

Scratch, Blockly & Co., Blocksysteme zum Programmieren

Scratch-Alternativen, ... https://wiki.scratch.mit.edu/wiki/Alternatives_to_Scratch

HTML5 als Grundlage wär besser, die Zukunft von **Flash** ist unklar.

Liste der **Modifikationen** ... https://scratch-dach.info/wiki/Liste_der_Modifikationen

Enchanting (Scratch Modifikation) ... [https://scratch-dach.info/wiki/Enchanting_\(Scratch_Modifikation\)](https://scratch-dach.info/wiki/Enchanting_(Scratch_Modifikation))

Beetle Blocks ist wie Scratch oder **BlocksCAD** für 3D-Grafiken... https://scratch-dach.info/wiki/Beetle_Blocks

Beetle Blocks GitHub Repository ... <https://github.com/ericrosenbaum/BeetleBlocks>

Beetle Blocks (3D-Design), ... <http://beetleblocks.com/>

Mod Share ... z.B.: Supported Scratch-Modifications ... https://wiki.scratch.mit.edu/wiki/Mod_Share

Scratch ... <https://wiki.scratch.mit.edu/wiki/Scratch>

Snap ... [https://wiki.scratch.mit.edu/wiki/Snap_\(Scratch_Modifikation\)](https://wiki.scratch.mit.edu/wiki/Snap_(Scratch_Modifikation))

Bingo ... [https://wiki.scratch.mit.edu/wiki/Bingo_\(Scratch_Modifikation\)](https://wiki.scratch.mit.edu/wiki/Bingo_(Scratch_Modifikation))

Panther ... [https://wiki.scratch.mit.edu/wiki/Panther_\(Scratch_Modifikation\)](https://wiki.scratch.mit.edu/wiki/Panther_(Scratch_Modifikation))

Insanity ... [https://wiki.scratch.mit.edu/wiki/Insanity_\(Scratch_Modifikation\)](https://wiki.scratch.mit.edu/wiki/Insanity_(Scratch_Modifikation))

... weitere: Stack, Kitcat, Ghost, Streak

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Blockly is used by hundreds of projects, most of them educational: ... <https://developers.google.com/blockly/>

Blockly, RoboBlockly, ... <https://code.org/learn>

Google Education, 1 Stunde, ... <https://hourofcode.com/blockly>

Got PCs with slow (or non-existent) internet access? Download the Blockly tutorials that were the precursor of the Code.org tutorials - a single 3MB ZIP file can be loaded onto any computer or used off a memory stick

Blockly Games ... <https://blockly-games.appspot.com/>

App Inventor ... <http://appinventor.mit.edu/explore/>

Code (div.) ... <https://code.org/>

Ozo Blockly (Mini-Roboter) - Ozobot Bit robot using the OzoBlockly editor. ... <http://ozoblockly.com/>

micro:bit (Raspberris Pi, MicroPython) ... <http://microbit.org/>

BlocklyProp ... www.parallax.com/product/program-blocklyprop

wonder workshop (dash-Roboter) ... www.makewonder.de

Robertar, NEPO (div.) ... <https://lab.open-roberta.org/>

Made w/ Code (div. s. Projekte) ... www.madewithcode.com/

all can code (apps & games) ... <https://next.allcancode.com/home>

CodeBug (Raspberris Pi) ... www.codebug.org.uk/

LearnToMod (Minecraft) ... <https://www.learntomod.com/>

Gamefoot ... <http://make.gamefroot.com/auth/login?ref=%2F>

Gameblox ... <https://gameblox.org/>

scriptr; (Apps usw.) ... <https://www.scriptr.io/>

NovaLabs (div.) ... www.pbs.org/wgbh/nova/labs/lab/cyber/

Code Spells (games usw.) ... <https://codespells.org/>

Thymio (Roboter) ... <https://www.thymio.org/home-de:home>

Blockly for Web, Blockly for developers ... <https://developers.google.com/blockly/guides/get-started/web>

Blockly in a browser allows web pages to include a visual code editor for any of Blockly's five supported programming languages, or your own. In Blockly Games, pictured here, users can solve a maze using Blockly's editor on the right. Blockly is...

- **Pure JavaScript library.** Under 150kb over the wire.
- 100% client side. No server side dependencies.
- Compatible with all major browsers: Chrome, Firefox, Safari, Opera, and IE.
- Highly customizable and extensible.

