BOOTSTRAP

Bootstrap:Algebra Overview

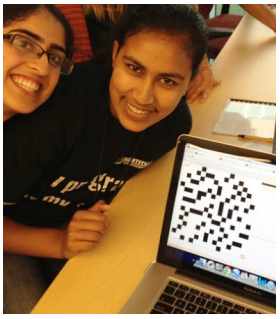
Bootstrap:Algebra is a 25-hour curricular module for students ages 12-16, which teaches algebraic and geometric concepts through computer programming.

Algebra is the Foundation for STEM careers

Success in algebra is critical to students' high school graduation, college enrollment, and earning potential. Unfortunately, many students disengage with math over frustrations with algebra. By integrating algebra with computing, Bootstrap:Algebra fosters student growth in both subjects while helping schools meet logistical and staffing challenges. Using Bootstrap:Algebra as part of a standard algebra class ensures equitable access: since every student takes algebra, Bootstrap:Algebra reaches *all* students – not just those who self-select by race, gender, or income.

Computing and Algebra: Together!

In Bootstrap:Algebra, students program a videogame of their own design, learning core algebra concepts like order of operations; function composition; function definition; inequalities; piecewise functions; and the distance formula. This is done amidst important computer science concepts such as reactive programming, datatypes, testing, and code reviews. Our explicit connection to algebra is unique among programming tools for beginners, and we've published results showing real impact in algebra.



Aligned to National & State Standards

We provide complete lesson plans, student materials, software, and teacher-training workshops. Our lessons are aligned to various state and national standards, and we continually assess our impact on student math achievement. Tens of thousands of students across the country have found success with Bootstrap:Algebra implemented in middle and high school math classes, IT/CS classes, media classes, standalone electives, and afterschool programs.

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Doesn't all programming teach math?

No! Most of the programming used in K-12 curricula teaches concepts called "functions" and "variables" that break basic rules of algebra. This kind of programming fails to reinforce, and actively violates, what students learn in mathematics.

Who is using Bootstrap:Algebra?

Students from Oakland to New York, Chicago to DC, and Minneapolis to Houston are discovering algebra and computer science through Bootstrap: Algebra. The course reaches more than *25,000 students* each year (43% female, 46% URM), in 17 states and 5 countries, and has been recognized by Code.org, Google, Microsoft, the NSF, and the White House.

Do teachers need a whole semester to teach Bootstrap:Algebra?

While some teachers use Bootstrap as a dedicated class, Bootstrap: Algebra is designed to be flexible, and can be taught with *as little as 25 hours of classroom time*. Most of these hours cover material that is already in the math curriculum. Implementations range from 1-2x a week for a whole semester to an end-of-semester module spread over 3-4 weeks. We can help individual teachers meet their needs. From there it scales up to a semester- or year-long course (Bootstrap: Reactive), and further (Bootstrap: Data Science, etc.).

Can a math teacher really teach Bootstrap: Algebra after a single PD workshop?

Yes! Bootstrap:Algebra leverages significant content and pedagogic techniques from math classes. Math teachers learn how to present material they're already comfortable with through computing, using techniques they already know. Hundreds of math teachers have successfully completed the PD; many have reported their surprise at how natural they find Bootstrap:Algebra.

What resources or equipment do we need?

Bootstrap: Algebra does not require full-time access to a computer lab. The class requires one computer for each pair of students, during one out of every four instructional hours. Our curriculum uses a paper-and-pencil workbook in which students design programs and functions before working on the computer. In addition, our software runs entirely on the Web; this requires internet access, but there is no software to install or maintain.

Are there PD trainings or workshops? How much do they cost?

We offer several PD and support packages for districts, tailored to different needs and budgets. We also run open-enrollment workshops that can accommodate individual teachers. See our website for workshop dates, or contact us for pricing. In some locations we can greatly subsidize cost thanks to sponsors. Check out our curricular materials for free on our website.

To see our materials, research, and evaluation results, find an upcoming PD workshop, or learn more, visit **www.bootstrapworld.org** or e-mail us at **contact@bootstrapworld.org**.