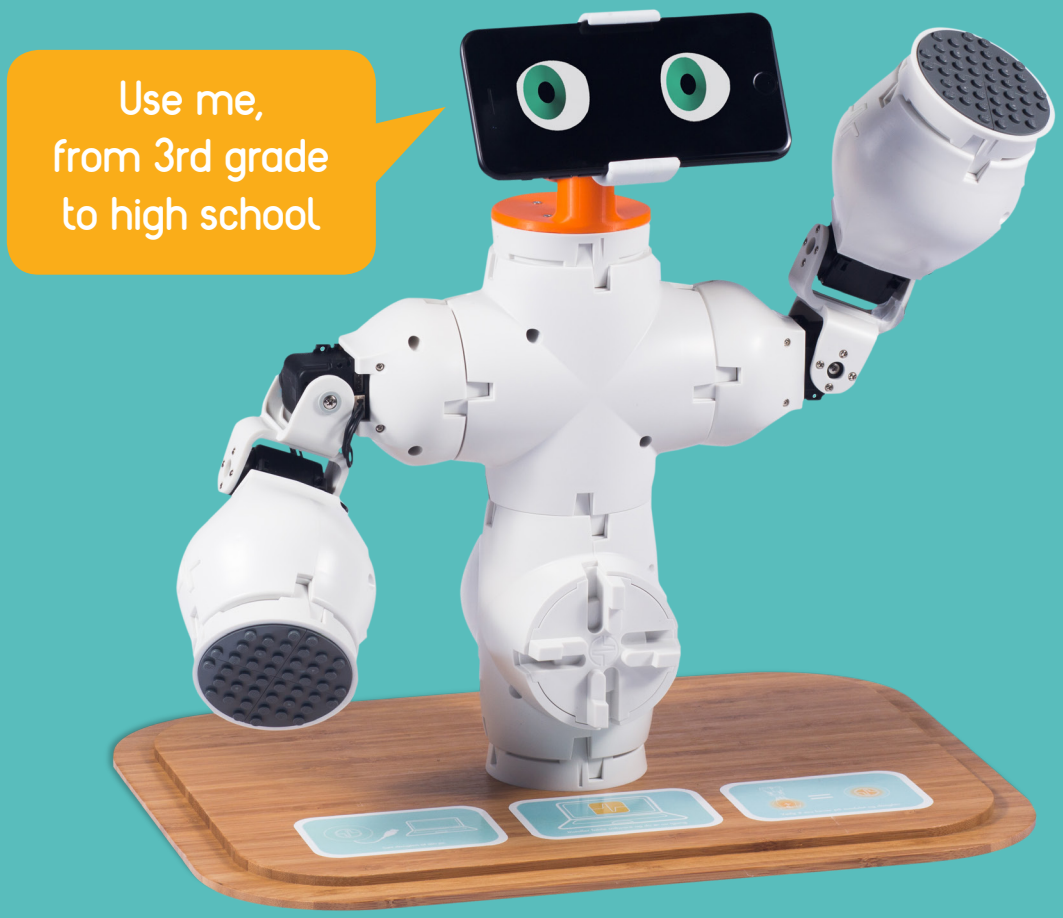

fable

A motivational learning system

Presentation & Inspiration

Shape Robotics

One robot: Countless possibilities

Meet Fable

It's never been easier to build advanced robots - and never more fun.

Fable is a modular construction set that anyone can use to build their own robot in just a few minutes. You can click the different modules together in no end of different ways to make your robot's body, and give it senses and movement. Depending on your experience, you can program the robot with simple-to-use or professional tools. In just one lesson. And with students from 8 to 18 years old.

Fable grew out of our research into play and learning, and our work on robots and artificial intelligence at the Center for Playware at the Technical University of Denmark. We developed Fable in close collaboration with key players from the education sector and we've tested it with hundreds of Danish school children.

> *"Working with Fable gave my students stronger competences in robots, programming and innovation.*
>
> Michael Fynsk, Antvorskov Primary School

From idea to robot in no time
Ideas can be tested very quickly because a robot can be assembled and dismantled in less than a minute.

Countless possibilities
You can click the different modules together in innumerable different ways and build countless different robots.

A complete learning tool
Fable comes with robot modules, programming tools and teaching materials adapted to common goals.

User friendly
The system is simple enough to be used by 8 year olds, challenging enough for 16 year olds, and flexible enough for high school and further education.

Innovation with Fable

1

Idea

In the idea phase, students start with either a real-life problem or a specific learning objective, e.g. in physics or maths. The first type of assignment could be a technical aid for the elderly. The second type of assignment could be to demonstrate Pythagorus' theorum.

