Overview for today

- CSNYC → CS4All NYC
  - Software Engineering Program
  - Teacher education efforts
- CSforAll Consortium
- Q&A
A short timeline of CS in NYC

- Before 2012: not much!
- Fall 2012: Academy for Software Engineering
- Fall 2013: CSNYC launched, funds new programs
  - SEP and Bronx Academy for Software Engineering
  - ECS / Code.org
- Fall 2014
  - TEALS, Bootstrap, ScriptEd, Scalable
- Fall 2015: Computer Science for All NYC (CS4All)
By 2025, all New York City schools will be expected to provide at least one unit of computer science to every student at each grade band: K-2, 3-5, 6-8, 9-12.
CS4All is a local & national movement

Scale computer science (CS) education to 100% of NYC’s 1.1 million students by 2025. Reach more than 240,000 students annually by 2025.

Build and refine training and implementation models that are adaptable to NYC’s diverse school needs and potentially scalable to districts across the nation.
CS4All offers a variety of PD options
Training is run by partners & CS ed staff and builds teacher leadership

<table>
<thead>
<tr>
<th>INTRO</th>
<th>UNIT</th>
<th>COURSE</th>
<th>SEQUENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ONE-DAY TO BUILD SELF EFFICACY AND PLAN CS IMPLEMENTATION</td>
<td>INTEGRATING CS INTO EXISTING COURSES THRU ~30 HOURS OF TRAINING</td>
<td>75-100 HOURS OF TRAINING TO IMPLEMENT A SEMESTER OR YEAR-LONG COURSE</td>
<td>75-100 HOURS OF TRAINING PER YEAR TO IMPLEMENT A FULL SEQUENCE OF CS</td>
</tr>
<tr>
<td>&gt; ENGAGE SCHOOL LEADERSHIP</td>
<td>&gt; TEACHING BIORobotICS THRU SCIENCE</td>
<td>&gt; AP COMPUTER SCIENCE PRINCIPLES (CODE.ORG &amp; BJC)</td>
<td>&gt; SOFTWARE ENGINEERING PROGRAM (MS &amp; HS) BLOCK-BASED LANGUAGES, JAVA, HTML, CSS</td>
</tr>
<tr>
<td>&gt; INTRODUCTION TO CS BLUEPRINT</td>
<td>&gt; USING DATA, SECURITY, &amp; ALGORITHMS IN SOCIAL STUDIES</td>
<td>&gt; COMPUTER SCIENCE DISCOVERIES (CODE.ORG)</td>
<td>&gt; SEP JR (ELEMENTARY) BLOCK-BASED LANGUAGES, LOGIC, &amp; REASONING</td>
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<tr>
<td>&gt; EXAMINATION OF HOW CS FITS ALIGNS WITH INSTRUCTIONAL PRIORITIES</td>
<td>&gt; BOOTSTRAP: COMPUTER PROGRAMMING W/ ALGEBRA</td>
<td>&gt; GET READY TO TEACH INTRO TO CS (PYTHON)</td>
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<tr>
<td>&gt; SELECT TRAININGS</td>
<td>&gt; CHOICE TIME W/ ROBOTICS</td>
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PEER OBSERVATION, PD LEADS, CURRICULUM FELLOWS
The creation of a CS4All blueprint

27 co-design & feedback sessions with:
100+ educators
100+ admin
50 + CS education
30 + industry

Design direction
Community buy-in
Validating assumptions
Qualitative data
Pivots
CS4All Blueprint

Blueprint:
blueprint.cs4all.nyc

Resources from teachers:
blueprint.cs4all.nyc/resources

Video example: “Peer Review”
blueprint.cs4all.nyc/resources/6
SEP for Middle School

NYCDOE’s Software Engineering Program
Software Engineering Program

The Software Engineering Program (SEP) is a multi-year intensive computer science education program for grades 6 to 12.

The program is designed to prepare students for careers in tech and to develop computational thinking and problem-solving skills in real-world contexts.

cs4all.nyc/academic-programs/software-engineering-program
# SEP Middle School Sequence

<table>
<thead>
<tr>
<th>GRADE LEVEL</th>
<th>TERM</th>
<th>TOPICS COVERED</th>
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<tbody>
<tr>
<td>6</td>
<td>Fall</td>
<td>Computer programming with Scratch</td>
</tr>
<tr>
<td>6</td>
<td>Spring</td>
<td>Lego Robotics, Web Design I (HTML/CSS)</td>
</tr>
<tr>
<td>7</td>
<td>Fall</td>
<td>Physical Computing I (Arduino)</td>
</tr>
<tr>
<td>7</td>
<td>Spring</td>
<td>Web Design II (HTML5/CSS), Digital imaging, Intro to p5.js</td>
</tr>
<tr>
<td>8</td>
<td>Fall</td>
<td>Web Design III (Bootstrap), Intro to Javascript, Github</td>
</tr>
<tr>
<td>8</td>
<td>Spring</td>
<td>Physical Computing II (Arduino), Interface Design</td>
</tr>
</tbody>
</table>
SEP 6th Grade Topics

- Computer Programming with Scratch
- Web Design (HTML/CSS)
- Lego Robotics

[cs4all.nyc/academic-programs/software-engineering-program/6th-grade-curriculum/](cs4all.nyc/academic-programs/software-engineering-program/6th-grade-curriculum/)
Unit 1 Overview – Basic Computing Concepts
Learning activity #1 – The roles of computers, programmers and users
Learning activity #2 – How computers process information
Learning activity #3 – Sets of instructions for literal-minded machines
Learning activity #4 – Get started with Scratch
Learning activity #5 – Building interactive collages in Scratch

