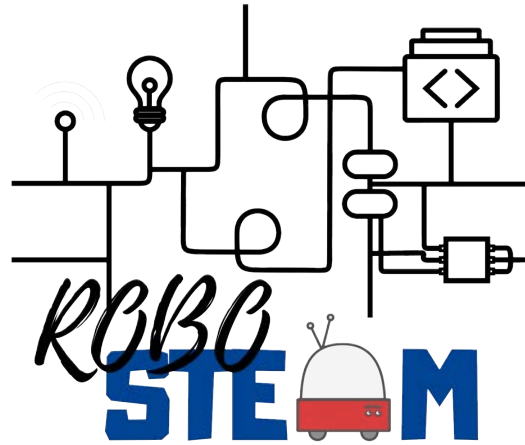




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RoboSTEM Project

2018-1-ES01-KA201-050939

Miguel Ángel Conde González

Universidad de León

Virtual Transnational Meeting

Agenda

- **09:00 – 09:30** Current context of the project (Work done until COVID break).
- **09:30 – 10:30** Results for Outputs 2 and 3 and Activities
- **10:30 – 11:10** Ongoing work after COVID break universities (IPB, KIT, ULE, UEF)
- **11:10 – 11:40** Coffee break
- **11:40 – 12:20** Ongoing work after COVID break schools (AEEG, CIC, ERAS, UEF)
- **12:20 – 13:00** COVID19 situation and changes to be done
- **13:00 – 14:00** Tasks to be done by the partners in the new situation
- **14:00 – 15:00** Lunch time
- **15:00 – 16:00** Managerial issues
- **16:00 – 16:30** Quality issues
- **16:30 – 17:00** Dissemination plan
- **17:00 – 18:00** Summary of partners tasks

Outline

- **Current context of the project**
- Results
- Ongoing work after COVID break
- COVID19 situation and changes to be done
- Tasks to be done by the partners in the new situation
- Managerial Issues
- Quality Issues
- Dissemination Plan
- Summary of partners tasks

We have done this

PROJECT TIMETABLE																	
MONTHS	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17
Project activity*																	
A1 Overall project management																	
A2 Quality Assurance																	
M1 (Bragança)					M1												
O2 G. Designing Open Hardware PD&R/A1																	
O2 G. Designing Open Hardware PD&R/A2																	
O2 G. Designing Open Hardware PD&R/A3																	
M2 (Karlsruhe)									M2								
O2 G. Designing Open Hardware PD&R/A4																	
O2 G. Designing Open Hardware PD&R/A5																	
A3 - Pilot Phase 1																	
C2 - Short-term exchanges of groups of pupils (Spain)													C2				
C3 - Short-term exchanges of groups of pupils (Portugal)													C3				
A4 - Pilot Phase 2																	
C4 - Short-term exchanges of groups of pupils (Spain)																	C4
C5 - Short-term exchanges of groups of pupils (Portugal)																	C5
C6 - Short-term exchanges of groups of pupils (Finland)																	
O2 G. Designing Open Hardware PD&R/A6																	
M3 (Joensuu)																	
E1 (Hackaton)																	
O3 RoboSTEAM Environment/A1																	
O3 RoboSTEAM Environment/A2																	
O3 RoboSTEAM Environment/A3																	
O3 RoboSTEAM Environment/A4																	
C1 - Short-term joint staff train.event																	
A5 Dissemination and mainstreaming																	
E5 German Local Multiplier Event (Karlsruhe)																	
E6 Finish Local Multiplier Event (Joensuu)																	
M4 (León)																	
E2 Final Conference																	

We should have done also this

Project activity*	PROJECT TIMETABLE								
	MONTHS	M18	M19	M20	M21	M22	M23	M24	M25
A1 Overall project management									
A2 Quality Assurance									
M1 (Bragança)									
O2 G. Designing Open Hardware PD&R/A1									
O2 G. Designing Open Hardware PD&R/A2									
O2 G. Designing Open Hardware PD&R/A3									
M2 (Karlsruhe)									
O2 G. Designing Open Hardware PD&R/A4									
O2 G. Designing Open Hardware PD&R/A5									
A3 - Pilot Phase 1									
C2 - Short-term exchanges of groups of pupils (Spain)									
C3 - Short-term exchanges of groups of pupils (Portugal)									
A4 - Pilot Phase 2									
C4 - Short-term exchanges of groups of pupils (Spain)									
C5 - Short-term exchanges of groups of pupils (Portugal)									
C6 - Short-term exchanges of groups of pupils (Finland)									
O2 G. Designing Open Hardware PD&R/A6									
M3 (Joensuu)									
E1 (Hackaton)									
O3 RoboSTEAM Environment/A1									
O3 RoboSTEAM Environment/A2									
O3 RoboSTEAM Environment/A3									
O3 RoboSTEAM Environment/A4									
C1 - Short-term joint staff train.event									
A5 Dissemination and mainstreaming									
E5 German Local Multiplier Event (Karlsruhe)									
E6 Finish Local Multiplier Event (Joensuu)									
M4 (León)									
E2 Final Conference									



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COVID Pandemic Situation

- Travel is not easy or secure
- Working is hard because of institutions lockdown
- Teachers should be adapted to a higher level of online activity and new ways to assess students



Reminder (I)

- Overall Project Activity
- Quality Assurance
 - Quality Plan available
 - Questionnaires to fulfil
 - M18 and M24 reports
- Dissemination Mainstreaming
 - Dissemination plan
 - M24 reports

Reminder (II)

- Complete Pilot Phase 1
 - A3. Pilot Phase 1 (M9-M17)
 - 5 secondary schools are involved with their students from 12 to 16 years old
 - Diagnostic phase
 - Challenges will be posed for small students' groups
 - Results will be analysed
 - » Time employed, grade obtained, external people involved, assessment of CT and STEAM and self perception about the experiment

Reminder (III)

- Complete Pilot Phase 2
 - A3. Pilot Phase 2 (M12-M19)
 - Same secondary schools
 - Same students groups
 - Use the methods and tools from other socioeconomic contexts
 - Results comparison with non participant, with other contexts and with those of the first pilots

Reminder (IV)

- Continue populating the RoboSTEAM Environment
- Exchanges
 - Portugal->Spain (October)
 - Spain->Portugal (November)
 - Finland->Portugal->Spain (February)
 - **Portugal->Spain->Finland (March)**
- Hackaton Bragança (April international week)
- Teacher Training Week (June - Germany)
- Local Multiplier Events (German and Finnish - September)
- Final Mainstreaming conference