2

Build and program

In the building phase, students make a prototype of their solution. Students can use Fable to test quickly different solutions by rebuilding and programming robots. The system can easily be extended and combined with other components such as 3D-printed parts that can be easily clicked into place on the relevant build modules.

3

Test

Students evaluate their prototypes in the test phase. This could be with users or through systematic functional tests. During the process, students achieve a better understanding of the requirements for their solution. Students often find possible improvements for their ideas and prototypes, and they can implement these by following an iterative methodology.

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Learning with Fable's robots

Fable is a modular robot construction set, it can be used across subjects and classes, and it helps students gain the skills they'll need in the 21st century.

Maths
Robots are best controlled by applying mathematics. Topics such as angles, percentages, functions and much more are brought to life and become fun when students work with Fable.

Physics
Fable contains motors and accurate sensors that can be used in physics experiments on forces and motion, for example. Data can be logged and then analysed.

Programming
Robots have to be programmed to do something. It's easy for students to start programming using a simple blocks-based language. Moving on to textual language, the sky's the limit for what an experienced student can do.

Biology
Biology and technology fuse together with Fable. Students can experiment with biology-inspired robots like walking or hovering/swarming robots. The robot becomes a model of the biology.

Innovation
Fable is an open-ended system with advanced functionality. Fable encourages students to be both creative and innovative as they build robot prototypes to meet needs in the real world.

Shape Robotics

Teaching with Fable

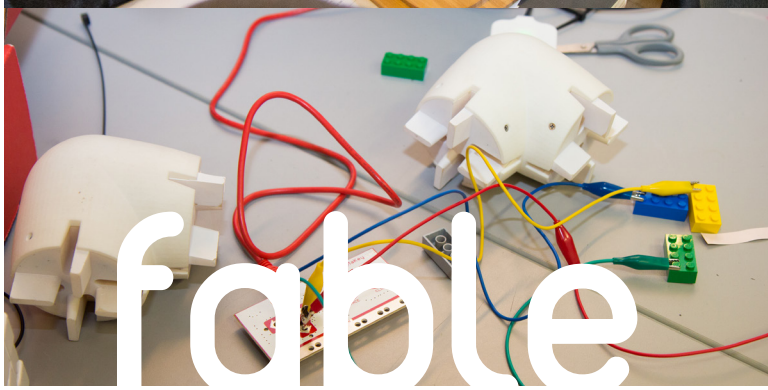
The system grows with the students.

At schools, Fable can be used by students aged 8 and upwards until they leave. After this, Fable can be used at high schools, vocational colleges and technical schools. Fable is also perfect for continuing training in industry. Fable can also be used in teaching at university level, for example signal processing and artificial intelligence.

Students have different personal interests and experience. Using Fable you can differentiate teaching by letting students work with simple or more complicated robot problems. Fable comes with different programming tools that can be used by students with different levels of experience.

When programming the robot, students learn in practice how to gradually break down and reduce complex problems into simpler sub-problems. Students will also learn that there is no defeat in making a mistake; this is an entirely natural and desirable part of learning and other innovation work. Students will enjoy a natural sense of achievement when they locate and correct an error in their own program. In this way, students learn how to work iteratively and how to manage complexity. They learn to start simply and gradually, and to use an experimenting methodology that enables them to develop refined and complex solutions.

