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Computers have radically changed our world. Grown from the initial explosion of PC's to the bigger explosion of mobile computers like smart phones and to the potentially even larger explosion of the Internet of Things. Our cars are becoming computers on wheels. Our planes are becoming computers with wings. We are automating our homes so we can talk to our houses and our houses can talk back. Our refrigerators will be emailing us to let us know when we are out of milk. With the advent of cyber espionage and cyber warfare, computers have become the new international battlespace.

For most Americans, this computerized world might as well be built from magic. But it is not magic. It is built from the computational problems solving techniques of logic, algorithms, and data structures along with methods to decompose problems such as object oriented design, polymorphism, and recursion. These techniques are embodied in the field of computer science.

Computer science is different than computer literacy. Computer literacy teaches us how to use existing computer programs. It teaches us to be the consumers of a technology future. Computer science teaches us how to use collaboration and creativity to build new programs and products. It teaches us to be the innovators and creators of that technology future. Our children are entering a world where every job maybe a computer job but we are not teaching our kids the problem solving skills of this century - computer science.

In 2014 prior to adopting their Computer Science for All initiative, New York City did an analysis that determined that only about 10% of their schools were offering any kind of computer science education and only about 1% of their students were receiving any type of computer science education. This analysis came out about the same time as Gallup released the results of a national poll that showed 9 out of 10 parents of 7th through 12th grade students wanted their children taught computer science. President Obama put it best while announcing his White House Computer Science For All initiative, “in the new economy, computer science is no longer an optional skill, but a basic skill.”

In Nevada, the only computer education all kids receive is a half credit high school graduation computer literacy requirement. This course, which has been described to me as a keyboarding class that teaches how to use a browser and the basics of office tools. It is a low grade consumer oriented class. It is a class that gives ½ credit as a graduation requirement. It is taught in middle schools and belongs in elementary school. This course is my generation's equivalent of receiving ½ credit as a graduation requirement for learning how to use a rotary phone and phone book. It is not the way to the New Nevada built on innovation.

While serving on the State Board of Education Graduation Requirements subcommittee, I was able to talk with several of our New Nevada economic sectors. They all indicated that their sectors required the computational problem solving techniques found in computer science. They all supported the expansion of computer science in K-12 and they all indicated that they were having trouble finding workers skilled in computer science.

The shortage of workers in computer science is not just a local problem but a serious national problem. Even during the great recession, companies could not hire sufficient numbers of employees skilled in

computer science. You might think that as the number of computerized devices has grown, so has the number of computer science graduates but this is not the case. For large part of the last 17 years, the number of computer science graduates actually had been in decline. Only recently has the number of computer science graduates reached the levels from the year 2000 and many of these graduates are now international students. The Computer science advocacy group Code.org did an analysis of the rate we are producing computer science graduates verse the growth in the demand for computer science graduates. The analysis indicated that by 2020 we could have 1 million unfilled jobs in computer science. Cybersecurity organizations are also predicting they maybe short up to 600,000 cybersecurity professionals. Both of these groups are targeting the same roughly 100,000 new graduates in computer science. For many of our top technology companies, their only limiting factor is their ability to recruit a skilled workforce in computer science.

This is a workforce with almost a complete lack of diversity. In 2014 Google released the demographic breakdown of their technical workforce. While women receive 60% percent of all bachelors degrees in all fields, women only make up 17% of the Google technical workforce. African Americans and Hispanics together make up about 27% percent of the national population but only 3% of the Google workforce. Google actively recruits women, African Americans, and Hispanics. They are not in the Google workforce because they are not in the computer science workforce. In the 1980's, women were about 38% of compute science graduates. Women are now down to just 17%. In 2014, we learned that there were 14 states where no African American students took the AP Computer Science exam. In 2015, we were somehow happy that there were only 9 states where no African American students took the AP Computer Science exam.

In the report titled “Stuck in the Shallow End: Education, Race, and Computing”, researchers in LA tried to determine why so few African Americans and Hispanics were taking computer science in high school. They determined that schools serving predominately white and wealthy students offered high rigor computer science courses taught by experienced teachers while schools serving predominately low-income students or students of color offered low rigor computer literacy courses often taught by inexperienced teachers. Also the way students were recruited into computer science courses often was not appealing to girls and students of color.

The roots of both the lack of skilled workers in computer science and the lack of diversity in the computer science workforce can be traced back to what is happening in K-12 computer science education. This realization has led to a national movement known as Computer Science For All. This problem is an intersection of economics and equity. The only way to solve the economic problem of not enough skilled workers in computer science is to expand equity through Computer Science for All.

Our notion about what is a technical job verse a non-technical job maybe about to change. Eight weeks ago, the White House released the report titled “Artificial Intelligence, Automation, and the Economy” which explores the potential for new advances in Artificial Intelligence (AI) to create new markets and expand the economy. But the report also explores the possibility for AI as famous scientist Stephen Hawking described “to extend job destruction deep into the middle classes.” Eighty three percent of jobs that pay less than \$20 an hour are now highly automatable. Up to 47 percent of all jobs maybe made wholly or partially obsolete by these changes in technology. It is unclear whether AI driven automation will result in a net increase or decrease of jobs but it is clear that the new jobs will require the computational problems solving skills of computer science. Consequently one of the recommendations made in this report is to guarantee that all students have access to computer science education.

Thirteen months ago, the Nevada STEM Coalition created a special task force on K-12 Computer Science. Through this task force last Spring, Nevada participated as one of 14 states along with Apple, Amazon, Google, Microsoft, the Computer Science Teachers Association, and a couple dozen other organizations to develop the K-12 Computer Science Framework. This framework is a high-level description of what every kid needs to know and be able to do in computer science. Last Fall Nevada was invited to join the Expanding Computing Education Pathways (ECEP) Alliance. Nevada is one of only four states in the west invited to join. Through ECEP Nevada gained access to most of the thought leaders in K-12 computer science education along with access to national best practices. Also through ECEP Nevada was invited by the White House Office of Science and Technology Policy to participate in the White House Symposium on K-12 Computer Science. Last December, Governor Sandoval became just the 7th governor to join to Governors' Partnership for Computer Science committing the state to offer computer science at every high school and adopting rigorous state computer science standards.

This bill embodies the national best practice recommendations of both the Nevada Task Force on K-12 Computer Science and the Governors' Partnership for Computer Science. This bill will make Nevada a lead state for K-12 Computer Science Education and grant a competitive advantage to both our kids and our efforts to attract companies to the New Nevada.