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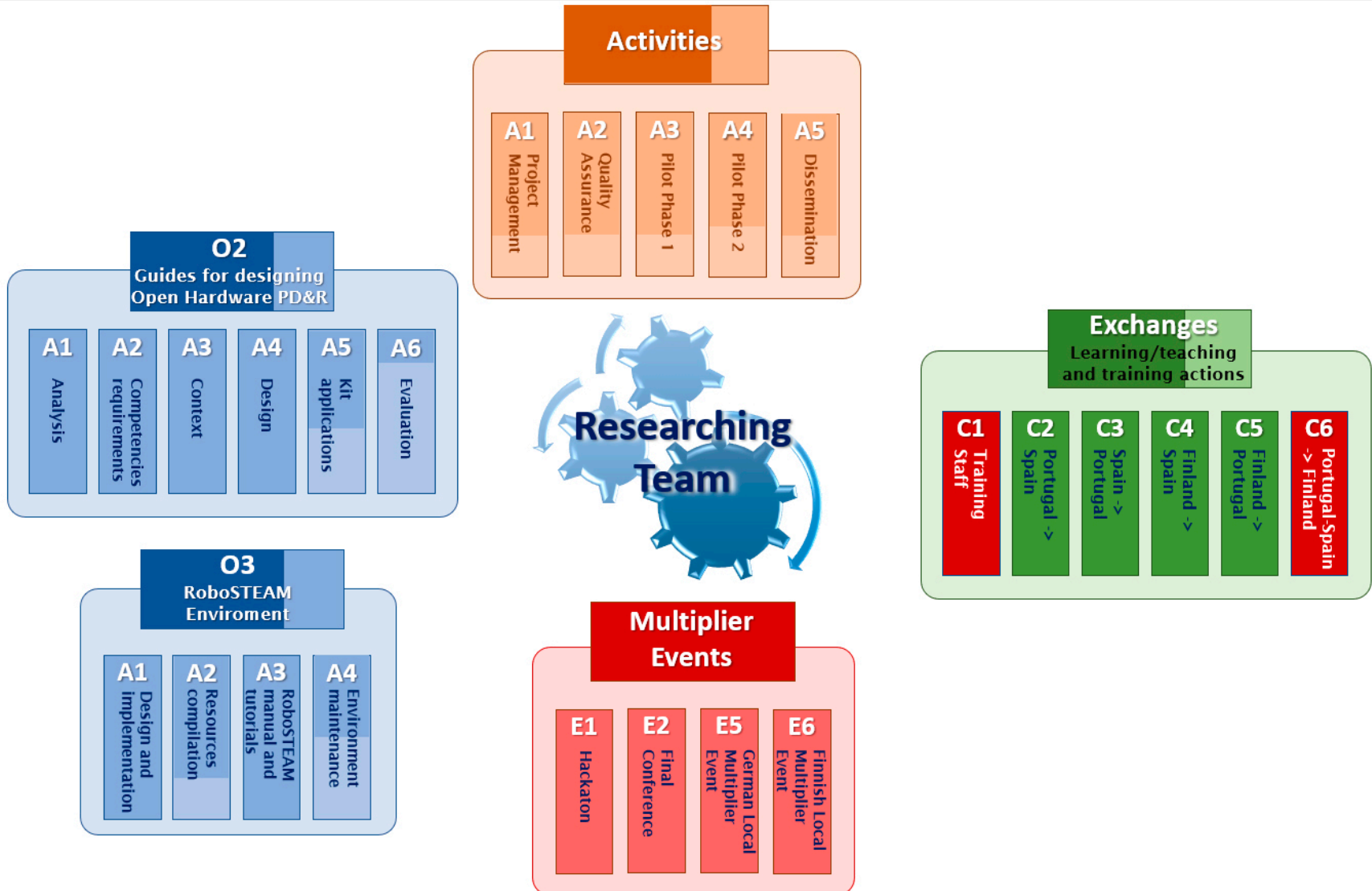
O2. Guides for designing Open Hardware PD&R (February 2019– May 2020)

- O2. A1. – Analysis of the existing PD&R
- O2. A2. – Definition of competencies related requirements depending on age and cultural contexts
- O2. A3. – Identification of the contexts to be tested (1 or 2 per partner)
- O2. A4. – Design of Open Hardware Kits to be applied during the learning challenges
- **O2. A5 – Application of the kits to STEAM challenges in the defined contexts**
- **O2- A6 – Evaluation of the experiences**

03. RoboSTEAM Environment (January 2019–October 2020)

- O3. A1 – Design and implementation of a virtual environment as the base of the portal
- O3. A2 – Compilation of STEAM challenge tools and guides
- O3. A3 - RoboSTEAM user manual and tutorials.
- O3. A4 – Environment maintenance

Complete state of the work

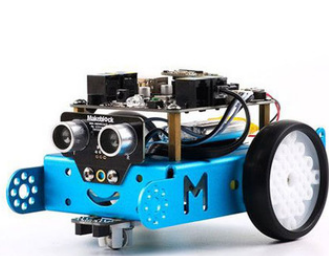


Outline

- Current context of the project
- **Results**
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O2.A1. Application of the kits to the educational contexts

- Done while teaching school students
- Done during the exchanges
- Done in Bragança Summer Camp