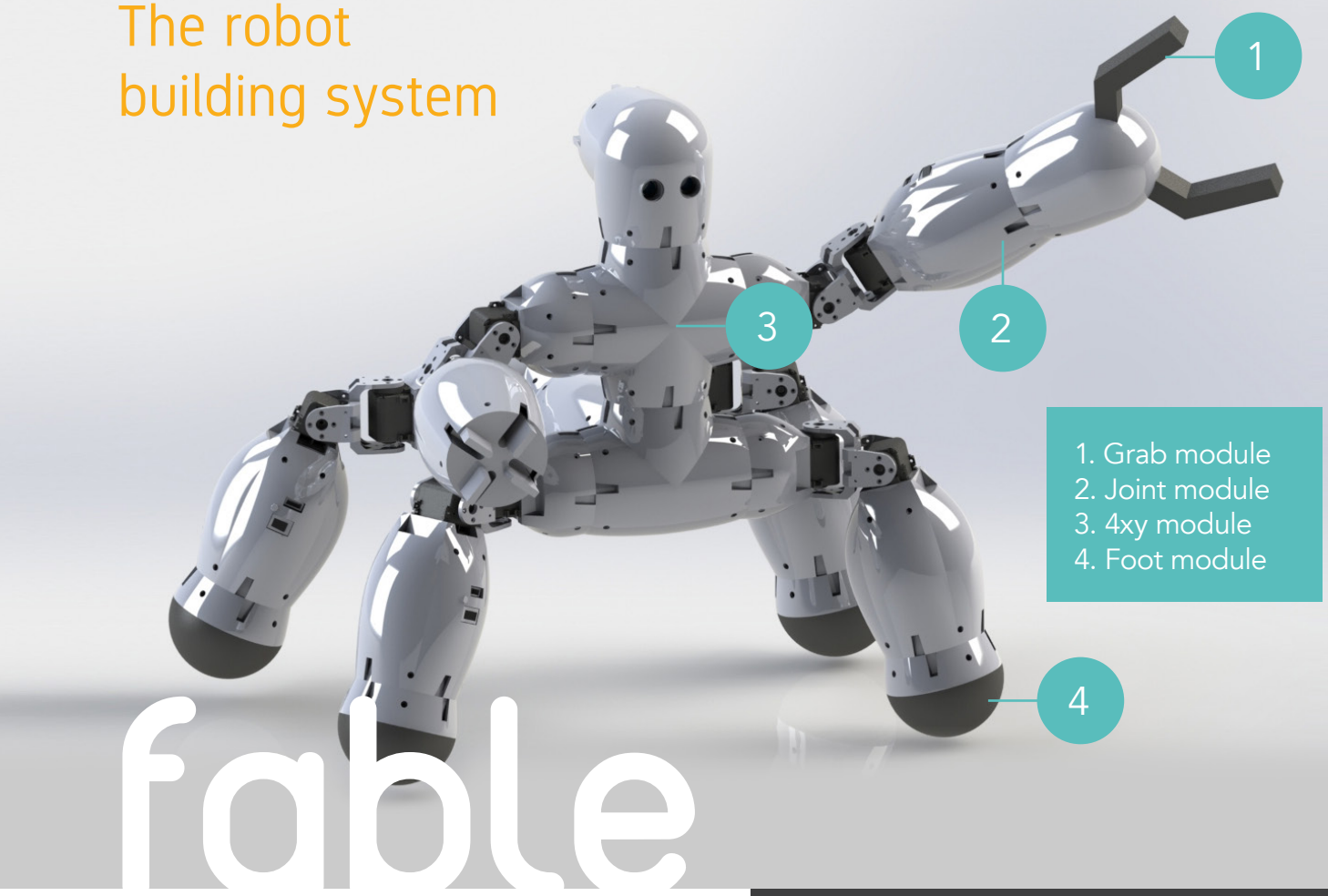
> *"With Fable, I saw that students could independently even set rather difficult problems for themselves, which they were much more motivated to deal with.*
>
> Héðinn Björnsson, H.C. Ørsted Gymnasiet



Mathematics with Fable

You can use Fable for maths in many ways and at many levels. For example, you can use a joint module fitted with a laser pointer to teach geometry. Mathematical models have to be set up to calculate the angles that the joint's motors have to follow to get the laser dot to trace a specific geometrical figure. There are more examples and ideas at shaperobotics.com

The robot building system



1. Grab module
2. Joint module
3. 4xy module
4. Foot module

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Fable facts

The Fable system is composed of three types of modules: Function modules, build modules and extension modules.

- Robust design, strong enough for rough treatment at school
- Quality components with powerful motors and accurate sensors
- No wires or cables: wireless programming and rechargeable batteries
- Strong magnetic joints, easily clicked together
- Quick to get ready and clear up, leaving more time for teaching
- Unique building system that can be scaled from just a few modules to very many modules

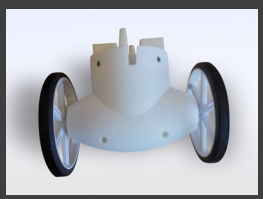
Dongle

Fable is controlled wirelessly via a dongle linked to your PC via a USB or your iPad via Bluetooth.

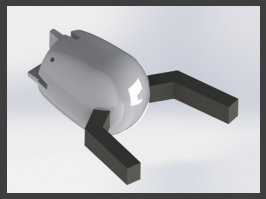
Function modules

These modules give the robot functionality such as movement or senses. Students develop a computer program that applies the modules' functionality to give the robot the desired behaviour. The modules contain a rechargeable battery and a small computer, and they communicate wirelessly with a dongle. The dongle can be linked to a computer via a USB or a tablet via Bluetooth.