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SNAP! ... Build Your Own Blocks, Examples, Teachers, Links, Extensions, ... <http://snap.berkeley.edu/>

drag-and-drop interface • visual metaphors for loops, conditionals, etc. • easy animation, ... from Scratch

Snap programmieren (TheSimpleInformatics), ... <https://www.youtube.com/watch?v=kSLnwUuE3Xg>

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micro:bit - JavaScript Blocks Editor, **Python** Editor - Let's code... <http://microbit.org/code/>
 makecode.microbit: **JavaScript Blocks** Editor, ... <https://makecode.microbit.org/>
 Microsoft Block Editor, micro:bit ... <https://www.microbit.co.uk/blocks/editor>

BlocksCAD, 3D-Teach ... <https://www.blockscad3d.com/>
 Editor: ... <https://www.blockscad3d.com/editor/>
 Community Project **Gallery** ... https://www.blockscad3d.com/community/projects#/?_k=sb0wr4

RoboBlockly, wie **Scratch**, ... <http://roboblockly.ucdavis.edu/>

Projekt-Webseite **Open Roberta**, (deutsch) ... <https://lab.open-roberta.org/>

Stunde des Codes, (**Hour of Code**) ... <https://hourofcode.com/de/learn>
 z.B. Minecraft, oder Creative Computing with **Kano Code!** Street Artist Kano, ... <https://kano.me/educators/lesson-plans>
 Coding with **RoboBlockly**, ... <https://hourofcode.com/roboba>
 Editor: ... <http://roboblockly.ucdavis.edu/hourofcode/h1.php>

Lego-Mindstorms. ... www.modrobotics.com/education/#lesson-plans

Make a game with **Gameblox** ... <https://gameblox.org/>

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Allgemein:

Python, Ruby oder Javascript?, ... 30.05.2016, ... <http://t3n.de/news/programmiersprache-lernen-711022/>

Ist der Hype um den **Calliope mini** gerechtfertigt? ...
<https://medienistik.wordpress.com/2017/01/02/dichtung-und-wahrheit-ist-der-hype-um-den-calliope-mini-gerechtfertigt/>
 Gegenwind – Calliope mini ... 20. Dezember 2016, stephannoller ... <https://calliopemini.wordpress.com/2016/12/20/gegenwind/>

Informatik in der Schule - **Nächste Stunde: App programmieren**. 31.05.2017, ... „**In Sachen Coding sind wir Entwicklungsland**“, sagt der Hauptgeschäftsführer des Digitalverbandes **Bitkom**, Bernhard Rohleder. „Derzeit steht Informatik nur in Bayern, Sachsen und Mecklenburg-Vorpommern verpflichtend auf dem Stundenplan.“

<http://www.faz.net/aktuell/beruf-chance/campus/informatik-in-der-schule-naechste-stunde-app-programmieren-15031281.html>

Rekord-Lücke : **237.500 MINT-Arbeitskräfte fehlen**, 10.05.2017 ...

<http://www.faz.net/aktuell/beruf-chance/beruf/rekord-luecke-237-500-mint-arbeitskraefte-fehlen-15008939.html>

Jeder zehnte deutsche Jugendliche kann programmieren, 19.10.2017 ...

www.faz.net/aktuell/wirtschaft/diginomics/digitalisierung-jeder-zehnte-deutsche-jugendliche-kann-programmieren-15253986.html

„**Wir brauchen dringend das Schulfach Programmieren**“, 24.10.2017 ...

www.faz.net/aktuell/wirtschaft/diginomics/it-verband-schlaegt-alarm-programmieren-als-schulfach-dringend-noetig-15261087.html

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Mirobot-Apps, ... Building the v2 Mirobot.doc, ... <http://apps.mirobot.io/>

