CONNECTICUT STATE BOARD OF EDUCATION
Hartford

TO: State Board of Education

FROM: Dr. Dianna R. Wentzell, Commissioner of Education

DATE: November 2, 2016

SUBJECT: Position Statement on Computer Science Education

Executive Summary

Introduction
The State Board of Education's (SBE) focus on equity, high academic achievement, and college and career readiness and its priorities as described in its five-year plan, *Ensuring Equity and Excellence for All Connecticut Students –2016-21,* supports a call for action in Computer Science Education as evidenced by:

1. The need to have a clear understanding of the principles and practices of computer science in order to be prepared for careers in the 21st century in a computer-intensive world.
2. A lack of access to computer science courses for under-represented minorities and socio-economically challenged groups, as well as a significant gender gap in students enrolling in advanced computer science courses.
3. Computer science being strongly based upon higher tiers of cognitive taxonomy as it involved design, creativity, problem solving, and analysis of solutions to problems.
4. The call in the Every Student Succeeds Act to provide quality computer science instruction as part of a "well-rounded education."

History/Background
Over the past few decades, computers have transformed both the world and the workforce in profound ways. The need for such skills across industries continues to grow rapidly, with 51 percent of all science, technology, engineering, and math (STEM) jobs projected to be in a computer science-related field by 2018. In addition, according a 2014 study by Gallup and Google, nine in ten parents want computer science taught at their child's school. Despite this growing demand, only a quarter of K-12 schools offer a computer science course with programming included and less than 1 percent of the Advanced Placement exams taken are the computer science exam.

These types of statistics are changing the face of computer science education around the nation. In the June 2016 Policy Update from the National Association of State Boards of Education, it was reported that 30 states count computer science toward graduation requirements, which is more than double the number in 2013. In addition, 13 states are actively participating in the

development of a framework with the goal of defining a baseline literacy for computer science students.

In his January 30, 2016 weekly address, President Obama discussed his plan to give all students across the nation the chance to learn computer science in school. Under the new Computer Science for All initiative, the President is requesting $4 billion for states in his fiscal year 2017 budget to increase access to computer science in K-12 schools by training teachers, expanding access to high-quality instructional materials, and building effective regional partnerships.

Specifically in Connecticut, Governor Malloy signed a petition asking Congress to support computer science in every K-12 school. This comes on the heels of the passage of Public Act 15-94 which requires districts to include computer programming as part of their curriculum beginning in the 2016-17 school year.

A position statement outlining beliefs and guidelines about computer science education has been developed in order to ensure that the Connecticut State Department of Education (CSDE) continues to prepare students to meet the changing needs of the workplace, technology and a global economy.

Development
In November 2014, the State Board of Education approved the creation of a Computer Science Advisory Group to examine computer science education in Connecticut and develop recommendations to support the growth of computer science in the state. This group consists of a variety of stakeholders including representatives from the CSDE, the President of the Connecticut chapter of the Computer Science Teachers Association, classroom teachers, higher education professors and community members.

This group meets regularly to discuss issues around computer science education. Based on these discussions the group developed an initial position statement on computer science education. This was brought before the Academic Standards and Assessment Committee on October 13, 2015. The committee provided feedback and suggestions on how to revise the document and over the course of several months, the document was revised to its current form. In September of 2016, the updated document was presented to the Academic Standards and Assessment Committee and they supported moving this position statement to the full board.

Overview of the Position Statement on Computer Science Education for All K-12 Students
The position statement is comprised of two components. The first includes a rationale for and description of computer science education. It describes the Board's beliefs about computer science education for all students in Connecticut. These beliefs include using computer science education to help ensure that students are college and career ready, obligations of teachers and administrators to provide opportunities to integrate and develop 21st Century Skills, and a call for increased efforts to provide access to computer science education to under-represented populations.

The second part of the position statement provides guidelines for various stakeholders to support computer science education. Through active stakeholder collaboration Connecticut will be able

to build a high-quality comprehensive computer science education program for all K-12 students. This responsibility begins with the Department of Education, but must be embraced at the district and school level, as well as expand beyond the educational system to include business, industry and community.

This position statement was created through the collective work of the stakeholders on the Computer Science Advisory Group. Experts representing each area of the guidelines submitted best practices that will enable computer science education to move forward in Connecticut. Feedback on this position statement was solicited from all members of the Computer Science Advisory Group and several revisions were completed. The current statement represents the combined efforts of all parties involved.

Recommendation and Justification
In order to ensure that the CSDE continues to meet the changing needs of the workplace, technology and a global economy I recommend that the State Board of Education support the adoption of the position statement on Computer Science Education for All Students K-12.

Attachment included with this summary
1. Position Statement on Computer Science Education for All K-12 Students
    - Updates from the Computer Science Advisory Group
    - Draft Position Statement on Computer Science Education for All K-12 Students
2. Letter signed by the CEO's, governors, and education leaders asking Congress to support computer science in every K-12 school
3. CS FACT SHEET: New Progress and Momentum in Support of President Obama's Computer Science for All Initiative

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CONNECTICUT STATE BOARD OF EDUCATION
Hartford
Draft Position Statement on
Computer Science Education for All Students K-12

The Connecticut State Board of Education (Board) believes the promise of an excellent public education is to equip every child with the knowledge and skills needed to succeed in college, careers and civic life. Therefore, schools must provide challenging and rigorous programs of study that integrate the knowledge and skills necessary to enable students to become productive members of society. These expectations hold for all students regardless of age, gender, socio-economic status, race/ethnicity, native language, abilities or disabilities.

The Board believes that computer science is a key to developing and integrating 21st Century Skills (e.g., technology, communication, collaboration, critical thinking, problem solving, innovation, creativity, persistence). Every student deserves a high-quality, comprehensive computer science education that is rich in content and builds interdisciplinary literacy, problem-solving, critical-thinking and effective communication skills. The Board believes that the study of computer science should be available to all students and is an important component of a K-12 education that prepares each Connecticut student to become college and career ready.

Computational thinking will be a fundamental skill used by everyone in the world by the middle of this century.[1] The study of computer science is a catalyst for the development of computational thinking skills. It is a problem-solving process that empowers the integration of digital technologies with human ideas. Computational thinking is characterized by logically ordering and analyzing data and creating solutions using a series of ordered steps. Computational thinkers have dispositions, such as the ability to confidently deal with complexity and open-ended problems. [2] Through computational thinking strategies, students develop parallel cognitive skills and unique ways of thinking about issues and problems. Students become empowered to create products and to move from being consumers of technology to producers and shapers of technology. Ultimately, computational thinking that evolves from the study of computer science fosters creativity and innovative thinking, and provides students with the confidence to adjust and adapt.

The Board believes that Connecticut schools must increase efforts to provide a comprehensive computer science education to all students. The Board believes teachers and administrators are obligated to ensure that students have, regardless of race, ethnicity or gender, access to a relevant computer science curriculum that fosters students' natural curiosity about the world. The integration of computer science into the K-12 curriculum should be purposeful and systemic, designed to motivate and prepare students to compete in a diverse and globally-driven workforce where science, technology, engineering and mathematics play a vital role.

The Board further believes that the study of computer science can prepare students for high-skill, high-wage, and high-demand careers. Since interest often results from experience, the evidence

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[1] Wing, Jeannette M. "Computational Thinking, 10 Years Later." Web log post. N.p., 23 Mar. 2016. Web. <https://blogs.msdn.microsoft.com/msr_er/2016/03/23/computational-thinking-10-years-later/>.

[2] Bajarin, Tim. "Why Schools Should Teach More Than Basic Coding." Time. Time, 16 Mar. 2016. Web. 29 June 2016.

suggests a direct correlation between exposure to computer science principles in the K-12 classroom and pursuit of further computer science studies in postsecondary education.[3] Regardless of whether students choose a career in a computer science-related field, they will benefit from learning to collaborate, answer complex questions, and develop solutions for real-world problems. These foundational skills and the ability to adapt to the future will allow students to adjust to industry trends in a rapidly evolving job market.