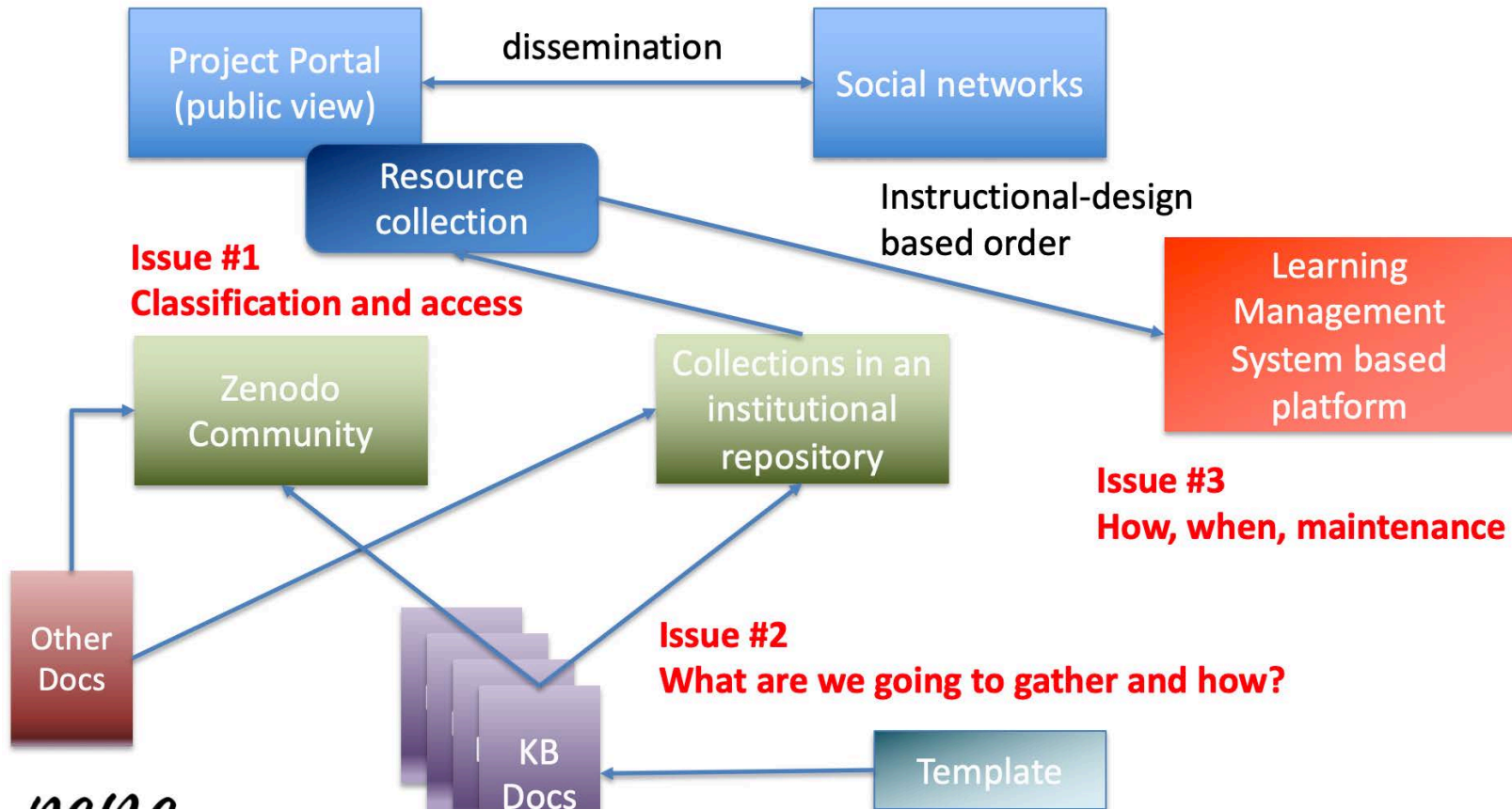


- Piloting was not completed so it is not finished

O2- A6 – Evaluation of the experiences

- Bragança Campus was evaluated
- Exchanges have been evaluated
 - Evidences of such evaluation
 - Photos, Instruments (STEAM Sematic Survey, CT Test, Co-measure), Grades, Times
 - I have not some of these evidences
- It is necessary to evaluate the pilots
 - All of us
 - It is necessary to achieve more answers to the diagnosis phase

O3. RoboSTEAM Environment



Compilation of STEAM challenge tools and guides (definition and/or compilation of tools and guides that may be used to carry out STEAM challenges). This is the core functionality of RoboSTEAM environment. This compilation should include:

- Online and desktop software for designing action/activity plans.
- Online questionnaires about integrating STEAM
- Integration systems with open source LMS environments (Moodle, Sakai, etc.)
- Report generator tools
- Learning analytics tools

03. A2 – Compilation of STEAM challenge tools and guides

- We have an interesting collection gathered in last months of the first year of the project and at the beginning
- Necessary to work to achieve more
- Include tools and kits employed in the pilots and in the exchanges
- We have 42 documents in the Zenodo community
- 3 Collections in the institutional repository
- Several documents about the different activities at the working platform

O3. A4 – Environment maintenance

- Upgrades of the elements of the ecosystems
- Improvements and security issues
- Contents curation
- New users creation
- New collections
- Integration of the different tools

- A1. Project Management
 - Continue with the videoconferences
 - Monitoring results
 - Publishing reports and results
 - Contact with the Spanish Agency
 - Make decisions regarding COVID19

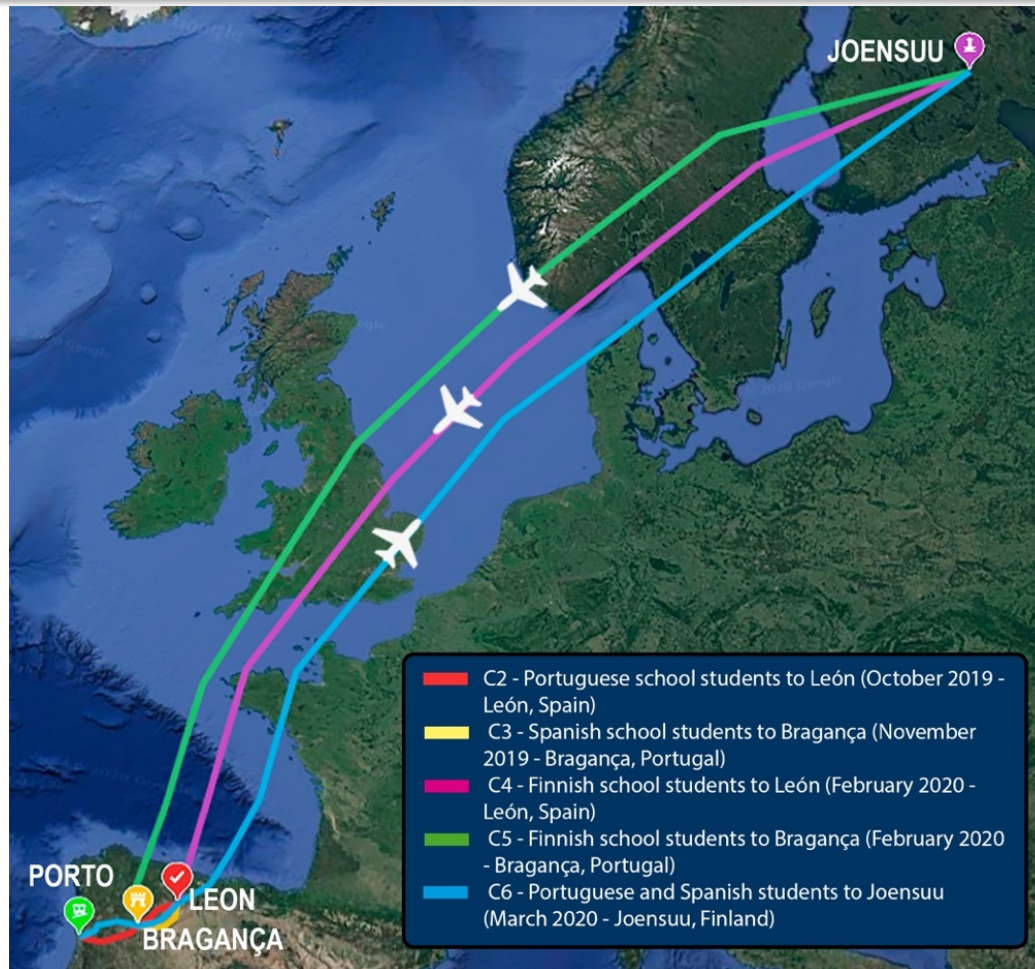
A2 and A3

- A2. Quality Management
 - Continue checking how the project progresses
 - Assess the quality of the products and events
- A3
 - Delayed: It should have finished yet
 - One partner has finished and evaluated it
 - Most of you have almost completed the pilot phase 1 but evaluation was not carried out because of the lockdown
 - Required instruments results, photos, grades, times, etc.
 - Required description of the pilots carried out

- A4. Pilot phase 2
 - Delayed: Most have begun
 - One has finished
 - In this case it is necessary to clarify which is the nanochallenge from other institution that you are addressing
 - Same indicators as in the other case

-
- A5. Dissemination and mainstreaming
 - Dissemination has continued
 - 3 Scientific Papers in International Event
 - 1 Accepted but not published in an international Journal
 - 1 Book Chapter In press
 - Media events
 - Necessary to increase visits to Web, Facebook and Twitter
 - Linked to the multiplier events
 - Students and other stakeholders
 - Send to Ilkka all dissemination results