- **Blockly** - allows more advanced programming techniques to be used to control Mirobot, ... <http://apps.mirobot.io/blockly/>
- **Snap!** - Snap! is very similar to Scratch and is good for using the addon sensors in code, ... <http://apps.mirobot.io/snap/>
- **Chrome App** - Check out standalone App which lets you run all of the apps from this site., ... <http://apps.mirobot.io/chrome/>
- **Javascript** - Program Mirobot using the full power directly from your browser, ... <http://apps.mirobot.io/javascript/>
- **Mirobot UI** - This is the built-in simple drag-and-drop app used to program Mirobot, ... <http://apps.mirobot.io/mirobot-ui/>
- **Point & Click** - Click to control Mirobot and see the program it would use, ... <http://apps.mirobot.io/point-click/>
- **Python** - Program Mirobot using the Python language from within your browser, ... <http://apps.mirobot.io/python/>
- **Remote Control** - Use buttons to directly remote control your Mirobot, ... <http://apps.mirobot.io/remote/>
- **Scratch** - Use Scratch to program your Mirobot (**requires Flash**), ... <http://apps.mirobot.io/scratch/>

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List of Scratch Modifications ... https://wiki.scratch.mit.edu/wiki/List_of_Scratch_Modifications

This page lists all completed [Scratch Modifications](#) known to this wiki. Please note that it does not include incomplete nor pre-release mods. [Mod Share](#) is a website where Scratch modifications and projects made in them can be shared and played online.

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Mod Share ... z.B.: Supported Modifications Mod Share allows the upload of any SB file, but also supports the following Scratch modifications: ... https://wiki.scratch.mit.edu/wiki/Mod_Share

- [Scratch](https://wiki.scratch.mit.edu/wiki/Scratch) ... <https://wiki.scratch.mit.edu/wiki/Scratch>
- Snap** ... [https://wiki.scratch.mit.edu/wiki/Snap_\(Scratch_Modification\)](https://wiki.scratch.mit.edu/wiki/Snap_(Scratch_Modification))
- Bingo** ... [https://wiki.scratch.mit.edu/wiki/Bingo_\(Scratch_Modification\)](https://wiki.scratch.mit.edu/wiki/Bingo_(Scratch_Modification))
- Panther** ... [https://wiki.scratch.mit.edu/wiki/Panther_\(Scratch_Modification\)](https://wiki.scratch.mit.edu/wiki/Panther_(Scratch_Modification))
- Insanity** ... [https://wiki.scratch.mit.edu/wiki/Insanity_\(Scratch_Modification\)](https://wiki.scratch.mit.edu/wiki/Insanity_(Scratch_Modification))
- ... weitere: Stack, Kitcat, Ghost, Streak

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Alternatives to Scratch ... https://wiki.scratch.mit.edu/wiki/Alternatives_to_Scratch

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 - 1.1.2 3D
 - 1.2 **Text-Based** Programming
 - 1.2.1 Tutorials
 - 1.3 Game Engines
 - 1.4 Other lists
- 2 Animation/Art Alternatives**
 - 2.1 3D Animation
 - 2.2 2D Animation
 - 2.3 Other lists

Programming Alternatives - Drag and Drop Programming - 2D

Program	Description	Code On	Code For
BYOB/Snap!	Snap! is an advanced Scratch Modification with lambdas, first class data, procedures, recursion, and many other features. Version 4.0 was renamed Snap! and was rewritten in JavaScript, and is thus no longer considered a Scratch modification.	Desktop, Mobile	Desktop, Mobile
Blockly	A drag and drop language made by Google. It is used on many websites. It converts the Scratch-like language to another text-based language in real time. This could be useful in learning traditional languages such as Javascript or Python. This is being used for the new Scratch 3.0 .	Desktop, Mobile	Desktop, Mobile
Android App Inventor	The Android App Inventor by Google allows Android apps to be created with a simple, Scratch-like interface. In fact, it was based on Scratch and coded by a team at MIT.	Desktop	Android
Stencyl	Stencyl has an interface similar to Scratch, but it has slightly more advanced editing features.	Desktop, Mobile	Desktop, Mobile
Gamefroot	An online game creation software for creating side-scrolling games. It has a drag and drop block editor for advanced scripting.	Desktop, Mobile	Desktop, Mobile
Pocket Code	A visual programming language and app for Android, iOS, and Windows Phone smartphones, tablets, and HTML5 enabled mobile browsers. It is inspired by Scratch and developed by the Catrobat team as free open source software.	Android	Android
Hopscotch	An iOS-based application which is similar to Scratch but is simpler and easier to use. It's somewhat based in the middle of Scratch and ScratchJr. Hopscotch is primarily for iPad, with the player being the only thing accessible on other devices.	iOS	iOS
GameSalad	A drag-and-drop programming software, aimed at inexperienced coders, which allows anyone to create games easily.	Desktop	Desktop, Mobile
GameMaker Studio	A drag-and-drop game-making software that can be used by inexperienced coders to create video games of many genres. Also uses "Game Maker Language", a CUI programming language used to add more advanced features to a game.	Microsoft Windows	Desktop, mobile, Xbox One, PlayStation 4