Finally, the State Board of Education believes that comprehensive K-12 computer science education is best realized through meaningful partnerships among business and industry representatives, post-secondary educational programs, community colleges and universities, community organizations, families, and school districts. Each of these stakeholders is necessary in order for students to understand the connections between their classroom work and skills required to be college and career ready.

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[3] Blouin, Janet Seeley. "High School Seniors' Self-Efficacy and Interest in Computer Science Careers." The University of Georgia, May 2011. Web. 30 May 2016.

Components of High-Quality Computer Science Education: Guidelines for Policymakers

2016

The Connecticut State Board of Education provides the following guidelines to support collaboration among the state's various stakeholders to build a high-quality, comprehensive, and culturally-responsive computer science education program for all Connecticut students. High-quality computer science education instruction should be content rich and address the core computer science areas of computational thinking, collaboration, computing practice and programming, computers and communication devices, and community, global, and ethical impacts. The realization of this vision is critical for our students' futures as active and engaged citizens and promotes their ability to succeed in a globally competitive computing-intensive world.

Department of Education's Responsibilities:
o Lead a statewide effort to increase the quality of and expand access to computer science education at the elementary, middle and high school levels.
o Consider the development of a K-12 computer science framework.
o Encourage appropriate professional development opportunities for computer science educators.
o Develop relationships with professional computer science organizations, higher education institutions and business and industry to provide professional development programs, honor excellence in computer science education, and promote high-quality computer science instruction for all students.
o Enable computer science courses to count toward a student's core graduation requirements.

School Districts' Responsibilities:
o Ensure that computer science is made accessible to all students, especially traditionally under-represented groups.
o Develop high-quality, comprehensive K-12 computer science curricula.
o Ensure instructional time for computer science education for all learners.
o Provide meaningful professional development, resources, instructional materials, and technologies to support computer science education.
o Provide introductory access to technology on an appropriate level that encourages participation, curiosity, and problem solving.
o Foster confidence and encourage persistence in solving challenging and meaningful problems.
o Implement age-appropriate computer science curriculum aligned to the K-12 Computer Science Framework.
o Provide embedded and ongoing instruction in computer science activities in order to enhance and support education in core content areas.
o Increase the number of students who take computer science courses at the high school level.
o Offer a continuum of courses that will allow interested students to study facets of computer science in more depth and prepare them for entry into the workforce or college.

Higher Education Institutions' Responsibilities:
- o Provide pre-service and in-service K-12 computer science teachers opportunities for professional development.
- o Embed coursework that incorporates computational thinking into pre-service programs.

Family, Community and Business and Industry Stakeholders' Responsibilities:
- o Advocate access to computer science instruction for all children.
- o Support creativity and encourage children to look at problems from multiple perspectives.
- o Engage students, schools and families in community-based computer science activities to support and enhance computer science education opportunities.
- o Develop ongoing, systemic partnerships with schools to support and enhance computer science education.

REFERENCES:

Phillips, Pat; Stephenson, Chris. "Bugs in the System". *Computer Science Teachers Association (CSTA)*. Copyright ' 2013. Web. Accessed 3/12/2015.

"Running on Empty." *Science* 246.4936 (1989): 1385. Web.

"CSTA - Computational Thinking." *CSTA - Computational Thinking*. N.p., n.d. Web. 02 Oct. 2015. <http://csta.acm.org/Curriculum/sub/CompThinking.html>.

Letter to

U.S. Senate

U.S. House of Representatives

Dear Members of Congress,

Technology is transforming society at an unprecedented rate. Whether it's smartphones or social networks, self-driving cars or personalized medicine, nothing embodies the American Dream so much as the opportunity to change or even reinvent the world with technology. And participating in this world requires access to computer science in our schools. We ask you to provide funding for every student in every school to have an opportunity to learn computer science.

Support for this idea is sweeping our nation. Ninety percent of parents want their children to have access to computer science education at school, and teachers agree. They know that technology opens doors. A hundred thousand teachers have taken matters into their own hands and already begun teaching computer science. Over 100 school districts are rolling out courses, from New York to Chicago to Los Angeles, from Miami to Las Vegas. Twenty states have passed policies and are now looking to support professional training for new computer science teachers. Private donors have collectively committed tens of millions of dollars to solving this problem.

Despite this groundswell, three-quarters of U.S. schools do not offer meaningful computer science courses. At a time when every industry in every state is impacted by advances in computer technology, our schools should give all students the opportunity to understand how this technology works, to learn how to be creators, coders, and makers — not just consumers. Instead, what is increasingly a basic skill is only available to the lucky few, leaving most students behind, particularly students of color and girls.

How is this acceptable? America leads the world in technology. We invented the personal computer, the Internet, e-commerce, social networking, and the smartphone. This is our chance to position the next generation to participate in the new American dream.

Not only does computer science provide every student foundational knowledge, it also leads to the highest-paying, fastest-growing jobs in the U.S. economy. There are currently over 500,000 open computing jobs, in every sector, from manufacturing to banking, from agriculture to healthcare, but only 50,000 computer science graduates a year. Whether a student aspires to be a software engineer, or if she just wants a well-rounded education in today's changing world, access to computer science in school is an economic imperative for our nation to remain competitive. And with the growing threat of cyber warfare, this is even a critical matter of national security. Despite this growing need, targeted federal funding to carry out these efforts in classrooms is virtually non-existent. This bipartisan issue can be addressed without growing the Federal budget.

We urge you to amplify and accelerate the local efforts in classrooms, unlock opportunity in every state, and give an answer to all the parents and teachers who believe that every student, in every school, should have a chance to learn computer science.

Business Leaders
Arne Sorenson, CEO, Marriott
Barry Diller, Chairman, IAC and Expedia

Bill and Melinda Gates
Bobby Kotick, CEO, Activision Blizzard
Brad Smith, President, Microsoft
Brian Chesky, CEO, Airbnb
Brian Cornell, Chairman and CEO, Target
Doug McMillon, CEO, Walmart
Daniel Schulman, CEO, Paypal. Chairman, Symantec
Dara Khosrowshahi, CEO, Expedia
Devin Wenig, CEO, eBay
Drew Houston, CEO, Dropbox
Doug Parker, Chairman and CEO, American Airlines
Edward Breen, Chairman and CEO, DuPont
Eric Schmidt, Executive Chairman, Alphabet, Inc.
Ginni Rometty, Chairman and CEO, IBM
Grant Verstandig, CEO, Rally Health
Herb Allen, President, Allen & Company
Jack Dorsey, CEO, Twitter and Square
James Murdoch, CEO, 21st Century Fox
James P. Gorman, Chairman and CEO, Morgan Stanley
Jeff Bezos, Chairman and CEO, Amazon
Jeremy Stoppelman, CEO, Yelp
Jessica Alba, CEO, The Honest Company
Joe Lonsdale, Partner, 8VC. Founder, Palantir
John Battelle, Chairman and CEO, NewCo
John Donahoe, Chairman, Paypal
John J. Legere – President & CEO, T-Mobile US, Inc.
Julie Sweet, Chief Executive, Accenture North America
Larry Ellison
Larry Fink, Chairman and CEO, BlackRock
Lowell McAdam, Chairman and CEO, Verizon
Marc Benioff, Chairman and CEO, Salesforce
Mark Cuban, Owner, Dallas Mavericks, Landmark Theatres
Mark Zuckerberg, Chairman and CEO, Facebook
Oscar Munoz, CEO, United Airlines
Rami Rahim, CEO, Juniper Networks
Randall Stephenson, Chairman and CEO, AT&T
Reid Hoffman, Chairman, LinkedIn
Rich Barton, Chairman, Zillow
Richard Anderson, CEO, Delta Airlines
Robert A. Iger, Chairman and CEO, The Walt Disney Company
Sam Altman, President, Y Combinator
Samuel Allen, Chairman and CEO, John Deere
Satya Nadella, CEO, Microsoft
Sheryl Sandberg, COO, Facebook

