2019-1-RO01-KA229-063086_1

MAKER EDUCATION

MAKER EDUCATION

Magazine No. 3, 2020

May 2020 - July 2020

ISSN 2668-7852 ISSN-l 2668-7852

Co-funded by the
Erasmus+ Programme
of the European Union

MAKER EDUCATION

Colegiul Tehnic ”Gheorghe Cartianu”
Piatra-Neamţ, Bd. Traian, no. 31
Neamț County, Romania
Tel/fax: +40233222800
E-mail: colegiulcartianu@gmail.com

Editors and Authors:
Horlescu Gabriela-Brânduşa, teacher
Secară Ana-Irina, teacher

Co-funded by the
Erasmus+ Programme
of the European Union

Project Title: Maker Education

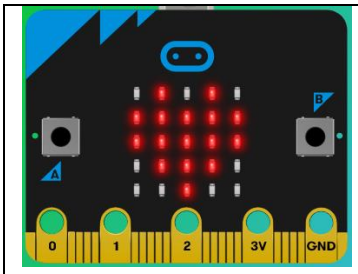
Main objective of the project: Exchange of Good Practices
Project Start Date: 01-09-2019
Project End Date: 31-08-2021
Project Total Duration: 24 months
Applicant Organisation: Colegiul Tehnic „Gheorghe Cartianu", România
Website: https://makereducation6.weebly.com/

Partner Organisations:

- **SABA, The Republic of North Macedonia, partner**
- **Insignare - Associacao De Ensino E Formacao, Portugal, partner**
- **Erbakir Fen Lisesi, Turkey, partner**
- **Iis Alessandro Volta, Italy, partner**
- **Centrum Ksztalcenia Praktycznego w Jastrzebiu-Zdroju, Poland, partner**

1.Micro:bit

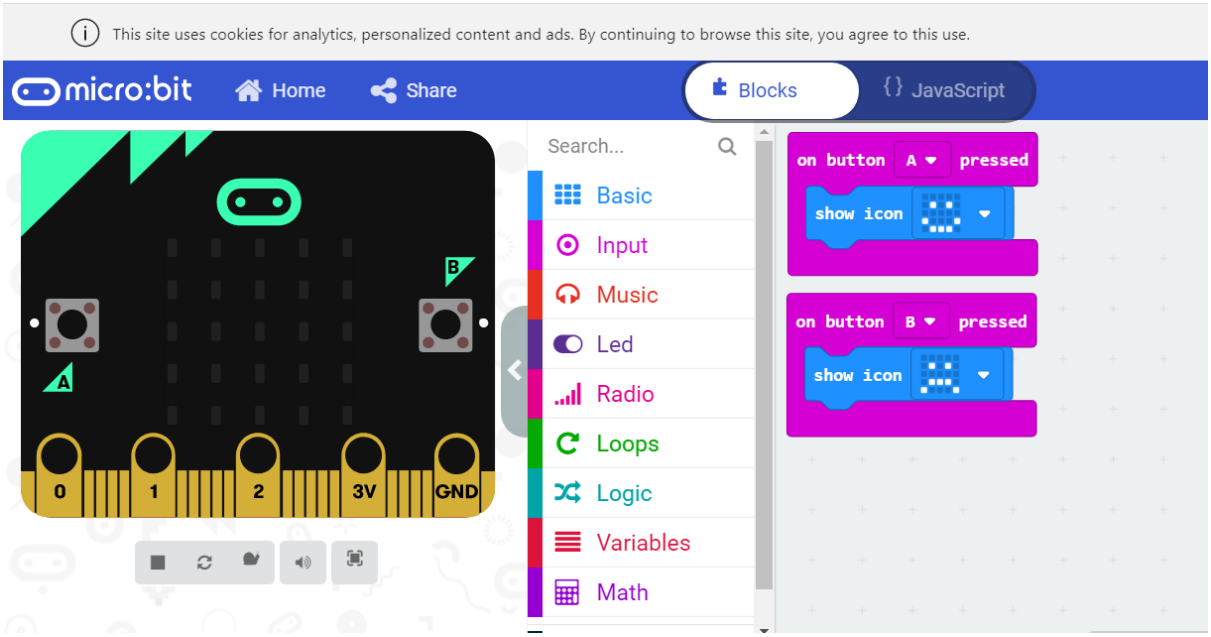
Nicoleta-Daniela Grădinaru, student
Gabriela-Brândușa Horlescu, teacher

	The **micro:bit** is a tiny computer that makes coding tangible and promotes digital creativity. More information about projects, lessons and coding can be obtained by accessing https://microbit.org/. The micro:bit has two input buttons on the front. What you need for begin the first applications: • micro:bit (or MakeCode simulator) • MakeCode or Python editor • battery pack (optional)

Project 1. Emotion badge

- When you press input button A a happy face imageappears on the LED display output.
- When you press input button B a sad face appears.

Code it

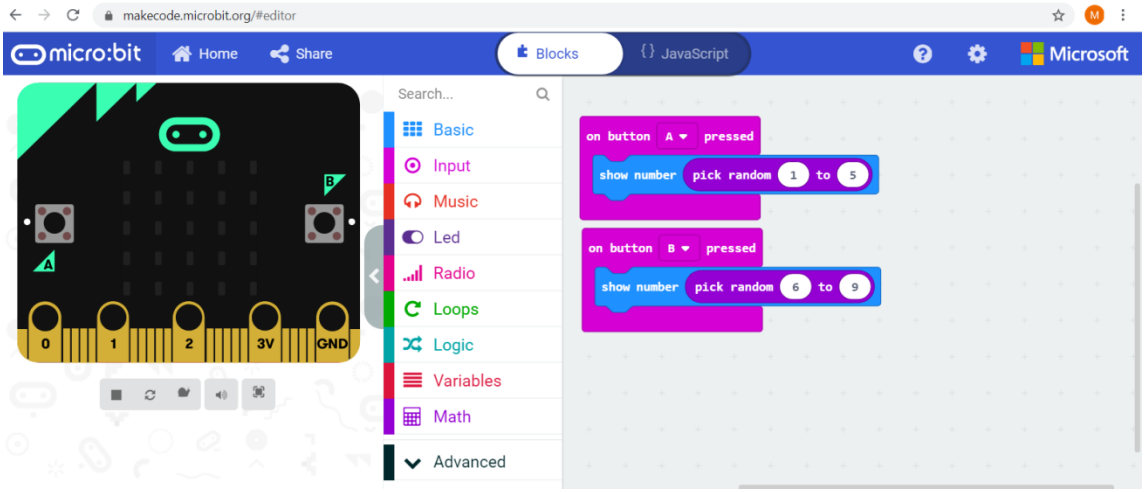


"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

Project 2. Random numbers

- When you press input button A a random number from 1 to 5appears.
- When you press input button B a random number from 6 to 9 appears.

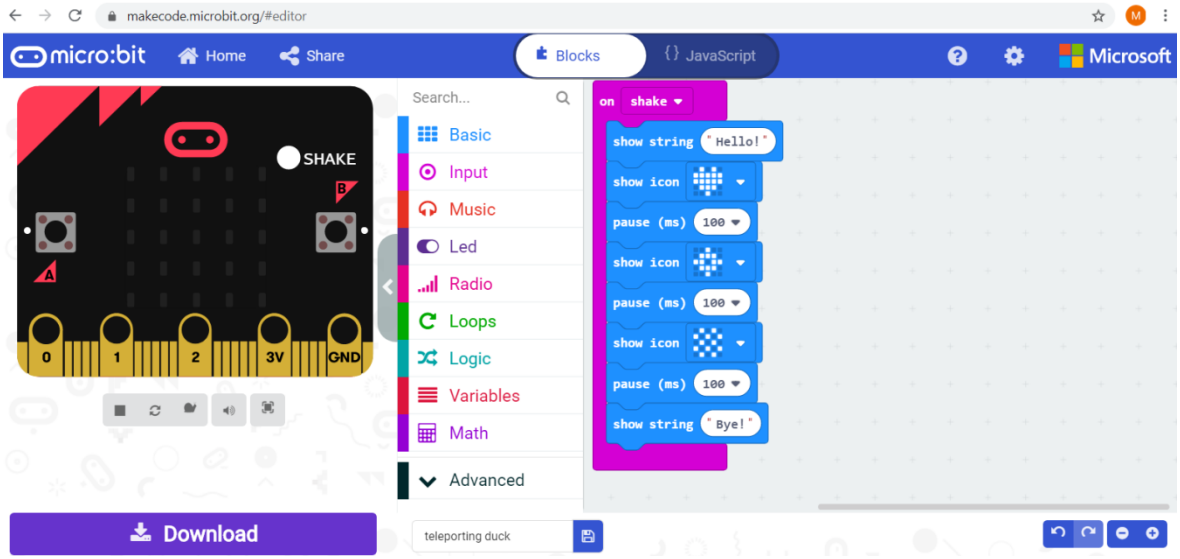
Code it



Project 3.Random numbers

When the board is shaken, some texts and figurines will appear, with a pause of 100ms between them.

Code it



"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

2.LEGO MINDSTORMS EV3

2.1.Robot snake controlled by remote control

Alexandru-Nicolae Bădîngă, Ciprian-Alexandru Nistor, students
Gabriela-Brânduşa Horlescu, Carmen-Simona Stanciu, teachers

A new acquisition for the project Erasmus+ Maker Education has given us a chance to work in a new way, perhaps prettier and easier to understand than the usual. The LEGO MINSTORMS EV3 kit was a new experience for our team. We assembled and programmed a new robot that now appears in our presentations.

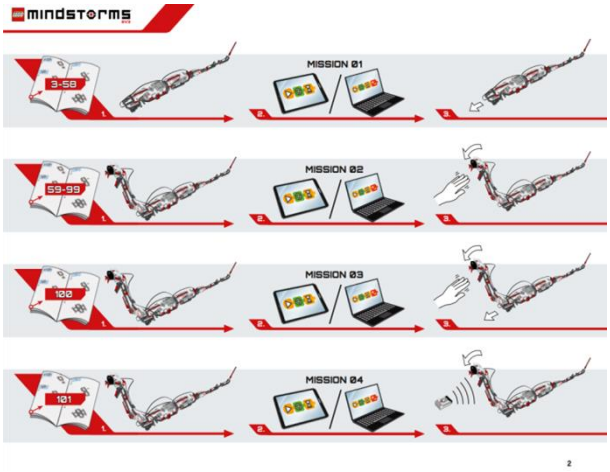
Previous robotics experience was helpful, but we cannot say we knew all from the beginning. Shortly we got used to the new block based programming we had to use for the robot. We succeed in making a new beautiful robot, that catches the sight of many, especially the children.

The Robot snake controlled by remote control project:

- The instructions were easy to follow, most of us have already had experience with lego since we were younger.
- We shared the work in “modules”, that we later assembled together. This is how we finished the project quickly

You can follow the steps from this link:
https://www.lego.com/cdn/cs/set/assets/bltfa9d17de847b8936/31313_R3PTAR_2016.pdf

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."



Required components:

- A LEGO MINDSTORMS EV3 KIT
- AAA batteries (for the IR remote)
- AA batteries (for the programmable brick)

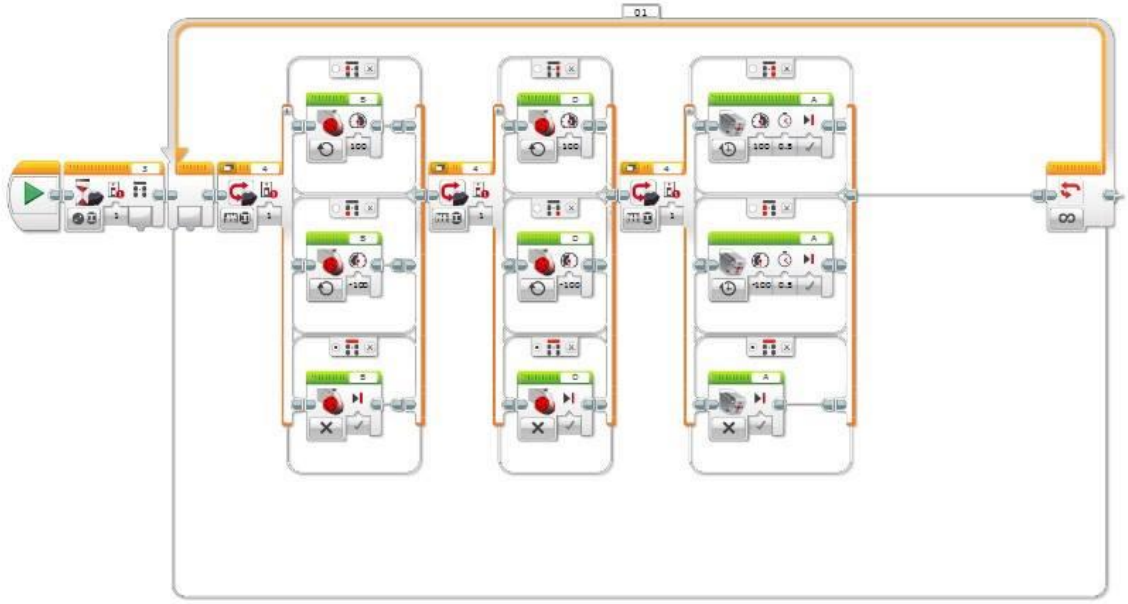
  Being eager to learn new things!

Steps:

1) Assemble the robot using this link: https://www.lego.com/cdn/cs/set/assets/bltfa9d17de847b8936/31313_R3PTAR_2016.pdf
2) Download the programming software from here: https://education.lego.com/en-us/downloads/mindstorms-ev3/software#MicroPython
3) Use your own imagination to make your robot unique. You can make it follow a line, to attack when it senses something, to control it with the IR Remote or via Bluetooth or all of the above!
4) You can take inspiration from this tutorial: https://education.lego.com/en-us/lessons/mindstorms-ev3/line-detection#Planitem0?fbclid=IwAR0LVFUHJIdnKWWdYgzDmFHgQjRnJghpBj75-98OWLkJXdL1YryEYqmJ2BY

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

The code we used:



What does our robot do?

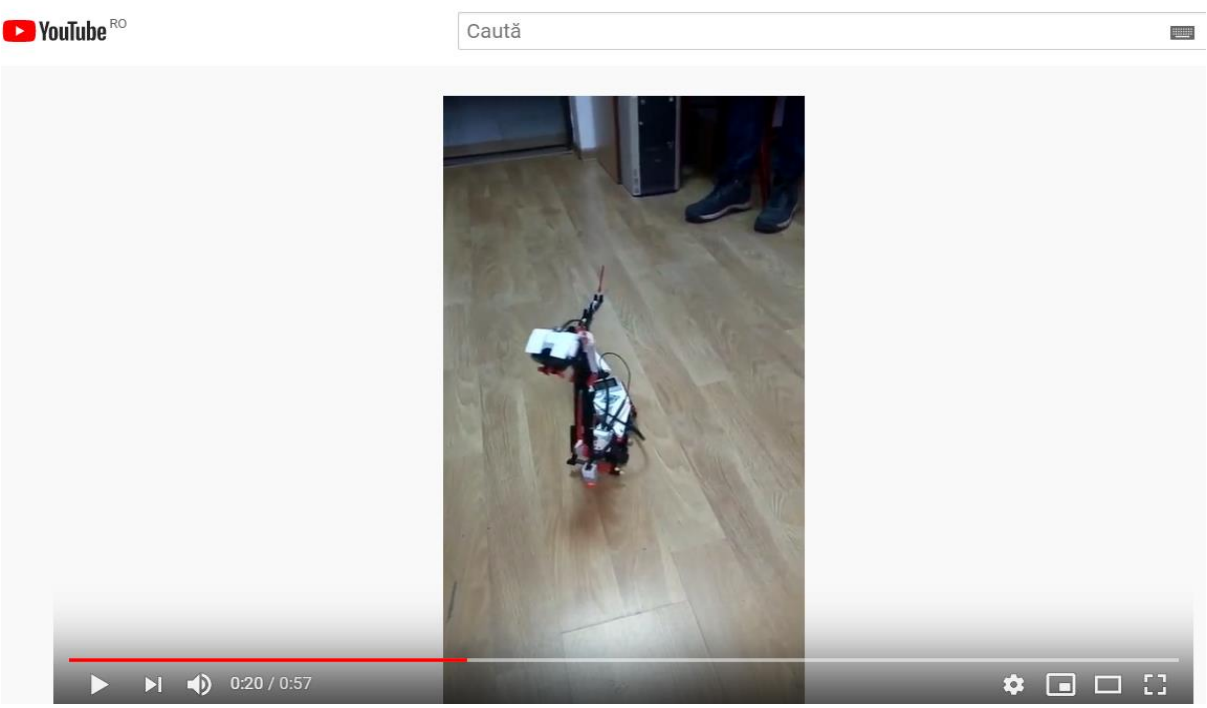
The robot can do the following:

- Move forward
- Move back
- Turn left
- Turn right
- Attack (Using the IR remote)

Photo gallery

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

Video: https://youtu.be/gg-oMFe5u8I



"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

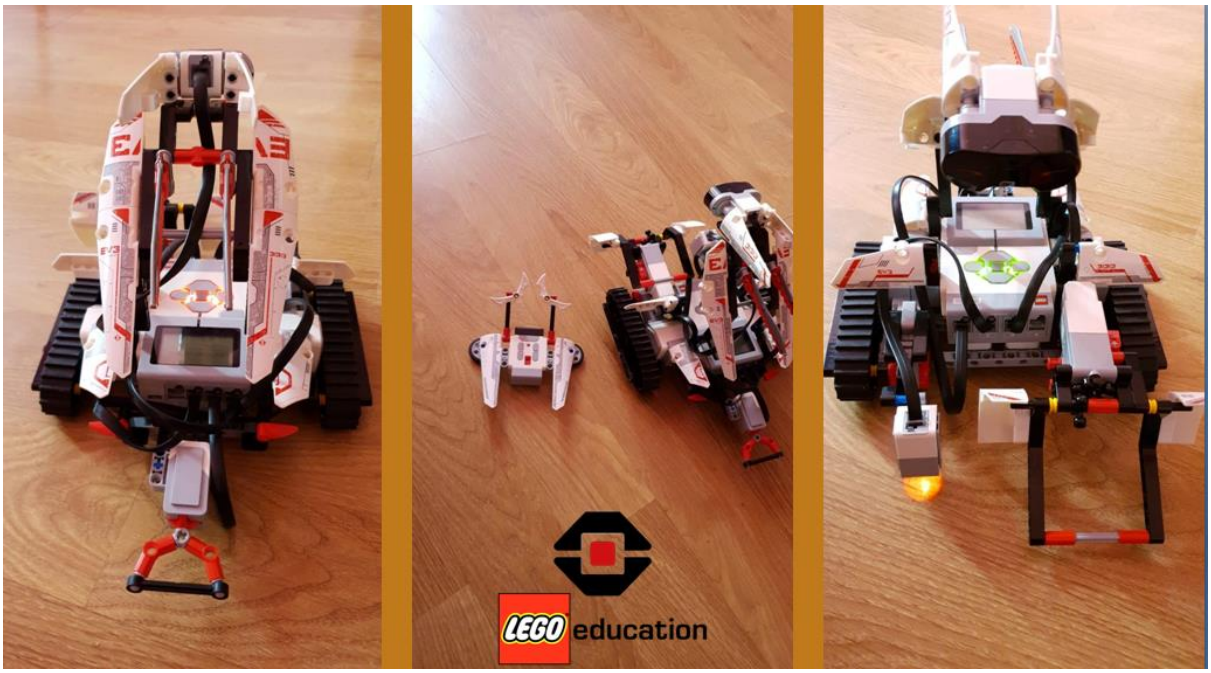
2.2.Line following robot

Cosmin-Valentin Irimia, Andrei-Matei Ciubotaru, students
Gabriela-Brândușa Horlescu, Carmen-Simona Stanciu, teachers

The new LEGO MINDSTORMS EV3 robotics kits gave us the chance to try something new, something more visually appealing and fun.

The robot was assembled manually, following only our imagination (no instructions required), showing the unlimited capabilities of creativity.

You can also do many other fun projects, you do not need to feel limited by the rules!

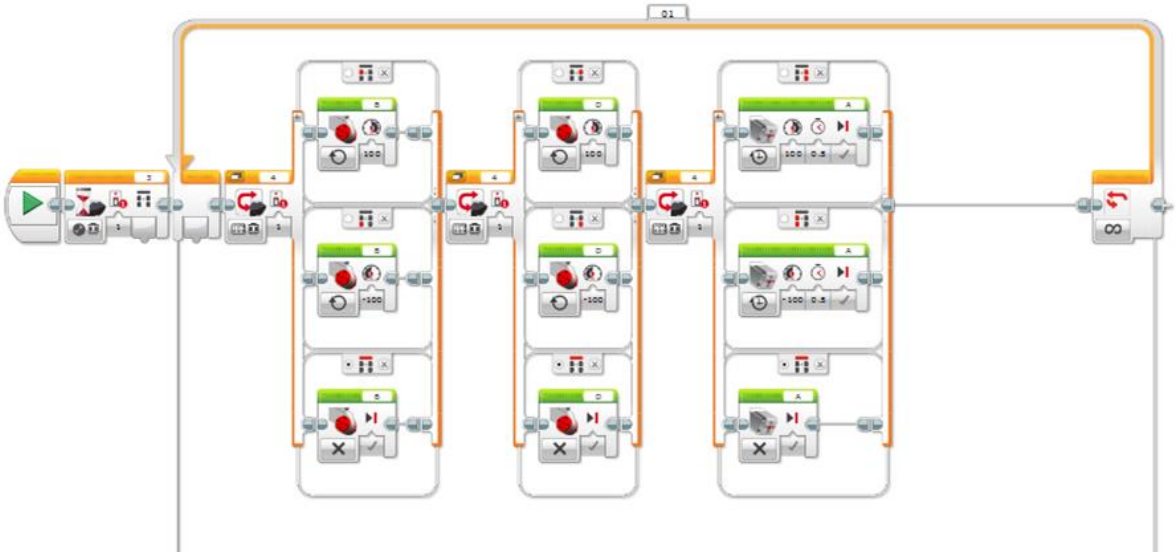


Required components:

- 1 LEGO MINSTORMS EV3 kit
- AAA batteries (IR remote)
- AA batteries (Lego Brick)
- 1 power cable
- 1 data cable

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

The code we used:



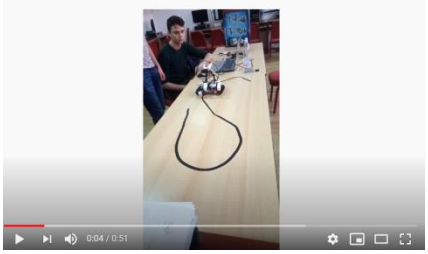
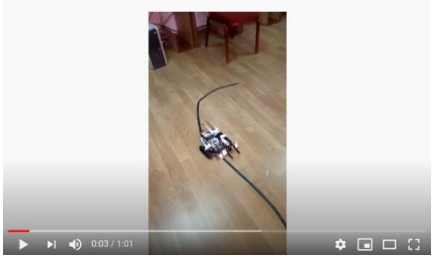
What can the robot do:

- Be controlled with the IR remote
- Use a claw to lift objects
- Follow a line

If the IR Remote is not ON, the robot will follow some instructions I coded in advance.

Our robot is designed to pick up and move packages, we have 2 large motors, 1 small motor, 1 ultrasonic sensor, 1 distance sensor, 1 stop button and a control block.

Video:

	https://www.youtube.com/watch?v=Od0xv7BixZQ&feature=youtu.be&fbclid=IwAR0QRRI8oA1t--PnjSp-3c-nweU9-qg1znPtCuJBh5kfud747Pjd4tm2rQY
	https://www.youtube.com/watch?v=Y10048XTzqY&feature=youtu.be&fbclid=IwAR0ydW8lbGhSIBkLER4nQ8XmDaYU8-tL0s-m6DqhdeFXjKe67pGJIpCxpWE

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

2.3.Crab and Scorpion

Alexandru-Nicolae Bădîngă, Nicoleta-Daniela Grădinaru, Ingrid Șalaru, students
Gabriela-Brândușa Horlescu, Constanța Șalaru, teachers

Crab

The code we used:

Scorpion

The code we used:

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

3.MakeCode for LEGO MINDSTORMS Education EV3!

Gabriela-BrânduşaHorlescu, teacher

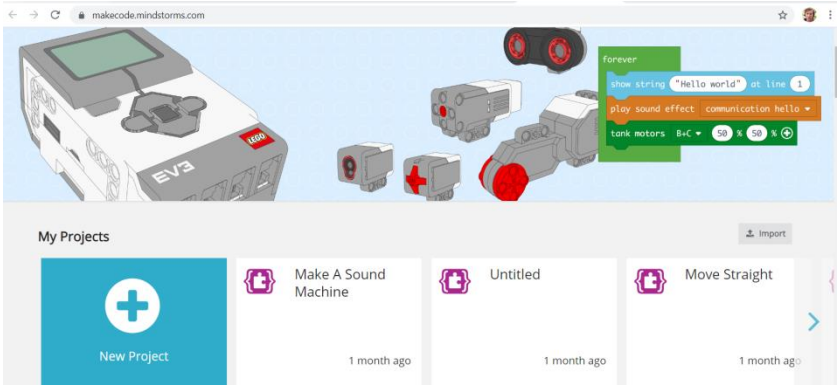
The LEGO MINDSTORMS Education EV3 Core Set comes with a variety of different sensors and motors that can be programmed:

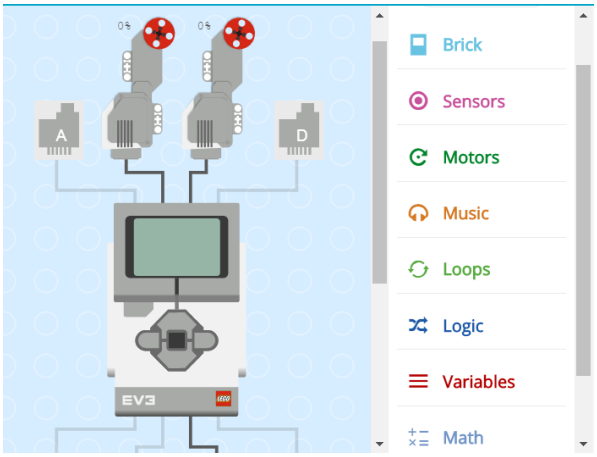
- a touch sensor,
- color sensor,
- ultrasonic sensor,
- infrared sensor,
- gyro sensor,
- large and medium motors.

Coding with MakeCode for LEGO MINDSTORMS Education EV3 is work in a web browser, no software to download or install!

To get started with MakeCode for LEGO MINDSTORMS Education EV3, you'll need:

- A computer with a USB port and internet access through a browser
- The LEGO MINDSTORMS Education EV3 Core Set
- Go to makecode.mindstorms.com

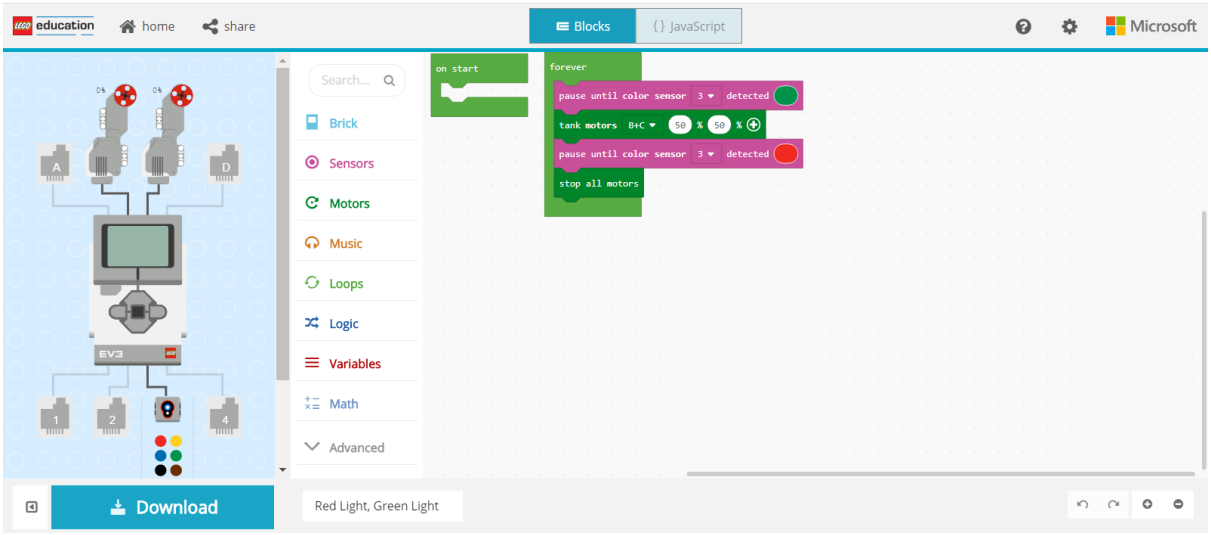




"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

Project 1.Red light, green light

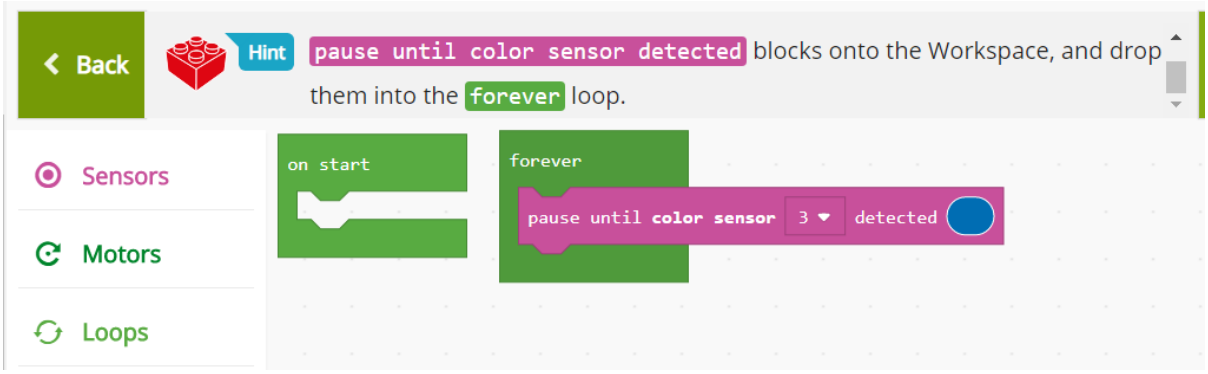
Blocks



JavaScript

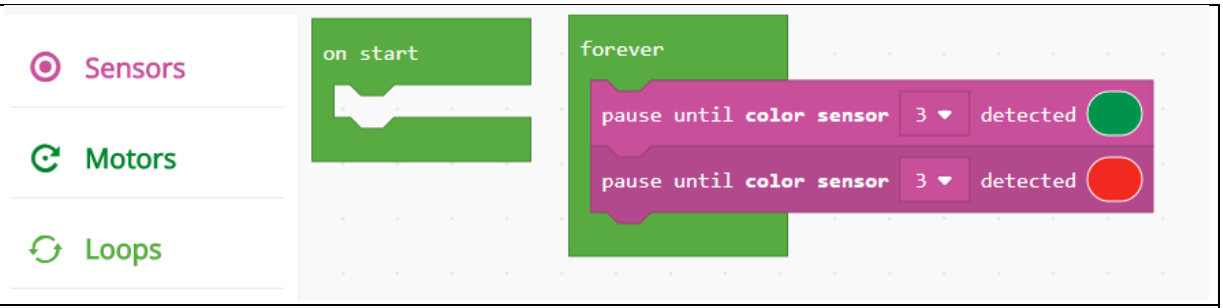
```
forever(function () {
sensors.color3.pauseUntilColorDetected(ColorSensorColor.Green)
motors.largeBC.tank(50, 50)
sensors.color3.pauseUntilColorDetected(ColorSensorColor.Red)
motors.stopAll()
})
```

Open the ***Sensors*** Toolbox drawer→drag out **2** pause until color sensor detected blocks onto the Workspace → drop them into the forever loop.

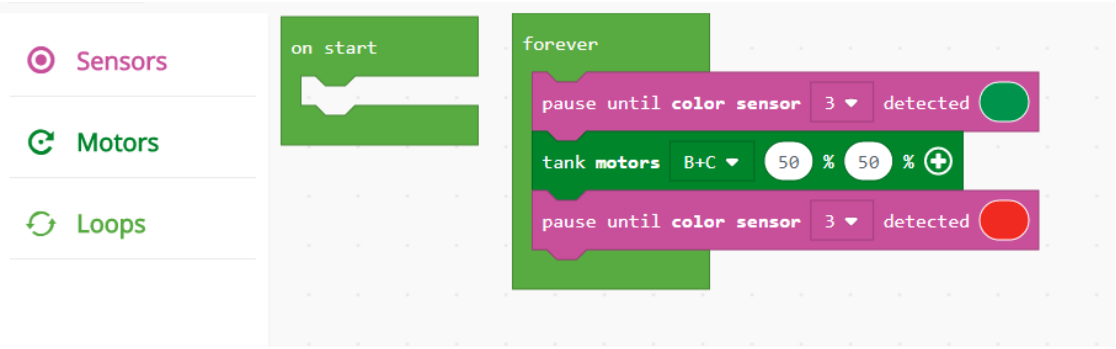


In the ***first pause until color sensor*** detected block, use the second drop-down menu to select the Green color. In the second ***pause until color sensor*** detected block, use the second drop-down menu to select the Red color.

