THE ARDUINO ENGINEERING KIT

INFORMATION GUIDE

ARDUINO.CC/EDUCATION

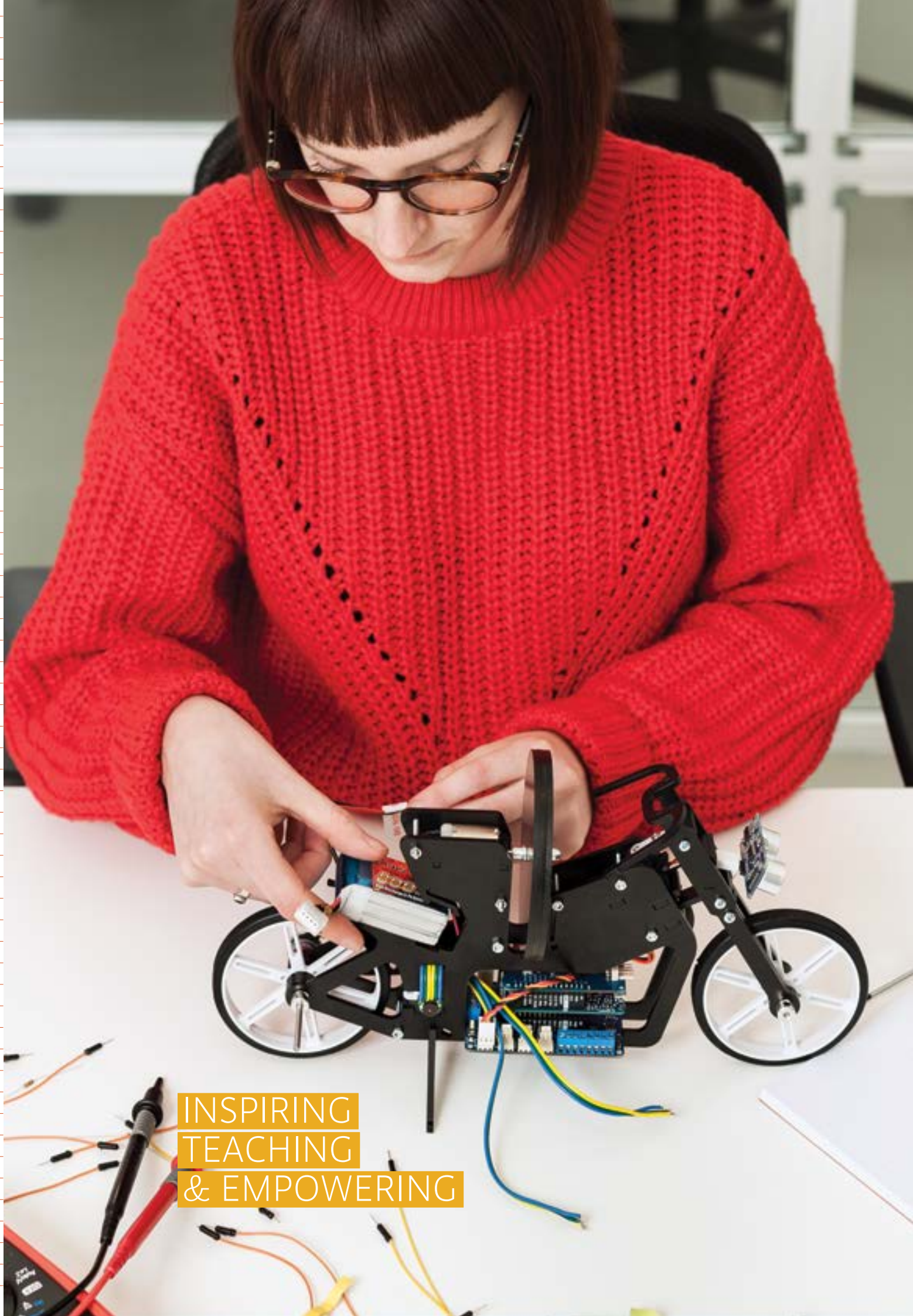
ARDUINO EDUCATION

Includes 1-year
individual user license of:

MATLAB® & SIMULINK®

In collaboration with:

MathWorks®



INSPIRING TEACHING & EMPOWERING

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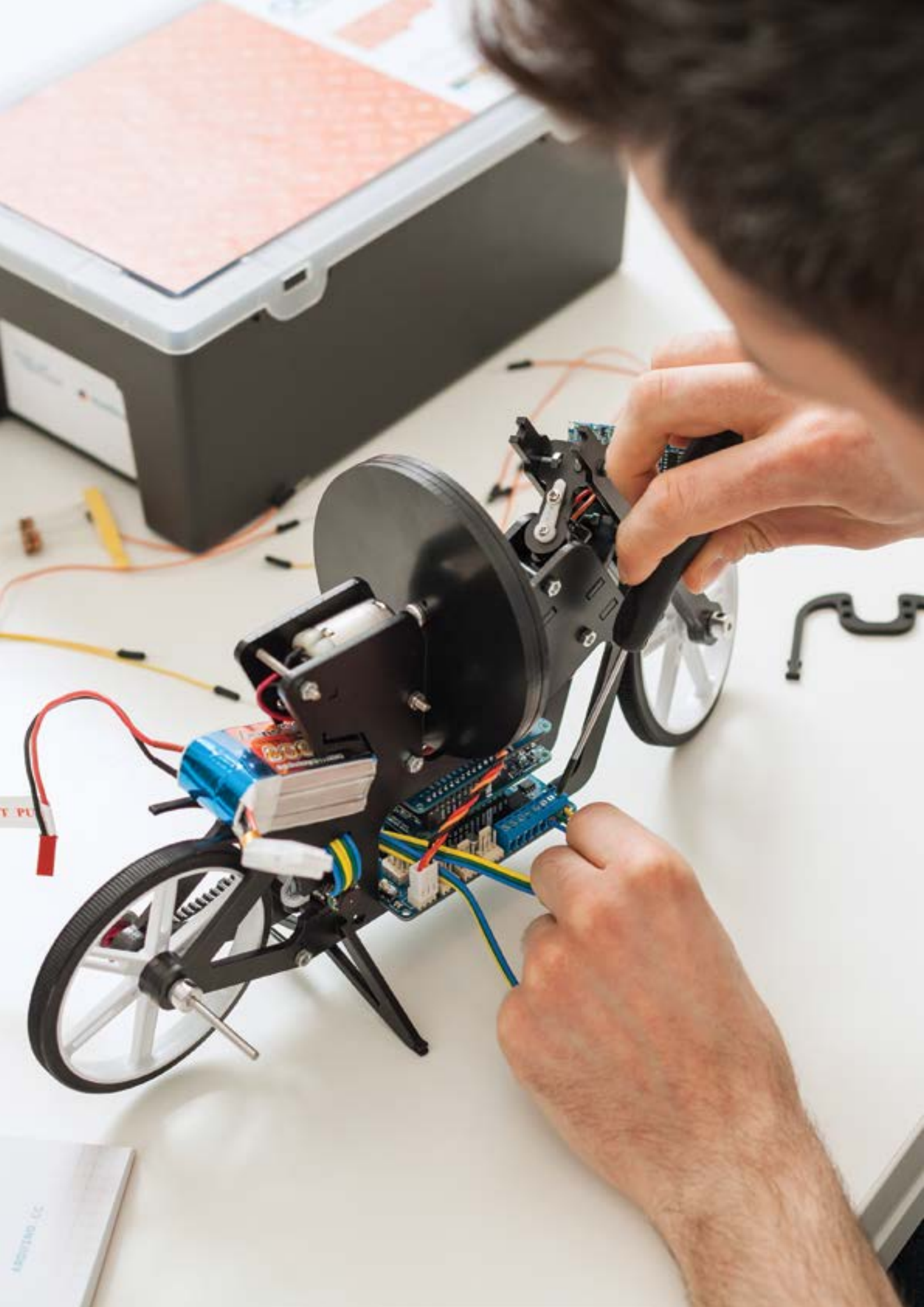
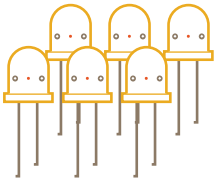


ARDUINO EDUCATION

WHAT IS ARDUINO?