Terry J. Lundgren, Chairman and CEO, Macy's, Inc
Tim Cook, CEO, Apple
Vishal Sikka, CEO, Infosys

Governors
Asa Hutchinson, Governor, Arkansas (R)
Brian Sandoval, Governor, Nevada (R)
C.L. "Butch" Otter, Governor, Idaho (R)
Charlie Baker, Governor, Massachusetts (R)
Dannell P. Malloy, Governor, Connecticut (D)
David Y. Ige, Governor, Hawaii (D)
Doug Ducey, Governor, Arizona (R)
Earl Ray Tomblin, Governor, West Virginia (D)
Edmund G. Brown, Jr., Governor, California (D)
Gina M. Raimondo, Governor, Rhode Island (D)
Jack Dalrymple, Governor, North Dakota (R)
Jack Markell, Governor, Delaware (D)
Jay Inslee, Governor, Washington (D)
John Hickenlooper, Governor, Colorado (D)
Kate Brown, Governor, Oregon (D)
Maggie Hassan, Governor, New Hampshire (D)
Mark Dayton, Governor, Minnesota (D)
Mary Fallin, Governor, Oklahoma (R)
Matt Bevin, Governor, Kentucky (R)
Matt Mead, Governor, Wyoming (R)
Mike Pence, Governor, Indiana (R)
Peter Shumlin, Governor, Vermont (D)
Phil Bryant, Governor, Mississippi (R)
Rick Snyder, Governor, Michigan (R)
Steve Bullock, Governor, Montana (D)
Susana Martinez, Governor, New Mexico (R)
Terry Branstad, Governor, Iowa (R)
Terry McAuliffe, Governor, Virginia (D)

K-12 Leaders
Antwan Wilson, Superintendent, Oakland
Bob Runcie, Superintendent, Broward County Public Schools
Carmen Fariña, Chancellor, NYC Department of Education
Forrest Claypool, CEO, Chicago Public Schools
Kenneth Huewitt, Interim Superintendent, Houston ISD
Kimberly Hill, Superintendent, Charles County Public Schools
Michelle King, Superintendent, Los Angeles Unified
Pat Skorkowsky, Superintendent, Clark County School District
Richard Carranza, Superintendent, San Francisco Unified

Richard Woods, State Superintendent, Georgia
Susan Enfield, Superintendent, Highline Public Schools
Tom Torlakson, State Superintendent, California Education

Nonprofit Leaders
Bobby Schnabel, CEO, Association for Computing Machinery
Cornell Brooks, President and CEO, NAACP
Daniel A. Domenech, Executive Director, AASA, The School Superintendents Association
David Coleman, CEO, College Board
Elisa Villanueva Beard, CEO, Teach For America
Gail Connelly, ED, National Association of Elementary School Principals
Hadi Partovi, CEO, Code.org
Judy Vredenburgh, President and CEO, Girls Inc.
Lee Hood, MD, PhD, President, Institute for Systems Biology. Co-founder, Amgen
Linda D. Hallman, CEO, American Association of University Women
Lucy Sanders, CEO, National Center for Women and IT
Mark Nelson, Executive Director, CS Teachers Association
Matthew Randazzo, CEO, National Math & Science Initiative
Peggy Brookins, CEO, National Board for Professional Teaching Standards
Telle Whitney, CEO, Anita Borg Institute for Women and Technology
Thomas J. Gentzel, Executive Director, National School Boards Association
Vince Bertram, CEO, Project Lead The Way

<u>**FACT SHEET: New Progress and Momentum in Support of President Obama's Computer Science for All Initiative**</u>

"We have to make sure all our kids are equipped for the jobs of the future – which means not just being able to work with computers, but developing the analytical and coding skills to power our innovation economy. In the new economy, computer science isn't an optional skill – it's a basic skill, right along with the three 'Rs.'"

President Obama, January 2016

Just 8 months ago, in his final State of the Union Address and subsequent weekly address, President Obama set a bold goal—every American student should have the opportunity to learn computer science (CS). The President's case was simple. More than nine in ten parents want CS taught at their child's school and yet, by some estimates, only a quarter of K-12 schools offer a CS course with programming included. However, the need for such skills across industries continues to grow rapidly, with 51 percent of all science, technology, engineering, and math (STEM) jobs projected to be in a CS-related field by 2018.

Since the President's call to action, strong momentum for CS education has been growing at all levels of government and in the private sector. Twelve states have taken concrete policy steps to expand CS education—and there are now 31 states that allow CS to count towards high school graduation. More than 100 organizations have already pledged more than $250 million to support CS education. Just this month, thanks to sustained Federal support over the past 8 years, a new Advanced Placement (AP) computer science course, AP Computer Science Principles, is launching and will be offered in more than 2,000 U.S. classrooms this fall, putting the course on track to be largest course launch in the history of the AP exam.

To mark this progress, and celebrate new commitments in support of the President's initiative, the White House is hosting a summit on Computer Science for All. Key announcements being made today include:

- More than $25 million in new grants awarded from the **National Science Foundation** (NSF) to expand CS education;

- A new **CSforAll Consortium** of more than 180 organizations, which will connect stakeholders with curriculum and resources, as well as track progress towards the goal of Computer Science for All; and

- New commitments from more than **200 organizations**, ranging from expanded CS offerings within the **Girl Scouts of the USA** that could reach 1.4 million girls per year, to **Code.org** supporting professional development for 40,000 additional teachers, to new collaborations to bring CS to students in a variety of

settings from African-American churches to family coding nights to tribal **Head Start** programs to students as **Chief Science Officers**.

Background

There are nearly half a million open tech jobs in the United States today, and that number is projected to more than double within the next 4 years. These jobs pay 50 percent more than the average private sector job. One recent analysis of 26 million job postings found that nearly half of all the jobs in the top quartile in pay require some coding knowledge or skills.

And yet, CS is largely missing from American K-12 education. By some estimates in the past year, 75 percent of U.S. schools do not offer a single CS course with programming. Furthermore, even though research-based models exist that integrate CS into subjects such as Algebra, Science, History, and English, such integrated courses are rare.

This lack of access is even worse for communities traditionally underrepresented in CS and other science, technology, engineering, and mathematics (STEM) fields. In 2015, only 22 percent of students who took the Advanced Placement Computer Science (AP CS) exam were girls, and only 13 percent were African-American or Latino students. In three states, no girls took the AP CS exam and in 10 states fewer than 10 girls took the exam. In 21 states, fewer than 10 African Americans took the AP CS exam. Furthermore, portrayals in entertainment media and widely-held stereotypes exacerbate this dynamic, with far more men than women depicted in technology roles in film and television.

These challenges in course access, bias and stereotypes are the reason why the Administration has progressively increased its focus on expanding access to CS. That is why the **College Board**, with NSF support, began developing a new AP Computer Science Principles course (AP CSP), designed with the goal to recruit and retain students who are typically underrepresented in CS fields. Instead of focusing solely on learning computer programming skills, the new AP CSP explores the creative aspects of programming, abstractions, algorithms, large data sets, the Internet, cybersecurity, and how computing addresses real-world problems. That course is rolling out nationally this month, with more than 2,000 classrooms already signed up, reaching an estimated 25,000 high school students in this academic year and putting AP CSP on track to be largest course launch in AP history.

It is also why, in 2013, President Obama called on every child to take the opportunity to code, and in 2014 became the [first President to write a line of code](). And it is why in 2015, the President launched [TechHire]() to get more adults access to accelerated paths to tech careers. Today, there are over 50 TechHire communities across the Nation, with nearly 1,000 employers participating. Finally, more schools and communities are able to

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benefit from today's announcements thanks to President Obama's ConnectED Initiative, which is helping teachers implement modern digital learning strategies and has delivered broadband to tens of millions of American students in the classroom.

