CS O Courses
Computer Science Courses

- **CS 1**
  - First CS course at the college level (designed for CS majors)
  - AP CS

- **CS 0**
  - Before the first CS course
  - Proposed AP CS Principles

- **Useful, but not central to CS**
  - Typing ("keyboarding"), using Microsoft Office, or designing graphics
  - Using/driving a car vs. designing a car (maybe a self-driving car!)
CS Principles
- Started with support from National Science Foundation (NSF)

ECS (Exploring CS)
- Started in Los Angeles (LA) Unified School District

Other “programming-centric” courses, but not at the AP CS level
Terminology (just in case)

- **Computer hardware**
  - Tangible electronic components

- **Computer software**
  - (Intangible) instructions for the hardware
  - Written by humans in a “programming language” (e.g. C, C++, Java)
  - Programming refers to writing software/programs
CS Principles

- An alternative first CS course in college (for any majors)
- Being designed in collaboration with College Board
  - AP CS Principles
  - Being led by a commission of 10 teachers and professors
- csprinciples.org
Timeline (from CE 21 meeting)

- **2009-10**
  - Big Ideas, Practices, Claims/Evidence [relatively high-level concepts]
- **2010-11**
  - Pilot I: 5 colleges
- **2011-12**
  - Pilot II: 10+ colleges, 10+ high schools
- **2012-13**
  - Pilot III
- **2013-**
  - Develop concrete AP course and exam, professional development
- **2015-16 (?)**
  - First AP course and exam
By May 2011, 82 colleges have attested to “my college’s intent for use of the proposed AP Computer Science Principles Exam by awarding college credit and/or placement within our program.” They include:

- Carnegie Mellon
- Georgia Tech
- Princeton
- Stanford
- UC Berkeley
- and Florida Tech 😊

More than College Board required at that time
Big Ideas in CS Principles (from College Board)

- **Creativity**: Computing is a creative activity.
- **Abstraction**: Abstraction reduces information and detail to facilitate focus on relevant concepts.
- **Data**: Data and information facilitate the creation of knowledge.
- **Algorithms**: Algorithms are used to develop and express solutions to computational problems.
- **Programming**: Programming enables problem solving, human expression, and creation of knowledge.
- **Internet**: The Internet pervades modern computing.
- **Impact**: Computing has global impacts.
Still flexible for now

- The Big Ideas are quite general

- The pilot sites show how those Big Ideas can be taught

- You could be a pioneer for the next AP course/exam!
Pilot Sites

- http://www.csprinciples.org/home/pilot-sites
Beauty and Joy of Computing

UC BERKELEY
CS Principles Pilot at UC Berkeley

• **Beauty and Joy of Computing (BJC)**
  - bjc.berkeley.edu
  - Rigorous CS concepts are covered
  - One approach to teaching CS Principles
  - Professional development for teachers (more later)
CS 10 offered at Berkeley

- inst.eecs.berkeley.edu/~cs10
- Lectures: video’s are posted
- Textbook: “Blown to Bits” and reading materials are online
- Software: BYOB (a more sophisticated version of Scratch)
- All resources are free!
BJC: Professional Development (Summer 2012 & 13)

- ~20 teachers, university hub, CSTA chapter
- 1 week in-person: tools and hard programming ideas
- 4 weeks of online course: CS 10
- 1 week in-person: exam, HS adaptation
- Monthly support: via local CSTA chapter

- Completing 6 weeks: $1,000 stipend and 200 hours of continuing education credit
- Additional $1,000 for teaching the course
Exploring CS (ECS)

LA UNIFIED DISTRICT
Exploring CS (ECS)

- [http://www.exploringcs.org/](http://www.exploringcs.org/)
- Started in 2008 in Los Angeles Unified School District (LAUSD) to improve diversity in CS
- 300+ students in 2008-09 to 2,100+ in 2011-12

- “implementation plans and/or discussions are underway in Oakland, San Diego, San Jose, Oregon, Chicago, and Georgia.”
ECS Curriculum

- 288-page curriculum
- lesson plans, exercises, scoring rubric
- **Human Computer Interaction**: major components of the computer
- **Problem Solving**: basic steps in algorithmic problem-solving
- **Web Design**: creation of Web pages, programs, and documentation for users and equipment.
- **Programming**: design algorithms and programming solutions
- **Computing and Data Analysis**: managing and interpreting data
- **Robotics**: build and program a robot to perform a required task
ECS: Professional Development

- [http://www.exploringcs.org/teacher-support](http://www.exploringcs.org/teacher-support)
- Beginning ECS Teachers participate in a week-long summer Institute prior to implementation to introduce the instructional philosophy of curriculum, units 1-3 and the first part of unit 4.
- Quarterly Saturday workshops during academic year to focus on Units 4, 5, & 6.
- ECS Coaches who visit teachers’ classrooms and provide individualized support.
- Advanced ECS teachers week-long summer Institute with deepened focus on inquiry-based instruction, culturally relevant pedagogy, assessment, and equity.
CS Principles vs Exploring CS

- **Goal**
  - CSP: a college-level course intended to be an AP course
  - ECS: a high-school course to improve diversity & participation in CS
  - Both can be used as pre-AP CS

- **Adoption**
  - CSP: 10+ pilot schools nationwide
  - ECS: 20+ schools in LA

- **Curriculum**
  - CSP: general goals, details are under development and piloting
  - ECS: 280+ pages with lesson plans

- **Initial Progress**
  - CSP: slower--stakeholders nationwide to agree (faster once it’s AP)
  - ECS: faster—schools in one district (slowly spreading to others)
Other Programming-centric courses
Introduction to Programming (in Brevard)

- West Shore (Maria Hedrick)
  - Speaking later in the day
- Bayside
- Edgewood
- ... ?
- Florida Virtual School
Computer Programming I @ Florida Virtual School

- [http://www.flvs.net/areas/flvsCourses/Pages/Course%20Catalog/CourseListing.aspx?CourseID=755](http://www.flvs.net/areas/flvsCourses/Pages/Course%20Catalog/CourseListing.aspx?CourseID=755)

- Python--controlling the motion and sensory capabilities of a robot.
- Java--manipulating graphics, images, and audio.
- Prerequisites: Algebra I, Geometry
Important Note

- A full CS course would be nice
- If not, incorporating some CS materials into existing courses might be appropriate
Questions?