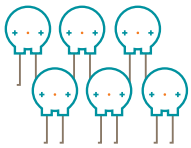
Arduino is an open-source hardware, software, and content platform with a worldwide community of over 30 million active users. It has powered thousands of projects over the years, from everyday objects to complex scientific instruments. This has been made possible due to a wide range of electronic boards for each communication protocol, including WiFi, Bluetooth, LoRa, Sigfox, GSM, and more.

ARDUINO COMMUNITY HIGHLIGHTS

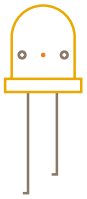


More than 30 million users annually

8 million visits per month to arduino.cc



More than 500.000 forum members



Tens of thousands of individual users per year use Arduino/ MATLAB integration

THE EDUCATION TEAM AND MISSION

Arduino is on a mission to get one of its boards and kits into the hands of every student and educator. To make this possible we have created ***Arduino Education***: a dedicated global team formed by education experts, content developers, engineers, and interaction designers focused on creating the next generation of STEAM programs, while supporting the needs of teachers and students throughout the educational journey.

CURRENT ARDUINO USE CASES IN EDUCATION

Educational institutions use ***Arduino*** as a resource to assist them in educating their students on a variety of topics, using several methods.

Develop: Arduino is widely adopted at ***universities*** in the fields of ***engineering***, ***Internet of Things***, ***robotics***, ***art***, and ***design***.
Teach and Learn: Many secondary schools use ***Arduino*** with innovative techniques for cross curriculum studies.
Play: Primary schools use toys embedded with ***Arduino*** technology to introduce physical learning, logic, building skills, and problem solving.

WHAT IS THE ARDUINO ENGINEERING KIT?

The ***Arduino Engineering Kit*** is the ideal solution for university students, providing a state-of-the-art, hands-on incorporation of ***Arduino*** technology in an educational setting. The kit is primarily for three types of users:

Students learning about engineering at a university or at a secondary school (e.g., to be used in an "Introduction to Engineering" course);

Professors teaching engineering who also want practical resources to demonstrate engineering concepts;

Makers with an interest or background in engineering, either professionally or as a hobby.

Basically, it's an enjoyable kit for anyone.

The ***Arduino Engineering Kit*** includes three cutting-edge Arduino-based projects so that students can easily learn fundamental engineering concepts, key aspects of mechatronics, and MATLAB and Simulink programming. These projects will challenge them intellectually and help them to develop physical engineering skills and they're just fun to do. Buildable projects included are:

SELF-BALANCING MOTORCYCLE

This motorcycle will maneuver on its own on various terrains and remain upright using a flywheel for balance. It's very exciting to build and to see in action.

