At Java programming workshops at Oracle headquarters and JavaOne, kids got hands-on with coding, robotics, and more.

JAVA: THE NEXT GENERATION

Teach kids to code and give them tools for success. **BY CAROLINE KVITKA**

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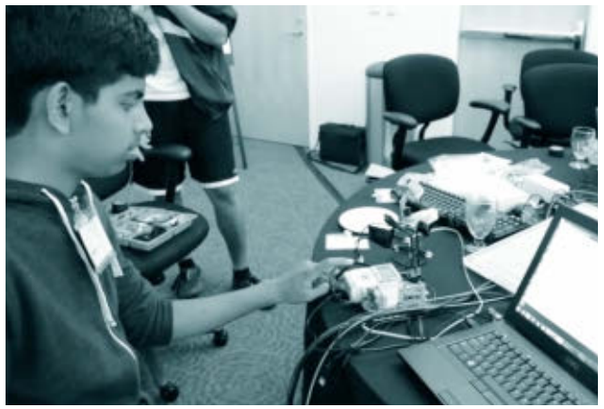
Kids are coding. They are creating animations, modifying Minecraft, building LEGO Mindstorms, programming NAO robots, and more. And they are doing it in Java.

With the number of computer science jobs on the rise, making sure the next generation can fill these positions is critical. According to the organization code.org, there will be 1 million more computer science jobs than computer



Kids at the Create the Future Java Workshop talk with Caroline Kvitka.

At the Devoxx4Kids event before JavaOne, kids chose from workshops in programming, robotics, and engineering.

PHOTOGRAPH BY HARTMANN STUDIOS

science students in the United States alone by 2020.

Whether kids are destined for careers in computer science or something outside of technology, programming skills are useful in many parts of their lives, says Wanda Dann, associate professor at Carnegie Mellon University and director of the Alice program. Alice is a tool that focuses on storytelling in a 3-D environment to teach kids the basic concepts of object-oriented programming.

"Learning to program actually is learning to decompose a problem into simpler steps," Dann says. "And by accomplishing those steps, one accomplishes the entire solution to the problem."

However, only 1 in 10 schools in the United States offers computer science classes, according to code.org, which wants US schools to follow the example set by China, the UK, and Vietnam, where coding classes are offered as early as elementary school.

That's where extracurricular programs come in. Although opportunities for kids to learn to code were limited just a few years ago, today programs abound and kids (and sometimes their parents) are flocking to them.

In August, 672 kids between the ages of 13 and 18 came to Oracle headquarters in Redwood Shores, California, for the Create the Future Java Workshop. Over three days, they learned to program in Alice 2.0 and Alice 3.0, and in Java on LEGO Mindstorms.

Alice 2.0 focuses on logical and computational thinking skills and programming fundamentals, while Alice 3.0 emphasizes object-oriented concepts and a full transition to the Java programming language. LEGO Mindstorms combines building LEGO robots with programming.

"We have used Java as our tool for implementation, and we write our code so that after students have used Alice they can go into a classroom

where Java is being taught and feel comfortable that they understand what those statements do because they actually have seen them before," Dann says. "I think one of the reasons that Java is so well liked as a programming language for teaching younger students is because it is possible to model everyday kinds of objects. Students can then relate to those objects, which makes it easier for them to see how the skills they're learning in computer programming are usable in many different career paths," she adds.

More recently, the next generation of Java developers got a taste of programming at a Devoxx4Kids day the Saturday before JavaOne San Francisco. At this event, a collaboration with Oracle Academy, 150 kids, ages 10 to 18, got hands-on and had fun with programming, robotics, and engineering. Topics included Alice, Arduino, Greenfoot, LEGO Mindstorms, Minecraft Modding, NAO humanoid robot, Python, Raspberry Pi gaming, and Scratch. Kids attended four sessions of their choice.

"Teaching children how to program must be a priority in a society where technology is becoming more and more important," says Daniel de Luca, worldwide manager of the Devoxx4Kids initiative, which started in 2012 in Belgium with programming workshops for kids. The program aims to teach and inspire kids about computer programming while they are having fun. Since its founding, Devoxx4Kids has shared its curriculum with Java user groups and other organizations around the world. To date, more than 80 Devoxx4Kids workshops have taken place, with 2,500 participants.