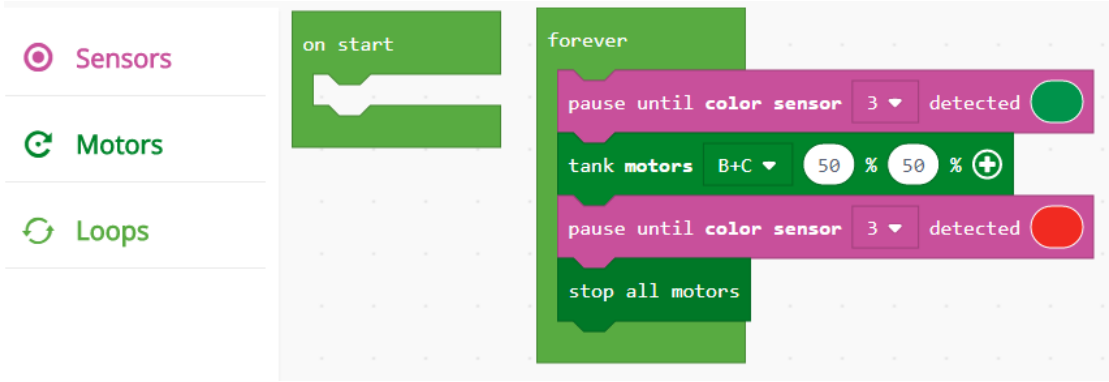
"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."



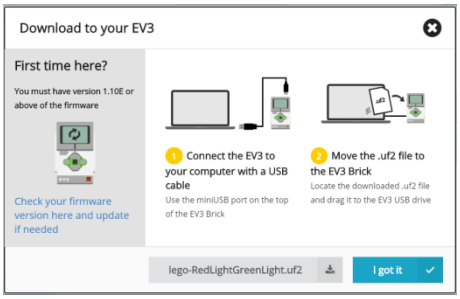
Open the ***Motors*** Toolbox drawer→drag out a ***tank motors*** block onto the Workspace → drop in between the ***pause until color sensor*** detected blocks.



Open the ***Motors*** Toolbox drawer → drag out a ***stop all motors*** block onto the Workspace→ drop it in after the second ***pause until color sensor detected*** block in the ***forever*** loop.



Plug your EV3 Brick into the computer with the USB cable, and click the ***Download*** button at the bottom of your screen. Follow the directions to save your program to the EV3 Brick.



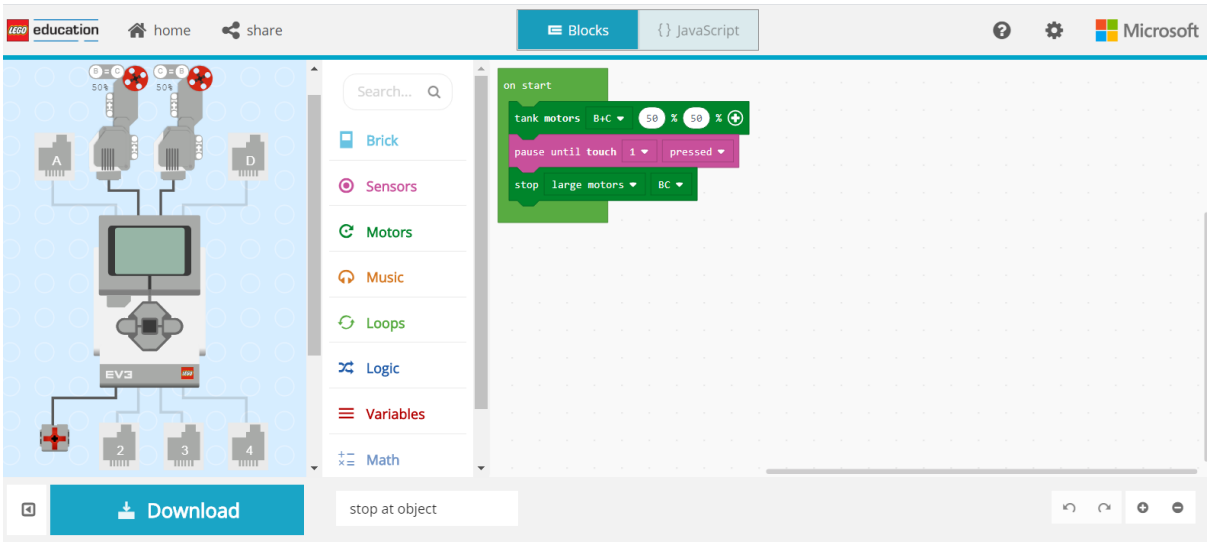
Bibliography:

https://makecode.com/blog/lego/05-15-2018

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

Project 2.Stop at object

Blocks



JavaScript

```
motors.largeBC.tank(50, 50)
sensors.touch1.pauseUntil(ButtonEvent.Pressed)
motors.largeBC.stop()
```

Bibliography:

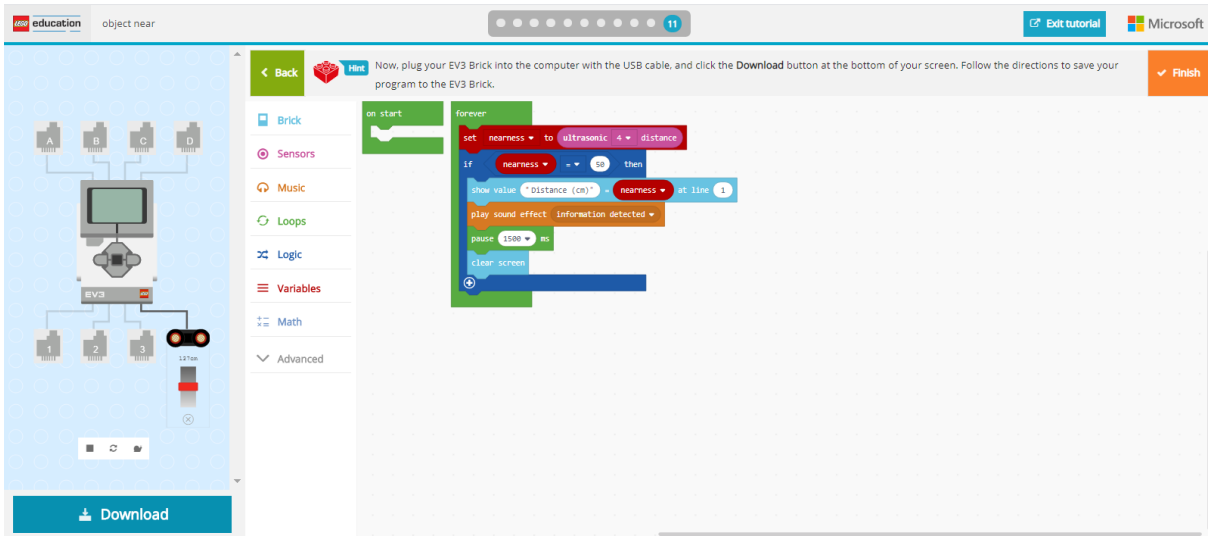
https://makecode.com/blog/lego/05-15-2018

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

Project 3. Object near

Blocks

The digital Ultrasonic Sensor generates sound waves and reads their echoes to detect and measure distance from objects in centimeters. Build a program that will detect when an object is nearby.

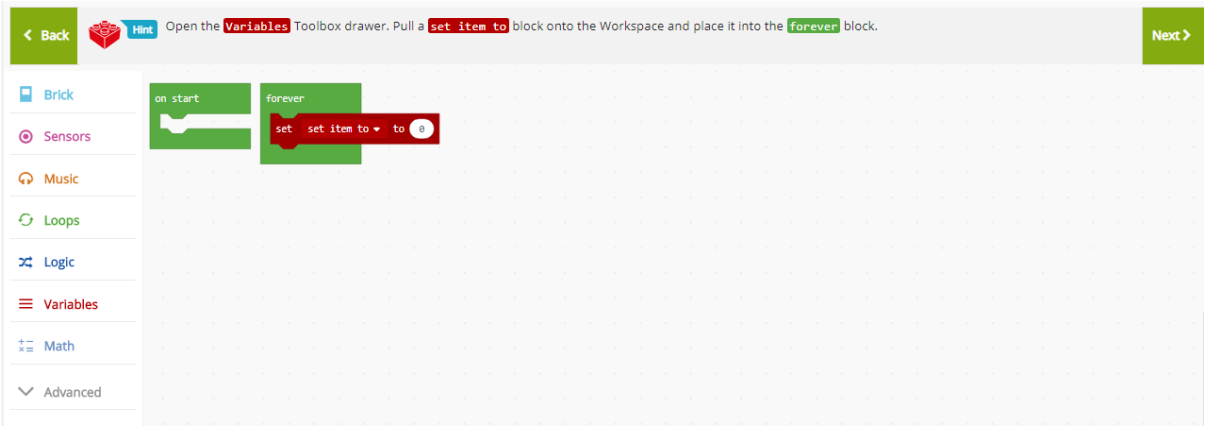


JavaScript

```
let nearness = 0
forever(function () {
   nearness = sensors.ultrasonic4.distance()
if (nearness == 50) {
brick.showValue("Distance (cm)", nearness, 1)
music.playSoundEffect(sounds.informationDetected)
pause(1500)
brick.clearScreen()
   }
})
```

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

Open the ***Variables*** Toolbox drawer→pull a ***set item to*** block onto the Workspace and place it into the ***forever*** block.

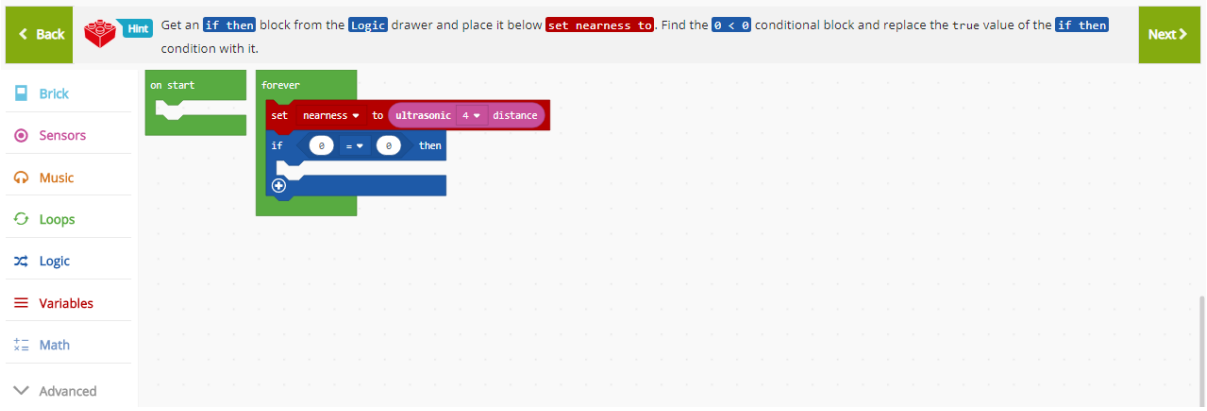


Go to the ***set item to*** block and click the variable name dropdown and select "Rename variable...". In the window that pops up, rename the variable to ***nearness*** and click Ok.

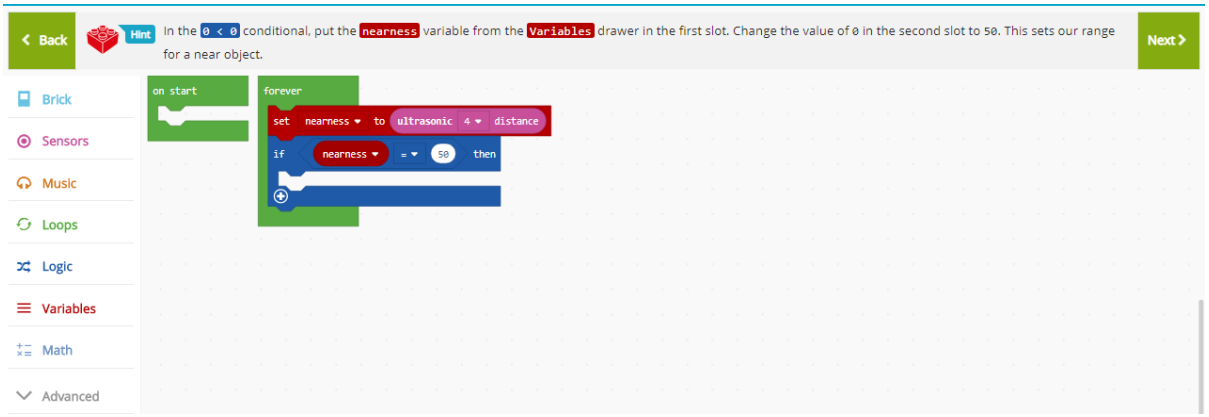
Open the ***Sensors*** Toolbox drawer→ drag the ***ultrasonic distance*** out and use it to replace the 0 in the ***set nearness to*** block.

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

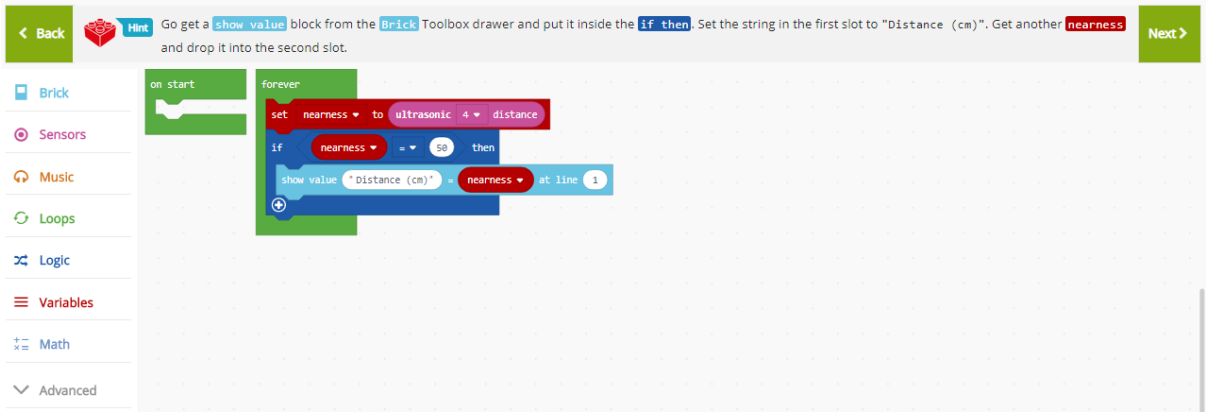
Get an ***if then*** block from the ***Logic*** drawer and place it below ***set nearness to***.
Find the ***0 < 0*** conditional block and replace the true value of the ***if then*** condition with it.



In the ***0 < 0*** conditional, put the ***nearness*** variable from the ***Variables*** drawer in the first slot. Change the value of 0 in the second slot to 50. This sets our range for a near object.

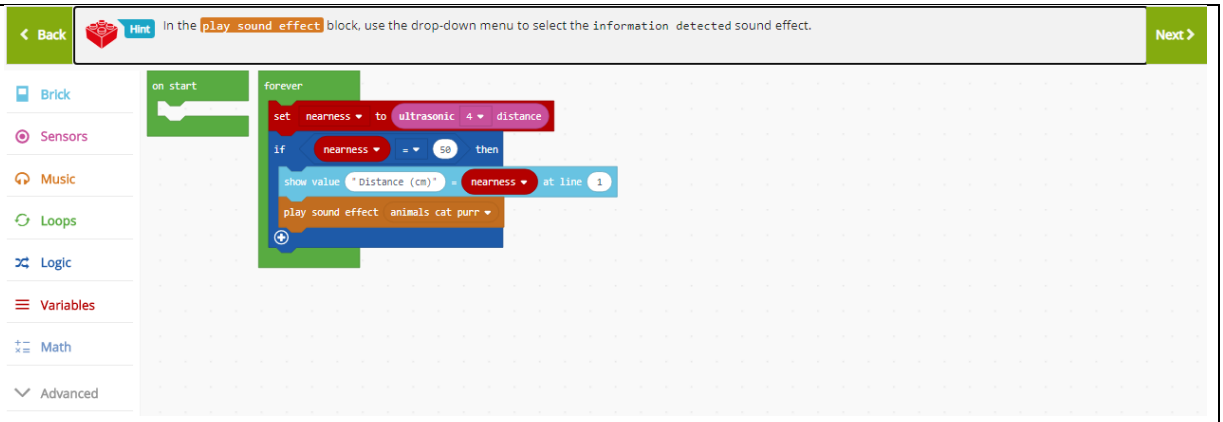


Go get a ***show value*** block from the ***Brick*** Toolbox drawer and put it inside the ***if then***. Set the string in the first slot to "Distance (cm)". Get another ***nearness*** and drop it into the second slot.

