

COMPUTER SCIENCE 1: STARTING COMPUTING CSCI 1300



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Gupta
Spring 2018
Lecture 1



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Where were the computers then?



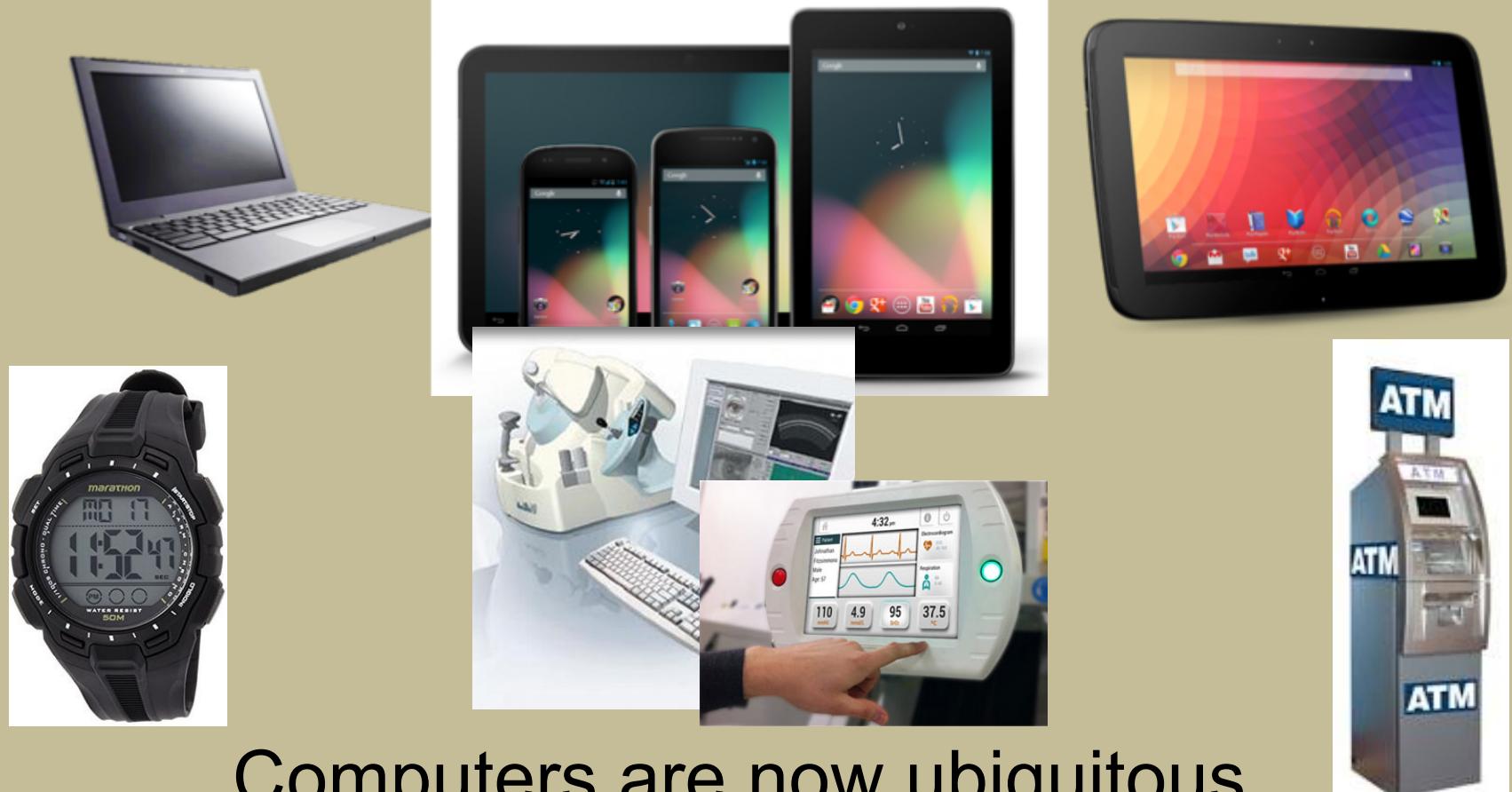
- A single computer for all of campus
- Housed in its own building on east campus



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Where are the computers now?



