BOOLEAN GIRL Annual Report 2024

Mission

The mission of Boolean Girl is to diversify STEM (science, technology, engineering and math) by teaching and inspiring girls, low-income students, and underrepresented youth in grades three to eight through meaningful, hands-on instruction and sustained exposure to computer science and engineering in a collaborative and welcoming environment.

We do this by engaging students in our in-school and after-school programs where they learn from rockstar instructors how to code, build, invent, and animate through unique projects, all while creating an enthusiastic STEM community with their peers.

Celebrating A Decade of Boolean Girl

We founded Boolean Girl in 2014 and began running Summer Camps and Clubhouses the following year. This summer, we will be celebrating our 10th Anniversary of Summer Camp!

As teachers and educators, we began Boolean Girl to develop and foster an interest in coding and engineering among elementary-aged girls. While there are tech programs for girls over 14, there are few that cultivate early and sustained interest in coding and engineering. That's where we come in. Over the years, we expanded this mission to reach into underserved and lower-income communities to further our mission to truly diversify STEM.

Our goal is to build an inclusive STEM community by inspiring underrepresented kids to code with early engagement and continued programming, thereby helping the next generation of coders and engineers grow in confidence as they get older and pursue careers in these vital fields.

How's it Going?

We started our journey teaching 49 girls in one elementary school in Arlington. We have now reached over 44,840 girls and underrepresented youth throughout the DMV, in addition to online students across the country.

44,840

Program Expansion

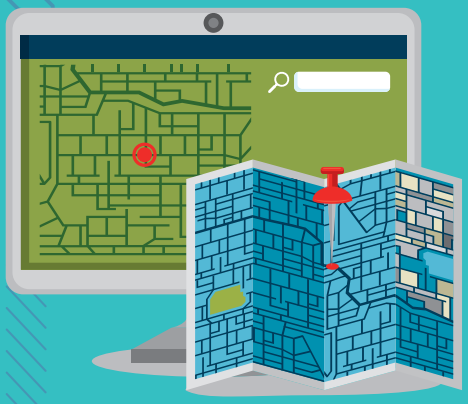
Over the past year, our "micro:bit for All" program and in-school curriculum opened the doors of computer science and engineering to underrepresented students who previously had limited access to these subjects. We got to see firsthand the excitement of discovery.

For many of these students, this is only the beginning. Students who are eager for more and are ready to dive deeper need a place to grow. Our after-school programs give these young innovators the support, space, and resources they need to continue exploring, building, and thriving in STEM.

We want to make sure no inspired student is left without a path forward. We need to provide additional after-school programs for students who are eager to do more. They need a place to go, and our goal is to provide that for students who wish to continue their STEM pursuits.

Our after-school programs really started to take off in 2024. We built on what we developed the prior year and broadened the program to include teacher training. By providing specialized resources for these educators, they have been able to begin hosting their own after-school Clubhouses, helping us to expand the program to even more schools.

In 2025, we are working to raise funds for more after-school clubs at schools with high percentages of low income and underrepresented students. These clubs support students who are inspired by the in-school STEM programs and want to do more. Led by teachers at the schools, we also frequently hire high school students to support the teachers.



Geographic Expansion

This past year, we began a small pilot in Loudoun County. Due to its success, we will be growing that pilot into a multiple-school program. We also hope to find funding to begin pilots in Prince George's County, Maryland. For both districts, our goal is to implement in-school and after-school programs that are already proving impactful in other districts across the DMV.

Partnership Building

In 2024, we developed a partnership with Sustainability Matters, a local environmental nonprofit that cultivates community through conservation.Together with **Sustainability Matters**, we will be hosting a game-changing program that combines environmental education and impact with coding and engineering.

As an example, we would host an event where students will learn about the importance of pollinators in the morning. Following that, they will design and build a device for collecting field data on pollinators such as time in the field, number of pollinators, distance traveled, temperature, date, time, and humidity. After conducting a field survey, students will return to the classroom to compare and analyze their data. Over time, students will be able to compare and discuss how their data compares to data sets collected on different days.