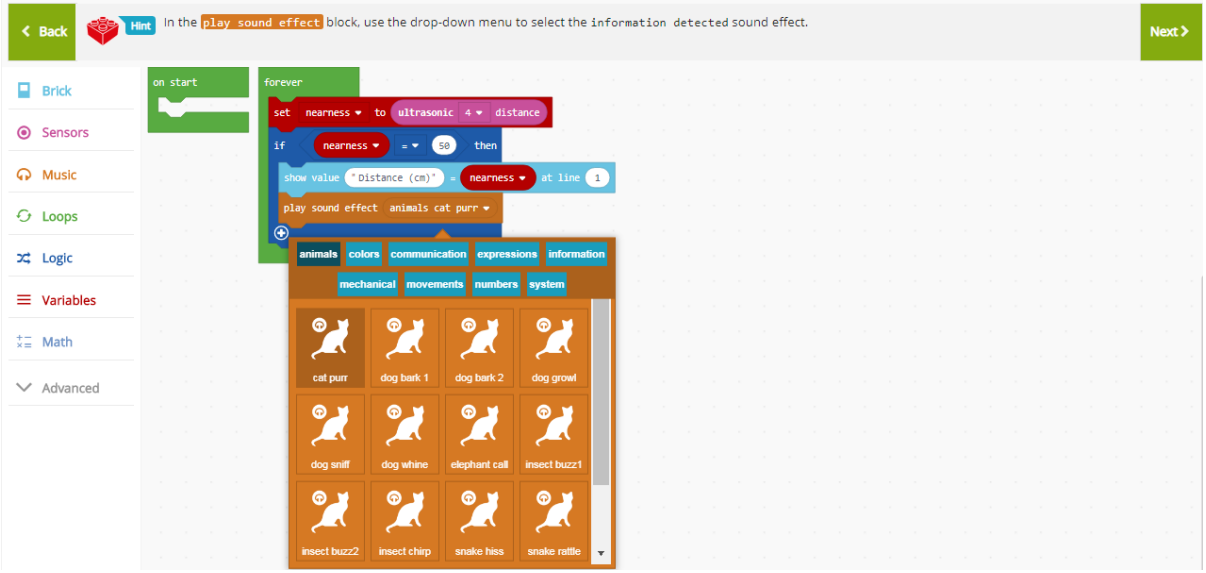


Now, let's add a sound as an alert when something is near. In the ***Music*** drawer, get the ***play sound effect*** and put it just below the ***show value***.

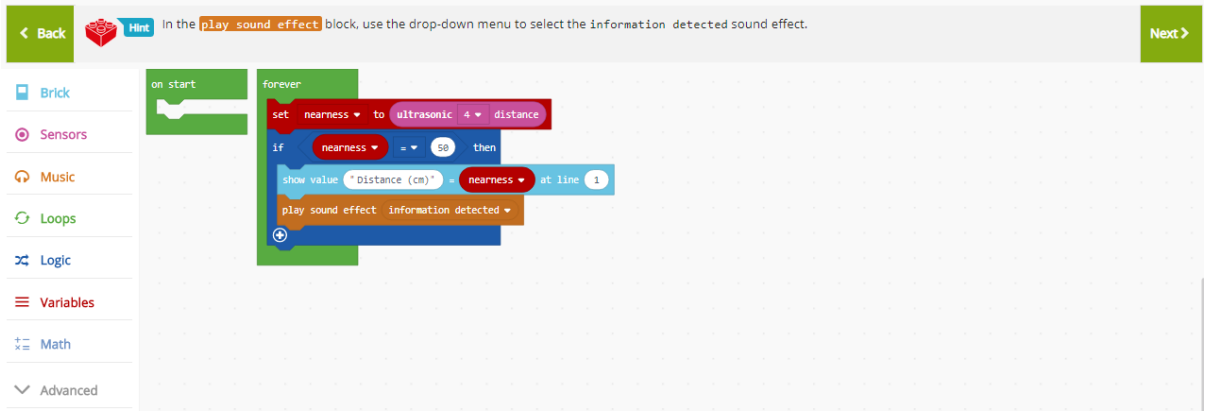
"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."



In the ***play sound effect*** block, use the drop-down menu to select the information detected sound effect.

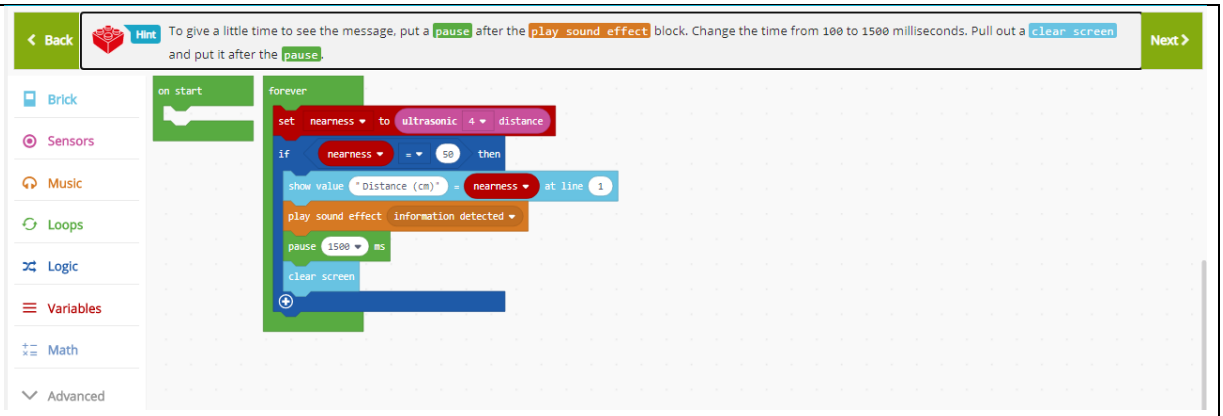


When an object is near, our brick will display the distance away that the object is detected in centimeters and then say "detected".

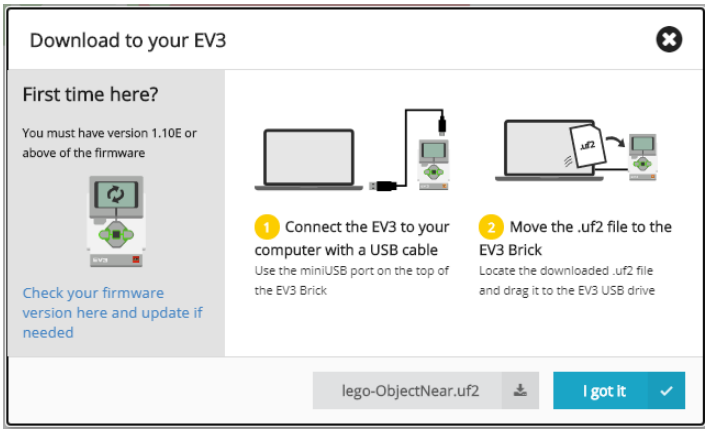


To give a little time to see the ***message***, put a pause after the ***play sound effect*** block. Change the time from 100 to 1500 milliseconds. Pull out a ***clear screen*** and put it after the ***pause***.

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."



Now, plug your EV3 Brick into the computer with the USB cable, and click the ***Download*** button at the bottom of your screen. Follow the directions to save your program to the EV3 Brick.



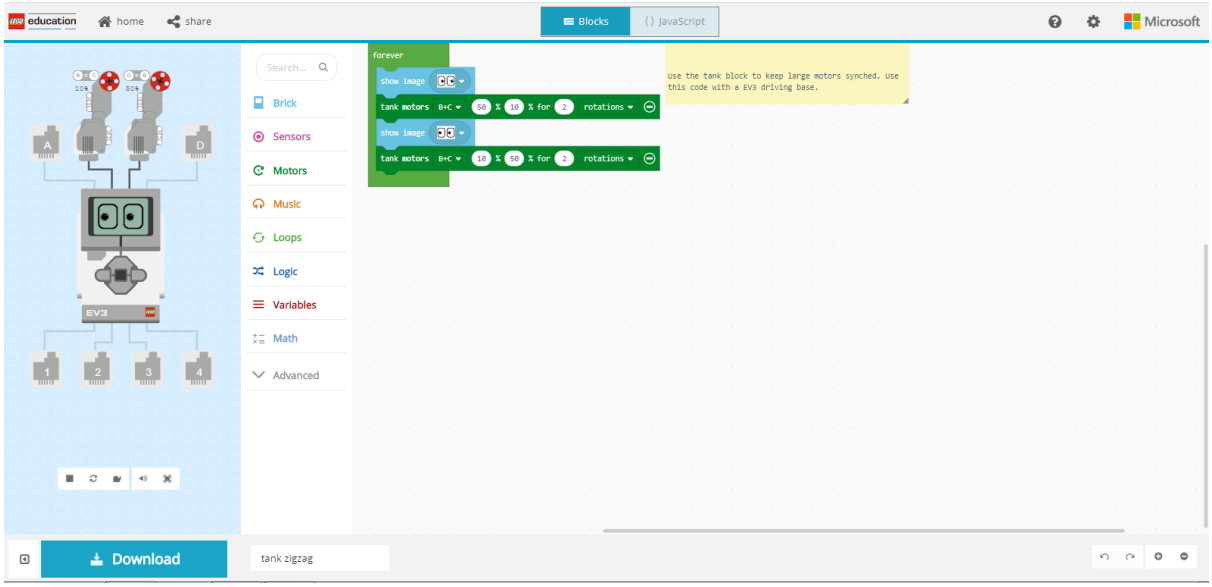
Bibliography:

https://makecode.com/blog/lego/05-15-2018

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

Project 4. Tank ZigZag

Blocks



JavaScript

```
/**
 * Use the tank block to keep large motors synched. Use this code with a EV3 driving base.
 */
forever(function () {
brick.showImage(images.eyesMiddleRight)
motors.largeBC.tank(50, 10, 2, MoveUnit.Rotations)
brick.showImage(images.eyesMiddleLeft)
motors.largeBC.tank(10, 50, 2, MoveUnit.Rotations)
})
```

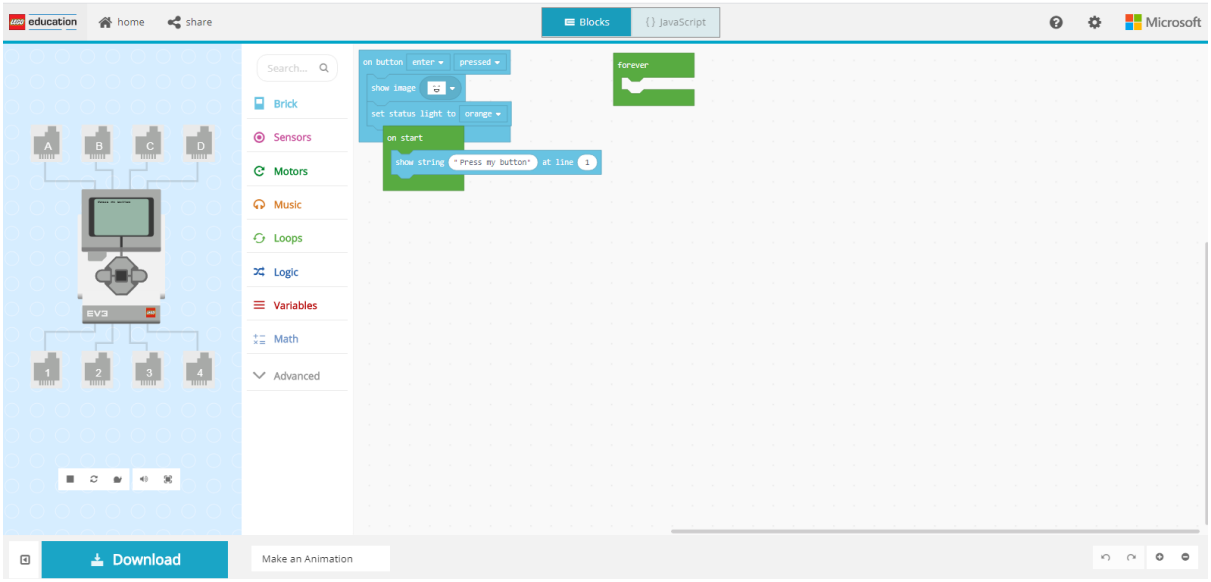
Bibliography:

https://makecode.com/blog/lego/05-15-2018

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

Project 5.Make an Animation

Blocks



JavaScript

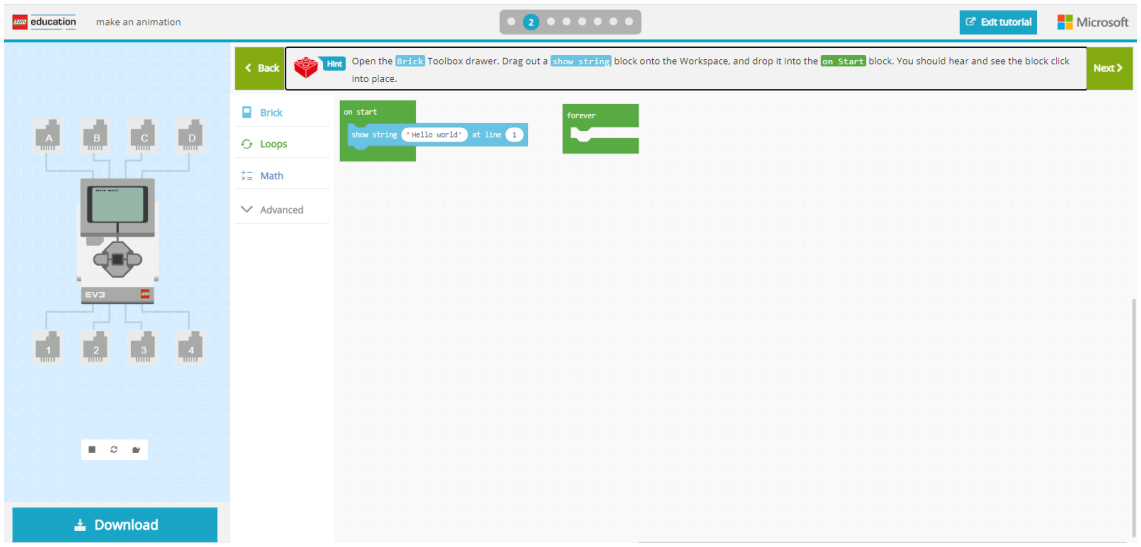
```
brick.buttonEnter.onEvent(ButtonEvent.Pressed, function () {
brick.showImage(images.expressionsBigSmile)
brick.setStatusLight(StatusLight.Orange)
})
brick.showString("Press my button", 1)
forever(function () {

})
```

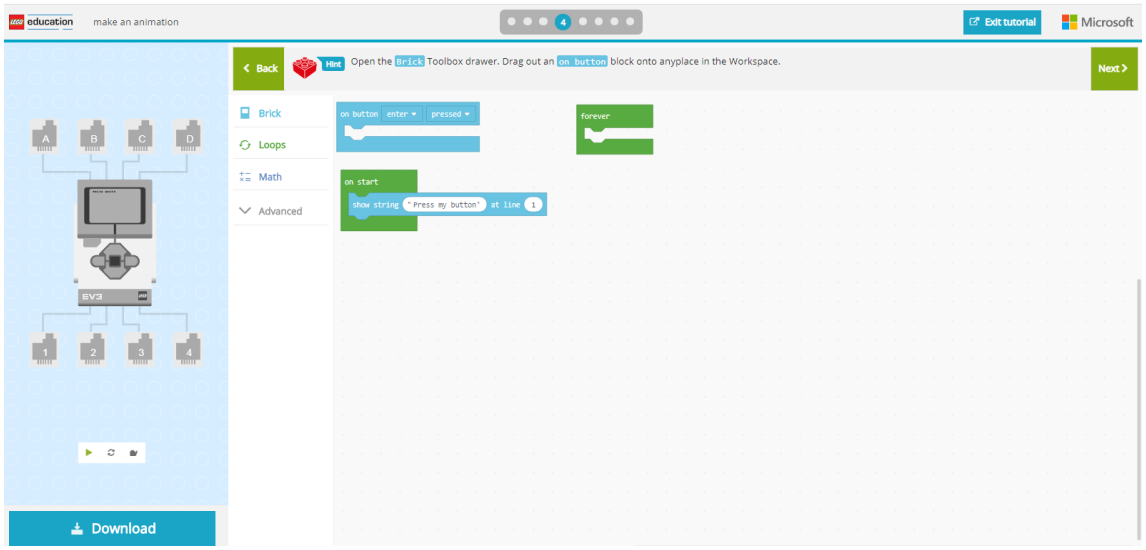
"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

Open the Brick Toolbox drawer → drag out a show string block onto the Workspace →drop it into the on Start block. You should hear and see the block click into place.

In the ***show string*** block, type the text "Press my button" to replace "Hello world".



Open the ***Brick*** Toolbox drawer →drag out an ***on button*** block onto anyplace in the Workspace.