In his 2016 State of the Union address and subsequent weekly address, President Obama put forward a bold budget proposal, meaningful executive actions, and a broad call to action to give every student the chance to learn CS in school. Significant progress has been made in the last eight months:

- <u>Federal agencies have announced new competitions, guidance, and support.</u> The President signed the bipartisan Every Student Succeeds (ESSA) law in December 2015 to reform No Child Left Behind, which also expands the opportunities that states and districts have to offer CS and other rigorous STEM coursework. This spring, the **Department of Education** (ED) released a Dear Colleague Letter to states, school districts, schools, and education organizations focused on how to maximize Federal funds to support and enhance CS education. In addition, ED's Investing in Innovation competition included a priority for STEM education, including CS education, and its 21st Century Community Learning Center program launched a webpage of available CS education materials for its network of State Directors, site Directors, and front-line staff, and featured CS at the program's Summer Institute in July. In addition, the NSF has accelerated its efforts to expand access to CS. As a result, in the past 8 months, over 1,200 high school teachers have participated professional development through NSF-funded CS projects, preparing them to teach either Exploring Computer Science (ECS) or AP CSP.

- <u>Twelve states have taken concrete policy actions to support CS education since the President's call to action:</u> **Colorado** (allowing CS to count towards graduation), **Delaware** (designating CS as a statewide program of study), **Florida** (adopting new K-12 CS standards), **Hawaii** (integrating CS into other core subjects), **Idaho** (creating a CS curriculum), **Indiana** (adopting new K-8 CS standards), **Louisiana** (allowing CS to count towards graduation), **Pennsylvania** (allowing CS to count towards graduation), **Rhode Island** (setting a goal to get CS into all K-12 schools and reaching the half-way mark), **Utah** (establishing CS training and resources), **Virginia** (embedding CS into its K-12 standards), and **West Virginia** (requiring all secondary schools to offer a CS course this fall). In addition, 27 governors have called on Congress to support CS education.

- <u>More than 100 organizations have already responded to the President's call to action.</u> Since January, organizations have pledged more than $250 million pledged in philanthropic support, and the more than 100 commitment-makers to the President's CS call to action have already reached more than 1 million students and teachers with CS programming. For example, in the past 8 months

and in support of the President's call to action, **Apple** announced Swift playgrounds, a new iPad app to learn coding, and nearly 12,000 students participated in coding sessions at Apple Camp this summer. Code.org has prepared more than 22,000 teachers to bring CS into their classrooms, including nearly 1,000 high school teachers. College Board has prepared 1,400 teachers to deliver the new AP CSP course in its summer institutes. **The Iron Yard** and **Code Fellows**, in collaboration with **Operation Hope**, last week launched Tech Opportunity Fund with $45 million in diversity scholarships, and goal of awarding $100 million in scholarships over five years. **National Center for Women & IT** (NCWIT) welcomed over 2,500 new members into the Aspirations in Computing Community in 2016, now supporting over 7,000 technical young women. **Oracle** has planned nearly 40 additional teacher training events for this academic year with an anticipated reach of 600 teachers. More than 50 CEOs and public sector leaders have called on Congress to support CS. In addition, as part of the United State of Women Summit, where the President cited the importance of depicting more examples of women in STEM, **Association of National Advertisers (ANA) Alliance for Family Entertainment** (AFE) announced a new initiative called "#SeeHer" to incentivize advertisers, content creators and the media to develop and showcase content that portrays diverse women and girls authentically.

New Steps Being Announced by the Administration Today

Federal announcements in support of CS education being made today include:

- <u>More than $25 million in new grants being awarded by NSF.</u> NSF is announcing today that it will award over $25 million in new grants in support of Computer Science for All by the end of this month for FY 2016. These awards accelerate NSF's ongoing efforts to enable rigorous and engaging CS education in schools across the Nation by funding: development and evaluation of scalable professional development for teachers for instruction of ECS and AP CSP courses; creation and piloting of instructional materials for use in preK-8; development of best practices; research on mechanisms for implementation of Computer Science for All; and coaching, mentoring, master teacher corps, online communities of practice, and other support for newly trained teachers. NSF anticipates an additional $100 million investment over the next 4 years.

- <u>CNCS will expand CS programs in six new communities.</u> Through a collaboration with **Google** and the **Boys & Girls Clubs of America**, the **Corporation for National and Community Service** (CNCS) will provide enhanced CS programming for six underserved communities and youth around the country. Today's announcement commits an additional 11 AmeriCorps VISTA members and 7 AmeriCorps VISTA Summer Associates to supporting

this effort in the following areas: Harlem, New York; San Francisco, California; Portland, Oregon; Dorchester, Massachusetts; Raleigh, North Carolina; and Omaha, Nebraska. Last year, this effort supported 12 AmeriCorps VISTA members who recruited and trained local volunteers across seven cities to deliver CS programming. In addition, AmeriCorps VISTA members designed Computer Literacy classes for parents, trained elementary school teachers on the CS First curriculum, increased accessibility to events like hackathons, and developed CS First Clubs at schools.

- Inter-agency working group to carry the Computer Science for All initiative forward. The **National Science and Technology Council,** under its Committee on Science, Technology, Engineering, and Math Education, has chartered a new interagency working group focused on meeting the goals of Computer Science for All. The working group is launching with the participation of more than 10 Federal departments, agencies, and offices, and will work to promote computer science education and coordinate activities between the Federal government and school districts, community organizations, non-profits, and the private sector.

- New report from the Department of Education on the future of STEM education. This week, ED is releasing a report entitled "STEM 2026." The report shares the perspectives of a range of education practitioners and outlines major opportunities for enhancing P-12 STEM education over the next 10 years. The report includes substantial discussion of computer science, and the importance of including computational thinking and CS-related activities in STEM education.

Private-Sector Commitments in Response to the President's Call to Action

Today, more than 200 different organizations are announcing new commitments, showcasing the strong response to the President's State of the Union call to give every child the opportunity to learn CS, as well as his overall "Educate to Innovate" campaign to ensure all students have the tools to be innovators and problem-solvers.

Meeting Students Where They Are, and Bringing CS to Them

- **All Star Code**, a non-profit organization that prepares diverse young men for careers in technology, is committing to deliver their Summer Intensive training to 1,000 students by 2020 in coding, technology, and entrepreneurship skills.

- **Apple**, under its new *Everyone Can Code* effort, is releasing two new free courses and teacher guides—Learn to Code with Swift Playgrounds for middle school students and App Development with Swift for high school students—which will

be available to U.S. schools beginning this fall. Apple is also launching free "Get Started with Coding" workshops and "Swift Drop-in Hour" sessions this fall.

- **BirdBrain Technologies** will add 500 new Finch Robots during the 2016-2017 school year to their flock of loaner educational robots, which travel the country engaging students in computational thinking and programming. In total, 1,200 Finch Robots will be loaned to over 250 schools, providing computer science learning for over 35,000 students who might not ordinarily have a CS experience.

- **Bruce Museum**'s "Power Up Girls" program will provide targeted computer science enrichment for 200 girls in 4th-8th grade in Fairfield County, Connecticut, starting early 2017.

- **Computing Innovation Center** is committing to provide comprehensive enrichment programs to over 500 K-8 students in creative computing through weekend events and summer camp courses in computer science, robotics, physical computing, and sewable electronics by August 2017.