Exchanges



C2 and C3

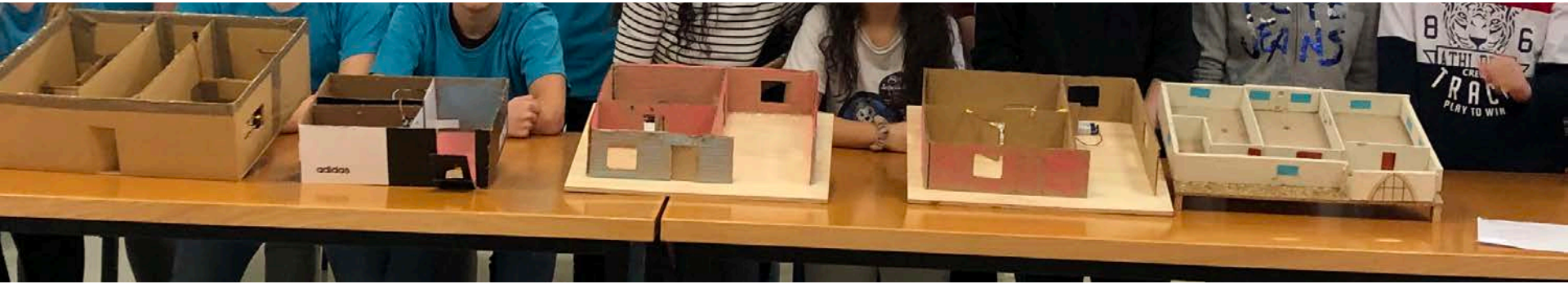
Title	Make an LED turn on and off
	What is an LED?
	What type of component is an LED? How is it connected? What resistor is required?
	Description
	<ul style="list-style-type: none"> • Research into the necessary components for the circuit to work correctly. • Calculate the resistor needed to prevent LED from blowing. • Create a program to turn on an LED. • Simulate the circuit using, for example, Tinkercad and send different values to an Arduino digital pin. • Connect the components to the breadboard. • Power on the Arduino board by connecting it to a computer using an USB cable. • Check that the real circuit works.
	Goal/s
	Know how to connect an LED to turn it on and off
	Kits to use
	Simulator program, Arduino Uno or similar Arduino board, a breadboard (preferably with a positive and negative rail), an LED, a resistor, jumper wires, USB cable, a computer, IDE Arduino
	Evaluation
	The students should connect correctly all the components and calculate the value for the resistor



TITLE	Use mobile robots to detect and avoid the cause(s) of wildfires and reduce the impact of global warming on this issue
	DESCRIPTION
	Can mobile robots prevent fire(s)? (acts of arson, lack of cleanliness, global warming – drought and severe heat- etc.) Human activities such as lighting campfires, discarding lit cigarettes, acts of arson, bushfires etc. are mainly responsible for starting a fire. However, hotter weather makes forests drier and more prone to burn. Rising temperatures, a key indicator of climate change, evaporate more moisture from the ground, drying out the soil and making vegetation more flammable. Think about how to employ mobile robots to reduce the impact of global warming on environment and avoid other causes of wildfires.
	GOAL/S
	<ul style="list-style-type: none"> • Study mobile robots • Develop computational thinking • Study possible ways to apply mobile robots to improve environment • Develop soft skills • Implement collaborative solution/strategy that involves students, parents, teachers and experts in this field • Design and explore the scenarios where mobile robots can be applied; • Develop creativity.
	EVALUATION
	<ul style="list-style-type: none"> • Time employed to solve the challenge (stds will fill in a grid) • Degree of success producing a solution (stds will fill in a self and hetero evaluation report) • Number of people involved in the challenge (information sheet including age, role/status and Education level) • Perception about STEAM (stds will be asked to talk about their experience throughout the whole process of this challenge – they can make a video, around two minutes) • Assessment of STEM skills and CT skills before and after the challenge (online questionnaires).

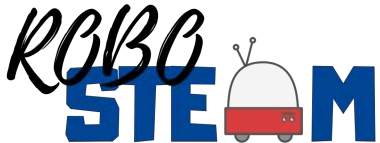


C4 and C5



Outline

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- Results
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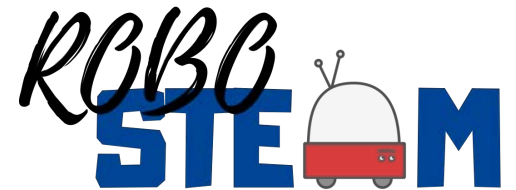
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RoboSTEAM activities at UEF

- Corona pandemic led to school closures in March, these were effective until end of semester
- In August, schools opened for a new semester but with restrictions in place (limited possibilities for mixing the student groups between the ordinary classes, etc.)
- Higher education has been mostly in distant work (teaching and research) since mid-March
- Ilkka currently running course Robotics and XR (eXtended Reality) where some lessons learnt from challenge-based learning are adopted

A 3D Mobile Robotics Simulator for Educational Purposes Based in Unity

IPB



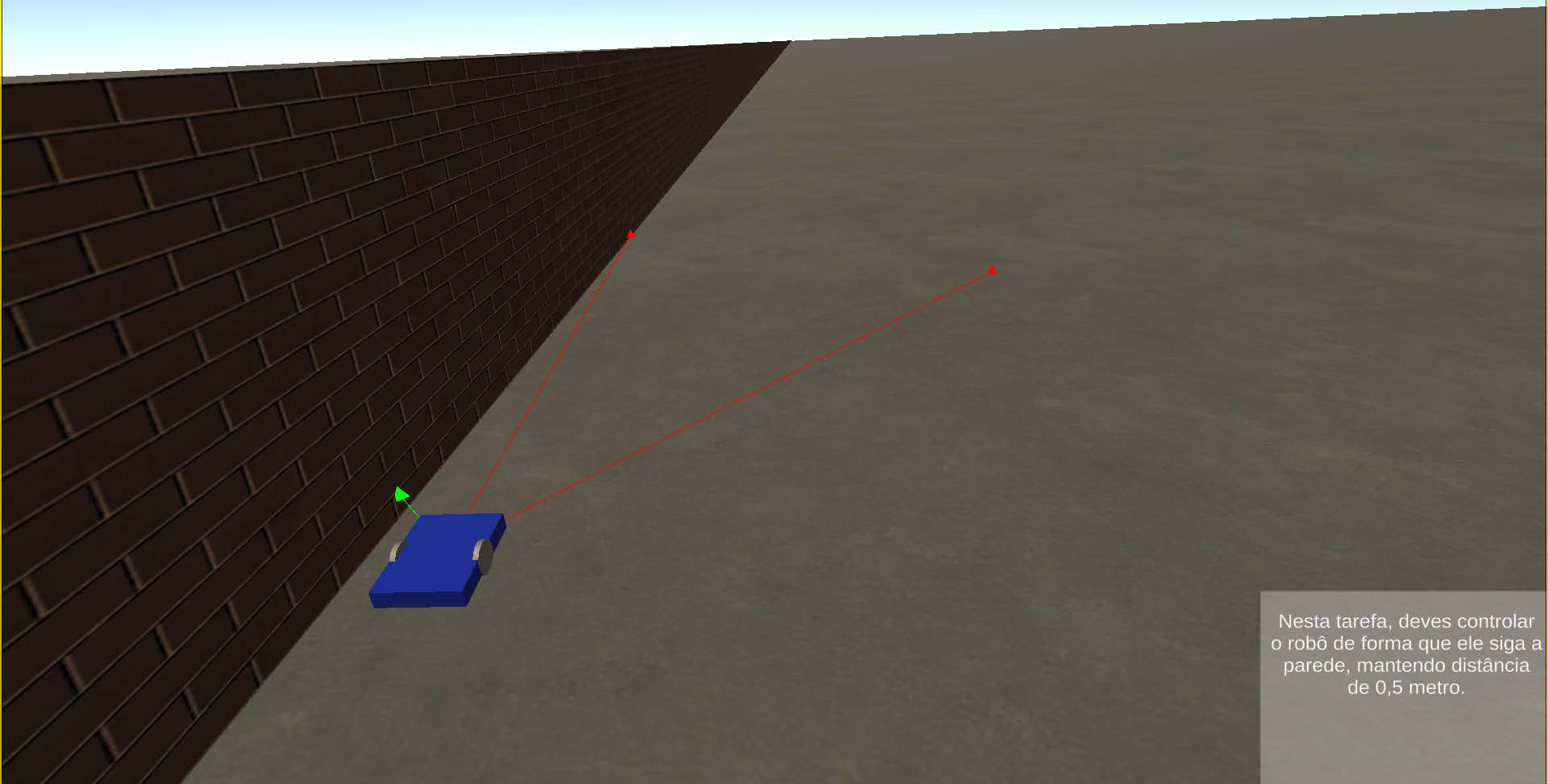
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Distância: 0,100 m