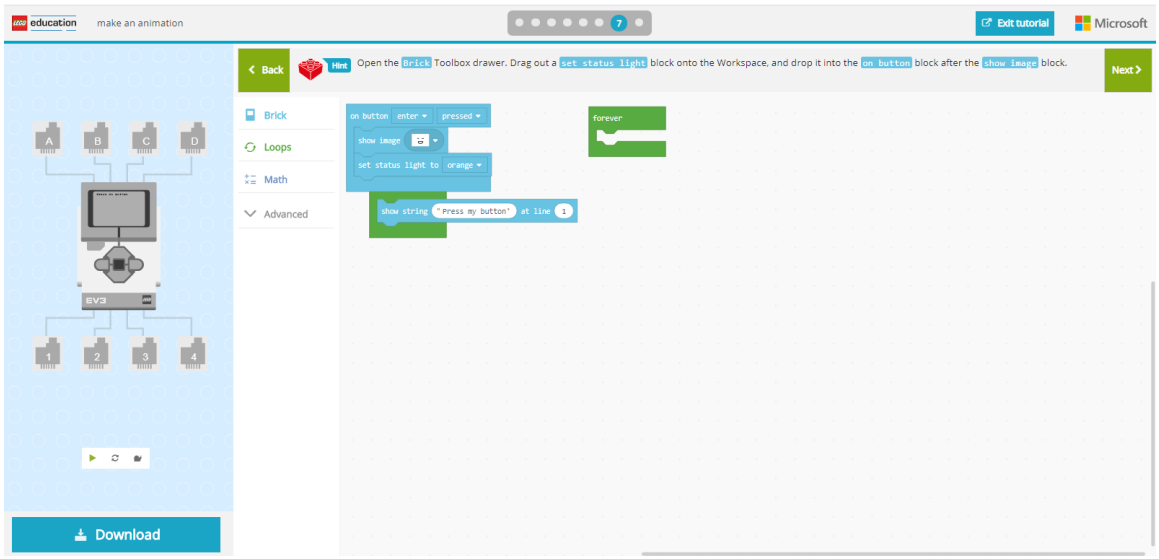
Open the ***Brick*** Toolbox drawer →drag out a ***show image*** block onto the Workspace → drop it into the ***on button*** block.

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

Try out your code in the EV3 Brick simulator!

Press the Enter button and check that the image shows up as you expected.

Open the ***Brick*** Toolbox drawer → drag out a ***set status light*** block onto the Workspace →drop it into the ***on button*** block after the ***show image*** block.



Plug your EV3 Brick into the computer with the USB cable, and click the **Download** button at the bottom of your screen. Follow the directions to save your program to the EV3 Brick.

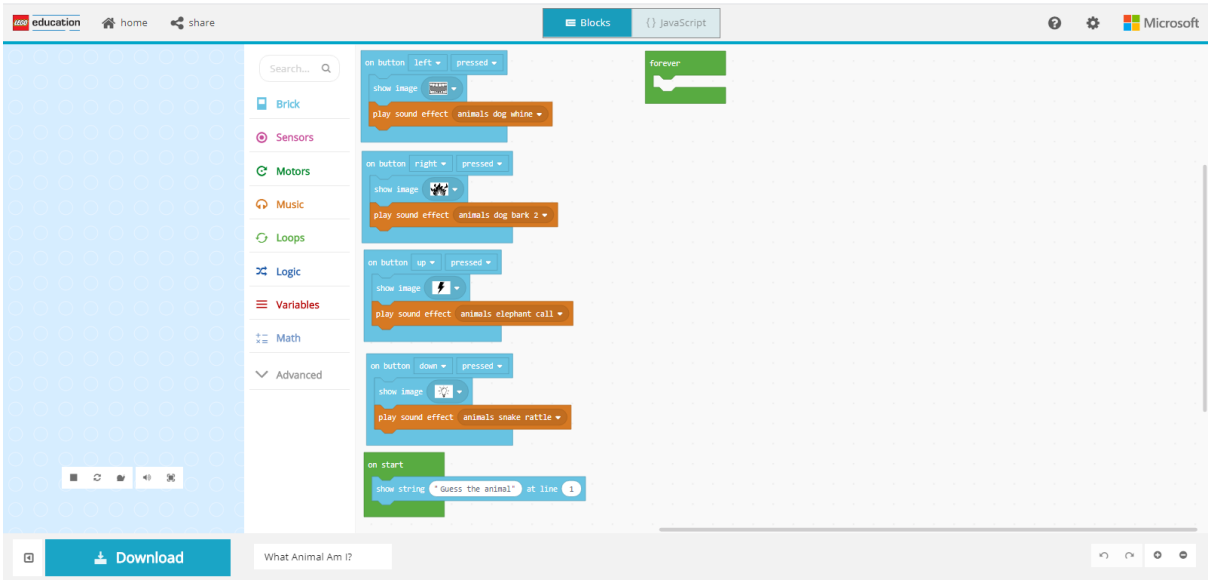
Bibliography:

https://makecode.com/blog/lego/05-15-2018

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

Project 6. What Animal Am I?

Blocks

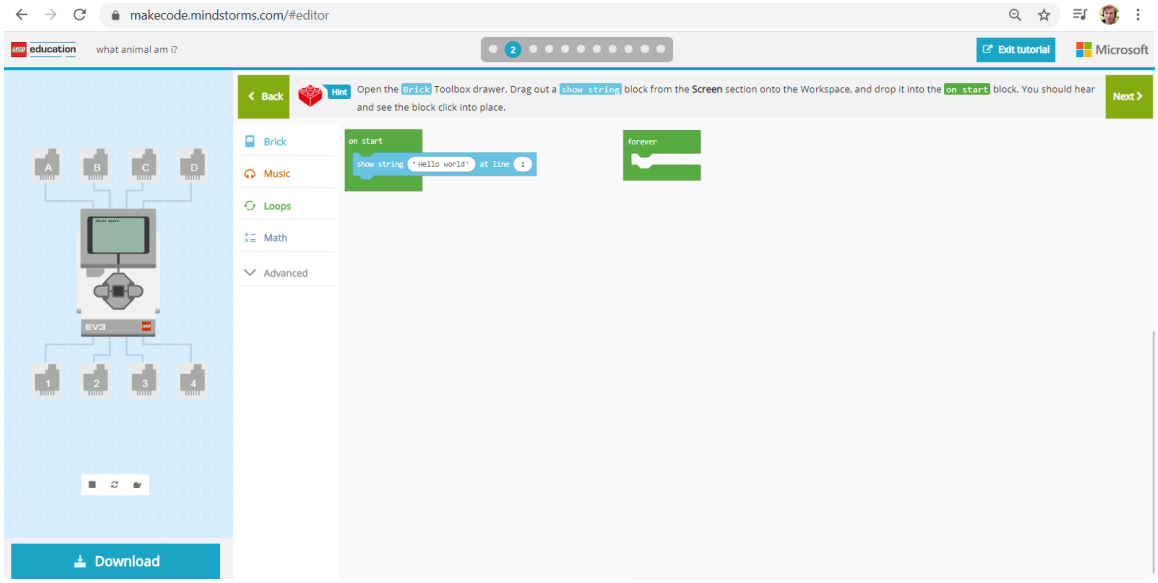


JavaScript

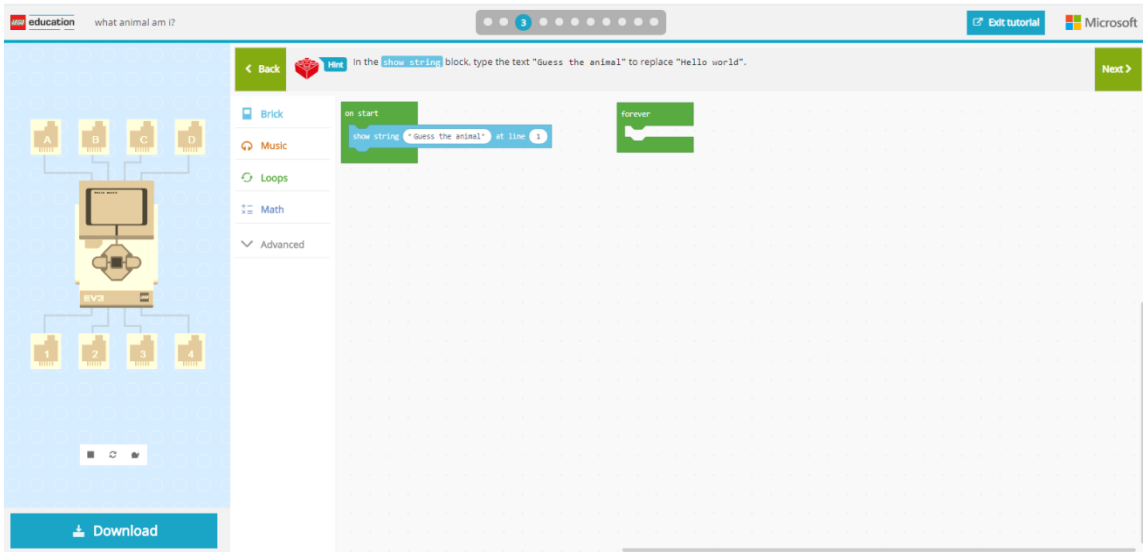
```
brick.buttonLeft.onEvent(ButtonEvent.Pressed, function () {
brick.showImage(images.expressionsMouth1open)
music.playSoundEffect(sounds.animalsDogWhine)
})
brick.buttonRight.onEvent(ButtonEvent.Pressed, function () {
brick.showImage(images.objectsFire)
music.playSoundEffect(sounds.animalsDogBark2)
})
brick.buttonUp.onEvent(ButtonEvent.Pressed, function () {
brick.showImage(images.objectsLightning)
music.playSoundEffect(sounds.animalsElephantCall)
})
brick.buttonDown.onEvent(ButtonEvent.Pressed, function () {
brick.showImage(images.objectsLightOn)
music.playSoundEffect(sounds.animalsSnakeRattle)
})
brick.showString("Guess the animal", 1)
forever(function () {
})
```

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

Open the ***Brick*** Toolbox drawer → drag out a ***show string*** block from the **Screen** section onto the Workspace → drop it into the ***on start*** block. You should hear and see the block click into place.

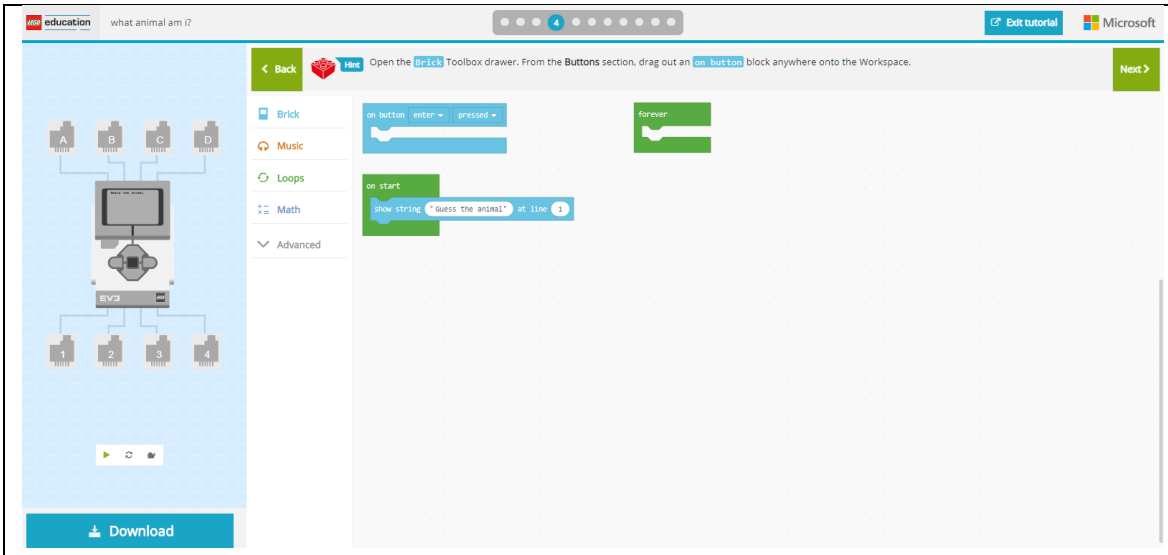


In the ***show string*** block, type the text "Guess the animal" to replace "Hello world".

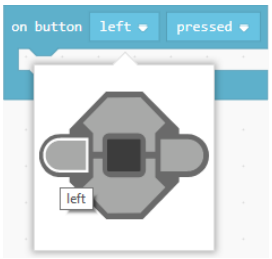


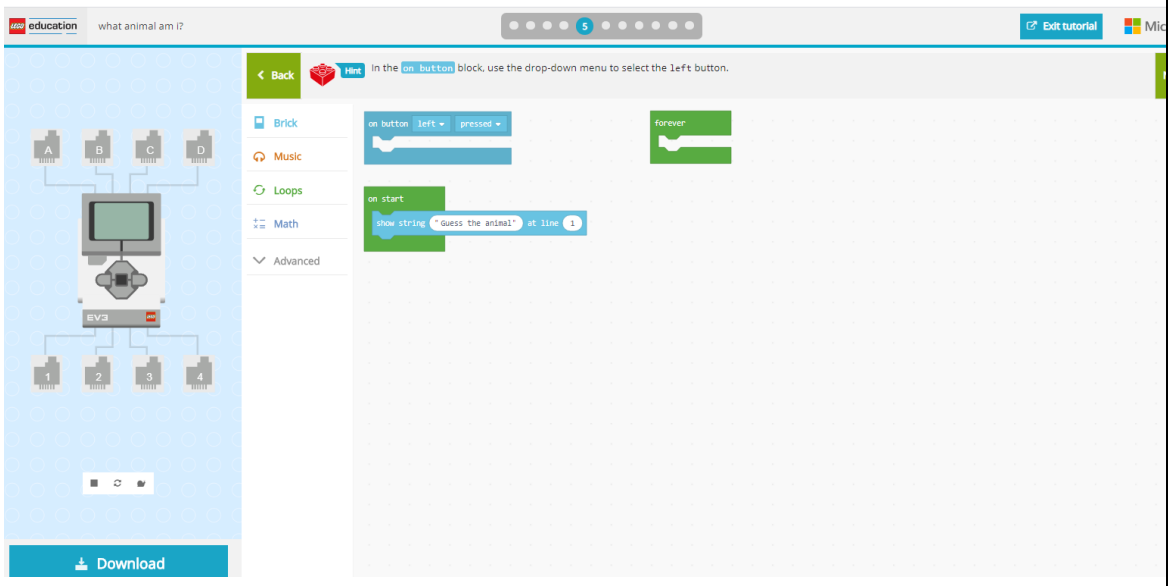
Open the ***Brick*** Toolbox drawer. From the **Buttons** section, drag out an ***on button*** block anywhere onto the Workspace.

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."



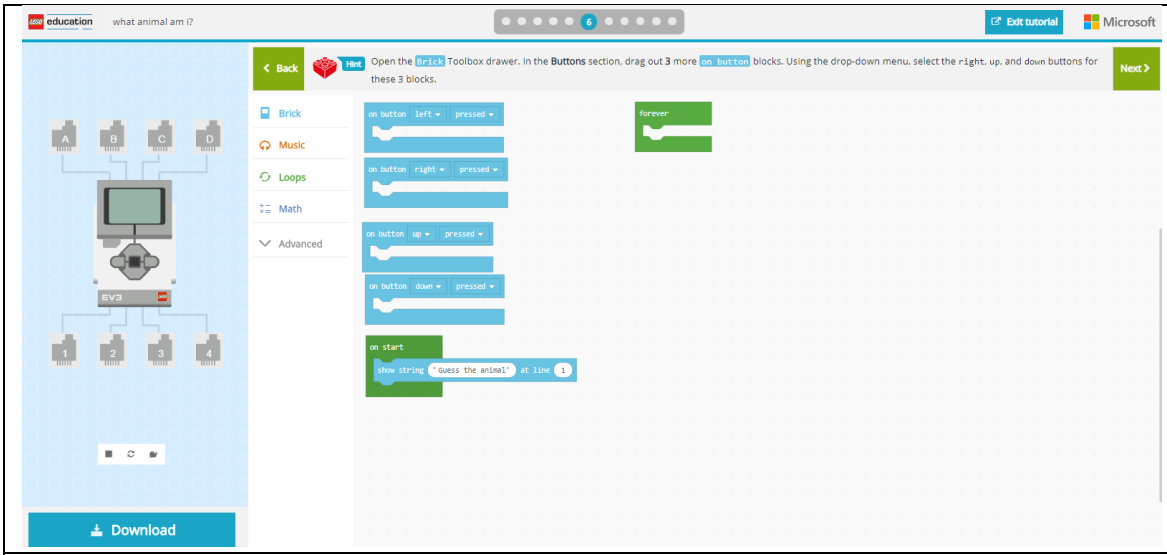
In the ***on button*** block, use the drop-down menu to select the left button.