3D- Programming

- **BeetleBlocks:** A GUI-based programming language, based off Scratch, which can be used for 3D modelling, unlike Alice.
- **Alice:** Features 3D projects. Created by Carnegie Mellon.
- **Starlogo-TNG:** Supports 3D models and terrain. Block-based, and meant for simulations and education purposes. Created by the MIT STEP group.

Text-Based Programming

Text-based programming is done through a [programming language](#). Here are several:

Language	Description	Implementation(s)	Editor(s)
Java	Java was originally created and popularised as a platform-independent programming language. In modern day, Java is a general purpose language.	<ul style="list-style-type: none"> • Java Runtime Environment: Software developed by Oracle for running Java that includes a virtual machine for interpreting compiled Java programs • Java Development Kit: Software for developing Java programs, that includes a Java compiler 	<ul style="list-style-type: none"> • Greenfoot: Greenfoot is a simple Java development environment with extensive documentation. It is focused on graphics and interactivity. It is often used with Java beginners. • Eclipse: A professional and widely-used Java IDE.
Python	Python is a general-purpose coding language with emphasis on readability. There are also libraries available for communicating with Scratch and reading/writing Scratch files.	<ul style="list-style-type: none"> • CPython: The Python interpreter 	<ul style="list-style-type: none"> • Command Line: This approach, although very advanced, does allow for the use of any Text Editor, like vim. • PyCharm: A cross-platform Python IDE.
C	C is a language originally praised for its portability. It was created by Dennis Ritchie and used to program Unix. C is also used in Linux. C# and C++ are based on C. Nowadays, they are often used in operating systems and embedded systems. They are also commonly taught languages.	<ul style="list-style-type: none"> • GNU C Compiler: A part of the GNU Compiler Collection 	<ul style="list-style-type: none"> • Command Line: This approach, although very advanced, does allow for the use of any Text Editor, like vim.
C++	C++ is a programming language based on C that features object-oriented programming. It was invented by Bjarne Stroustrup.	<ul style="list-style-type: none"> • G++: The C++ compiler in the GNU Compiler Collection 	<ul style="list-style-type: none"> • Emacs: A text editor • Code::Blocks: A C++ IDE
C#	C# is a programming language by Microsoft that is based on C.	Visual Studio has a C# compiler.	<ul style="list-style-type: none"> • Microsoft Visual Studio: An advanced, professional IDE created by Microsoft designed for the languages Visual Basic, C#, C++, and F#. Though more languages may be added.
ActionScript	ActionScript is a general purpose programming language for Adobe Flash. Flash provides powerful libraries for graphics and animations. It is, however, not free.	<ul style="list-style-type: none"> • Flash Player: The Flash player for playing Flash applets 	<ul style="list-style-type: none"> • FlashDevelop: A Flash IDE.
Lua	Lua is a lightweight programming language which uses multiple paradigms. Lua is a very popular language in programming video games and is used as the main programming language for ROBLOX .	<ul style="list-style-type: none"> • Lua: The Lua compiler 	<ul style="list-style-type: none"> • ZeroBrane Studio - A lightweight Lua IDE.
HTML & CSS	Websites are coded in HTML & CSS. The basics are simple to learn.	<ul style="list-style-type: none"> • Chrome: A browser by Google • Firefox: A browser by Mozilla 	<ul style="list-style-type: none"> • Brackets: A simple, clean web IDE. • Atom: A text editor by GitHub
Javascript	Javascript is a language used for	Modern browsers should support	<ul style="list-style-type: none"> • Brackets - A simple, clean web