COM Port

Baud rate

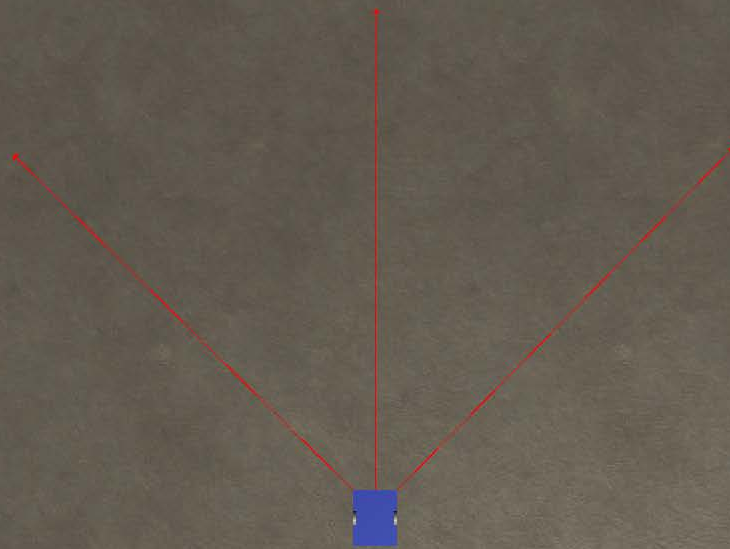
Connect



Nesta tarefa, deves controlar o robô de forma que ele siga a parede, mantendo distância de 0,5 metro.