Computers are now ubiquitous



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Computer Scientists are working collaboratively in most fields



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What is Computer Science?

- What is Computer Science trying to understand?
 - Computers?
“Computers are to CS what telescopes are to astronomy” – E. Dijkstra
 - Computer programs?
- Roots: math, engineering, cognitive science, ...
- What can be computed?
 - design, analysis and experimentation
 - networking, HCI, AI, machine learning, ...
 - automation of tasks, improving existing solutions



What is Computer Science?

- the study of the principles and use of computers
- a discipline that spans theory and practice. It requires thinking both in abstract terms and in concrete terms
- uses computational technology to solve problems
- makes computers do new things or accomplish tasks more efficiently



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Computational Thinking is used in many fields of study

A problem-solving process that includes
(but is not limited to) the following characteristics:

- Formulating problems in a way that enables the use a computer to help solve them
- Logically organizing and analyzing data



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Computational Thinking is used in many fields of study

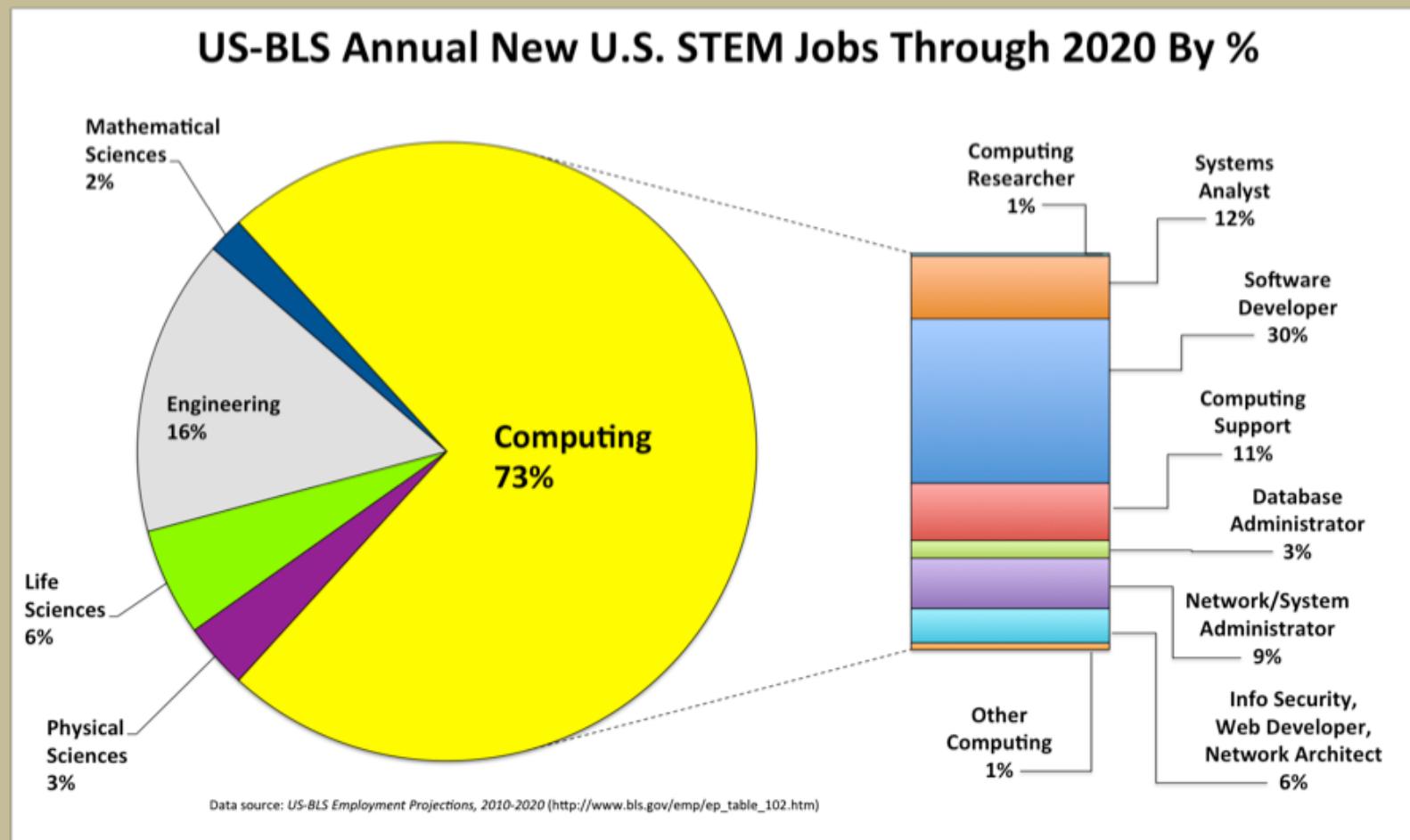
Computational Thinking Concept	Subject Area Application
Break a problem into parts or steps	Literature: Break down the analysis of a poem into analysis of meter, rhyme, imagery, structure, tone, diction, and meaning.
Recognize and find patterns or trends	Economics: Find cycle patterns in the rise and drop of the country's economy.
Develop instructions to solve a problem or steps for a task	Culinary Arts: Write a recipe for others to use.
Generalize patterns and trends into rules, principles, or insights	Mathematics: Figure out the rules for factoring 2nd-order polynomials Chemistry: Determine the rules for chemical bonding and interactions.