- **Digi-Bridge** will deliver #STEAMSaturdays—science, technology, engineering, arts and mathematics (STEAM) courses, rooted in computer science—to more than 500 K-8 scholars at nine sites in Charlotte-Mecklenburg during the 2016-17 academic year. Community collaborators such as the **OrthoCarolina Foundation**, will allow Digi-Bridge to extend these experiences free of charge to students living in socioeconomically disadvantaged neighborhoods. Digi-Bridge's STEAM Community Catalyst will create a model K-12 CS program with Charlotte area Title I schools during the 2016-17 academic year. In addition, Digi-Bridge will host Daddy Daughter Code-Ins introducing school-age girls and their fathers or male role models to coding in a welcoming environment.

- **Emerging Entrepreneurs, Inc.**, through its "Urban Leadership Lab" for at-risk youth, will introduce a new tech-focused startup platform called #TechLabs. The program will combine its teen entrepreneurship incubator with STEM learning, encouraging over 1,200 youth ages 11-18 to explore startup concepts in robotics, coding, programming, and data sciences by November 2017.

- **FlyTechnista** and **STEEAMnista.org** will engage 5,000 students in CS across five U.S. cities (New York, NY; Boston, MA; Washington, DC; Atlanta, GA; and Oakland, CA), collaborating with regional collaborators to offer events such as hackathons and workshops in the fields of STEM, arts, and making.

- **Girls Inc**. will collaborate with NCWIT to bring the AspireIT Outreach Program to ten Girls Inc. affiliates by 2018, providing 300 girls with CS experiences taught by "near-peer" instructors who have recently gone through similar experiences.

- **Girl Scouts of the USA** is committing to develop and launch a computer science progression for Girl Scout Daisy, Brownie and Junior levels (girls ages 4 -11), providing CS opportunities to as many as 1.4 million girls annually in the United States and overseas locations.

- **Girls Who Code** will launch a new custom mobile app, which will allow its students and alumni to stay connected, and will also publish new research with **Accenture** concerning the gender gap in computing and the factors increasing the likelihood of girls becoming and staying interested in computing.

- **Hive Research Lab**, a project of **Indiana University** and **New York University**, with support from the **Spencer Foundation**, **Capitol One,** and the **Hive Digital Media Learning Fund in the New York Community Trust**, is announcing the launch of the Building Youth Pathways in Computer Science and Digital Making (CS-Paths) initiative, a collaboration with the **Mozilla Hive New York City Learning Network** to connect at least 500 teens to high quality computing and digital making experiences connected to out-of-school settings and online. Hive Research Lab will create and disseminate "CS opportunity brokering tool kits" — a collection of best practices for front-line educators. Additionally, **HRL**, in collaboration with researchers from **CUNY-Graduate Center**, is announcing the launch of "Visions and Ideologies of Computer Science Education" (CSed Visions), an initiative that highlights the voices and expertise of over 100 computer science education stakeholders in order to develop a framework to support vision-setting in various Computer Science for All efforts.

- **JPMorgan Chase** will invite and encourage their employees to engage in CSEdWeek and will provide webinars and a specially curated offering of online youth technology resources for staff to leverage for their families and their local communities, with the goal of engaging 3,000 staff and youth by end of this year.

- **LA Makerspace** is collaborating with the **Housing Authority of the County of Los Angeles** to bring computer science opportunities to four public housing sites as part of its Coding Crew program. Coding Crew trains kids to code while also teaching pedagogy and classroom management so they can teach others.

- **LRNG** will create a new digital playlist and badge that teaches computer science skills in the context of fashion design. The playlist will be available to all youth

on the LRNG platform including 12 cities in the LRNG network, with an estimated impact of 1,000 badges earned by December 2017.

- **ManyMentors** will provide online and in-person STEM mentoring to support computer science, cybersecurity, and data science awareness and education for 1,500 students ranging from Pre-K to college students by facilitating mentor-mentee discussions via its browser-based and mobile platforms, strategically directing CS opportunities to students, and facilitating hands-on courses by 2018.

- **MENTOR** will create a new customized mentoring guide to support CS-mentoring program development and implementation. This guide will be based on the Elements of Effective Practice for Mentoring, which provides an overview of the evidence into effective mentoring practices for programs and mentors. The CS guide will be published by July 2017.

- **MIT Scratch Team** will make available 10 new free activity packets that provide creative pathways into coding—supporting a variety of introductory experiences, from making interactive stories and games to coding musical instruments and beats. Each packet includes tutorials, facilitator guides, and activity cards, and will be accessible in multiple languages to learners and educators around the world in fall 2016 on the Scratch website.

- **Montana Code Girls**, a free after school coding program for girls ages 9–19, is setting a goal to expand its program across the state of Montana by 2019, with a first stage commitment of getting 150 girls enrolled for the 2016–2017 year.

- **More Active Girls in Computing** (MAGIC) will provide one-on-one mentoring in STEM areas to an additional 50 middle and high school girls by December 2017, with a priority on serving those from under-resourced communities.

- **National Society of Black Engineers** (NSBE) is collaborating with **Google** to launch the Code Success @ NSBE program, offering year-round opportunities for 300 NSBE collegiate members to further their interest in CS through coding bootcamps focused on JavaScript, JAVA, Python, and Ruby coding languages lead by expert instructors in the field, and CS workshops at the NSBE 2017 Convention. NSBE is also committing to add mathematics and computer science and cyber security concepts to their Pre-College Initiative chapters and national SEEK summer camps in underserved communities, exposing approximately 10,000 K-12 students through 2018.

- **New York Hall of Science**, along with **Columbia University's Center for International Earth Science Information Network** and media designers **Design I/O**, is developing a digital game that will enable students to use computational problem solving skills to investigate environmental phenomena. The game and curriculum will be freely available to more than 100,000 middle school students in New York City by 2018.

- **NPower** will expand its high school technology education programming to New Jersey serving more than 275 low-income students through the Technology Service Corps Program in Jersey City, work-based learning activities with schools in Newark and Jersey City, and app development training through 2017.

- **Project Code Nodes,** in collaboration with the Partnership of African American Churches and others, is setting the goal to establish coding clubs for 70 girls in economically disadvantaged communities in Charleston, West Virginia.

- **RBC Capital Markets** has set a goal to deliver 10,000 hours of free coding lessons to students ages 8-12 in 2017 through the Teaching Kids to Code initiative, a program in which RBC Capital Markets technical employees provide coding lessons in collaboration with community organizations and schools.

- **Southern Connecticut State University** (SCSU) will engage at least 10 CS college students per semester in leading weekly after-school mini programming lessons and mentoring approximately 20 to 30 local middle school students. In addition, SCSU, as part of the **NCWIT Pacesetters** 2016-2018 cohort, has set a goal to increase the proportion of female CS majors from the current 13.8 percent to 25 percent by 2018. Finally, SCSU will offer professional development for high school teachers to offer AP CSP courses as part of the **Mobile CSP Alliance**.

- **TECH CORPS**, with support from **Battelle** and in collaboration with **Franklin University** and several Central Ohio school districts, will develop and implement a two-week computer science experience for 75 Central Ohio high school students in summer 2017. Furthermore, with support from **AT&T**, TECH CORPS will host a free two-day #CBusStudentHack Fall Coding Workshop for 50 Central Ohio teens. Participants will learn the building blocks, UI, graphics, media and sensors to develop a cell phone app, and be mentored by IT professionals and exposed to representatives from local tech companies.

- **Tennessee STEM Innovation Network** will create a virtual STEM education hub equipped with CS courses, CS and STEM career awareness through **Learning Blade** to reach rural and under-served students at over 150 schools by June 2017.

- **Tufts University** is collaborating with **100 Girls of Code** to launch local chapters in the Boston-area to provide young women the opportunity to create and gain confidence in problem-solving and programming. The collaboration will serve at least 100 middle and high-school girls by April 2017.

- **University of Washington** (UW) is starting a one week game development camp for 9th and 10th graders using the accessible programming language, Quorum, in order to ensure that students with disabilities can actively participate in the course. Additionally, UW partner **University of Nevada Las Vegas** is implementing a physics engine in the Quorum programming language and the game, thereby expanding the types of activities that teachers can assign students to complete in Quorum.