MOBILE ROVER

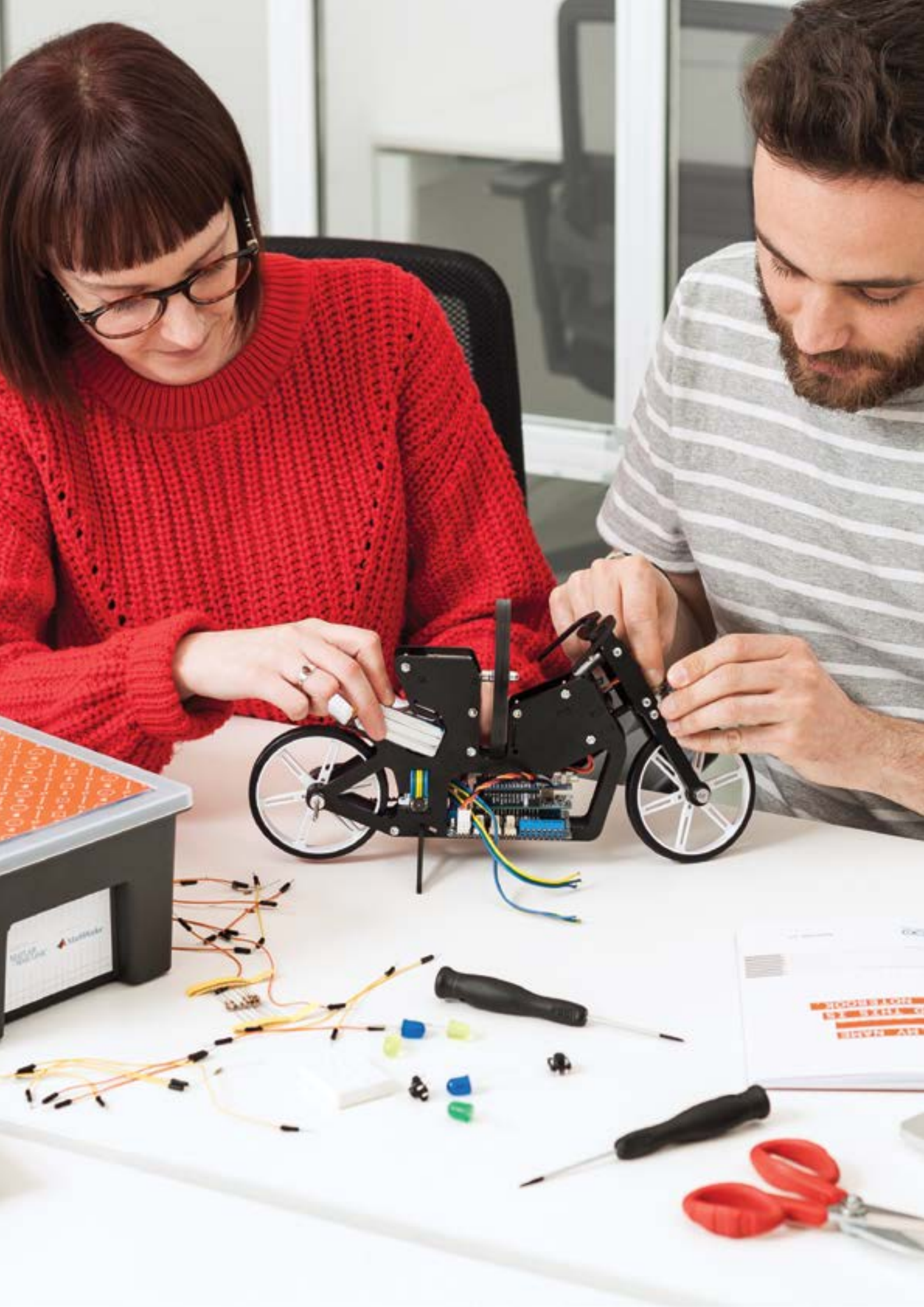
This vehicle can navigate between given reference points, move objects with a forklift that's controlled by computer vision, and much more. It's very fun to make and use.

WHITEBOARD DRAWING ROBOT

This robot can take a drawing it's given and duplicate it on a whiteboard. It's most impressive.

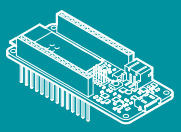
The kit is sold in a hard plastic, stackable tool box for storage and years of reuse. Inside the box is an easy-to-use ***Arduino MKR1000*** board, several customized parts, and a complete set of electrical and mechanical components needed to assemble all three projects. See next pages for detailed list of what's included in the kit.

In addition to the state-of-the-art, high-quality, open-source hardware provided, after registering online, the user will have access to a dedicated e-learning platform and high quality learning materials. Additionally, users are granted a **one-year individual license for MATLAB and Simulink** providing them with hands-on experience in system modeling and embedded algorithm development.