	making interactive web applications. Any web editor should be good for JavaScript.	JavaScript.	IDE.
Logo	Logo is the predecessor to Scratch, created by MIT. It is text-based, with commands closely resembling those of Scratch. It provides a single sprite , a turtle, which is used to draw via a set of Pen instructions. It has procedures (which may output values), recursion and first-class lists.	n/a	n/a
QB64	QB64 has a large variety of applications and can be easily be picked up by beginners to text based programming. It is very similar to Python and is a offshoot of BASIC.	<ul style="list-style-type: none"> • QB64 - The original QB64 compiler. 	<ul style="list-style-type: none"> • The compiler comes with an IDE but any editor such as Notepad++ will work fine.
Haskell	Haskell is an ML-style functional programming language used in academia. It features pattern matching, lazy evaluation, closures and partial application, and an expressive type system.	<ul style="list-style-type: none"> • Glasgow Haskell Compiler • Haskell Platform "Haskell with batteries included" - Includes the Glasgow Haskell Compiler, the Cabal build system, the Stack tool, and common Haskell modules • Downloads page 	List of IDEs and text editors
Rust	Rust is a systems programming language that ensures memory safety via compile-time tracing of object lifetimes.	<ul style="list-style-type: none"> • The Rust compiler 	n/a

Tutorials - To learn how to code in text-based programming languages, try:

- [Codecademy.com](#) teaches the basics of coding in a fun and interactive way. It has interactive help guides and built-in code interpreters. It teaches a variety of common languages, from Javascript to Python.

Game Engines

- [GameMaker](#): GameMaker is quite similar to Scratch, except it also allows the option of typing commands and features commands geared more towards making games, whereas Scratch is more open. It is a good introduction to text-based programming and debugging. It is not free, but a free version is available with fewer features.
- [Unity3d](#): Unity3d is a program that is used for the making of 3D games. It supports coding in three languages: Javascript, C#, and Boo. It may also be confusing to a beginner due to all the new features in comparison to Scratch, but with time, this should wear away.
- [Godot](#): Godot is an open-source game engine. Godot uses its own programming language, GDScript.
- [The Source Engine](#) is a Game Engine in which the MP version is free, it includes things like faceposing, volumetric lighting, an I/O system, and more things that can be used to create a mod/game. It does things like Fresnel water effects and dynamic rendering for you.

Other lists

- [List of Educational programming languages](#)
- [Comprehensive list of programming languages](#)



Built with Blockly

<https://developers.google.com/blockly/>

Blockly is used by hundreds of projects, most of them **educational**:



Blockly Games ... <https://blockly-games.appspot.com/>
App Inventor ... <http://appinventor.mit.edu/explore/>
Code (div.) ... <https://code.org/>



Ozo Blockly (Mini-Roboter) ... <http://ozoblockly.com/>
micro:bit (Raspberrys Pi, MicroPython) ... <http://microbit.org/>
BlocklyProp ... www.parallax.com/product/program-blocklyprop



wonder workshop (dash-Roboter) ... www.makewonder.de
Roberta, NEPO (div.) ... <https://lab.open-roberta.org/>
Made w/ Code (div. s. Projekte) ... www.madewithcode.com/



all can code (apps & games) ... <https://next.allcancode.com/home>
CodeBug (Raspberrys Pi) ... www.codebug.org.uk/
LearnToMod (Minecraft) ... <https://www.learntomod.com/>

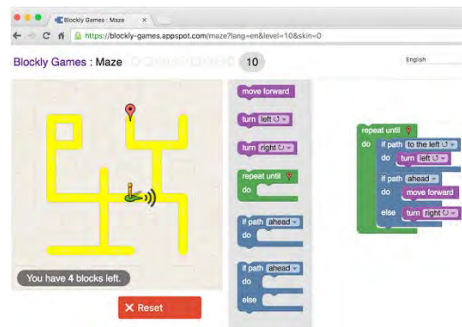


Gamefroot ... <http://make.gamefroot.com/auth/login?ref=%2F>
Gameblox ... <https://gameblox.org/>
scriptr; (Apps usw.) ... <https://www.scriptr.io/>



NovaLabs (div.) ... www.pbs.org/wgbh/nova/labs/lab/cyber/
Code Spells (games usw.) ... <https://codespells.org/>
Thymio (Roboter) ... <https://www.thymio.org/home-de:home>

Blockly for Web



Blockly in a browser allows web pages to include a visual code editor for any of Blockly's five supported programming languages, or your own. In Blockly Games, pictured here, users can solve a maze using Blockly's editor on the right. Blockly is...