- The **Walt Disney Company's** STEM initiatives in 2016 and beyond will leverage the company's characters, brands, television, film and online programming, consumer products and theme parks. Disney will develop a new computer science tutorial incorporating some of its newest characters. This tutorial will be distributed across the company's online and television programming channels for CSEdWeek. Pixar Animation Studios and Khan Academy will release a new topic in their joint online free STEAM-education program Pixar in a Box in October, sharing with learners how Pixar uses computer science to create and simulate believable-looking hair for films like Brave and Finding Dory. Disney will also launch a new STEM challenge tied to an upcoming film that will encourage girls to use their STEM and CS skills to save the world.

Preparing Teachers, and Supporting CS in Schools

- **American Institutes for Research** (AIR), with support from the NSF, is expanding the scope of its virtual community of practice to include computer science teachers at all grade levels. Support for ECS and AP CSP high school teachers will continue, while new preK-12 activities and resources will be added. A rebrand from "CS10K Community" to "CS for All Teachers" will reflect the expanded scope.

- **Arkansas School for Mathematics, Sciences and Arts** (ASMSA) will engage 1,000 Arkansas students in grades 6-12 in creating "Apps for Good" by April

2017. ASMSA will mentor middle school and high school teachers in more than 30 districts to increase the number of qualified CS teachers by June 2017.

- **ASU School of Computing, Informatics & Decision Making Systems Engineering**, and **Mary Lou Fulton Teachers College**, in consultation with **Technology Education and Literacy in Schools**, will create an elective course that will allow over 5,500 undergraduate and graduate students to volunteer in high school CS courses.

- **Big Sky Code Academy**, **Bitterroot College** and **Missoula County Public Schools** will launch the Montana Teaching Teachers Tech initiative in 2016 to train teachers in Missoula County in 2016. The initial pilot will train 10 new teachers and then scale up to train 500 teachers and serve 21,000 students over the next three years.

- **BizWorld.org** will expand access to introductory computer science activities at 300 K-12 schools, and release BizWorld 5.0 for this school year, which will incorporate HTML coding and e-commerce development into its program.

- **Bootstrap** will release and offer teacher professional development for a new "Lightweight Data Science" module. This module provides an introduction to sophisticated processing of data tables, exploiting custom programming language enhancements created for this purpose. Through funding from **Bloomberg LP** and the **NSF**, Bootstrap will also host teacher workshops for 50 middle- and high-school teachers to pilot these new materials in 2017.

- **Brooklyn Laboratory Charter School** will develop free, open computer science playlists through its online platform, Cortex, to share across Cortex's 7,500 student and teacher users by the end of the 2016-2017 school year.

- **Broward County Public Schools** (BCPS) will expand the #BrowardCodes initiative in 2016-17 to more than 50,000 students through computer science offerings at all 236 K-12 schools. BCPS will build a cohort of 20 master teacher trainers and increase the number of CS trained K-12 teachers to over 1,000. In the 2016-17 school year, eight middle schools will offer the ECS course, and 2,000 high school students will be enrolled in CS courses at the college level through Advanced Placement or college dual enrollment courses. #BrowardCodes will broaden participation by hosting clubs, CS fairs, app challenges, and codefests.

- **Capital One** will expand C1 Coders, a program that helps middle-school students learn software development through a 10 week in-school program taught by Capital One employee volunteers. Capital One will expand the program from six to eight cities, adding New York, NY, and San Francisco, CA. This commitment includes a million dollar investment to provide computers and tablets for the in-school programs and a laptop to each student at the end of the course to encourage continued learning. With the expansion of the program, C1 Coders will impact more than 3,000 students by end of 2017.

- **Carnegie Mellon** will collaborate with the **Microsoft TEALS** initiative to offer seven new CS courses in five Pittsburgh Public Schools serving approximately 200 students during 2016-17. They will also collaborate with **Google** to host the Google Computer Science Summer Institute in Pittsburgh in 2017 for 30 underrepresented students, and will add a CS strand to the Carnegie Mellon Summer Academy for Math and Science (SAMS), a 6-week residential program reaching 40 underrepresented students, in 2017.

- **Central York School District** will develop and implement a K-6 CS curriculum in conjunction with a grant from **Wonder Workshop**, providing opportunities to an estimated 3,000 learners and over 150 educators in York, Pennsylvania during the 2016-2017 school year.

- **Chief Science Officers** (CSO), a non-profit initiative that engages school and local communities by supporting elected student positions to act as liaisons for STEM, CS, and innovation, will create new programs in at least 600 schools in 14 regions with support and training for more than 1,400 elected student CSOs. Regional collaborators include the **Arizona SciTech Ecosystem**, **Science@OC** and **OC STEM**, Science and Citizens Organized for Purpose and Exploration, **SCOPE**, **The Great Lakes Bay Regional STEM Ecosystem**, **ecosySTEM KC** with **KC STEM Alliance** and the **Science Pioneers**, **STEM for Idaho**, **California State University Department of Student Engagement** and **CSU Northridge**, **The Biocom Institute**, **The Western New York STEM Hub** in collaboration with the Interdisciplinary Science Engineering Partnership at **University at Buffalo**, **The Long Island Sound Science Festival** in collaboration with **STEM Collaboratives, Southern Oregon STEM Hub** in collaboration with **ScienceWorks Museum** and **Rogue Valley Workforce, STEM East** in North Carolina**, Georgia BioEd Institute** and **Atlanta Science Festival,** and the **Colorado STEM Ecosystem**.

- **Code in the Schools** is launching an organized effort in Baltimore City of local stakeholders from the school system, business, and philanthropy communities

tasked with expanding access to CS education opportunities in Baltimore City. Code in the Schools will focus efforts on recruiting underrepresented students, retaining them in a four-year Computer Science Career Technology Education Pathway, and engaging them in Code in the Schools' additional training and education programs, including the Prodigy Program and CodeWorks.

- **Code.org** will launch a new course, CS Discoveries, to teach CS for grades 7 through 9; will expand its professional learning network from 25 organizations to 40 organizations; and support professional development for 40,000 additional CS teachers in time for the 2017-18 school year.

- **CodeSpark** will launch this fall new free tools for K-5 teachers including a teacher dashboard, lesson plans, standards mapping, and more, supporting more than 10,000 educators in all 50 states.

- **Codesters** will collaborate with 100 Title I middle schools and elementary schools in New York City during the 2016-2017 school year to bring CS to at least 5,000 low-income students.

- **Colorado School of Mines** will host CSPdWeek in 2017, with the goal of doubling the number of teachers at the conference and adding new professional development collaborators to the team. They will also work with **Front Range Computer Science Teachers' Association** to recruit, engage, and train 100 Colorado teachers in CS content and pedagogy in 2016-17.

- **Computer Science for All in Western New York** (CSA-WNY) will provide CS professional development for 45-50 teachers in 2016-2017 to offer ECS across Western NY. This will serve more than 1,000 students, with focus on including schools that serve students underrepresented in CS. CSA-WNY at **SUNY Buffalo State College** will also provide CS professional development for 15-30 teachers in 2016-2017 to offer AP CSP across Western New York serving potentially more than 600 students.

- **Connecticut Chapter of the Computer Science Teachers Association** (CTCSTA) will run a one-day exploratory activity for 100 African-American and Hispanic boys during CSEdWeek 2016, and provide organizational collaborators such as the **Science Center**, **Hartford Public Library**, and **Random Hacks of Kindness JR.**, with qualified CS teachers to support their efforts.

- **Cornell Tech Teacher-in-Residence** (TIR) will provide embedded professional and curriculum development in CS in 7-10 NYC public elementary and middle schools, supporting 50 teachers and 5,000 students this year.

