CS Principles: computing for everyone

Discussion facilitated by Owen Astrachan, Amy Briggs, Lien Diaz, and Brook Osborne

CE21, 15 January 2013
who we are

Owen Astrachan, Duke University, PI
Amy Briggs, Middlebury College, co-PI
Lien Diaz, College Board, co-PI
Brook Osborne, Duke University, pilot and outreach coordinator
outline of talk

• who, when, and how we got here
• where we are going and how we’re getting there
• course and assessment
• questions
how did we get here and where are we going?

forever - 2009:
10 + 30 + community

2009 - now:
item writing group, community

2013 and beyond:
advisory board, development committee, community
where are we going?

advisory board

provide input related to psychometrics, the portfolio assessment, and broadening participation

development committee

develop and curate all aspects of the course, from assessment to course materials
how did we get here and where are we going?

### Pilot Timeline

<table>
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<tr>
<th>Curriculum Framework Developed</th>
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<tr>
<td>pilot 1, 5 universities</td>
<td>pilot 2, 9 universities</td>
<td>pilot 3, 2 universities</td>
<td>40+ partner schools</td>
<td>40+ partner schools</td>
<td>portfolio development and refinement</td>
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- **Development of Curriculum Frameworks**
  - 2009: CE21, 15 January 2013
  - Online At: CSPRinciples.org

- **Pilots**
  - Pilot 1, 5 universities (2009)
  - Pilot 2, 9 universities (2010)
  - Pilot 3, 2 universities (2011)
  - 40+ partner schools (2012)
  - 40+ partner schools (2013)

- **Evaluation**
  - Project evaluation (2014)

- **Assessment**
  - Portfolio development and refinement (2015)
  - Portfolio and prototype test administration (2016)
  - Prototype test administration (2017)
where are we going?
course and assessment development timeline

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<th>2013</th>
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where are we going?

course and assessment development timeline

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CE21, 15 January 2013

Online At: CSPrinciples.org
how did we get here?

pilots I, II, III

- extremely important components of how we got here
- five schools from advisory board/commission in pilot I
- eighteen (10 high schools, 8 universities/colleges) in pilot II
- six (4 high schools, 2 universities) in pilot III
- evolution of learning objectives and assessment
where are we going?

phase 2 pilots (2013-16)

- 40-50 supported partner schools (75-80% high schools) using the portfolio in 2013-14 AND 2014-15
- continue to refine and test portfolio assessment, working towards an operational AP course and assessment
criteria for phase 2 pilots

what we’re looking for

- recruitment plan, potential for broadening participation
- attend two meetings per year, ongoing CoP activities
- potential for success in administering portfolio assessment
- capacity and potential to deliver course
- syllabus mapped to learning objectives
criteria for phase 2 pilots

goinging involved

check csprinciples.org and watch for a call via the AP teacher community, CSTA and the SIGCSE mailing lists, and other related sites.
making this AP ongoing work, 2013-15

- develop audit process
- produce instructional and professional development (pd) materials
- conduct teacher pd
- develop AP assessment
prototype assessment

documents available to the community

annotated copies of the prototype free response questions (2011-12) and portfolio task descriptions (2012-13) are now available on csprinciples.org
where are we going?

AP assessment roll out

a planned assessment combining traditional fixed-response questions and a set of portfolio tasks.

this planned assessment will be administered as a computer-based assessment. this opens the door for a distributed grading process.
In June of 2011 a conference titled “Information: Making Sense of the Deluge” used the quote below to express the purpose of the conference:

The world now contains unimaginably vast amounts of digital information, which is growing exponentially. The era of big data presents incredible opportunities --- smarter cities, stronger companies, faster medicine --- but just as many challenges. Storage is scarce, systems overloaded and governments and businesses know too much. Managed well, data can be used to unlock new sources of economic value, provide fresh insights into science and hold governments to account. Managed poorly, it can cause great harm.

Using this quote as a starting point provide two examples of what are referred to as “incredible opportunities” that can arise from big data, and two examples of how big data can “cause great harm”, as mentioned at the end of the quote.
free response question (’11-’12) the internet

The Internet Protocol (IP) and the Domain Name System (DNS) are two important components of the Internet and the World Wide Web. Write a short response to each of the two questions below. You should take a few minutes to plan and outline your answer for each of the two questions.

(A) The Internet Protocol IPv4 was in widespread use from 1980-2012. There is a more recent protocol named IPv6 now used more frequently than in the past. With IPv6 128 bits specify an IP address whereas 32 bits specify an address using IPv4. IPv6 also includes support for Internet security that is not present in IPv4. Describe two examples for why the change in the number of bits per address is necessary and two examples for why security is necessary in the new, more recent IPv6 protocol compared to the IPv4 protocol.

(B) The Domain Name System or DNS translates human-readable addresses or hostnames like www.whitehouse.gov to IP addresses like 208.77.55.42 (IPv4) or 2001:db5:1f67::998:de4:7457:6d5 (IPv6). Describe one reason that DNS is useful for a person using a web browser to find information. Describe one characteristic of DNS that demonstrates your knowledge of how DNS is hierarchical.
Choose two of the following four questions and write a brief response. High scores will be earned only by responses that explore both benefits and risks, demonstrate knowledge of the Internet, provide a credible argument rather than simply listing facts, and that use appropriate computing terminology.

1. Browser cookies are an example of a computing technology that has privacy implications. Identify and explain one associated privacy benefit and one risk to individuals or society that stem from the use of browser cookies or another use of the Internet that has privacy implications.

2. Firewalls are an example of a computing technology that has security implications. Identify and explain one potential benefit and one associated risk to individual or societal security that come as a result of the use of firewalls or another aspect of the Internet that has security implications.

3. Broadband Internet access is an example of a computing technology that has economic implications. Identify and explain one associated benefit and one risk to individual or societal economics that develop from the use of broadband Internet access or another aspect of the Internet that has economic implications.

4. YouTube® is an example of a computing technology that has cultural implications. Identify and explain one associated benefit and one associated risk to individual or societal culture that derive from the use of YouTube or another use of the Internet that has cultural implications.
the journey to an assessment

portfolio

the first version of the CS Principles portfolio assessment was completed in December 2012. Development and refinement of the portfolio tasks and rubrics will continue each year leading up to the first offering of the scored AP assessment in 2016-2017. These tasks are a work in progress, and should not be interpreted as a representation of what will appear on the actual AP assessment.
students will submit executable programs in any language. With a partner, students will select a domain or area for all of the programs to be submitted, with a subset of that work being completed in collaboration with another student. Task submissions will include a reflective explanation of the programs and discussion of collaboration.
students will submit a written report that demonstrates in-depth research, analysis, and synthesis around a significant, contemporary problem and potential solution that are connected by computing and the internet to a societal, economic, or cultural context.

current events will play a major role in students’ selection of a specific topic.
students will submit a collaboratively developed analysis of a publicly available data set chosen by the students. The artifact communicates an investigation of data that meets one of the following objectives: gaining insight and knowledge, resolving doubt, or solving a problem. The questions posed by student groups must require computing to formulate an answer.
the journey to an assessment portfolio: what have we learned?

we’re going to use these tasks again, but that requires reworking based on instructor feedback.
where are we going?

scaling up the community

how do we translate weekly calls with < 10 people into a model that works with 1,000 or even 10,000 people?

enter CoP
alignment is key

a metaphor
alignment is key

as a group we will go further, get there faster, and the journey will be more efficient if we work together.

CSP, ECS, PLTW, CAS, APCS A, CSTA...