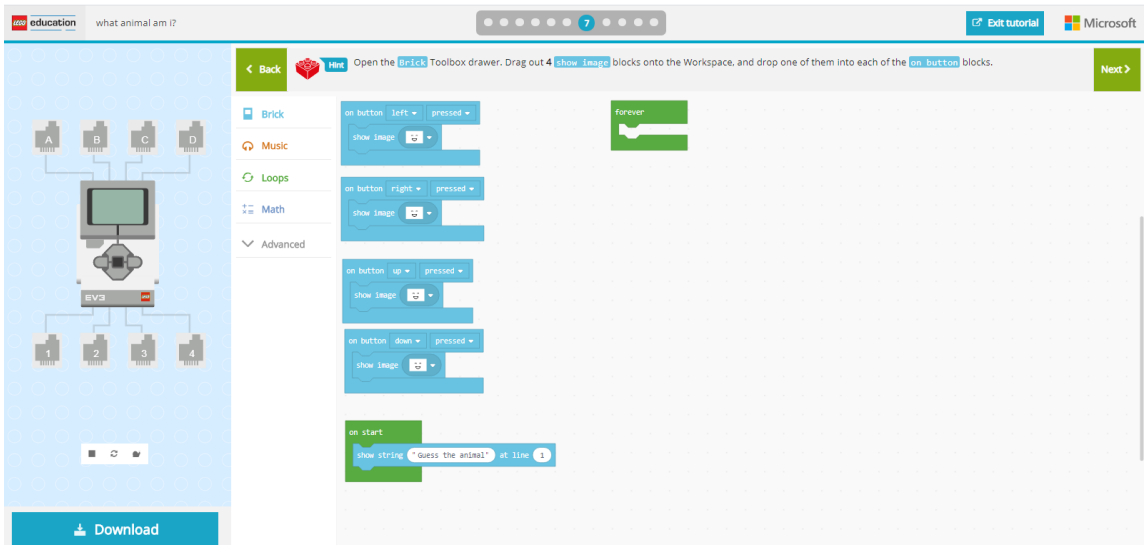


Open the **Brick** Toolbox drawer→ in the Buttons section, drag out 3 more ***on button*** blocks. Using the drop-down menu, select the right, up, and down buttons for these 3 blocks.

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

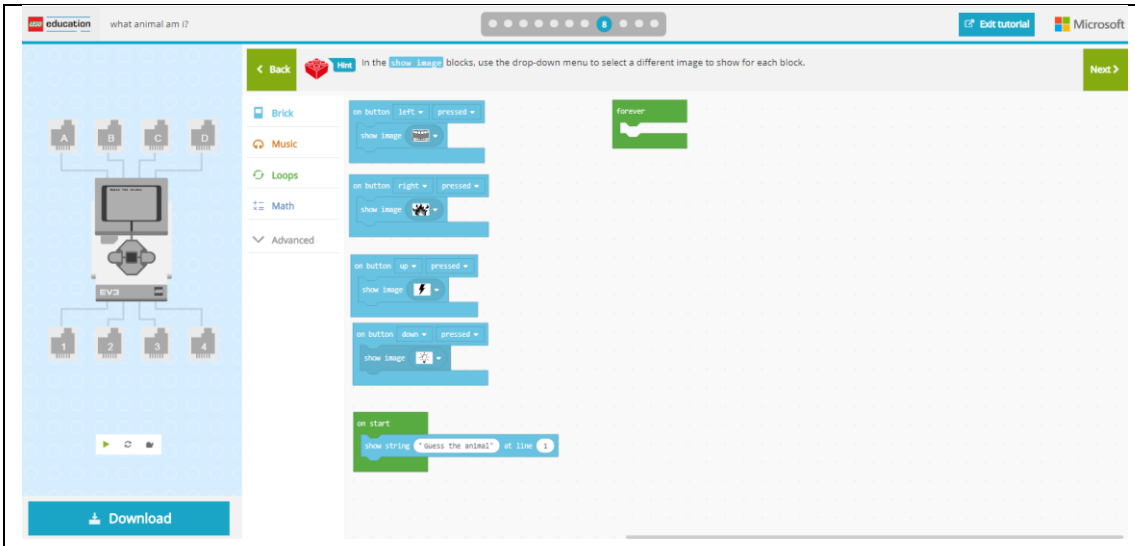


Open the ***Brick*** Toolbox drawer →drag out **4 *show image*** blocks onto the Workspace→ drop one of them into each of the ***on button*** blocks.



In the ***show image*** blocks, use the drop-down menu to select a different image to show for each block.

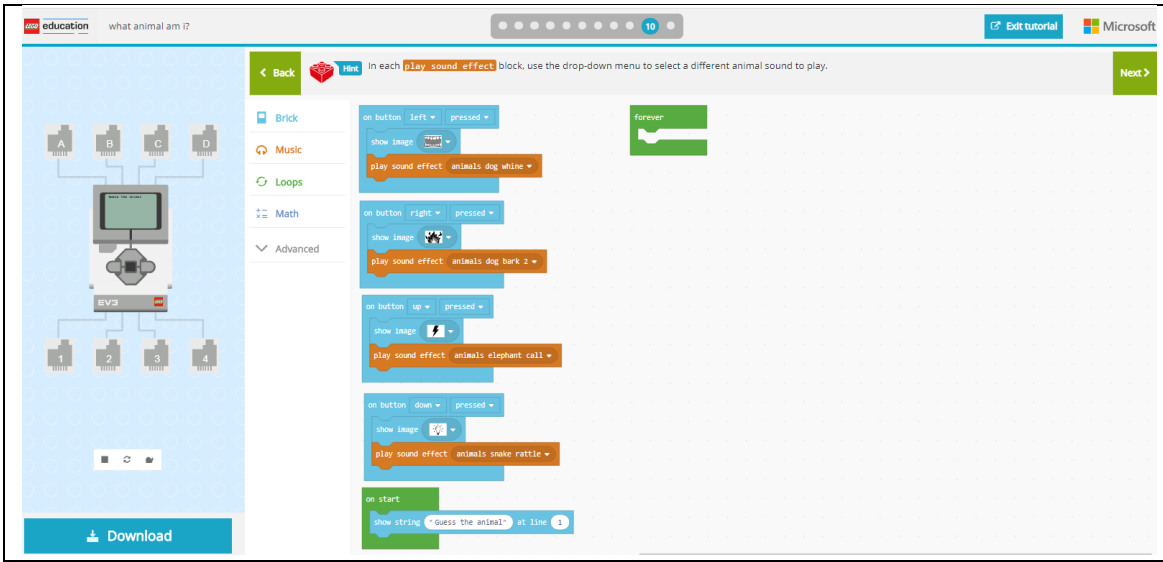
"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."



Open the ***Music*** Toolbox drawer →drag out 4 ***play sound effect*** block and drop one of them into each of the ***on button*** blocks, just after the ***show image*** block.

In each ***play sound effect*** block, use the drop-down menu to select a different animal sound to play.

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."



Now, plug your EV3 Brick into the computer with the USB cable, and click the Download button at the bottom of your screen. Follow the directions to save your program to the brick.
Test your program with a friend by pressing the right, left, up, and down buttons on your brick. Have your friend guess what animal it is!

Bibliography:

https://makecode.com/blog/lego/05-15-2018

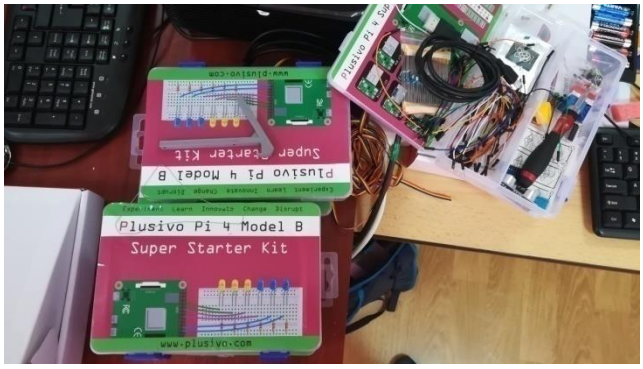
"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

Raspberry Pi

Alexandru-Nicolae Bădîngă, Nicoleta-Daniela Grădinaru, students
Gabriela-Brândușa Horlescu, Constanța Șalaru, teachers

The newly purchased Raspberry Pi kits lay the foundation for interactive learning for our high school students. At the moment, we have started basic lessons in the Python programming language, with which we have managed to re-create simple, beginner projects, which we want to present to you.

Our first steps in the world of Raspberry, respectively Linux (NOOBs) and Python were easy and full of joy, thanks to our eager to learn and thanks to our teachers who are willing to guide us in an interactive way, with presentations and projects.

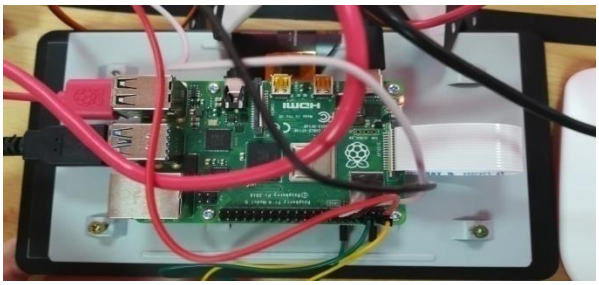


Our first experience with Raspberry

At the beginning, we assembled the capacitive screen with the help of an online tutorial.
(https://www.instructables.com/id/Raspberry-Pi-Touchscreen-Setup/)

We inserted the card that was included in the package and which already had the Linux OS pre-installed and some programming applications, games written in Python and a web browser.

We can say that the Raspberry Pi 4 is a pretty powerful mini-PC.



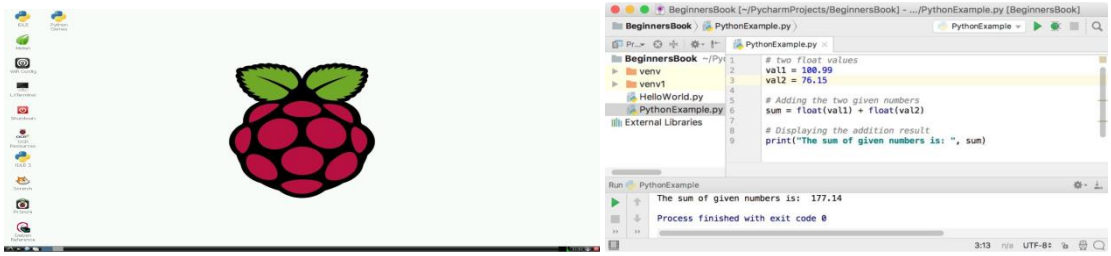
"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

Our first experience with Linux

In the Linux terminal, we learnt how to install an application using, as a first example, a virtual keyboard.

sudo apt-get install matchbox-keyboard

Then followed the Python lessons where we learnt the types of numbers, maths, and how we can use GPIO pins.

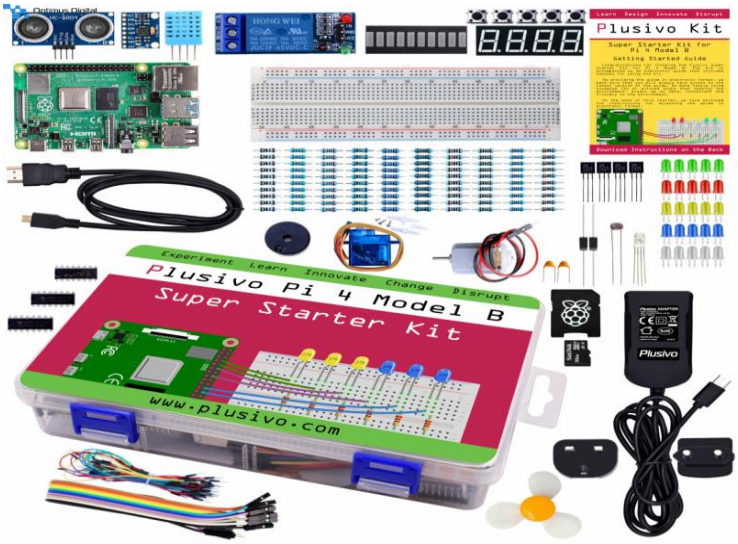


Raspberry Pi 4 specs

We have a “Kit Plusivo Pi 4 Super Starter with Raspberry Pi 4 - 4 GB RAM with a NOOBs 32 GB SD card”

https://www.optimusdigital.ro/ro/kituri/9554-kit-plusivo-pi-4-super-starter-cu-raspberry-pi-4-cu-4-gb-ram-si-card-noobs-de-32-gb.html

The kit contains various components such as sensors, motors and electrical components.



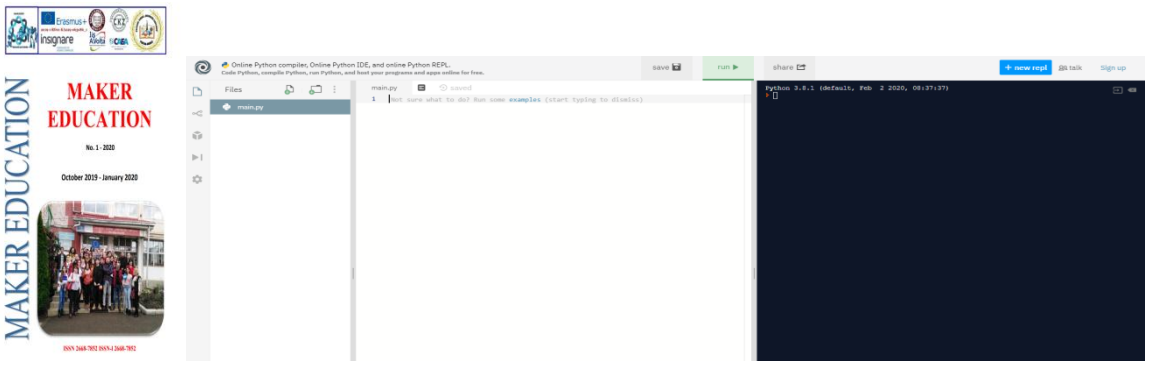
Code

The theoretical support was developed within the project and published in the Maker Education journal.

(https://makereducation6.weebly.com/uploads/1/2/5/7/125705654/maker_education_magazine_no_1.pdf)

You can test the programs online with a Python compiler: https://repl.it/languages/python3

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."



Project 1. LED Blink

With Thonny Python IDE, we compiled a program that makes an LED flash every 1 second.

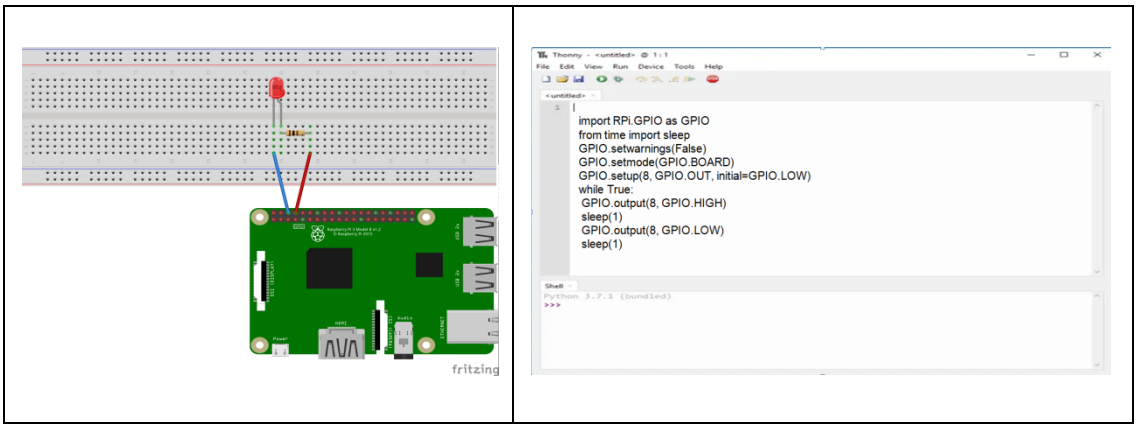
Compared to the Arduino IDE, respectively the C / C ++ programming language, the experience is similar (except for the keywords and the new way of making a loop that we try to get used to).

You'll need:

- 1 Led
- 1 Raspberry Pi board
- 1 100 Ohm resistor
- 1 Power supply (in our case, a raspberry pi charger)

How to do it:

- Assemble the circuit using the following scheme:
- Turn on the Raspberry Pi, and open the Thonny Python IDE
- Use the code on the table ...