"We need to train our kids in technology, and have them stay engaged in technology at an early age. If we catch them raw and show them it's fun, it's possible, they won't be scared," adds Arun Gupta of Devoxx4Kids Bay Area.

And from the looks of the San Francisco event, the kids did have fun. "It's been really cool . . . I really liked it," says Tim Gonzales, a 14-year-old participant from San Francisco who plans to pursue a career in technology. "The door to opportunity is *so* open. I just need to find out my passion within technology." Programs such as

Cool Tools for Kids

Scratch
A drag-and-drop programming tool, Scratch teaches young kids how to program interactive stories, games, and animations.

Greenfoot
This visual and interactive integrated development environment (IDE) teaches object orientation with Java.

BlueJ
This standalone Java IDE is used to teach the beginnings of programming.

SnapCode
Featured at the JavaOne Community keynote, SnapCode is a new, free tool for building Java applications with simple drag and drop.

PHOTOGRAPH BY HARTMANN STUDIOS

Twenty-one girls from the organization Black Girls Code participated in the Devoxx4Kids event at JavaOne.

Left: Kids took a stretching break at the Devoxx4Kids event. Below: Chris Hollinger of Oracle Academy talked about Alice at the Create the Future Java Workshop.

Devoxx4Kids can help him get where he needs to go, he adds.

Of the Devoxx4Kids attendees, 21 were girls from the San Francisco chapter of Black Girls Code, an organization that seeks to introduce girls from underserved communities to computer science and technology with a goal to increase their representation in the STEM (science, technology, engineering, and mathematics) fields. "The event was a wonderful opportunity for our students to experience a wide array of technology tools in a youth-friendly atmosphere," says Black Girls Code Founder Kimberly Bryant.

AROUND THE WORLD

Computer programs for kids are popping up all over the world. In the Philippines, JEDI4KiDS educates children to be more creative using computers and provides them the opportunity to learn computer programming in a fun and interactive manner.

JEDI4KiDS is part of the larger JEDI initiative, which provides free and open source computer science and IT

Kids and organizers talk about their experience at the Devoxx4Kids event.

PHOTOGRAPHS BY HARTMANN STUDIOS, ORACLE/RON SELLERS

More Organizations

Girls Who Code
This US-based nonprofit organization works to educate, inspire, and equip high school girls with the skills and resources to pursue opportunities in computing fields.

CoderDojo
CoderDojo is a global network of volunteer-led, independent, free computer programming clubs for young people between 7 and 17 who learn how to code; develop websites, apps, programs, and games; and explore technology.

Maker Kids
The Toronto, Canada–based Maker Kids builds maker learning activities for kids and educators and runs one of the world's only "makerspaces" for kids. Curriculum and training are available to educators, parents, and interested adults in any location.

Hour of Code
This global programming movement is reaching tens of millions of students in every country. Hour of Code takes place during Computer Science Education Week, December 8 to 14, 2014. Hour of Code offers one-hour tutorials in more than 30 languages for ages 4 and up.

PHOTOGRAPH BY ORACLE/RON SELLERS

Daniel de Luca, worldwide manager of Devoxx4Kids (top row, center, in white), and Arun Gupta of Devoxx4Kids Bay Area (top row, second from right) with Devoxx4Kids day participants, volunteers, and NAO robots.

training to colleges and universities. JEDI4KiDS was developed when the JEDI founders realized that there was a need to teach programming at an early age. The program offers one-day workshops in Greenfoot, LEGO Mindstorms, and Scratch in partnership with Devoxx4Kids.

"Coding allows children to think creatively and use their brains in a way they have never imagined," says Gerald Concha, founding partner of JEDI4KiDS. "It allows them to feel confident that they can solve problems. If there is something they don't like, they can fix or change it. If there is something they wish they had, they can create it."

The momentum around exposing more kids to computer technology opens the door to a bright future—both for Java and the next generation of Java developers, technologists, and creative minds. `</article>`

Caroline Kvitka is editor in chief of *Java Magazine*.