Among the many goals for the program is the desire for students to understand how technology is used to support environmental field work and the role that engineers, computer scientists, and data scientists play in environmentally related careers.

> ***I love that in 1 short hour my daughter learned the basics and her knowledge prior to that was zero. Caithin was super nice and professional."*** ~Mirjana D.

Boolean Girl by the Numbers

Revenue:

$333,372.89 Earned Revenue

$254,211.58 Direct Public Support

Expenses:

$34,189 General Operations

$472,856 Programs

$26,265 Fundraising

Supporters: 130

Instructors: 78

Coders and Engineers:

10,140

Number of Girls Reached by Year

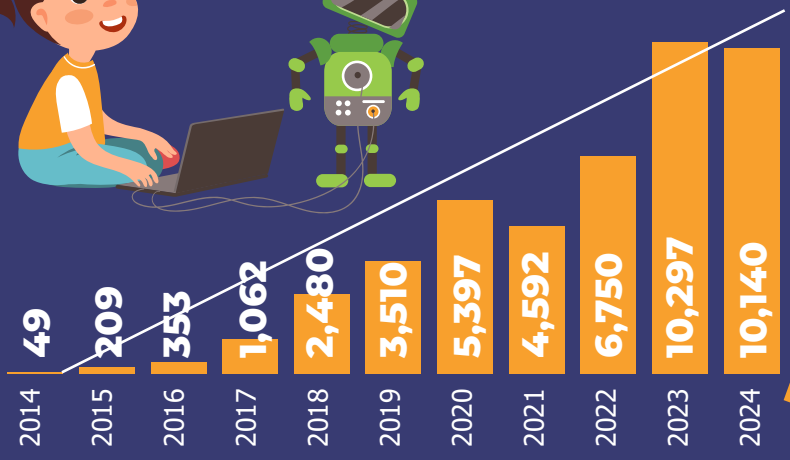
Despite concluding our Hour of Code program and taking our Ambassador program down from one per month to one per quarter in 2024, we maintained our overall numbers and were able to focus more on driving growth in Summer Camp, Clubhouse, and micro:bit for All, programs that impact girls and other underrepresented youth more directly.

Number of Girls Reached in 2024:

10,297

Total reached to date:

44,840



2024 Impact By Program

In-School/After-School Clubhouses:

1,018
participated in a Clubhouse

+79%

Summer Camps:

761
kids attended summer camp

+17%

Micro:bit for All:

4,199
micro:bit kits delivered to schools and individuals

+51%

Partner Schools: 75

+15%

Awards & Grants

Alice and Eugene Ford - STEM programs in DC including DCPS Arts Build day

Amazon - Supporting micro:bit for All in Alexandria and Clubhouse at low-income housing communities in Arlington

Community Foundation for Northern Virginia Business Women's Giving Circle Grant - supports Arlington Clubhouse

CSS - General donation to support micro:bit for all in Montgomery County, MD

LabCorp for Clubhouses in Montgomery County, MD

KFC - Laptops for Clubhouses in DC

Efficiency Group - General Support

Ramboll - Purchased and built micro:bit kits for Title 1 schools

Capital Area Society of Information Management SIM - General Support

Northern VA Magazine: 2024 Best Summer Camp (since 2018)

How Do We Impact the Next Generation of Female Coders?

Clubhouse

Clubhouses deliver hands-on instructions across a wide range of STEM topics for all levels of skill and experience. We run Fall and Winter Clubhouses on Saturdays at Marymount University in Arlington, VA. We partner with Saturday School in Montgomery County to host free Saturday classes for MCPS students and include Boolean Girl sessions in their full-day program. Additionally, we work with teachers across the DMV to bring Clubhouse to their schools as after-school programs.

Summer Camp

Girls age 7+ learn computer science and engineering fundamentals through a series of unique projects and hands-on challenges. Our students learn coding, robotics, AI, engineering, teamwork, and digital citizenship.

micro:bit for All

We work with the Virginia Tech Thinkabit Labs K-20 STEM Education and Workforce Development Programs, along with school districts in our communities, to get a micro:bit kit in the hands of every 5th grader in the DMV (District of Columbia, Maryland, Virginia).

