to explain how they work and find and correct errors
- Use abstraction to manage complexity in programming and problem solving
- Analyze the beneficial and harmful effects of computing in our society
- Describe the limitations of computational tools and techniques
- Communicate clearly and effectively about technical topics

How does this course work?

Learning computing isn't done by reading about it. Also, one of the most critical parts of this course is development of your ***analysis and communication skills*** regarding computing. Those skills are even more important than being able to "just do it". For each topic, you will be able to get practice and feedback in the following ways:

- Exploratory homework: As we introduce each topic, you will complete an exploratory homework that guides you in understanding that topic by playing around on the computer to get the basics down.
- Lab sessions: Each week, you will attend a lab session that builds on the concepts you learned in the exploratory homework. We will be there to help you with any problems that might come up. You can also work on the lab assignments on your own, either before or after the lab session.
- Quizzes: At the beginning of lecture, you will take a quiz answering a few basic questions from the concepts you learned in the homework and lab assignments.
- Discussion Clicker Questions: During lecture, you will deepen your understanding of computing concepts and develop technical analysis and communication skills by discussing challenging questions in a group of three or four students.

There will also be a course project (your choice of either a paper or a more complex Alice program), and regular postings and discussion on current technology developments,

and how those might affect our lives. I'll give you more details about those things in a few weeks.

Grading

Your course grade will be calculated (approximately) as follows:

Quizzes and clicker questions (in class)	15%
Lab assignments	20%
Technology and society blog postings	10%
Course project	15%
Midterm exam	20%
Final exam	20%

Details and course policies

The in-class quizzes and discussion questions will require that you have an i>clicker remote (the standard SDSU clicker system). You will need to bring your clicker to class every day (except when we are meeting in the lab). Be sure to put your name on the clicker; it is also recommended that you cover the ID number with a piece of clear tape to keep it from rubbing off. I recommend that you keep an extra set of batteries for your clicker (two AAA).

In order to earn credit, you will need to register your clicker for this class. To do this, go to the home page for our class on Blackboard. Click on the "Tools" item in the menu on the left, and then on the link that says "register Your i>clicker Remote ID". You can find further information and resources at http://clicker.sdsu.edu.

Be sure to register your clicker on the SDSU site, *not* at www.iclicker.com (no matter what the instructions on the box say).

Do not use any other student's clicker, and do not ask anyone else to use yours. (This would be considered a violation of academic integrity, much like cheating on an exam.)

It is OK to talk with other students about the exploratory homework and the lab assignments — that can be part of the learning process for everyone involved. However, when you submit a lab assignment, it is important to be sure that you understand everything you are submitting and are able to answer questions about it if necessary.

The textbook for this class is *Learning to Program with Alice* (3rd edition), by Dann, Cooper, and Pausch. You will be making very frequent use of the textbook in all lab sessions, and some classroom sessions. It is important to bring the book with you every day. Because of the way you will be using the textbook in class, it will not be practical to share a book with another student.