Joint module



Drive module



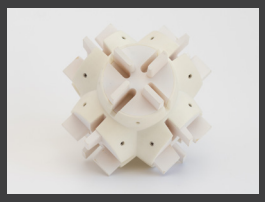
Grab module

Sensor module

Build modules

There's no electronics in these modules, but they make the system easy to build with, or better at walking or moving, for example. The modules are available in a number of different shapes that mean you can build very simple or very complex robots.

4xy module



6xyz module

3xyz module

2xy module

Foot module

Extension modules

These modules make it possible to can combine the system with other systems. For example, a robot can be fitted with a LEGO® hand, a smartphone running Skype, a 3D-printed robot head, or the laser pointer that comes with the product.

Block module

Smartphone module

Examples of Fable robots

Combining function, build and extension modules gives students untold possibilities to create different types of robots.

Some robots are pure imagination and are mostly for fun, while others have been carefully designed by the student to solve a real-life problem. We've developed more than fifteen different types of module, of which some are already in production, several are on the way, and even more will be developed in the future.

Arm robot
You can program this to move items from one place to another, extremely accurately, again and again.

Walking robot
Correctly controlling the motors' angles will make it walk like a dog or a cat.

Snake robot
This is best controlled if you know a bit about waves and sine curves.

Pure imagination
You can combine the modules to create weird and wonderful Fable animals or Fable robots.

Easy to program

User-friendly programming tools are a crucial part of Fable.

The design of the programming tools means you can differentiate teaching, and this helps students to gradually progress from the simple, visual programming language to a more powerful, textual language. Today, we support the Blockly visual programming language, which provides an easy-to-understand introduction to programming, and the Python textual language.

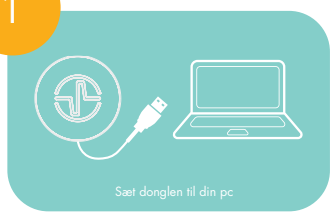
Compatibility

We want to support as many of the technologies applied in the education sector as possible, and the 'bring-your-own-device' approach.

- Windows Vista, 7, 8, 10 and Mac OSX
- Data processing with MS Excel, Google docs and Open office

Four simple steps, and you're off

1

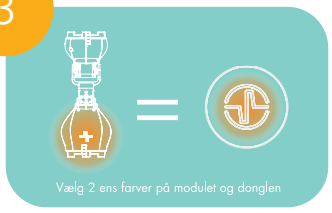


Put the USB dongle in your computers.

2

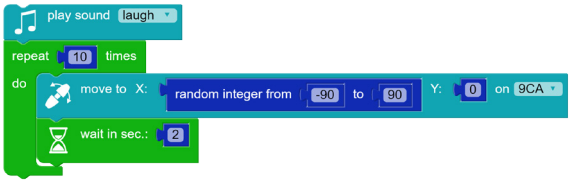
Download and install the program from www.shaperobotics.com

3



Click on the dongle and the movement module until they are the same colour.