- **Digital Promise** will work with all 73 members of its League of Innovative Schools (League) on a coding challenge in middle and high schools during the 2016-2017 school year. Additionally, 37 League school district leaders, representing over 1 million students, have committed to providing rigorous CS and computational thinking in their individual districts, and Digital Promise will organize a League working group on this topic.

- **Dysart Unified School District** in Maricopa County, AZ will start after-school CS clubs at all 19 of their K-8 schools, open a middle level coding academy in the district, and offer AP Computer Science courses at all 4 high schools in 2016-17.

- **Edmodo** will send in-stream posts to its network to encourage participation in CSEdWeek and other non-profit based initiatives to encourage coding and CS in schools through the 2016-17 school year.

- **Exploring Computer Science** (ECS) will refine and integrate an NSF-supported and research-based e-textiles instructional unit into its curriculum, bringing together the maker movement and CS education and giving an estimated 40,000 public school children access to the tools to compute, create, and make. ECS will also provide four day-long, face-to-face regional professional development workshops for 400 first-year teachers during the 2016-17 school year. In addition, ECS will bring its curriculum, professional development, and policy support to Native American communities in New Mexico, Montana, Arizona, and South Dakota through its support of 18 educators in these communities. Finally, ECS will work in collaboration with **Girls Build LA** (a project of **LA Promise Fund**) as part of a multi-year program designed to reach more than 500 girls in the LA County public schools.

- **Gianforte School of Computing** at **Montana State University** will develop and deliver a new dual-enrollment course entitled The Joy and Beauty of Data at **Bozeman High School** during spring 2017 for 30 high school students. Next summer, they will also train up to 20 Montana high school teachers in CS.

- **Girls Rising in Technology** (GRIT), which was started by a student at Bethesda-Chevy Chase High School in Montgomery County, Maryland, will host eight monthly presentations for area students with female role models in the STEM

fields, including CS. GRIT is also collaborating with DC-based tech organization Girls Tech Too to provide a free, after school, semester-long website development and CS workshop.

- **Hodges University** will collaborate with the **Southwest Florida Regional Technology Partnership**, a non-profit, to directly engage and encourage by June 2017 2,500 K-12 students and teachers in Southwest Florida to explore computer programming as a problem-solving mechanism for community issues.

- **Infosys Foundation USA** will establish the Computer Science Teachers Association (CSTA) Continuing Professional Development Pipeline program, building their capacity and growing their community of 23,000 teachers; and launch the Infosys Foundation ACM CSTA Awards for Excellence in the Teaching of Computer Science in collaboration with the Association for Computing Machinery (ACM) through which 10 K-12 CS teachers will be recognized and awarded $10,000 each. Finally, Infosys Foundation will support the Next Scholars Program at the New York Academy of Science providing resources, career guidance and mentoring for as many as 300 young women interested in studying CS, with a focus on first-time college goers.

- **Ira A. Fulton Schools of Engineering**, **Mary Lou Fulton Teachers College**, and the **Institute for the Science of Teaching and Learning** will create a new 10-part online professional development, and continuing education courses teaching CS in elementary and middle schools.

- **KISS Institute for Practical Robotics** (KIPR) and **Concerned Citizens Community Involvement** are collaborating to reach an estimated 2,500 youth in 25 U.S. cities by 2018 with CS and STEM programming. KIPR is also collaborating with the **Muscogee (Creek) Nation** to expand the Muscogee (Creek) Nation Junior Botball Challenge and Botball programs to impact an additional 15 Oklahoma schools and an estimated 200 Creek students, and implement the standards-based Junior Botball Challenge program in 10 Head Start programs targeting 250 Creek Pre-K students. KIPR is also collaborating with New Mexico State University to implement the Junior Botball Challenge Program into two elementary schools in Las Cruces, N.M serving 60 elementary students and six educators in the first year. Finally, KIPR and Tulsa Public Schools will expand the Junior Botball Challenge program to 15 additional elementary schools in 2016-17 bringing CS to 350 students.

- **Learning.com** will host a code-a-thon in mid-November and during CSEdWeek, offering free Nation-wide access to their new K-8 computational thinking lessons and coding solution for students and teachers.

- **Department heads from more than 75 universities and colleges** have agreed on behalf of their departments to take concrete actions to expand K-12 CS education. Actions they are committing to act on may include: collaborating with colleges and schools of education to support the in-service or pre-service preparation of CS teachers; supporting their local **Computer Science Teachers Association** (CSTA) chapter; giving credit or placement for the new AP CSP course; and connecting undergraduate and graduate students to service learning opportunities in K-12 classrooms.

- **Maine Mathematics and Science Alliance**, with support from NSF, will add to its existing cohort of 40 teachers to include a new cohort of 20 teachers from rural western Maine in implementing ECS by March 2018.

- **Michigan State University College of Education** will redesign its Introduction to Educational Technology course around computational thinking to prepare its preservice teachers to embed computational thinking concepts and practices in the classroom. Approximately 175 preservice teachers will participate in this redesigned course per year. In addition, the Master of Arts in Educational Technology program will launch a new graduate certificate in creative computing to meet the growing demand of in-service teachers who need CS education. Approximately 250 in-service teachers will gain the opportunity to complete the certificate program as a part of the Master's program annually.

- **Mississippi State University**, with support from the **National Security Agency** GenCyber Program, will host teacher residential experiences in cybersecurity and programming, promoting the involvement of underrepresented populations in rural settings. The new residential teacher institutes will support 30 teachers from a variety of disciplines who are committed to integrating computing concepts in their curricula, extending the reach of 90 middle and high schoolers in the student camps to 3,000 per year in classrooms across Mississippi.

- **MESA** (Mathematics, Engineering, Science Achievement) USA, with support from **Amazon** and **Microsoft**, will pilot a CS initiative for middle and high schools and launch an Internet of Things (IoT)-themed MESA National Engineering Design Challenge by the 2017-18 school year, engaging 10,000 underrepresented students, 500 teachers and 500 expert mentors in hands-on CS challenges at schools across 10 states.

- **PinkThink** is launching a new coding website that allows students to learn to program any Arduino-supported hardware product. PinkThink will launch this new open source coding language and curriculum at Perspectives Charter Schools, which will reach at least 5,000 students in Chicago this school year.

- **Project Lead The Way** (PLTW) will launch this fall a new professional development approach, Online Core Training, to give more teachers greater options and flexibility in how they take part in CS training. Teachers will have the opportunity to create and implement solutions in their classrooms and benefit from real-time coaching by experienced PLTW teachers.

- **Raspberry Pi Foundation** will expand Picademy, its digital making educator workshop, with a goal of training at least 300 U.S. K-12 educators for free in 2017. These educators will have the opportunity to get hands-on professional development aimed at blending project-based learning with CS.

- **RePublic Schools Computer Science** will train over 200 teachers in CS and will reach over 15,000 students across the South in the next two years.

- **Southern New Hampshire University's** School of Education, in collaboration with the **Flatiron School**, will offer Code Sharing: Empowering Teachers to Teach Code, a new course aligned to CSTA standards that equips K-12 teachers with no prior knowledge the skills to teach high school students how to code.

- **STEAM:CODERS** will offer a 10 week programming course at **John Muir High School** for 25 students and launch a high school cybersecurity course in collaboration with **University of Laverne**.

- **Taskar Center for Accessible Technology** and the Computer Science & Engineering Department at the **University of Washington** will engage 60 school communities in computational thinking experiences and civic action through 20 challenges in geographical information systems about sharing data about accessibility and use of pedestrian paths.

- **Teach For America** (TFA), as an **AmeriCorps** grantee and building on funding from **AT&T** and an NSF research project, will recruit, develop, and mobilize a diverse group of more than 120 educators to implement the ECS and AP CSP courses in high-needs schools by the 2018-2019 school year.