Curriculum for Schools

After pioneering our in-school curriculum in 2024 to great success, we will continue to expand this program, working with teachers and school districts to develop and share lesson plans for in-school STEM learning and after-school programs like Clubhouse.

Ambassadors

Boolean Girl STEM Ambassador events show girls what kind of jobs they could have, featuring successful women who have helped pave the paths for future generations. We now feature Ambassador events once per quarter, so girls have four opportunities each year to learn about jobs in coding and engineering!

micro:bit Challenges

This free resource provides over 25 courses at different levels inspired by our other programs to help kids code and engineer on their own.

Girl Scouts

Our Clubhouses are always free for Girl Scouts. We offer certificates for completion of the Coding Basics badge following Clubhouse classes. Troops and individuals are welcome! We began promoting this program for Fall 2024 Clubhouse, leading to 67 girls and 7 troops attending Clubhouse during that season.

Student-Teachers

We provide leadership opportunities to girls who graduate from our programs or other STEM programs and want to work for us as paid instructors.

Scholarships

We offer full scholarships for students who cannot afford to pay for Clubhouse. We also offer scholarships for our after-school programs in Title 1 schools.

The Gender Gap in STEM

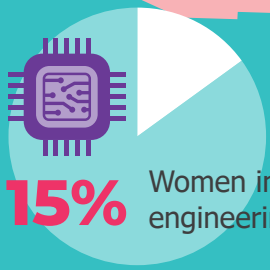
College Educated Workforce

50% Female

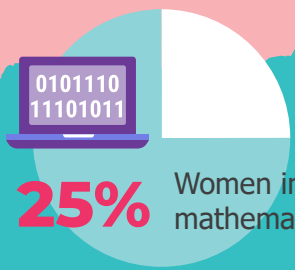
3% Latinx and African American in science & engineering

33% Women in science & engineering

Gender gap among Gen Z men and women pursuing careers in engineering and computer science