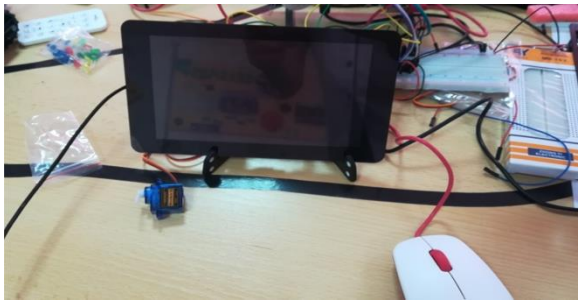
Bibliography:

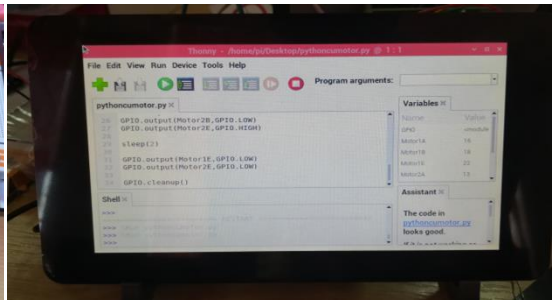
https://raspberrypihq.com/making-a-led-blink-using-the-raspberry-pi-and-python/

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

Project 2. Servomotor Control

Another project we did is to control a servomotor, soon followed by a project using DC motors and a controller chip.

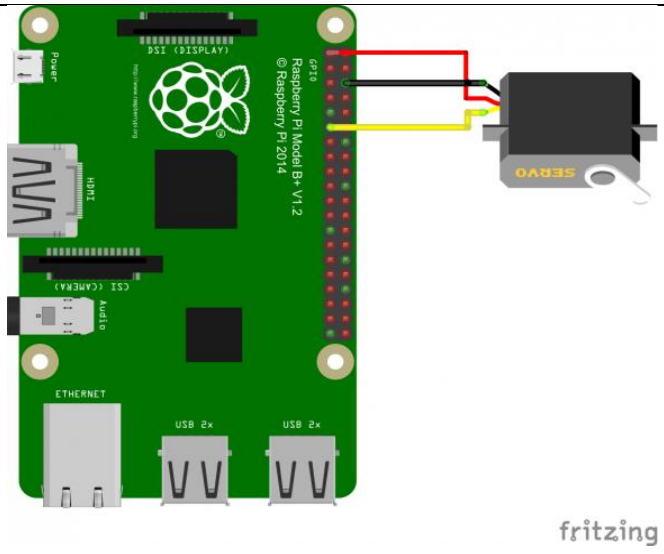




You will need:

- 1 Servomotor
- 1 Raspberry Pi Board
- Power Source

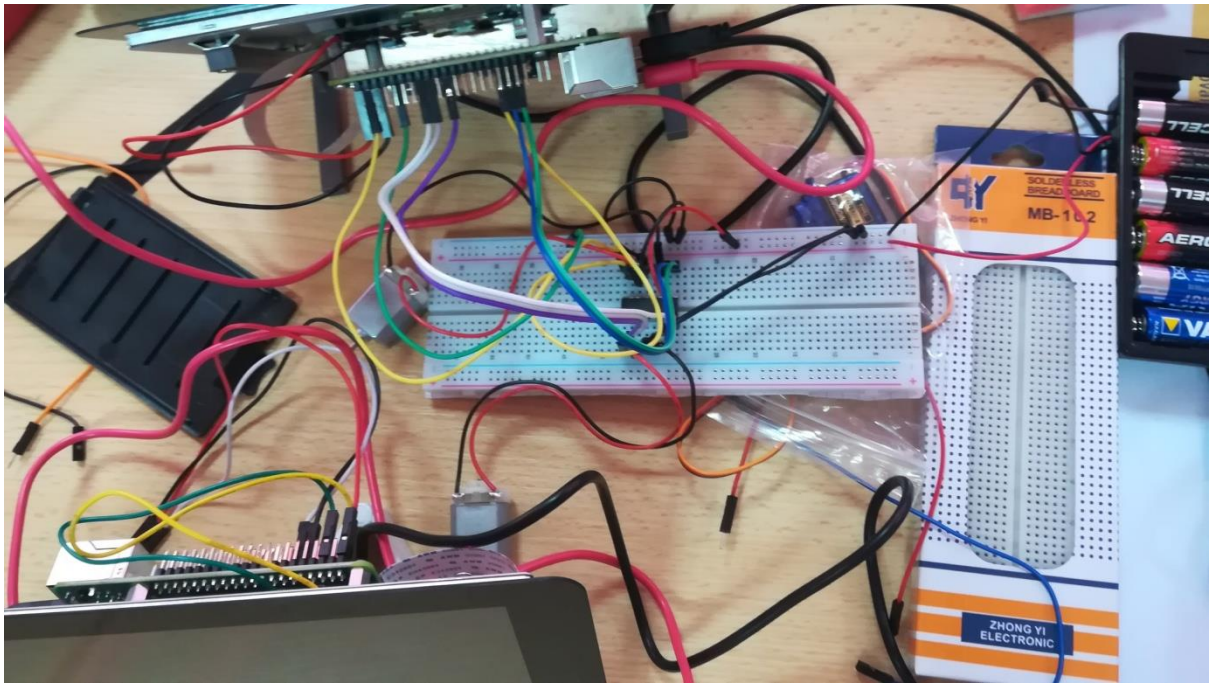
How to do it:




```
import RPi.GPIO as GPIO
import time
servoPIN = 17
GPIO.setmode(GPIO.BCM)
GPIO.setup(servoPIN, GPIO.OUT)
p = GPIO.PWM(servoPIN, 50) # GPIO 17 for PWM with 50Hz
p.start(2.5) # Initialization
try:
  while True:
    p.ChangeDutyCycle(5)
    time.sleep(0.5)
    p.ChangeDutyCycle(7.5)
    time.sleep(0.5)
    p.ChangeDutyCycle(10)
```

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

```
            time.sleep(0.5)
            p.ChangeDutyCycle(12.5)
            time.sleep(0.5)
            p.ChangeDutyCycle(10)
            time.sleep(0.5)
            p.ChangeDutyCycle(7.5)
            time.sleep(0.5)
            p.ChangeDutyCycle(5)
            time.sleep(0.5)
            p.ChangeDutyCycle(2.5)
            time.sleep(0.5)
        except KeyboardInterrupt:
          p.stop()
          GPIO.cleanup()
```



Bibliography:

https://tutorials-raspberrypi.com/raspberry-pi-servo-motor-control/

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

5.How can we use the phone as a microphone for the PC?

IT programmer: Elena Manole –
"Gheorghe Cartianu" Technical High School Piatra-Neamț

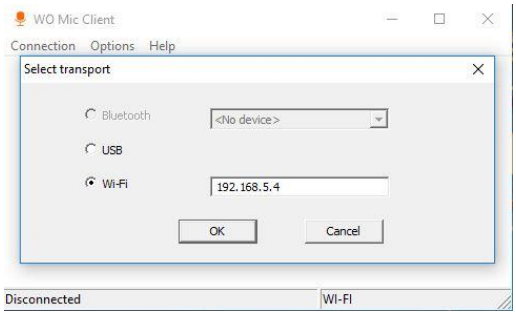
Nowadays, there is almost nothing that a PC can do and a smart phone cannot do. Even a PC can exist in its basic form, without a camera, microphone, GPS, etc., while a smartphone cannot lack these things. Therefore, I propose to see how we can use the microphone of a PC phone. First we need a phone application and two PC programs. For android or iOS we will download the application "WO Mic", and for PC the program "WO Mic Client" and the driver "WO Mic virtual device driver".

We will install the virtual microphone driver and set it in Control Panel → Sound →Recording → WO Mic Device as the default device. From the application on the smartphone we go to Settings → Transport and we will select the same type of connection that we will choose later in the PC program, after which we press Start.

We turn on the program from the PC, select Connection → Connect → Select transport and from here we choose the connection method: Bluetooth, USB or Wi-Fi, the method initially chosen from the phone application. From the Options menu we will select "Play in speaker" to test the functionality.

Note: if we choose a Wi-Fi connection, the phone must be on the same network as the PC, so it must have the same class of IPs. Then the phone's IP will be entered in the Wi-Fi box.

For Bluetooth connection we need a Bluetooth USB adapter or a Bluetooth laptop in the PC, but usually laptops already have built-in microphones and this application would not be so useful.



The necessary drivers and the PC program can be found at: http://www.wirelessorange.com/womic/, and the android application can be found in the Play Store at: https://play.google.com/store/apps/details?id=com.wo.voice

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

6.How to Trick Our Phone's GPS

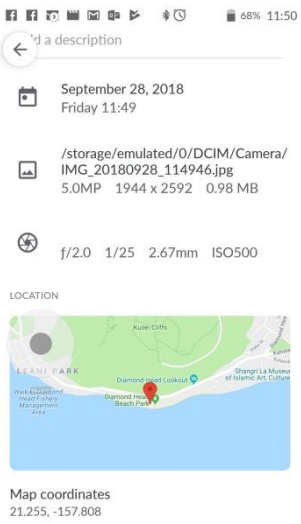
Computer scientist: Dănilă Ticușor-Gabriel
"Gheorghe Cartianu" Technical High School Piatra-Neamț

Fictitious location: Developers use this method to test their applications that use GPS. But we can use this to fool our phone that we're somewhere else. Be careful, however, it is not good to forget the application started because we will have problems if we want to use navigation, the exact location becoming unavailable.

Why shall have fictitious locations?

1. To mislead some spyware
2. Check-in from different locations of your choice
3. To fool your friends on Facebook (that you are in exotic locations)
4. Misleading games that use GPS

Do you want your friends to think you are walking around Hawaii? Sit by the flower pot in the living room, put a picture in the back with a beautiful beach, put a garland around your neck and take a selfie! You know very well that on social networks during this period the last destination of exotic vacation is very important. He who does not go as far as possible from Romania does not solve the problem☺.



How do we fool the GPS that we are in another location?

1. We install an application to falsify the location
2. In Developer Settings / Options we activate dummy locations or select the dummy locations application
3. Start the application for the fictitious location and select the preferred location
4. The Mock GPS application also has a joystick with which you can move around the map

Link to the app: https://play.google.com/store/apps/details?id=net.marlove.mockgps

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

7.Business ideas

7.1.Holiday Village *Valley of the Twelve*

Ana-Irina Secară, teacher

IonuţButa, a young entrepreneur from Neamţ County, put into practice in Dobreni, Neamț County, a unique projectin Europe, "The Valley of the Twelve". In the countryside he built a holiday village with 12 houses made of mud, wood and stone that can be rented for touristic purposes. The village opens its gates every Monday and closes them on Sundays, and from 12 at noon to 4 pm tourists are expected to visit this corner of Heaven.

***The Valley of the Twelve* is located 15 km from Piatra Neamț and 47 km from Roman. The nearest airport is Bacau International Airport, 91 km from the property. The company provides an airport shuttle service at an additional price.**

Talking with the owner of the place, I found out that the idea was to create a village following a beautiful story, to help us disconnect from everyday life, a place where everyone can come for a day or a week and dream of fairy tales.

This village reminds us that happiness comes from simple things and that the elements of culture and folk traditions are priceless treasures. Accommodation is offered in the 12 houses lit with an old fashion oil lamp called *opaiț*, the ventilation is natural, and the heat (during the cold period of the year) is provided by wood stoves. Tourists are expected to enjoy a glass of wine near the stove or relax in the *ciubăr* (an old large barrel where people used to take baths) or simply listen to long-forgotten *doina* (old folk songs). Rooms are equipped with bed linen, towels, slippers and sauna towels. The toilets are shared, equipped with showers, towels, hairdryer, soap and shampoo.

The House of Robardin

The House of Davos

The House of Astor

The House ofBardas

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

Tavern **-** The food tastes differently when cooked on the stove. Tourists can enjoy live music and selected dishes. A continental breakfast, lunch and dinner with organic wood-cooked dishes are prepared at the accommodation.

Facilities **-** the resort is located near Dobreniriver, Dobreni village and offers various leisure opportunities: tavern, sauna, pub, guided mountain walks, carriage rides, free bicycles, terrace and a ski pass sales point. Overlooking the river, each room in the *Valley of the Twelve* includes a seating area.

More details can be obtained by accessing the link:http://www.valeacelordoisprezece.ro/

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

Active Park, a Place in the Middle of Nature

Ana-Irina Secară, teacher

Located in a legendary land full of history, *Active Park& Hostel* completes the touristic offer in Neamt county, along an area of 4 hectares, at the foot of the Almas forest, away from the citiy crowd and traffic jams, but close to the main touristic attractions. Active Park is located near Lake Cuejdel, the Neamt Ancient Fortress, Creanga's house, just 15 minutes from Piatra Neamt.

At Active Park, tourists meet in nature, the forest is at home with all the species of trees in Romania, medicinal plants and flowers, falcons, songbirds, woodpeckers, storks and insects. At this place the vacation takes place right in the family. The joy of children who participate in activities with their parents is boundless. Mom at a paintball game, or dad climbing trees, yes, it really is a different time spent with their own children.

Active Park & Hostel offers local products, grown naturally, on its own farm or purchased from local producers. The cheese is from the sheepfold, the jams are from their own orchards and berries, the vegetables from their gardens, natural honey, lime teas and acacias from the park. Their menus are seasonal because they avoid having frozen stocks. Homemade cakes have a special taste, and for children they can be cooked according to what the parents ask for.

Things to do

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

Climbing the trees

The difficulty of climbing routes is designed progressively starting with workshops with an easier degree of difficulty, such as zigzag walkways or semicircles, to more difficult workshops, high bridges, trapezoids or monkey bridges. The safety of everyone is very important for the management team of the tourist complex. The complete climbing equipment, as well as safety and protection training, are provided by the company's staff and offered to each adventurer at the beginning of the course.

Paintball

Paintball is a game that challenges tourists both physically and mentally, stimulating cardiovascular and muscular activity, and *milsim*(military simulation) equipment ensures the degree of immersion in adventure. Paintball is an adult game, but children over the age of 14 can play paintball at Active Park. Safety represents their priority and that is why the emphasis is on strictly explaining and following the rules of the game.

Archery

Archery is a sport that develops the ability to concentrate, improves mental balance and coordination. There is no upper age limit for this sport - some people continue to shoot until the age of 80.

Playground

Active Park is equipped with slides, swings and trampolines.

Teambuilding

*Active Park*is also the partner of companies that want to strengthen their teams through an active approach in nature, through exercises that involve creativity, communication through play, outdoor competition, fun and active learning. All activities can be carried out "in-house", the purpose of the owners being to meet the particular needs of each client. Consequently, there is a range of programs available to those interested from which to choose the most appropriate, as follows:

-Competitive-creative programme - activities and group games that challenge communication, spiritually competitive and creativity. It requires moderate effort, minimum to medium difficulty, being composed of fun printer teambuilding activities that we can list: the giant's steps, various team building games, the electrical network, archery, relay, etc.

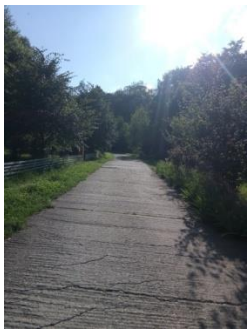
-Height adventure programme - climbing activity in trees, three routes of medium to advanced difficulty (including zip line) - involves sustained effort, adrenaline, exceeding the limits. All this takes place inside the park.

-Paintball combat adventure programme - the activity takes place in the paintball field within the park. For an optimal game on the field, ten people enter for one game. The activity requires sustained effort, and team play, self-confidence, dexterity, the ability to make decisions under pressure, are just some of the skills they can develop in interested teams.

-Campfire programme and recreational activities - relaxation activities during the campfire dinner. The animators of the touristic complex propose a series of unpublished challenges, and the participating teams will be left with special memories and testimonies of a memorable day.

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

After a day spent in nature, tourists can recharge with energy on the terrace where they serve healthy food which is cooked over a wood fire and served outdoors. The park is not a place for picnics or barbecues, so visitors are welcome with delicious barbecue and French fries from the local vegetable garden, cleaned by hand and freshly fried. For relaxation, guests are expected to lie on the grass or take a walk on the alleys.



Accommodation capacity: 37 places 3 *:

• 2 suites: capacity for 4 and 5 people, respectively, each with its own bathroom
• 6 double rooms with private bathrooms
• 3 youth rooms with 4 bunk beds *
• 1 youth room with 6 beds bunk beds *

* common toilets, intended exclusively for tourists who stay in these rooms

• 3 * Restaurant
• Lounge / dining room for recreational activities
• Conference room

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

8.“Summer feast" workshop with handmade objects

Nicoleta-Daniela Grădinaru, student
Gabriela-Brânduşa Horlescu, teacher

8.1.Sewing workshop - traditional objects

The expression "handmade" is present in almost all cultures of the world, since ancient times and refers to both the product obtained and the work behind its creation.The emphasis is on mastering different work techniques andthe formation of practical skills, on the formation of character.

In recent years, more and more young people choose to create various accessories and objects decorated with traditional Romanian motifs.We all have a duty to continue Romanian traditions.We have made some models with traditional Romanian motifs that can be used to decorate:

-”ia” - traditional Romanian blouse

-”martisor” – a token which is offered in March, a symbol of spring

-bookmarks

-gifts

To sew on the etamine you need to have some skills:

- to know how to localise oneself in the plan, using the axes of the x&y coordinate system;
- to calculate the distances correctly

-to estimate the necessary materials

-to harmoniously combine colours.

