Computer Science Principles
PANEL

RU4CS
August 18, 2014
Panel- CSP Pilot Instructors

- Fran Trees (Rutgers University): CSP Overview and Curriculum Framework
- Eric Allatta (Academy for Software Engineering – NYC): PT Create
- Brian Fuschetto (Lyndhurst High School): Tools for Collaboration
- Chinma Uche (Greater Hartford Academy of Mathematics and Science): Resources
- Barbara Froehlich (East Orange STEM Academy): Recruitment

The presenters will elaborate on this introduction!
The curriculum provides a pathway for students, especially females and underrepresented minorities, to consider studies in computing.

The curriculum is engaging requiring students to be creative and consider impacts of technology on society.

Though programming is one of the big ideas, it is not a programming-centric course.

The curriculum focuses on computational thinking and fluency – based on research and input from college faculty.
Computational Thinking practices (skills)

Big Ideas – major content areas of study in the course

Enduring Understandings – Important concepts central for the course

Learning Objectives – targets for measuring learning

Essential Knowledge – statements specifying the boundaries of the curriculum
AP Computer Science Principles Curriculum Framework
Enduring Understandings and Learning Objectives

- **1.1 Computing fosters the creation of artifacts.**
  *Learning Objectives for 1.1:*
  - 1.1.1 Use computing tools and techniques to create artifacts. [P2]
  - 1.1.2 Collaborate in the creation of computational artifacts. [P6]
  - 1.1.3 Analyze computational artifacts. [P4]

- **1.2 Computing fosters creative expression.**
  *Learning Objective for 1.2:*
  - 1.2.1 Use computing tools and techniques for creative expression. [P2]

- **1.3 Programming is a creative process.**
  *Learning Objective for 1.3:*
  - 1.3.1 Use programming as a creative tool. [P2]
AP CSP Curriculum Framework Components

**Computational Thinking Practices**
Identified skills that capture important aspects of studying AP Computer Science Principles.

**Big Ideas**
Overarching themes for the course.

**Enduring Understandings**
Core concepts that students will retain from their learning experiences.

**Learning Objectives and Essential Knowledge**
Statements about what students will know and be able to do by the end of the course.

*All AP® Exam questions are based on Learning Objectives.*
Exclusion Statements

- **Exclusion statements** are included in various locations of the framework. These statements provide further clarity about the scope of a particular learning objective or essential knowledge statement. They specify content that will not be assessed on the exam because it is outside the scope of the course.
<table>
<thead>
<tr>
<th>Enduring Understandings</th>
<th>Learning Objectives (What students must be able to do)</th>
<th>Essential Knowledge (What students need to know)</th>
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</thead>
<tbody>
<tr>
<td>4.2 Algorithms can solve many but not all computational problems.</td>
<td>4.2.1 Explain the difference between algorithms that run in a reasonable time and those that do not run in a reasonable time. [P1]</td>
<td>4.2.1A Many problems can be solved in a reasonable time. 4.2.1B Reasonable time means that as the input size grows, the number of steps the algorithm takes is proportional to the square (or cube, fourth power, fifth power, etc.) of the size of the input. 4.2.1C Some problems cannot be solved in a reasonable time, even for small input sizes. 4.2.1D Some problems can be solved but not in a reasonable time. In these cases, heuristic approaches may be helpful to find solutions in reasonable time.</td>
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<tr>
<td></td>
<td>Exclusion Statement (LO 4.2.1): Any discussion of nondeterministic polynomial (NP) is beyond the scope of this course and the AP Exam.</td>
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<td>4.2.2 Explain the difference between solvable and unsolvable problems in computer science. [P1]</td>
<td>4.2.2A A heuristic is a technique that may allow us to find an approximate solution when typical methods fail to find an exact solution. 4.2.2B Heuristics may be helpful for finding an approximate solution more quickly when exact methods are too slow. 4.2.2C Some optimization problems such as “find the best” or “find the smallest” cannot be solved in a reasonable time, but approximations to the optimal solution can. 4.2.2D Some problems cannot be solved using any algorithm.</td>
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<td>Exclusion Statement (LO 4.2.2): Determining whether a given problem is solvable or unsolvable is beyond the scope of this course and the AP Exam.</td>
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<td>Exclusion Statement (4.2.2B): Specific heuristic solutions are beyond the scope of this course and the AP Exam.</td>
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AP Computer Science Principles Assessment
NEW! AP® Computer Science Principles Course and Exam

AP Computer Science Principles Assessment – Two Components

1. **The AP Computer Science Principles Exam** – short answers…comparable to other AP Exam MC section.

2. **The through-course assessment** – AP Computer Science Principles Performance Tasks
   - Designed to assess AP CSP learning objectives requiring students to collaborate in the development of computational artifacts (including programs)
     - Explore
     - Create
   - **Students will receive one AP score**
AP Computer Science Principles Performance Tasks

Create – Applications from Ideas

For this performance task, students are required to:

- work as a team to develop a program together and answer questions about it.
  - The team should consist of two students; however, a single group of three is allowed to accommodate an odd number of students in the class.

- work alone to write an individual program, and answer questions about your individual program and about the collaboration between you and your partner.
AP Computer Science Principles Performance Tasks

Explore – Impact of Computing Innovations

For this performance task, students are required to:

- work alone while completing the task.
- choose an innovation that has a significant effect on some population. The effect could be a small effect on more than a hundred people, or a very large effect on a smaller number of people.
Who is teaching CS Principles today?
AP Course Audit

- Teachers will have to submit a syllabus for the AP Course Audit
- AP Course Audit Resources will include
  - Curricular Requirements
  - Syllabus Development Guidelines
  - Sample Syllabi
How does this REALLY work in the classroom?

Our Pilot Instructors (and their resources):

- Eric
  - Website: [https://sites.google.com/a/afsenyc.org/google-apps-demo-main/home](https://sites.google.com/a/afsenyc.org/google-apps-demo-main/home)
  - Video: [https://plus.google.com/hangouts/onair/watch?hl=en-us&d=r&hid=hoaevent/cmtrlgd9kc7t3kr4bgmpiqqlj10&ytl=M4JFWieaQ0Q](https://plus.google.com/hangouts/onair/watch?hl=en-us&d=r&hid=hoaevent/cmtrlgd9kc7t3kr4bgmpiqqlj10&ytl=M4JFWieaQ0Q)
- Brian (Utilizing Moodle Forums and Blogs in CPS)
- Chinma (NSF-sponsored CPS Projects)
- Barbara (Teaching the CS Principles course and recruitment)