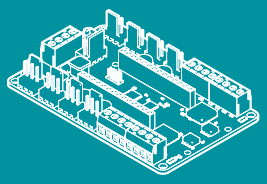


WHAT'S INSIDE?

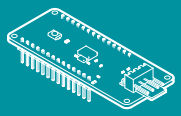
EACH ARDUINO ENGINEERING KIT INCLUDES:



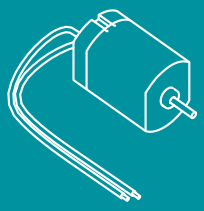
X1
ARDUINO MKR 1000



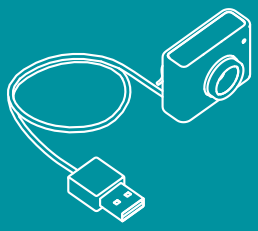
X1 ARDUINO
MKR MOTOR SHIELD



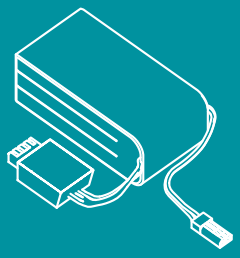
X1
ARDUINO MKR IMU SHIELD



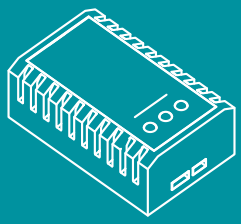
X1
DC MOTOR



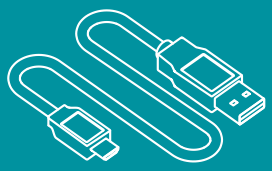
X1
WEB-CAM



X1
LIPO BATTERY

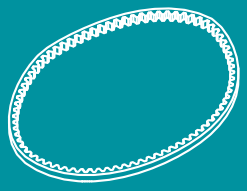


X1
BATTERY CHARGER

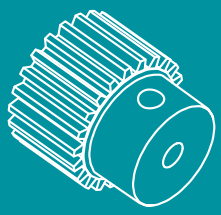


X1
USB CABLE

X1
CASTER WHEEL

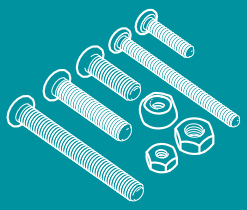


X1
TIMING BELT



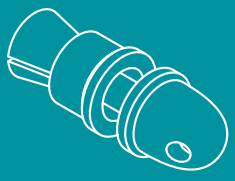
X2
TIMING PULLEYS

X2 DC MOTOR
MOUNTING BRACKETS



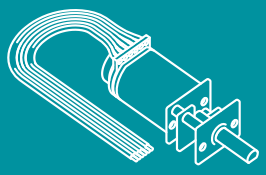
BOLTS & NUTS SET

X2 SHAFT COLLARS

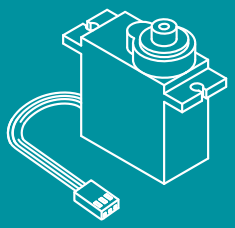


X1 PROPELLER
ADAPTER SCREW

X2 MAGNETS

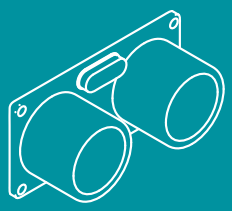


X2 DC MOTOR
WITH ENCODERS

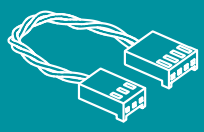


X1 STANDARD
MICRO SERVO

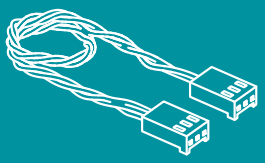
X1 HALL
SENSOR MODULE



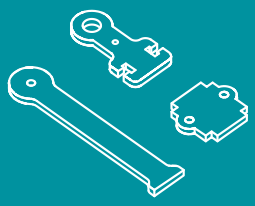
X1
ULTRASONIC MODULE



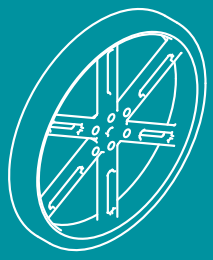
3-PIN TO 4-PIN
MODULE CABLE
(12CM)