Linear 0,000 m/s
Angular 0,000 rad/s

COM Port Baud rate Connect

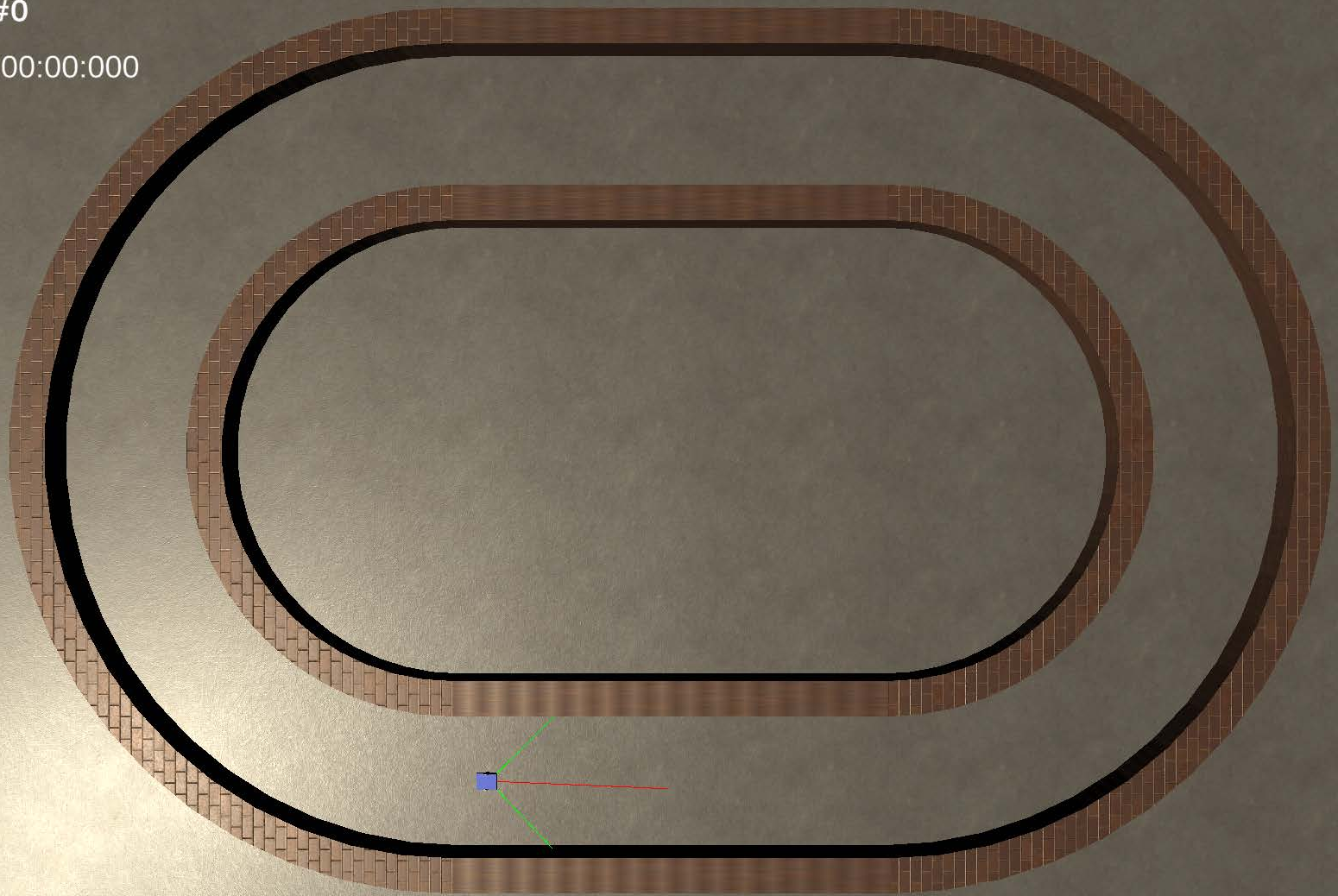


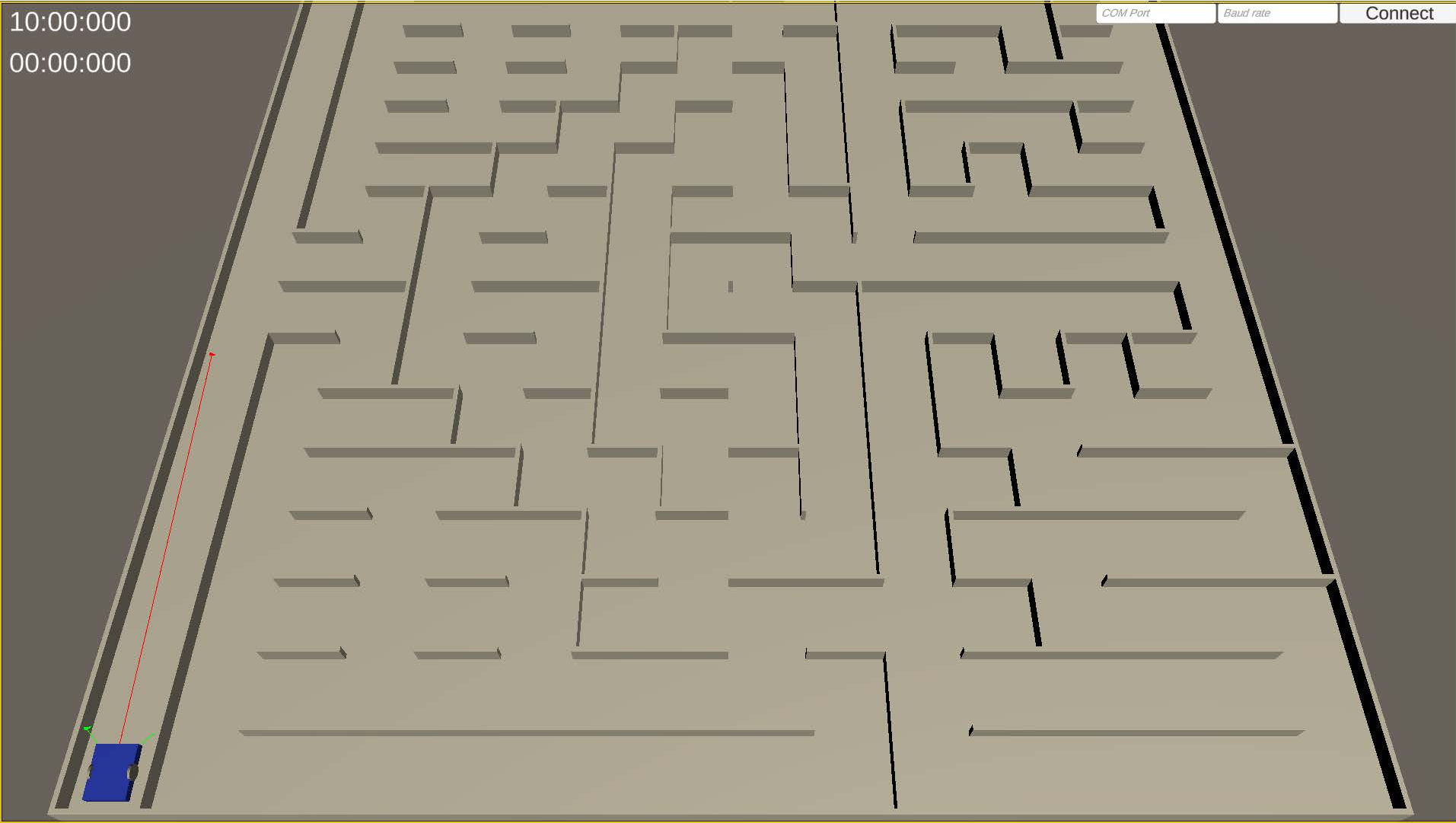
Nesta tarefa, deves controlar o robô de forma que ele mantenha um certo nível de velocidade durante 5 segundos.

Velocidade linear: 1 m/s
Velocidade angular: 3,14 rad/s

Volta #0

Tempo 00:00:000





Sensor and actuator specifications

Inspector

Time Of Flight (Time Of Flight Specification)

Script: TimeOfFlightSpecification

Range: 1

Blind Spot: 0.05

Coefficient Of Variance: 0.05

Field Of View: 0

Update Time: 0.03

Time Of Flight Serial Adapter (Script)

Script: TimeOfFlightSerialAdapter


Id: 2


Number Of Bits: 16

Time Of Flight Gizmo (Script)

Script: TimeOfFlightGizmo

Ray Location: Static

Hit Color: 

Miss Color: 

Draw Ray:

Draw Hit:

Hit Size: 0.02

Inspector

Encoder_12PPR (Encoder Specification)

Script: EncoderSpecification

Pulses Per Revolution: 12

Incremental Encoder Serial Adapter (Script)

Script: IncrementalEncoderSerialAdapter

Id: 4

Number Of Bytes: 4

Inspector

DC Motor_Pololu_30LP (DC Motor Specification)

Script: DCMotorSpecification

Rated Voltage: 6

Gear Ratio: 29.86

Torque Constant: 0.079025

Resistance: 16.66667

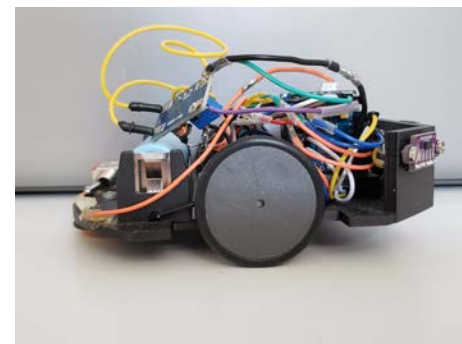
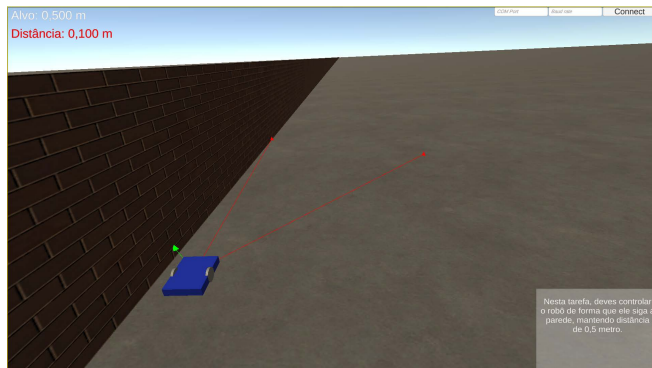
Inductance: 0.001

H Bridge Serial Adapter (Script)

Script: HBridgeSerialAdapter

Id: 5

Bits Of Resolution: 10



<Program>
...<Simulation setup>
...<Control Logic>
</Program>

<Program>
...<Hardware Setup>
...<Control Logic>
</Program>

```
17 using timer_t = unsigned long,
20
21 // Simulation interface objects
22 StreamActuatorManager actuatorManager {Serial};
23 StreamSimulationSensorManager<5> sensorManager {7, actuatorManager, Serial};
24
25 // Sensors and actuators
26 DistanceSensor<distance_t, 2> distSensorLeft {0, sensorManager, 1.0, 16};
27 DistanceSensor<distance_t, 2> distSensorRight {1, sensorManager, 1.0, 16};
28 DistanceSensor<distance_t, 2> distSensorFront {2, sensorManager, 1.0, 16};
29 EncoderSensor<encoder_t, 4> encoderLeft{3, sensorManager};
30 EncoderSensor<encoder_t, 4> encoderRight{4, sensorManager};
31 MotorActuator<motor_t> motorLeft(5, actuatorManager);
32 MotorActuator<motor_t> motorRight(6, actuatorManager);
33
34 SimulationLogger logger(8, actuatorManager);
35
36 // Manager that smoothens changes in voltage
37 MotorManager2<motor_t> motorLeftController(motorLeft, 1000);
38 MotorManager2<motor_t> motorRightController(motorRight, 1000);
39
40 // Robot Wheel specifications (used for odometry)
41 constexpr RobotConstructionSpecification robotSpecs
42 {
43     .leftWheelPPR = 29.86 * 12,
44     .rightWheelPPR = 29.86 * 12,
```

Done uploading.