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What computer jobs are going to be available in 2020?



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What is a computer program?

- sequence of instructions: tell computer what to do.
 - Unambiguous
 - Terminating

“I saw the man in the park with the telescope”

- human, natural language not suitable for describing algorithms
- Programming languages – exact and unambiguous
 - precise form (*syntax*) and meaning (*semantics*)



What is Computer Programming?

- The art of communicating with a computer
 - Learning its languages
 - C++
 - Python
- Writing useful, maintainable, and extensible source code which can be interpreted by a computing system to perform a meaningful task
- Learned SKILL – everyone can do it



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Computer Programming is a Learned SKILL



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Computer Programming is a Learned SKILL Practice is what makes a Professional



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If you are apprehensive about programming, form a study group

- Today programming is a collaborative task
- Share your knowledge, ask questions
- Your classmates are your allies, not your competitors



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What if you just want to learn a little bit of computer programming (or you are locked out of this course)

CSCI 1200: The Art of Computational Thinking

Teaches computational thinking and techniques for writing computer programs using the Python programming language. The course is intended for students who realize that obtaining computational skills is beneficial to all fields of study, but who have little or no experience in programming or are not Computer Science majors. Students will be expected to create computer programs to solve problems in a range of disciplines.

Note: CSCI 1200 does not count toward Computer Science credit requirements for the Computer Science B.A., B.S., or minor

CSCI 1320: Intro Progr. Engineers (Matlab, C++)



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Which Introduction CS Course Should I Take?

Common learning objectives for either course:

- Computational Thinking techniques for decomposition and abstraction (breaking a problem down into solvable parts, creating solutions for a set of related problems)
- Algorithm Design (expressed in pseudo code, finding the most efficient way to solve a problem)
- Syntax and Semantics for a programming language (how to instruct a computer to perform a task)
- Procedural Coding (defining a sequence of instructions to solve a task, creating functions/subroutines to solve specific task within the total solution, use of branching and iteration to handle multiple sets of data, reading and writing data files, object oriented design and programming)
- Debugging techniques (making the computer do what you wanted instead of what you told it to do, techniques to determine why your program does what it does and ways to fix it)



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Which Introduction CS Course Should I Take?

CSCI-1200

- Python
- **1 - 50 minute lecture per week**
- **1 - 100 minute lab per week**
- **3 units with 8-10 hours** of coursework per week expected outside of lecture/lab
- Learn the basics to read, analyze, and visualize data
- Non-major course

CSCI-1300

- C++ and Python
- **3 - 50 minute lectures per week**
- **1 - 75 minute lab per week**
- **4 units with 12-15 hours** of coursework per week expected outside of lecture/lab
- CS major. Prepares you to succeed in CS-2 and other higher level CS courses



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Why care about programming skills?