- **Pure JavaScript library.** Under 150kb over the wire.
- 100% client side. No server side dependencies.
- Compatible with all major browsers: Chrome, Firefox, Safari, Opera, and IE.
- Highly customizable and extensible.

<https://developers.google.com/blockly/guides/get-started/web>

iOS and Android



Blockly running natively on iOS and Android demonstrates improved performance and tighter integration with platform UI frameworks. In addition to standard features, Blockly for iOS includes experimental support for multitouch capabilities and block animations. Blockly for Android provides deep support for Fragments and UI customization.

Get started on iOS • [Blockly iOS Codelab](#) • on **Android** ... <https://developers.google.com/blockly/guides/get-started/android>

Scratch Blocks (developer preview)



Google and the MIT Media Lab's Scratch Team are collaborating on the development of a new generation of graphical programming blocks, called Scratch Blocks. Scratch Blocks builds on Google's Blockly technology and the Scratch team's expertise in designing creative interfaces for young learners. Scratch Blocks is...

- A collaboration between MIT and Google, on Blockly.
- Beginner friendly with an icon based horizontal UI.
- Scratch's standard vertical UI (in progress).
- Designed specifically for younger kids.

Explore Scratch Blocks ... <https://scratch.mit.edu/developers>
 z.B. HTML5 ... <https://scratch.mit.edu/search/projects?q=HTML5>

...

robotictrends.com: Evolve Inc. News, **Ozobot Bit** Uses Google Blockly to Make Programming Fun ... http://www.robotictrends.com/company/evolve_inc

...

Google Research Blog

Project Bloks

June 27, 2016 - The latest news from Research at Google ...
<https://research.googleblog.com/2016/06/project-bloks-making-code-physical-for.html>

Project Bloks: Making code physical for kids

Posted by Steve Vranakis and Jayme Goldstein, Executive Creative Director and Project Lead, Google Creative Lab

At Google, we're passionate about empowering children to create and explore with technology. We believe that when children learn to code, they're not just learning how to program a computer—they're learning a new language for creative expression and are developing computational thinking: a skillset for solving problems of all kinds.

In fact, it's a skillset whose importance is being recognised around the world—from President Obama's [CS4All program](http://www.cs4all.io/educators/tools-and-student-resources) ...
<http://www.cs4all.io/educators/tools-and-student-resources>

to the inclusion of [Computer Science in the UK National Curriculum](https://www.gov.uk/government/publications/national-curriculum-in-england-computing-programmes-of-study/national-curriculum-in-england-computing-programmes-of-study). ...
<https://www.gov.uk/government/publications/national-curriculum-in-england-computing-programmes-of-study/national-curriculum-in-england-computing-programmes-of-study>

We've long supported and advocated the furthering of CS education through programs and platforms such as [Blockly](https://developers.google.com/blockly/), ...
<https://developers.google.com/blockly/>

[Scratch Blocks](https://developers.google.com/blockly/), ...
<https://developers.google.com/blockly/>

[CS First](https://www.cs-first.com/de/home) ...
<https://www.cs-first.com/de/home>

and [Made w/ Code](https://www.madewithcode.com/projects/). ...
<https://www.madewithcode.com/projects/>

Today, we're happy to announce [Project Bloks](https://projectbloks.withgoogle.com/), ...
<https://projectbloks.withgoogle.com/>

a research collaboration between Google, [Paulo Blikstein](https://www.ideo.com/eu) (Stanford University) and [IDEO](https://www.ideo.com/eu) with the goal of creating an **open hardware platform** that researchers, developers and designers can use to build physical coding experiences. ...
[IDEO-München, Kellerstraße 27, 81667 München, +49 89 38 3467 0 ... https://www.ideo.com/eu](https://www.ideo.com/eu)

As a first step, we've created a system for tangible programming and built a working prototype with it. We're sharing our progress before conducting more research over the summer to inform what comes next.