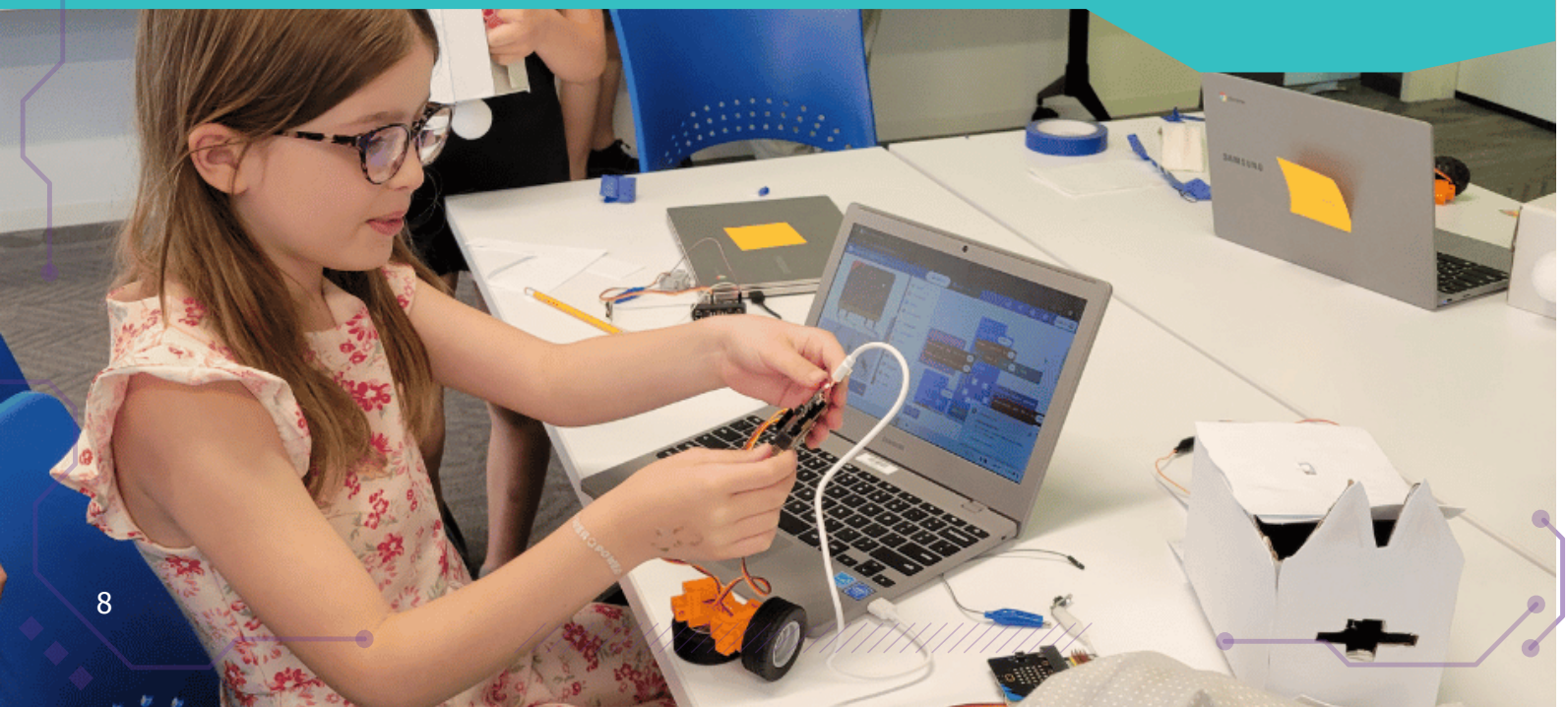
15% Women in engineering



25% Women in computer and mathematical science

As subjects like computer engineering, AI, and robotics will only grow in importance as the world leads us in that direction, we must better prepare girls and women to take on leadership roles in these fields. That starts with fostering inclusive, creative, and collaborative environments in which girls can learn and grow confidence in STEM subjects at a pace equal to that of their male peers. **Read more on our blog** *(blog.booleangirl.org/how-to-address-the-gender-gap-in-stem-fields).*

Source: rulingourexperiences.com/stem



The Confidence Issue

Girls' confidence is in crisis, and it is impacting the gender gap in STEM careers. Our friends at ROX (Ruling Our Experiences) produced a report on the subject that outlines the declining confidence of girls and young women, and its impact on their future careers. This study was supported by Battelle (a Boolean Girl Sponsor)

Girls & STEM & Confidence

Since 2017, there has been a significant decline in self-confidence and self-efficacy among girls.

FROM THE GIRLS' INDEX: GIRLS & STEM IMPACT REPORT 2024 BY RULING OUR EXPERIENCES (ROX) Sponsored by BATTELLE

13%

fewer girls described themselves as confident compared to 2017

5th grade girls showed the steepest decline, dropping from

86% to 68%

Across age groups, confident girls were

20%

more likely to be interested in a STEM occupation than less confident peers

52%

of 5th-6th grade girls report that they do not believe they are smart enough for their dream job, up from

23% in 2017

40%

of girls with a 4.0 grade point average are not sure if they are smart enough for their dream career

Girls who feel like they belong at school are more likely to also describe themselves as confident. Girls who "feel like they can be their true self around people at school" report higher confidence

78%

of girls do everything they can to avoid messing up or falling at something

While girls' interest in STEM is increasing, their perceptions of their abilities in math & science are declining rapidly

My daughter had a lot of fun in this camp and was eager to share the projects she was working on. The extended day program was also great, filled with many engaging activities." ~Daria T.

Girls' confidence declines as they get older, as does their belief in their own abilities & opportunities. Confidence is connected to their perceptions of their own abilities and individual decision making. Feeling support and belonging help strenghten girls' confidence.

How do we address this?