Sketch uses 31136 bytes (1%) of program storage space. Maximum is 2031616 bytes.

Global variables use 62132 bytes (11%) of dynamic memory, leaving 462156 bytes for local variables. Maximum is 524288 bytes.

```

70 void setup() {
71   // Setup sensors (for simulation communication purposes)
72   Serial.begin(115200);
73   sensorManager.addSensor(distSensorLeft);
74   sensorManager.addSensor(distSensorRight);
75   sensorManager.addSensor(distSensorFront);
76   sensorManager.addSensor(encoderLeft);
77   sensorManager.addSensor(encoderRight);
78 }

154 void loop() {
155   // Updating sensors (serial input). This command processes the simulation output.
156   sensorManager.updateSensors();
157
158   updateOdometryOnTimer();
159 }

111 void updateOdometryOnTimer()
112 {
113   if (odometryChrono.hasPassed(odometryUpdateTime, true))
114   {
115     encoder_t leftWheelPulses = encoderLeft.readReset();
116     encoder_t rightWheelPulses = encoderRight.readReset();
117     poseManager.updatePose(leftWheelPulses, rightWheelPulses);
118   }
119 }

204 leftMeasurement = distSensorLeft.distRead().distance;
205 rightMeasurement = distSensorRight.distRead().distance;
206 frontMeasurement = distSensorFront.distRead().distance;

```

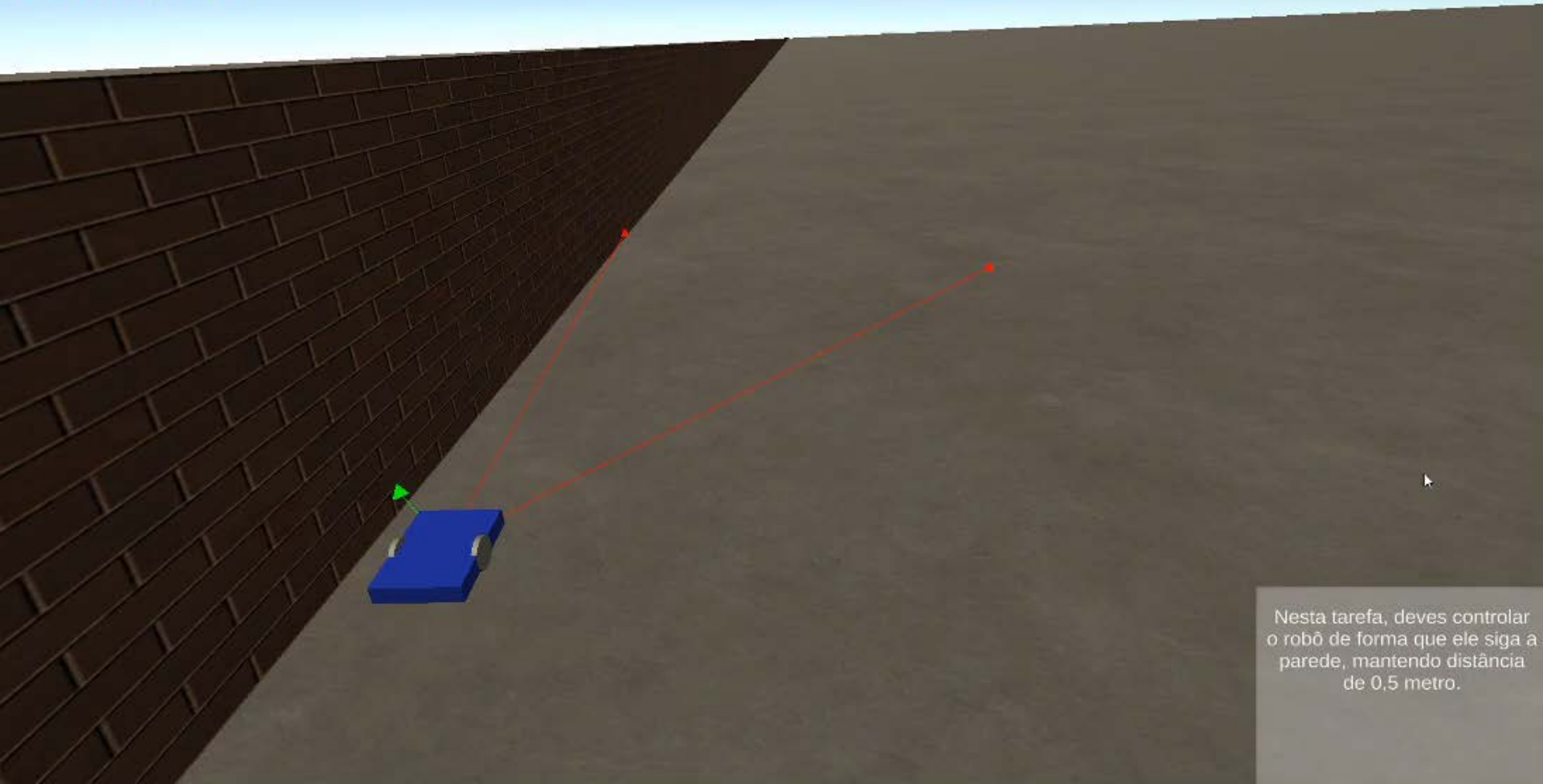

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Distância: 0,100 m

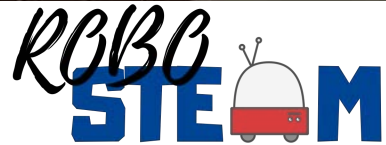
COM Port

Baud rate

Connect



Nesta tarefa, deves controlar o robô de forma que ele siga a parede, mantendo distância de 0,5 metro.