Below I will present some samples made.

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

8.2.Modelling workshop

The necessary materials:
-ipsos
-water
-forms of casting the material
-a vessel in which to prepare material
-markers

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

Tutorial: https://www.youtube.com/watch?v=9frXfHN_c4k

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

8.3.Be creative!

Ingrid-Nicola-Elena Șalaru, student, National High School of Computers Science
Constanta Șalaru, teacher, "Gheorghe Cartianu" Technical High School
Piatra-Neamț, Romania

I am sure that it happened to you, too! How many times have you looked at an old pair of shoes and felt that it no longer attracted you? Like you, I gave up my old shoes and I bought new ones.

I have recently discovered that I can be creative and that it is possible to customize my old pieces of clothing or shoes and give them a new look. Thus, I am in line with the new trends, I have unique clothing or shoes and I can even save money.

You can do the same! All you need is textile markers or textile dyes and a lot of creativity. Depending on your personality, you can make all kinds of designs on the canvas of tennis, basketball, or clothing.

Here is what I got:

o From a pair of white basketball shoes, which had become a bit gray, using some textile markers, I obtained other colourful and nice ones.

o A pair of pants, which I stained with nail polish, was improved with 3D effect paint, covering the nail polish with flowers. The result was on my taste.

Let your imagination guide you! It will be really fun!

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

9.Textiles of the future

Rodica Negrea, teacher engineer
Octavian Marina, designer
Luana Apetri -11th grade high school student, clothing design profile
Patricia Neamțu - 11th grade high school student, clothing design profile
Technological High School "Dimitrie Leonida" Piatra Neamț

The origins of the fibers are some times strange. Coffee, a basalt pebble or glycine can give rise to a fiber, a thread, a fabric. The new fibers seem to come directly from the science fiction field. Interactive, intelligent, subjected to various techniques of coating textile swith a protective layer, dressing and microencapsulation, acquires cosmetic or therapeutic properties; bio-sensory textiles, for example, can change certain physical conditions depending on your environment, thus becoming antibacterial, thermo regulatory, hydrophilic, therapeutic. ("Caroline David").

Contents:

What will the textiles of the future look like?

- Multifunctional textiles
- Smart textiles

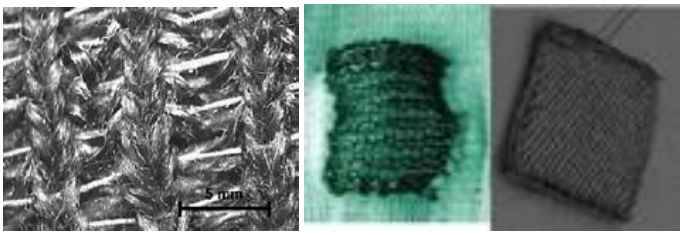
What are the textiles of the future

- High comfort for clothing (humidity control, waterproofing, etc.)
- Superior protection (anti-electromagnetic radiation, anti-UV, anti-bacterial, anti-fire).
- Easy maintenance (anti-dirt).
- New visual and sensory properties.
- Be able to react to external stimulus –smart textiles.
- Superior mechanical properties.
- Low energy consumption for production and maintenance.

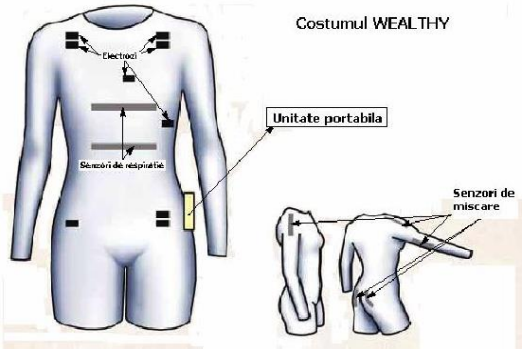
The smart pen with 40 touch sensors has the ability to find the body by tracking its movements during sleep.

In the "Intellitex" project carried out at the University of Ghent (Belgium) through the collaboration between specialists in textiles, electronics and pediatrics, and had as finality the "Intellitex" suit for long-term monitoring of children. The textile, which is a knitted structure, encompasses the sensors and acts as a signal carrier. The sensors were designed to monitor heart rate, electrocardiogramand respiration. These biosensors have been called "textrodes" and represent the distinct areas knitted in an inlay structure, being made of steel fibers.

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."



The textile biosensor made for breath monitoring, called RESPIBELT, is a knitted structure in the form of a belt made of textile yarn, steel yarnand Lycra elastomeric yarn, which is placed around the child's abdomen or chest. Lycra elastomeric threads provide the necessary elasticity for fixation on the body. The figure shows a detail of the structure of the "Respibelt" sensor.

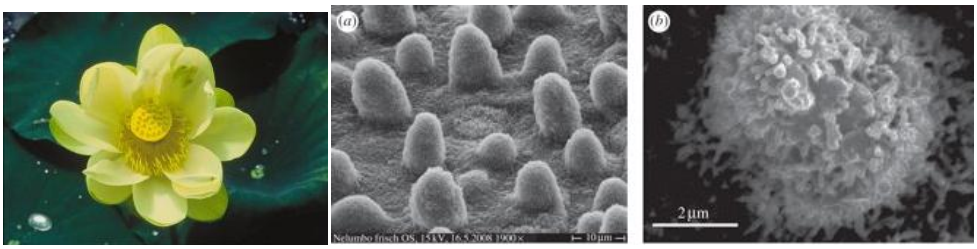


The suit is made of elastic knit, being a product molded on a body type, with longs leeves, made by "seamless" knitting technology (seamless) on Santoni circular machines. It is provided with a series of elements that allow the transmission of data in real time from the patient to the hospital.

Six electrodes for the electrocardiogram and four for monitoring respiratory activity were integrated inside the suit. A gel is applied to the inside of the electrodes to facilitate the transmission of the signal to the skin. Several traction-sensitive strips record the movements of the back, upper and lower limbs, and the received signals are transported inside the shirt, and then centralized, through a cable connected to a portable unit (type "computer palm"). It, attached to the pants strap like a mobile phone, records, processes and transmits bio signals to the monitoring center via a GPRS system.

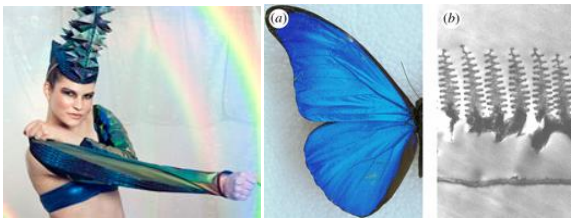
Bio-mimetic textiles

Surface treat ments for water proofing andi ncreasing the dirtresistance of textiles inspired by the surface structure of water lilies.

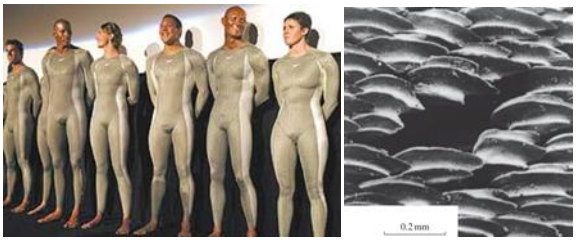


Iridescent materials (structural colors) inspired by the surface structure of butter flywings

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."



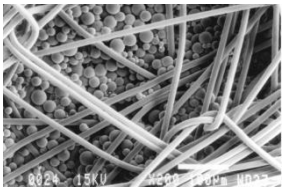
FASTSKIN® swimming suits developed by resemblance to shark skin



Scented textiles, therapeutic textiles

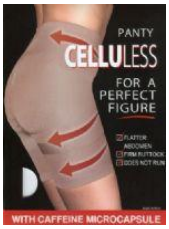
Textile Materials With Microcapsules

A new technology allows the encapsulation of liquid or solid substances in hermetic microspheres, which adhere to the surface of textile fibers.



Scented microcapsule materials for under wear, stockings, sports wear, foot wear, clothing, etc. (Welbeck, Bayer)

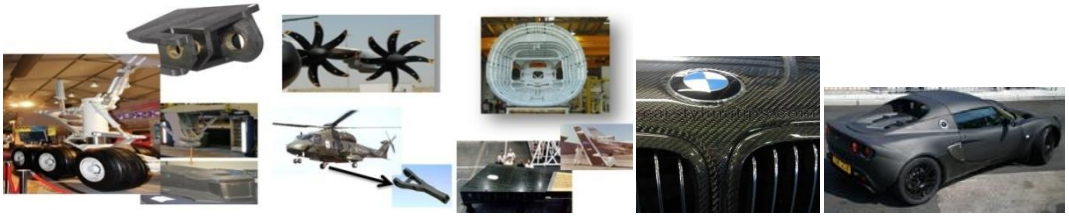
Lycra yarn materials containing microcapsules with moisturizing and massaging substances (Penn Elastic).



At present, fabrics capable of detecting and reacting to environmental conditions or stimuli of origin are defined as "smart textiles" ...

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

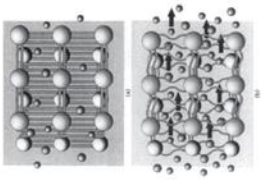
Composite Materials Reinforced With High Performance Fibers - Carbon, Glass, Aramid.



Smart textiles

HIGH PERFORMANCE - carbon, glass, copper

At low temperatures, molecular chains form continuous surfaces, which block the transfer of heat and vapor. As the temperature rises, the molecular configuration changes and free spaces appear. Sweating is evacuated and the discomfort disappears.

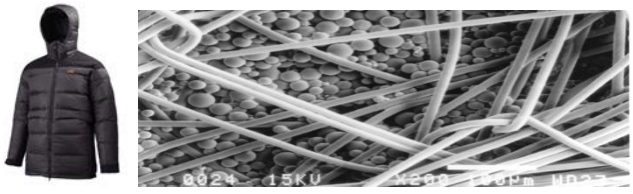


Nickel-titanium shape memory alloys

Microcapsule textiles with phase change material for increased thermal comfort. The capsules are made of durable plastic and contain paraffin. Paraffin is sensitive to temperature variations: below 37º, it remains solid; over 37º, it passes into the liquid state, accumulating a surplus of body heat.

When it solidifies again, the phase change material releases the heat accumulated in the plastic wrapand distributes it aroundthe body.

The phase change material canchange its state an unlimited number of times.



Helly Hansen jacket with microcapsules with phase change material

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

Smart textiles in FASHION

The wire dress

Today we face a society in which technology plays a very important role in the lives of each of us. We live in an age where technology is very advanced, an age where smartphones, tablets, the Internet and the media govern our lives without realizing it.

Our perspective on this project leans slightly to wards medicine. Each artist creates new creations using his own inspiration. Next we will share how we associated this genesis with medicine.

As you all know, the components of human blood, red liquid (of different shades) are:

- plasma
- fat globules
- chemicals and
- base

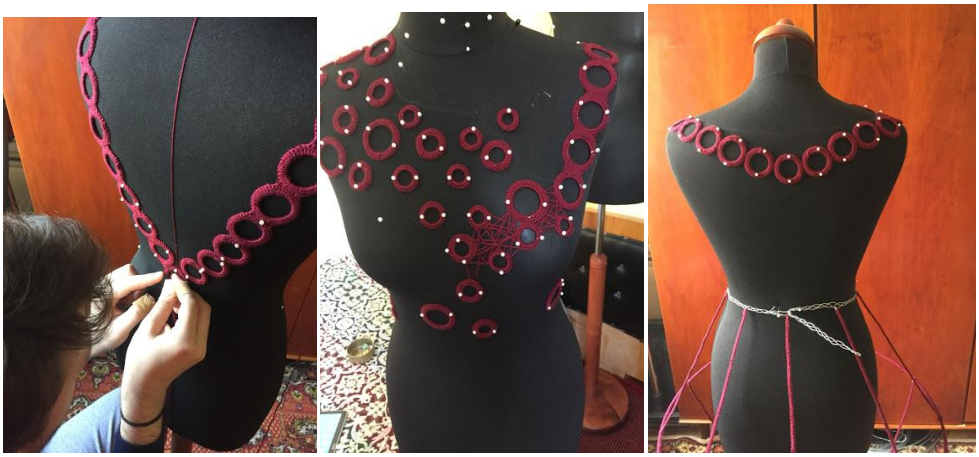
Plasma or dress, consists of:

-White blood cells, also called leukocytes and empty spaces.

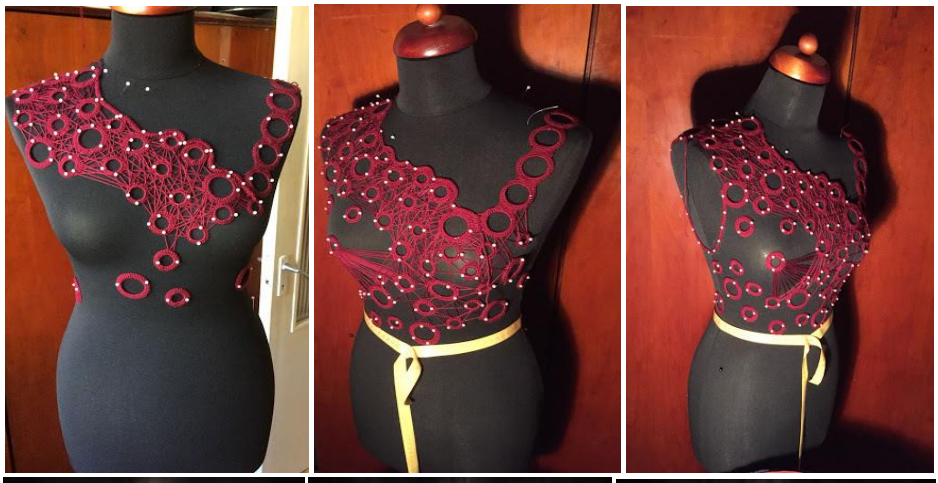
-The called red blood cells and erythrocytes respectively the biconcave discsoccupy 45% of the blood volume in our case occupying 45% of the surface of the dress.

The spread of theth reads on the entiresurface of the suit gives an overview of the cardiovascular system, namely how the arteries and veins (threads) make possible the existence in the foreground of thew hole project.

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."



The spread of the threads on the entire surface of the suit gives an overview of the cardio vascular system, namely how the arteries and veins (threads) make possible the existence in the foreground of the whole project.



Bibliography:

https://arte.uvt.ro/

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

Content

1.Micro:bit, *Nicoleta-Daniela Grădinaru, Gabriela-Brânduşa Horlescu* ... 1
2.LEGO MINDSTORMS EV3..... 3
2.1.Robot snake controlled by remote control, *Alexandru-Nicolae Bădîngă, Ciprian-Alexandru Nistor, Gabriela-Brânduşa Horlescu, Carmen-Stanciu Simona* 3
2.2.Line following robot, *Cosmin-Valentin Irimia, Andrei-Matei Ciubotaru, Gabriela-Brânduşa Horlescu, Carmen-Stanciu Simona*..... 7
2.3. Crab and Scorpion, *Alexandru-Nicolae Bădîngă, Nicoleta-Daniela Grădinaru, Ingrid Şalaru, Gabriela-Brânduşa Horlescu, Constanţa Şalaru*.. 9
3.MakeCode for LEGO MINDSTORMS Education EV3!, *Gabriela-Brânduşa Horlescu*..... 10
Project 1. Red light, green light..... 11
Project 2. Stop at object..... 13
Project 3. Object near..... 14
Project 4. Tank ZigZag..... 19
Project 5. Make an Animation..... 20
Project 6. What Animal Am I?..... 23
4.Raspberry Pi, *Alexandru-Nicolae Bădîngă, Nicoleta-Daniela Grădinaru, Gabriela-Brânduşa Horlescu, Constanţa Şalaru***.....** 29
Project 1. LED Blink..... 31
Project 2. Servomotor Control..... 32
5.How can we use the phone as a microphone for the PC?, *IT programmer: Elena Manole* 34
6.How to Trick Our Phone's GPS *Computer scientist: Dănilă Ticuşor-Gabriel* 35
7.Business ideas..... 36
7.1.Holiday Village Valley of the Twelve, *Ana-Irina Secară,* 36
7.2. Active Park, a Place in the Middle of Nature, *Ana-Irina Secară*..... 38
8. "**Summer feast" workshop with handmade objects,** *Nicoleta-Daniela Grădinaru, Gabriela-Brânduşa Horlescu,* 41
8.1.Sewing workshop - traditional objects..... 41
8.2.Modeling workshop..... 42
8.3.Be creative! *Ingrid-Nicola-Elena Şalaru, Constanţa Şalaru* 44
9.Textiles of the future, *Rodica Negrea, Octavian Marina, Luana Apetri, Patricia Neamţu* 45

Co-funded by the
Erasmus+ Programme
of the European Union

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsi-ble for any use which may be made of the information contained therein."