Practice Failing
Show Representation
Build Community
Provide Mentors

Show girls they belong in STEM

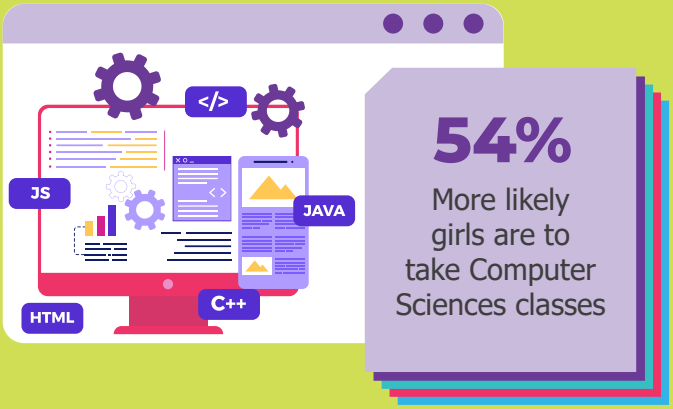
Source: rulingourexperiences.com/stem

The Importance of After-School Programs

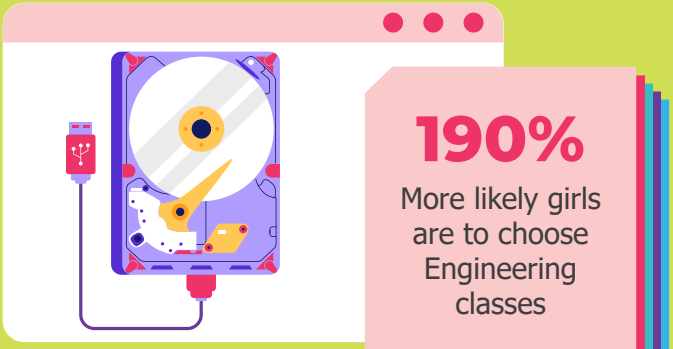
Learning is not just done in the classroom in between bells.

According to data from Million Girls Moonshot, a movement of **STEM Next Opportunity Fund**, from the time they begin elementary school until they graduate high school, more than 80% of children's time is spent learning outside of school. Whether they are participating in after-school programs or summer camps, or learning at museums, libraries, in their communities, or at home, learning is constant and vital to spur on educational ambitions.

Out-of-school STEM programs work! Girls who participate in STEM clubs and activities outside of school are more likely to say they will pursue STEM subjects later in their education.



54%
More likely girls are to take Computer Sciences classes



190%
More likely girls are to choose Engineering classes

The children's information session was both enjoyable and educational! The content was presented in a clear and engaging manner, helping kids grasp ideas more effectively. Thanks for this wonderful educational opportunity."
~Karam J.

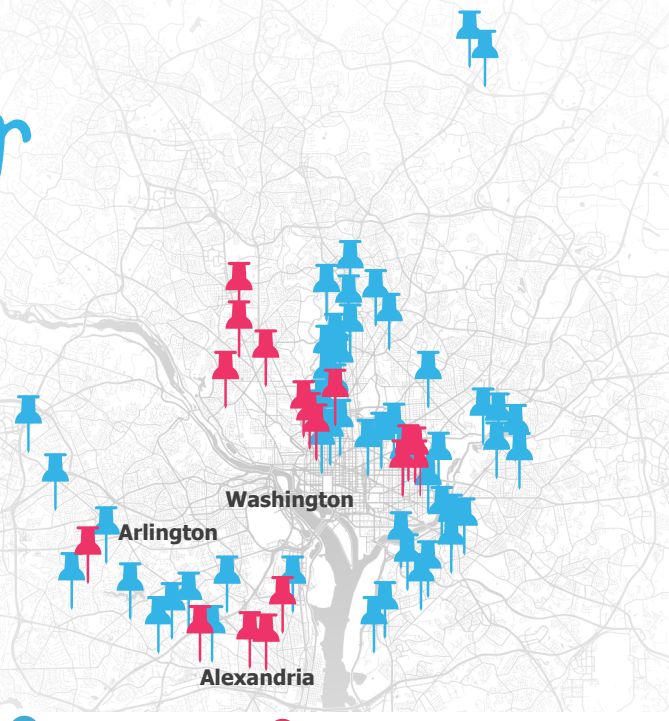
Source: stemnext.org

The Income Factor

By the sixth grade, kids from middle-income households spend 6,000 more hours in after-school and summer learning programs than their low-income peers. We have expanded our mission to include low-income and other underserved groups to help address this disparity.