Where High Tech is Going:

- The world has changed:
 - Cheap infrastructure => low entry price
 - Coding can be done anywhere in the world
 - Result: Global competition
- Two paths to win:
 - Be the cheapest among equals (not likely in the US)
 - Provide unbeatable value (combination of leading-edge knowledge and strong skills)

You don't want to position yourself anywhere in between.

Strong skills need to be developed early!



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Administrative Details

Course syllabus on Moodle

<http://moodle.cs.colorado.edu/>

CSCI 1300 – Fleming/Gupta - CS 1: Starting Computing Spring 2018

Enrollment key: **1300fg**

Dr. Ioana Fleming - ioana.fleming@colorado.edu Office Location: ECOT 735

Vipra Gupta – vipra.gupta@colorado.edu Office Location: ECOT 524

Office Hours: posted on Moodle – Office Hours Calendar
or by appointment

Recitation:

Weekly, mandatory 75 minute lab with recitation activity.

Ask questions about assignments and get extra help.

Office hours:

Homework and topic help from TAs, CAs, and me.

GO! Seriously, GO! *Just make sure you GO prepared.*

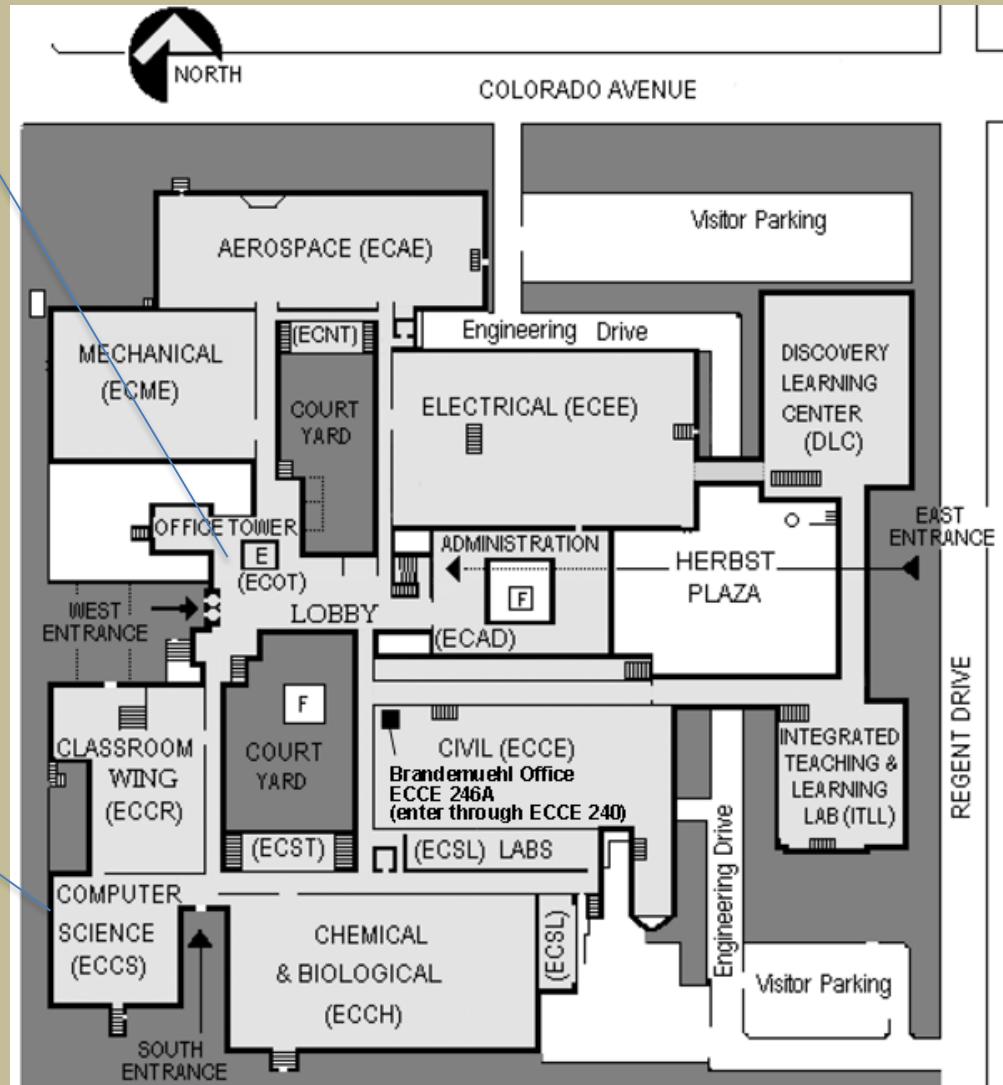


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Math
Building

Elevators to
the 7th Floor
to find CS
Department.
Some OH
rooms on the
8th floor

Area where
some CA and
TA office hours
will be held



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Access:

<https://moodle.cs.colorado.edu>

Moodle



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CU Login Name

Identikit Password

Check this box to view your [Digital ID Card](#) and reset release approvals before logging into the service. [Learn More...](#)

Continue

Trouble signing in? [We can help.](#)

To ensure you end your session with Federated Identity Service, you will need to quit your web browser when you are finished. Leaving your browser open may make you more vulnerable to another user gaining access through your account.

Note: Due to the nature of this authentication page loading dynamically per service, **DO NOT** bookmark the URL in your browser's address bar. Instead, bookmark the service URL (e.g. <https://voicethread.colorado.edu> or <https://qualtrics.colorado.edu>).

University of Colorado Boulder
Office of Information Technology
IT Service Center | 303-735-HELP(4357)

Moodle

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Dashboard / My courses / Spring 2018 / CSCI1300-S18



Piazza - Help Forum



What makes a good forum post?



Which Intro CS Course Should I Take?