Physical coding

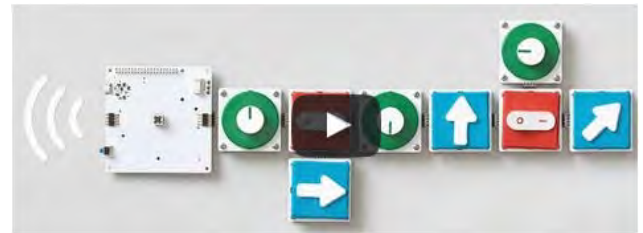
Kids are inherently playful and social. They naturally play and learn by using their hands, building stuff and doing things together. Making code physical - known as tangible programming - offers a unique way to combine the way children innately play and learn with computational thinking.

Project Bloks is preceded and shaped by a long history of educational theory and research in the area of hands-on learning. From [Friedrich Froebel](https://www.ideo.com/eu), [Maria Montessori](https://www.ideo.com/eu) and [Jean Piaget's](https://www.ideo.com/eu) pioneering work in the area of learning by experience, exploration and manipulation, to the research started in the 1970s by Seymour Papert and Radia Perlman with [LOGO and TORTIS](https://www.ideo.com/eu). ...
<http://cyberneticzoo.com/cyberneticanimals/1969-the-logo-turtle-seymour-papert-marvin-minsky-et-al-american/>

This exploration has continued to grow and includes a [wide range of research and platforms](http://hci.cs.tufts.edu/tern/). (Programming with Wooden Blocks)...
<http://hci.cs.tufts.edu/tern/>

However, designing kits for tangible programming is challenging—requiring the resources and time to develop both the software and the hardware. Our goal is to remove those barriers.

By creating an open platform, Project Bloks will allow designers, developers and researchers to focus on innovating, experimenting and creating new ways to help kids develop computational thinking. Our vision is that, one day, the Project Bloks platform becomes for tangible programming what [Blockly](https://developers.google.com/blockly/) is for on-screen programming. ...
<https://developers.google.com/blockly/>



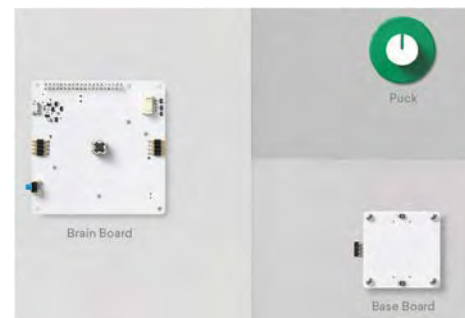
The Project Bloks system

We've designed a system that developers can customise, reconfigure and rearrange to create all kinds of different tangible programming experiences.

A birdseye view of the customisable and reconfigurable Project Bloks system

The Project Bloks system is made up of three core components the "Brain Board", "Base Boards" and "Pucks". When connected together they create a set of instructions which can be sent to connected devices, things like toys or tablets, over wifi or Bluetooth.

The three core components of the Project Bloks system



The three core components of the Project Bloks system



Pucks allow for the creation and customisation of endless amount of different domain-specific physical instructions cheaply and easily.

Pucks: abundant, inexpensive, customisable physical instructions

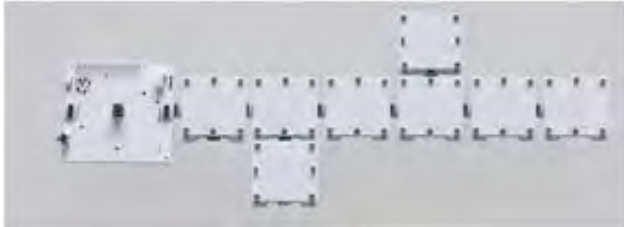
Pucks are what make the Project Bloks system so versatile. They help bring the infinite flexibility of software programming commands to tangible programming experiences. Pucks can be programmed with different instructions, such as 'turn on or off', 'move left' or 'jump'. They can also take the shape of many different interactive forms—like switches, dials or buttons. With no active electronic components, they're also incredibly cheap

and easy to make. At a minimum, all you'd need to make a puck is a piece of paper and some [conductive ink](#). ...