- **Rural schools, urban schools, and smaller schools are less likely to offer foundational computer science.***
- **This past year, 47% of our students came from low income households and have received scholarships to Boolean Girl.**
- **72% of our partner schools are Title I status.**

** Code.org*



Title 1 School **Non-Title 1 School**

Alexandria Schools:

- Charles Barrett
- Cora Kelly
- Douglas MacArthur
- Ferdinand T Day
- George Mason ++
- James Polk
- Jefferson Houston ++
- John Adams
- Lyles Crouch
- Mount Vernon
- Naomi L Brooks ++
- Patrick Henry ++
- Samuel Tucker ++
- William Ramsay

Arlington:

- Abingdon

FairFax:

- Beech Tree
- Dogwood
- Mason Crest
- Parklawn
- Sleepy Hollow
- Timber Lane

DCPS:

- Barnard
- Beers
- Boone
- Brent
- Brightwood (Wittier)
- Bruce-Monroe
- Burroughs
- Burrville
- Cleveland
- Drew
- Eaton
- Excel Academy
- Garrison
- Hart Middle
- H.D. Cooke
- Houston
- Ida B. Wells
- J.O. Wilson
- Janney
- John Lewis
- Key
- King
- Langley
- LaSalle-Backus
- Leckie
- Ludlow-Taylor
- Malcolm X
- Mann
- Marie Reed
- Maury
- McKinley
- Miner
- Moten
- Oyster-Adams
- Payne
- Randle Highlands
- Raymond
- Ross
- School Without Walls @ Francis-Stevens
- School-Within-School @ Goding
- Seaton
- Smothers
- Stanton
- Takoma
- Thomson
- Walker-Jones
- Whitlock (formerly Aiton)

Montgomery County

- Paint Branch High School
- Springbrook High School
- Burnt Mills Elementary ++
- Cannon Road Elementary ++
- Cresthaven Elementary ++
- Drew Elementary ++
- Greencastle Elementary ++

(++ New in 2024)

Representation Matters

...As society sees what women can do, as women see what women can do, there will be more women out there doing things, and we'll all be better off for it".
~ Ruth Bader Ginsburg

We know representation is important to help children see what is possible. We hire female instructors – often girls in our communities and former campers who have gone on to pursue STEM subjects in high school and college. These instructors are also close in age to the students and may have even gone to their schools, providing relatable role models and mentors for the elementary students.

Girls who know a woman in STEM compared to those who do not:

+39%
Feel powerful while doing STEM

+45%
Know how to pursue a STEM career

+38%
Understand how STEM is relevant and the jobs that are possible through STEM

Source: pewresearch.org/social-trends/2018/01/09/women-and-men-in-stem-often-at-odds-over-workplace-equity/

Boolean Girl Ambassadors

We decreased the number of Ambassador chats to one per quarter in 2024, giving us more time to find top tier female leaders and innovators.

- Siân Gordon, Director, Innovation at lululemon
- Veronica Pinnick, NASA Goddard
- Francesca Civano, Chief Scientist, NASA Goddard
- Priyanka Kamath, Software Engineer Manager, Amazon

Absolutely loved it! Complex topics were explained in such a simple, clear way that children could understand."
~Anna D.

Featured Programs

girl scouts nation's capital

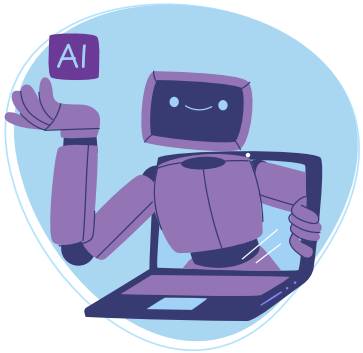
Girl Scouts - National Capital Region

Boolean Girl and the Girl Scouts have always been a great partnership. Girl Scouts are always invited to come to Clubhouse for free. There they can earn their Coding Basics Badge as individuals or with their troops.

In 2024 we began promoting this program to the Girl Scouts - National Capital Region troops, at which point we saw tremendous growth in the program. For the Fall 2024 Clubhouse, we hosted a Girl Scout troop in every Clubhouse (one troop per Clubhouse is our limit), accounting for a total of 67 girls and 7 troops.