3-PIN
MODULE CABLE
(6CM)



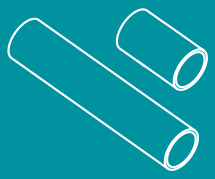
ASSEMBLY
PIECES



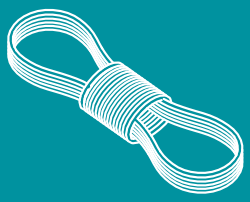
X2
WHEELS

X1
METAL SHAFT

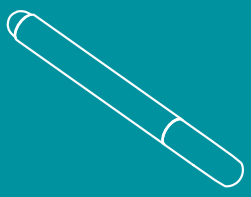
X2
METAL D-SHAFTS



X2 SET OF
DISTANT SPACER

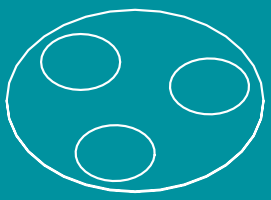


THREAD



X2
WHITEBOARD MARKERS

X2
PULLEYS



X1
STICKER FOR VISION
RECOGNITION

Since some components are used in more than one project, users are limited to one fully assembled project at a time. The inherent advantage of that is that it forces them to disassemble a project to assemble the next and maybe one day reassemble the first project, thus reinforcing what they learned.

ONLINE PLATFORM

The ***Arduino Engineering Kit*** is built on its own Education Learning Management System (LMS) with step-by-step instructions and lessons. The content of this kit is divided into six chapters, featuring a short introduction, a getting-started guide for the tools that will be used, a concepts section, and finally the projects themselves. Users will receive access to the online platform for one year and can purchase additional licenses to extend platform access.

The online platform will help students to begin learning fundamental engineering concepts, key aspects of mechatronics, and MATLAB and Simulink programming. The content is currently available in English.

Learning objectives include, but are not limited to the following:

- Connect MATLAB to the Arduino MKR1000;
- Create scalar and vector variables, and apply functions and arithmetic operations to existing variables;
- Create, simulate, and save a Simulink model;
- Visualize simulation data in the Simulink environment;
- Create and call a MATLAB function;
- Implement external sensors and actuators in a Simulink model;
- Model basic mathematical and discrete dynamics in Simulink;
- Build and run a working Arduino application from a Simulink model;
- Adjust model parameters while the application is running on Arduino, and interpret the results; and
- Run an Arduino application as a standalone program, outside Simulink.

MATHWORKS

MathWorks is the leading developer of mathematical computational software for engineers and scientists. Founded in 1984, MathWorks employs more than 4,000 people in 16 countries, with headquarters in Natick, Massachusetts, in the United States. For additional information, visit: ***mathworks.com***

ABOUT MATHWORKS COMMUNITY:

5000 colleges and universities around the world using MATLAB and Simulink for teaching and research

More than 3 million users of MATLAB worldwide

Software installations at over 90,000 business, government, and university sites

MATLAB

MATLAB is a programming platform designed specifically for engineering and scientific computing. Millions of engineers and scientists in various industries and academia use MATLAB for a range of applications, including deep learning and machine learning, signal processing and communications, image and video processing, control systems, testing and measurements, computational finance, and computational biology. ***The MATLAB Support Package for Arduino enables the user to communicate with Arduino hardware directly in MATLAB.*** Users can interactively read data from a variety of sensors and peripheral devices, process the raw data into meaningful values, and actuate external devices (e.g., lights and motors). Because MATLAB is a high-level interpreted language, users can see results immediately from I/O instructions without having to compile code: users can just focus on the engineering!