Unit 2 Overview – Structure of Program
Learning activity #1 – Parallelism: Make different things happen at the same time
Learning activity #2 – Parallelism: Make multiple sprites interact
Learning activity #3 – Program flow: Loops, booleans and conditional statements
Learning activity #4 – Remix an existing project

Unit 3 Overview – Solutions for Efficient Programming
Learning activity #1 – Debug a problem in a program
Learning activity #2 – Create a function by building the custom block
Learning activity #3 – Create a Scratch project

Unit 4 Overview – Creating Dynamic Effects / Game Design
Learning activity #1 – Intro to variables
Learning activity #2 – Remixing games with variables
Learning activity #3 – Cloning: Generating additional sprites while a Scratch program is running
Learning activity #4 – Creating dynamic interactions with users
Learning activity #5 – Creating an interactive game
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CSTA Standards: 2-AP-16

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CSTA Standards: 2-AP-13

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CSTA Standards: 2-AP-17, 2-AP-13, 2-AP-14

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Learning activity #3 – Cloning: Generating additional sprites while a Scratch program is running
Learning activity #4 – Creating dynamic interactions with users
Learning activity #5 – Creating an interactive game

CSTA Standards: 2-AP-16
Data and CS Education
Your Turn

When a data scientist attempts a problem they have a process, and first they decide what information is important.

What information would you use about Netflix customers or movies in order to make a prediction?
Your Turn

Next, a data scientist will make a series of statements that together (in a function) will decide if you might like the movie.

E.g., if you have liked movies of the same genre as the new movie, you are likely to like the new movie.

Write three more statements that use some of the variables you chose.
Teacher Education

PD is just one piece of the puzzle
Teacher Pipeline Examples

CSNYC produced a report in 2016 based on 4 models from NYC located institutions.

- Queens College: Intensive masters in CS Education
- Lehman College: “Extension” model
- New York University: CS Education Minor
- Brooklyn College: CS concentration for elementary education majors

See pipeline.csnyc.org for report
Home4CS in Schools of Education

Bring together university departments of education to define how computing education should fit in schools of education.

Areas of focus:

<table>
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<tr>
<th>Integrating CS into other disciplines</th>
<th>Integrating CS content into general teacher education</th>
<th>Preparing educational leaders to support CS education</th>
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<tbody>
<tr>
<td>Non-integrated, standalone CS education</td>
<td>Teacher development models for computing education</td>
<td>Creating a CS Education PhD pipeline</td>
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<tr>
<td>What do teachers need to know about computing</td>
<td>CS education in K-5</td>
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Csforall ALL

CONSORTIUM
CSforAll Consortium

A national movement and community
CSforAll Timeline

- September 2015: NYC announcement of CS4All
- January 2016: White House national call to action
- June 2016: “CSforAll” mention at RNC by AR Governor Asa Hutchinson
- September 2016: CSNYC launch of CSforAll Consortium
The CSforAll Consortium is a hub for the national Computer Science for All movement that works to enable all students in grades K-12 to achieve CS literacy as an integral part of their education experience.
Strategy

The Consortium sets a collective agenda together with our membership of over 350 content providers, education associations, researchers, and supporters to:

- Help schools and districts provide all students with rigorous K-12 computer science education
- Serve as a platform for connecting diverse stakeholders
- Provide support to new and developing initiatives
- Track and share progress
- Communicate about the work to local and national audiences
Consortium Members

383 Approved Members

187 Content Providers

90 LEAs (States/Districts) or Aggregate Ed Groups (ECEP)

106 Funders/Supporters & Researchers of CS Education
Priority Areas

Strategic Connections

Knowledge and Resource Dissemination

District Consultation and Support
Standards and the Framework

First view into standards: Running on Empty
- [www.acm.org/runningonempty](http://www.acm.org/runningonempty)

Fall 2016: K12 CS Framework
- [www.k12cs.org](http://www.k12cs.org) (has standard writing guidance)

Summer 2017: New CSTA standards
- [www.csteachers.org/page/standards](http://www.csteachers.org/page/standards)
Join the Consortium!

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<th>Education Association</th>
<th>CALL TO ACTION</th>
<th>CONSORTIUM CAN HELP</th>
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<tbody>
<tr>
<td>• Request an office hour</td>
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<td>• Encourage other school districts to join</td>
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<td>• Incorporate feedback mechanism</td>
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<th>Researcher</th>
<th>CALL TO ACTION</th>
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<tr>
<td>• Make research digestible for practitioners</td>
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<th>Funder</th>
<th>CALL TO ACTION</th>
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<td>• Fund research/evaluation &amp; teacher capacity initiatives</td>
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<tr>
<td>• Support opportunities for in person convenings</td>
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|                  |                |                      |
|                  |                | Real time guidance  |
|                  |                | Connections to other schools |

|                  |                | Host feedback focus groups |
|                  |                | Mapping to K12 CS Framework |

|                  |                | Disseminate research to practitioners |

|                  |                | Provide in depth overview of national CS ed landscape |
|                  |                | Identify and support collaborations focused on scale |
Become a member!

Mobilize Our Youth. Become a Member!

Visit www.csforall.org
Q & A
Thank you!