4

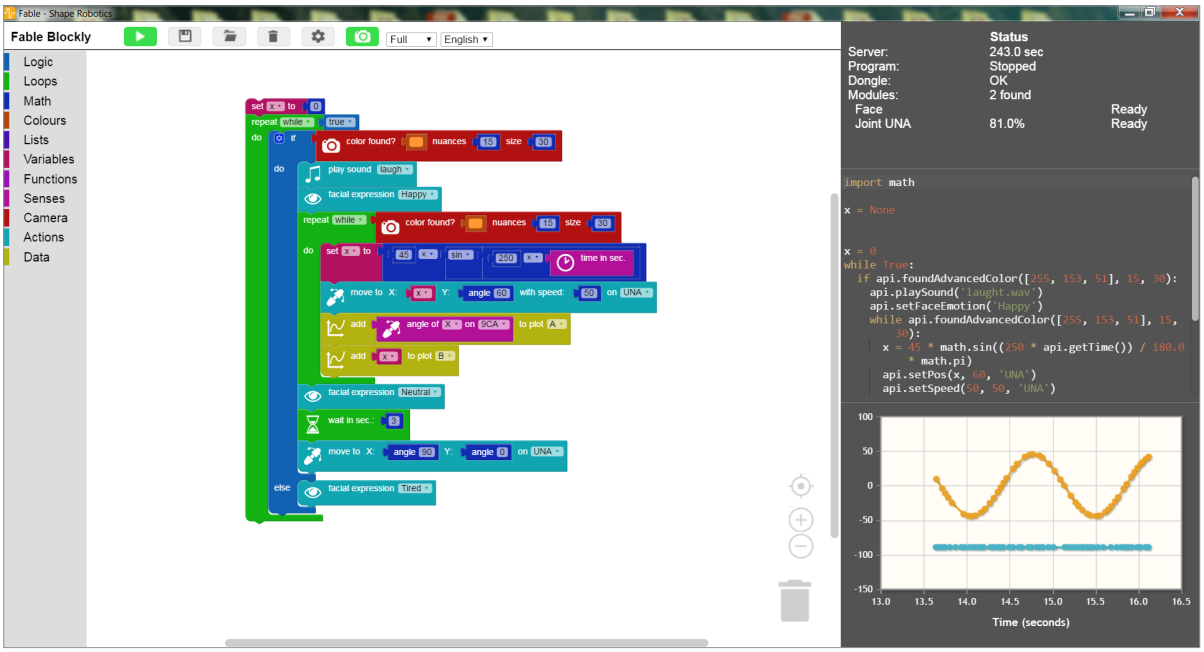


Start the program and use your mouse to combine programming blocks like a jigsaw puzzle. Run the program. Now your computer will emit a sound and Fable will move as you have requested.

The programming interface

Using a USB dongle, the students program their Fable robots wirelessly on an interface running on their own PCs.

The interface is divided into different levels depending on the students level of competence, from very simple visual programming with Blockly, over more advanced visual Blockly programming, to powerful textual programming with Python. It's also possible to perform simple data processing on the interface with graphs,, or to log data to files for later processing, e.g. in MS Excel.



Fable app on the way

We're developing apps that will make it even easier and more exciting to program Fable robots.

The first app is a visual programming interface for tablets that makes the system more accessible. The second app is an interactive robot application for smartphones that enables students to build robots that are interactive 'social' individuals and experiment with algorithms to control and visualise eyes, activate sounds, take pictures with a camera and much more. We'll be launching the applications during autumn 2017. We received support from the Danish Ministry for Children, Education and Gender Equality, the Danish Ministry of Finance, and Local Government Denmark.

Buy Fable now and begin to explore

Fable for the whole class

The Fable Class Set is an ideal start point for your teaching on robots, whether your class is 8 or 18 years old.

Divide your class into up to ten groups and let them work with robot arms, throwing robots, walking robots and much more. The Class Set includes access to our learning portal, with a wealth of ideas and teaching materials, all ready to use with your class. As Fable is 100% modular, it's always possible to upgrade or extend your system with new modules.

The Fable Class Set includes:
10 x wireless programming dongles
10 x joint modules with two powerful servos
10 x block modules
10 x connector modules, e.g. for 3D-printed accessories
10 x stands
10 x storage boxes
6 x phone holders
10 x laser pointers
2 x 6-way charging stations
Free access to our learning platform

See prices at www.shaperobotics.com

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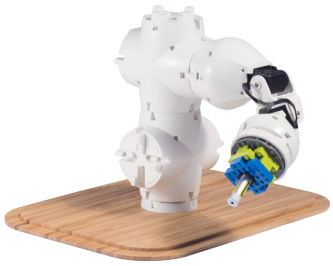
Examples of Fable robots

Walking robot

Robot animal

Social robot



Robot arm, e.g. with laser pointer

Waving robot

Throwing robot

The sky's the limit!

...Let your imagination run wild!

The story behind Fable

The Fable story starts in 2011 at the Technical University of Denmark just outside Copenhagen. Moises Pachecho started his collaboration with David Johan Christensen, an associate professor and robot researcher.

Moises and David shared the same vision: To develop a robot system, extremely easy-to-use, even for younger school students. The two developers were inspired by previous projects with modular robots that could repair themselves, as well as a project they had in progress with LEGO® to develop new digital products. The project became Moises' Ph.D. project, and as the years passed interest in using Fable grew ever greater. Therefore, at the end of 2015, David, Moises and Helene Christensen, a project manager, set up the spin-out company Shape Robotics. Their mission is to make Fable as widely available as possible, and with funding from the Technical University of Denmark and the Danish Ministry of Education, they are well on the way.

Tested at Danish schools
Fable is being tested on hundreds of students in many different contexts at Danish schools and associations, including Antvorskov Skole, Trekronerskolen, Coding Pirates and H.C. Ørsted Gymnasiet.

The research community behind Fable
The Technical University of Denmark is Denmark's largest and leading environment for training engineers and for technical-science research. The Center for Playware is a globally leading research centre, working at the interface between play, learning, robot technology and artificial intelligence.

DTU Danmarks Tekniske Universitet

Fable's friends and partners
A close collaboration between the Technical University of Denmark, and the Center for Undervisningsmidler (centre for teaching aids) at University College Absalon has ensured that Fable meets all the the Danish education sector's needs and requirements.

University College SJÆLLAND

There's much more at our website: www.shaperobotics.com

Follow us on Facebook ...see our videos!

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