SIMULINK

Simulink is a block diagram environment for modeling and simulating dynamic systems and developing algorithms that can be embedded into ***Arduino*** and other hardware. Operations and functions are represented by Simulink blocks, while data is represented by signals which flow from one block to another. ***The Simulink Support Package for Arduino extends Simulink with blocks for configuring Arduino sensors and reading and writing data from them.*** After creating a Simulink model, users can run the simulation and interactively tune algorithm parameters in order to meet the expected result. Users can then download the completed algorithm for stand-alone execution on an Arduino device. With the MATLAB Function block, users can incorporate MATLAB code into their Simulink model. Both Arduino support packages remove the need to write C or C++ code. That also means that users don't need to compile and build an application for it to run.

PURCHASE

The Arduino Engineering Kit can be purchased online from the official Arduino Store

STORE.ARDUINO.CC/ARDUINO-ENGINEERING-KIT

and from selected Arduino Education resellers.

STORE.ARDUINO.CC/DISTRIBUTORS

CONTACT US

Send Questions about the Arduino Engineering Kit:

EDUCATION@ARDUINO.CC

Learn More about Arduino Education:

ARDUINO.CC/EDUCATION

FAQ

THIS KIT IS INTENDED FOR WHOM? DO USERS NEED AN ENGINEERING BACKGROUND?

Users don't necessarily need to have prior experience with the underlying concepts. Since all MATLAB and Simulink programs are included, almost anyone can assemble and use these projects.

The kit has primarily been designed for

- Instructors teaching engineering and related courses;
- Students learning about engineering at a university or vocational school; and
- Makers with an interest or background in engineering.

WHY ARE MATLAB AND SIMULINK USED INSTEAD OF ARDUINO IDE?

MATLAB and Simulink are built for engineers and make the complex math and engineering calculations in the kit's projects easier and more intuitive. They are pervasive across industries and many engineers will use the environments in their future jobs.

WILL THE KIT BE SOLD WORLDWIDE?

Yes. The content is currently available in English. We may consider adding other languages in the future.

WHAT ENGINEERING CONCEPTS ARE COVERED?

The kit covers system modeling, controls, image processing, robotics, and signal processing, among many others. Concepts are not covered at an advanced level.

ARE MATLAB AND SIMULINK INCLUDED OR DO I HAVE TO PAY EXTRA?

MATLAB, Simulink, Stateflow, and five other add-on products are included in the kit at no extra cost. The Arduino Engineering Kit also includes a one-year license for one individual.

WHAT TYPE OF MATLAB LICENSE IS INCLUDED IN THE KIT?

The kit includes a one-year Sponsored Education license. This is a new, free of charge license created to support the Arduino Engineering Kit.

WHAT IF THE INCLUDED LICENSE IS NOT SUFFICIENT? SUPPOSE SEVERAL INDIVIDUALS WHO WILL BE SHARING A KIT NEED ACCESS FOR LONGER THAN ONE YEAR. WHAT SHOULD WE DO TO GET MORE LICENSES?

MathWorks has various options for supplementing the included license. They will assist you in determining what is appropriate for your situation. Please visit *www.mathworks.com/company/aboutus/contact_us/contact_sales.html to request a quote*.

IF I HAVE AN EXISTING MATLAB LICENSE, CAN I USE JUST THAT?

Yes, but you must use the latest release (R2018a) and have access to the following products: MATLAB, Simulink, Stateflow, Control System Toolbox, Image Processing Toolbox, Symbolic Math Toolbox, Simscape, and Simscape Multibody. If your school has a campus license (university or primary/secondary), you should have these required products.

INSPIRING
TEACHING
& EMPOWERING

NOTE

ARDUINO
EDUCATION

ARDUINO® is an Open-Source hardware, software and content platform with a global community. It's intended for anyone making interactive projects.
Visit us at: **www.arduino.cc**

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for WiFi Development Tools - 802.11 ***category:***

Click to view products by Arduino ***manufacturer:***

Other Similar products are found below :

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