Office Hours Calendar



Syllabus



Tentative Schedule

All correspondence for this course must be through Piazza.

Piazza allows you to post question to everyone (peers, CAs, TAs, Instructor) and also send private messages to instructor or TA.



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Getting Help outside of Lectures

- See Office Hours calendar on Moodle (Tas, Cas, instructors)
- Course Assistants (CAs)
 - Undergrads who took this class and love programming
 - CSEL Support in the Engineering Center (1B50)
help.cs@colorado.edu
- BOLD Center, in the Engineering Center
- A word of hiring a tutor



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Due this week

- Recitation 1
 - Create an account on the Moodle
 - <http://moodle.cs.colorado.edu/>
 - Enrollment key: 1300fg
 - Get set up with Cloud9
 - c9.io
 - Submit Moodle exercise
- Read the syllabus on Moodle.
 - Post your questions or concerns to me or your TA via Piazza
- Meet other students in your class / recitation to start a study group



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Syllabus

- Let's review the Syllabus

Information in the Syllabus you are responsible for knowing

- PRACTICUM POLICY
- ASSIGNMENTS AND LATE SUBMISSION POLICY
- ATTENDANCE POLICY
- CLASSROOM BEHAVIOR
- COLLABORATION POLICY & HONOR CODE
- DISCRIMINATION AND HARASSMENT
- DISABILITY ACCOMMODATIONS
- RELIGIOUS OBSERVANCES
- SEXUAL MISCONDUCT, DISCRIMINATION, HARASSMENT AND/OR RELATED RETALIATION



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Students of Concern Team

<https://www.colorado.edu/studentaffairs/student-concern>



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Programming takes Time and Effort, BUT mostly PERSISTANCE

- Your code is wrong most of the time and needs to be fixed
- You will constantly fail to correctly instruct the computer to perform a task
- You must continually lookup how to write the simplest of commands
- But, with repetition you will begin to avoid the simple mistakes and begin to create larger ones



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A final word on programming

- This class should be all beginners
- Programming takes practice...
don't give up
- Everyone who already has
programming experience, please
be helpful to your classmates
- Work together to solve problems
- When it works, it's magical
(I still think so after many years
in this field)



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Questions?



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