https://en.wikipedia.org/wiki/Conductive_ink

Base Boards: a modular design for diverse tangible programming experiences

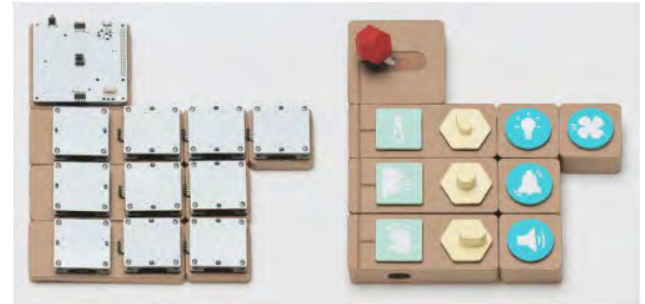
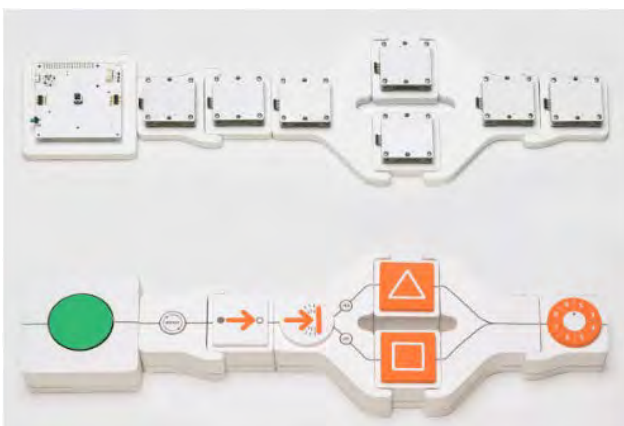
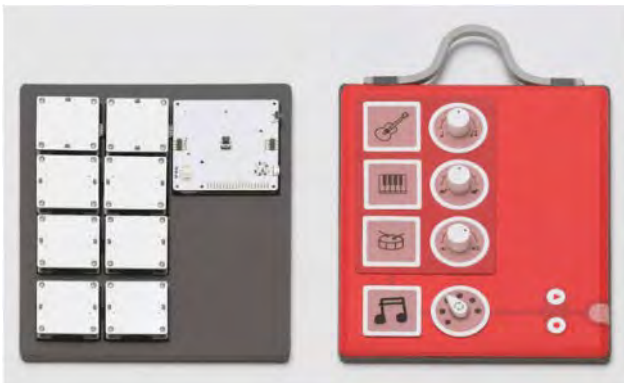
Base Boards read a Puck's instruction through a capacitive sensor. They act as a conduit for a Puck's command to the Brain Board. Base Boards are modular and can be connected in sequence and in different orientations to create different programming flows and experiences.



The modularity of the Base Boards means they can be arranged in different configurations and flows

Each Base Board is fitted with a haptic motor and LEDs that can be used to give end-users real time feedback on their programming experience. The Base Boards can also trigger audio feedback from the Brain Board's built-in speaker. **Brain Board: control any device that has an API over WiFi or Bluetooth** The Brain Board is the processing unit of the system, built on a [Raspberry Pi Zero](#). ... <https://www.raspberrypi.org/downloads/>

It also provides the other boards with power, and contains an API to receive and send data to the Base Boards. It sends the Base Boards' instructions to any device with WiFi or Bluetooth connectivity and an API. As a whole, the Project Bloks system can take on different form factors and be made out of different materials. This means developers have the flexibility to create diverse experiences that can help kids develop computational thinking: from composing music using functions to playing around with sensors or anything else they care to invent.



The Project Bloks system can be used to create all sorts of different physical programming experiences for kids

The Coding Kit

To show how designers, developers, and researchers might make use of system, the Project Bloks team worked with IDEO to create a reference device, called the Coding Kit. It lets kids learn basic concepts of programming by allowing them to put code bricks together to create a set of instructions that can be sent to control connected toys and devices—anything from a tablet, to a [drawing robot](#) ... <https://mime.co.uk/>

or educational tools for exploring science like [LEGO® Education WeDo 2.0](#). ... <https://education.lego.com/en-us/elementary/explore/science>



Developing on Project Bloks ... www.youtube.com/watch?v=bi9lpZUGvZw

Project Bloks ... <https://projectbloks.withgoogle.com/>

What's next?

We are looking for participants (educators, developers, parents and researchers) from around the world who would like to help shape the future of Computer Science education by remotely taking part in our research studies later in the year. If you would like to be part of our research study or simply receive updates on the project, please [sign up](#). If you want more context and detail on Project Bloks, you can read our [position paper](#). Finally, a big thank you to the team beyond Google who've helped us get this far—including the pioneers of tangible learning and programming who've inspired us and informed so much of our thinking.

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