- **Texas State University's** Department of Occupational, Workforce, and Leadership Studies will offer CS workshops for interested K-12 Career and Technical Education (CTE) teachers in Round Rock and San Marcos, Texas.

- **Thinking Media** is committing to exposing up to 30,000 middle school students in 320 schools in Arkansas to CS careers through the Governor of Arkansas's initiative to deliver Learning Blade, a tool for increasing STEM career awareness, by December 2017. In addition, at a national level, **TATA Consultancy Services** will collaborate with Thinking Media and Learning Blade to introduce 10 CS careers and technologies in way that emphasizes social interaction and impact.

- **University of California—Irvine** will, through the **NSF**-funded CS1C@OC project, produce 100 well-prepared CS teachers in Orange County by the year 2020. These educators will in turn teach computing to secondary students who have traditionally been underserved and underrepresented in CS.

- **University of Nebraska at Omaha** is committing to doubling the number of credentialed K-12 computing teachers in Nebraska to 160, through formal endorsement curricula and new graduate programs within the next 3 years.

- **University of Texas at Austin's Department of Computer Science** (UTCS) students, alumni, and faculty will introduce and encourage programming in elementary, middle, and high schools in the Austin area during CSEdWeek 2016. UTCS members are committing to volunteer 300 hours in local classrooms, an increase of 50 percent over their 2015 participation, thereby reaching approximately 3,500 Austin area Pre-K-12 students. In addition, the university's UTeach program will convene representatives from 10 major pre-service teacher preparation programs to discuss and draft a report for national distribution that includes recommendations specific to improving pre-service CS teacher preparation and increasing the number of pre-service teachers with both a CS major and minor and strong pedagogical preparation.

- **Upperline Code** is committing to training 40 new CS teachers in New York, DC, and Boston in 2017 through their "learn, teach and code" fellowship. The 40 high school teachers will have the opportunity to receive online mentorship and training, a one-week paid intensive boot camp and up to six weeks of teaching experience with intensive feedback with Upperline's summer programs. Additionally, Upperline commits to supporting 100 high school students through its summer scholarship programs.

- **Vidcode** and **Girl Scouts of Greater New York** will pilot a new 20-week afterschool program—Breaking the Code—with approximately 120 middle school girls in 6 high-need schools in New York City during the 2016-2017 school year. Breaking the Code combines coding and creative video projects with the leadership development outcomes central to Girl Scouting.

- **Washington State University's School of Electrical Engineering and Computer Science** is committing to bring 150 high school girls to campus by the end of the 2017 school year and every year thereafter. Students will spend a half-day learning from college students with a meet-and-greet, facilities tour, robotics lab activity, overview of CS club and research activities, panel discussion and mentoring activity, and hands-on programming.

- **Zulama**, in conjunction with the CSTA, will begin offering a Computer Game Design Teacher Certificate in the fall of 2016 to prepare teachers to lead student inquiry and development of CS principles through computer game design.

Building a National Movement

- **ACT | The App Association** will publish a follow up report in 2016 to their recent *Six Figure Salaries: Creating the Next Developer Workforce*, highlighting subsequent research on the availability of CS education in underserved communities; the economic benefits that accrue locally from CS education; industries and jobs beyond tech companies that rely on skills that come from CS; and the participation level in CS education measured by gender and ethnicity.

- **Computer Science Teachers Association** (CSTA) is launching the *Computer Science is...* campaign this fall, a series of videos that describe the multiple ways that CS is used in careers, industries, and daily life, and feature a diverse group of professionals sharing stories of how they got interested in CS. The video collection will be available for use by educators, counselors, parents and students. Additionally, CSTA is releasing a new promotional video for the new K-12 Computer Science Standards.

- A new **CSforAll Consortium** is launching to monitor and celebrate progress towards the goal of Computer Science for All, and to connect stakeholders with curriculum and resources. The new consortium is led by **CSNYC** and a steering committee comprised of the **Association for Computing Machinery**, **Code.org**, **The College Board,** CSTA, and **NCWIT**. The CSforAll Consortium is launching with a membership of over 180 organizations.

- **CS4TX** is launching a campaign and statewide pledge for Texas district and campus administrators to commit to expand access to CS in their schools.

- **Cyber Innovation Center** (CIC) is committing to reach 450,000 students over the next two years through its CS and cyber curricula. The CIC is also committing to working with an additional 15 Governors and state departments of education to approve CIC courses in their state-wide curricula and educational pathways bringing the total to 25 states. Additionally, the CIC will engage 2,500 underserved students, including girls and minorities, by hosting and supporting hands-on events focused on CS and cybersecurity.

- **Expanding Computing Education Pathways Alliance** (ECEP), an NSF Broadening Participation in Computing Alliance led by Principal Investigators at the **University of Massachusetts**, **Amherst**, and **Georgia Tech**, will engage five new states in the ECEP network improvement community model, and host a summit bringing together more than 100 leaders from 17 member states as well as researchers and CS organizations to exchange best practices in state-level educational policy reform and develop strategic plans to achieve CS for All. These 17 states will serve as models for others seeking to implement sustainable K-16 CS programs and educational policy.

- **International Association for K-12 Online Learning** (iNACOL) will support 10 states over the next year in advancing student-centered learning through policy development and ensuring the flexibility for next generation learning models, including access to CS courses. iNACOL will provide direct support to more than 1,000 public schools and districts in designing next-generation learning. iNACOL will also host the annual symposium, reaching over 3,400 experts.

- **Google** is committing to contribute an additional $1.1 million to support CS education, and to reach one million students by the end of the 2016-2017 school year through CS First, Google's free introductory coding program. Google will also: collaborate with the **Global Poverty Project** to inspire girls and women to start coding and join the Technovation Challenge; commission new research on diversity in CS education; distribute 100,000 free copies of *Careers with Code* - a new CS career magazine from **Refraction Media;** and, along with **Cartoon Network**, create a one-hour coding activity, where students can create their own stories with code using the characters from *The Amazing World of Gumball*.

- **National Association of State Boards of Education** will release a State Innovations publication this September highlighting best practices in supporting

K-12 CS education in Arkansas and Maryland, with the goal of supporting other states interested in expanding access to CS education.

- **Raise the Game** is committed to launching three large-scale public engagement campaigns with the goal of reaching up to 500,000 people in 2017, all specifically focused on empowering women in the video game industry and community. These campaigns will elevate women in the games industry, support STEAM education programs, tackle online harassment, and inspire the next generation of women to harness the potential of video game technologies.

- **SignUp.com** and the **CSforAll Consortium** are co-developing an 'idea center' launching later this year, focused on bringing CS to their school for the SignUp.com community of 8 million parents. In addition, **MV GATE**, SignUp.com and the **National Watch D.O.G.S (Dads Of Great Students)** volunteer network, with support from Capital One, will launch and promote the *Family Code Night Event Kit* to help more parents host a coding event at their child's school.

- **Twitch**, a social video platform, is launching twitch.tv/programming, a channel focused on bringing existing and emerging programmers together to learn, chat, and connect with each other over inspiring community content. To kick-off fostering and empowering the next generation of CS talent, Twitch will also live stream and promote the Computer Science for All Summit occurring today.

###

SOURCE
President Obama Announces Computer Science For All Initiative." The White House. The White House, 30 Jan. 2016. Web. 25 Oct.

Computer Science Advisory Group		
Name	**Position**	**Affiliation**
Jon Bishop	STEM Coordinator	Canton Public Schools
Jason Bittner	CEO	Triple Helix
Joe Campbell	Education Consultant, Educational Technology	Connecticut Technical High School System
Doug Casey	Executive Director	Commission for Educational Technology
Glenn Cassis	Former Executive Director	African-American Affairs Commission
Jackie Corricelli	Secondary Computer Science Teacher	Conard High School, West Hartford
Jonathon Costa	Senior Assistant Executive Director	EdAdvance
Seth Freeman	Professor	Capitol Community College
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