Interested in bringing your troop? Learn more at booleangirl.org/girl-scouts or get on the list by emailing info@booleangirl.org.

> ***Boolean Girl was so welcoming to our Girl Scout troop! They provided us with wonderful and knowledgeable instructors who really knew coding. Our troop was completely engaged in coding for the entire time. Thank you again for your flexibility with our shifting number of participants! We will be back!"***
>
> ~Victoria K.



Artificial Intelligence

While AI has been part of our lives for years — from spell check on our computers, face ID on our phones, spam filters, and much more — there has been a more recent surge in interest of AI in elementary computer science education. Generative AI tools, a type of artificial intelligence that can create content, such as ChatGPT, have become more accessible, which is already leading to an impact on education globally. According to the 2023 State of Computer Science Education report by Code.org, 44% of teachers believe that ChatGPT will have a major impact on their jobs.

We cannot prepare students for a future with AI without teaching them the foundations of computer science. Boolean Girl has been integrating AI into our lessons in computer science to students beginning in third grade for over three years already. As the impact of AI increases across subject matter, it becomes increasingly important to introduce students to the concepts, capabilities, and limitations early on.

Source: code.org/assets/advocacy/stateofcs/2023_state_of_cs.pdf

micro:bit for All

The goal of our micro:bit for All program is to get a micro:bit kit in the hands of every 5th grader in the DMV (District of Columbia, Maryland, Virginia) to spark an interest in technology, computer science and engineering. Starting in school then at home, young learners get hands-on experience and make a connection between abstract ideas of coding and real world outcomes in hardware first in the classroom then at home. Students work with hardware and software together to design, build, and prototype physical gadgets. They work to iteratively improve their gadget, along the way making and learning as they create.

Base kits are distributed to schools. Schools that can afford them might purchase them, at cost. Other schools will receive them as part of a grant or donation from corporations, individuals, and foundations that support STEM education for younger learners.

Barcroft Clubhouse

Now an Ongoing Program!

amazon

Now in its second year thanks to funding from our partner, Amazon, our Barcroft Clubhouse program takes STEM education directly to Barcroft Apartments, Section 8 affordable housing in Arlington County. Through this program, we bring our STEM Clubhouse directly to low-income and underrepresented children, many of whom have limited access to after-school and weekend programs. We hope by bringing Boolean Girl to low-income residences such as Barcroft Apartments, we will drive greater awareness to this free (thanks to Amazon!) program and build an interest in and passion for coding and engineering in children who often do not get the opportunities in STEM that those without financial difficulties in their age groups receive.

Sponsorships & Partnerships

When you support Boolean Girl, you transform the lives of the thousands of participants in our online and in-person programs. We are tremendously grateful for the support and hard work of all of our partners. They provide a diverse range of support to our mission, including:

- **Financial support**
- **Providing space for events**
- **Volunteers**
- **Technical support and resources**
- **Guidance**

Learn more about our 2025 sponsorship opportunities and how to get involved on our website (**booleangirl.org/partner**).

Thank You to:

Our Sponsors

amazon

THE community foundation FOR NORTHERN VIRGINIA

SIM CAPITAL AREA — WHERE IT LEADERS CONNECT

labcorp

CSS COMMON SECURITIZATION SOLUTIONS

THE EFFICIENCY GROUP

KFC FOUNDATION

RAMBOLL

WELLS FARGO

Our Partners

Each of these organizations contributes to further the Boolean Girl mission.

ACHIEVEUNITE

ARLINGTON VIRGINIA — DEPARTMENT OF PARKS AND RECREATION

BURGUNDY

CONGRESSIONAL APP CHALLENGE

ACPS Alexandria City Public Schools

DCPS ARTS

DISTRICT OF COLUMBIA PUBLIC SCHOOLS

girl scouts nation's capital

swe Society of Women Engineers

WICS

MARYMOUNT UNIVERSITY

MONTGOMERY COUNTY PUBLIC SCHOOLS

SUSTAINABILITY MATTERS

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