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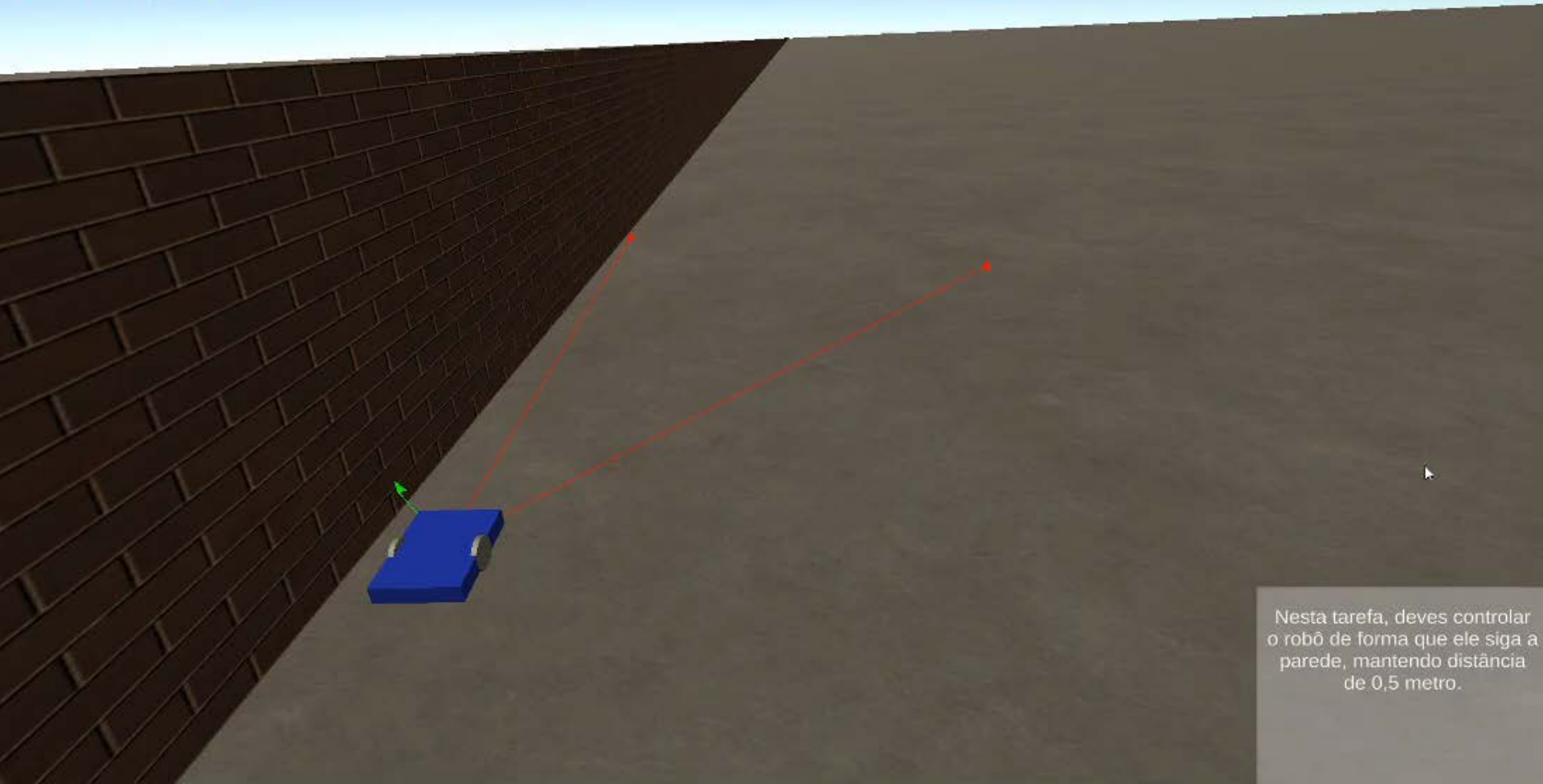
Alvo: 0,500 m

Distância: 0,100 m

COM Port

Baud rate

Connect



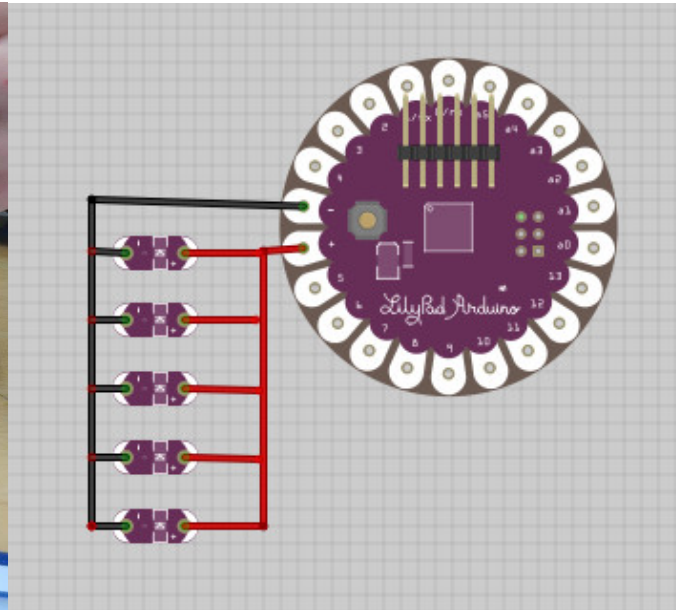
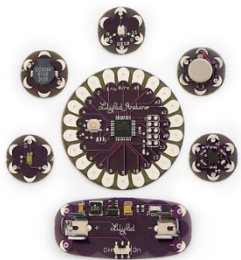
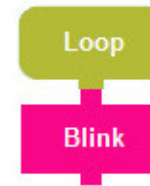
Nesta tarefa, deves controlar o robô de forma que ele siga a parede, mantendo distância de 0,5 metro.

KIT - Smart textile as a context to support computational thinking



Daniela Reimann,

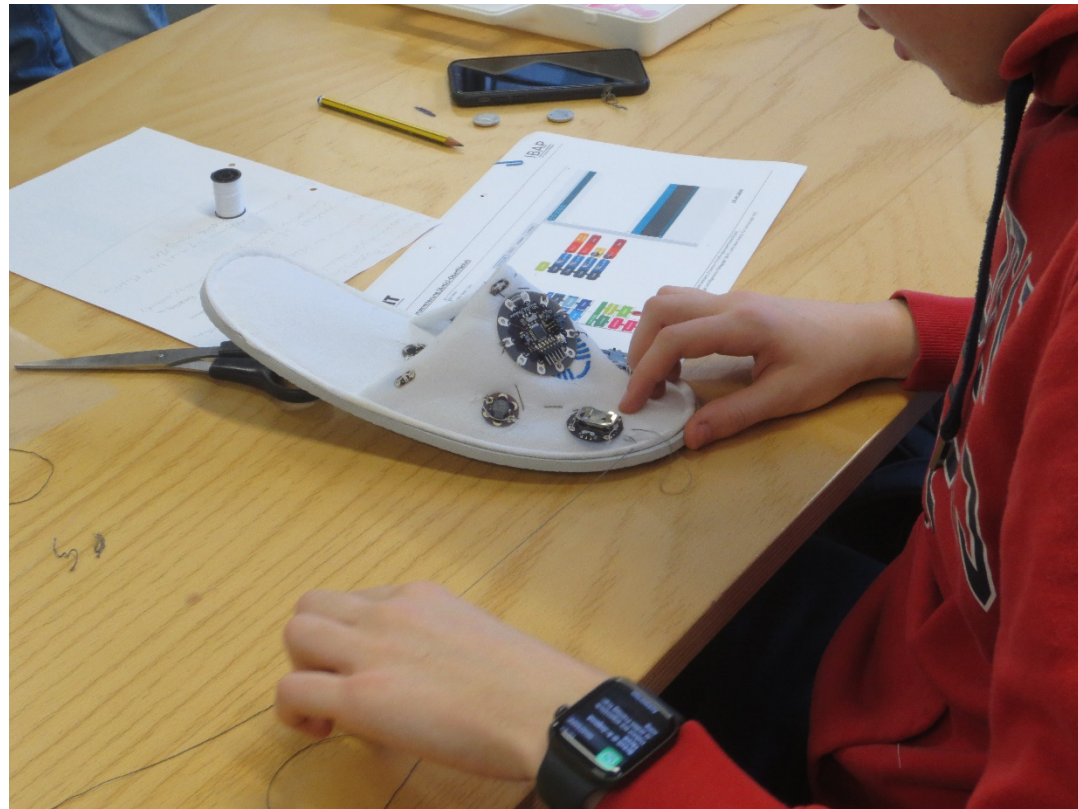
bringing together creative processes to support computational thinking in the classroom, in the Erasmus+ ROBOSTEAM project



Seminar connected to the school project

Media literacy: Challenge and design based learning and teaching by developing robotic Objects at school (RoboSTEAM)

In collaboration with the Carl Benz School Karlsruhe

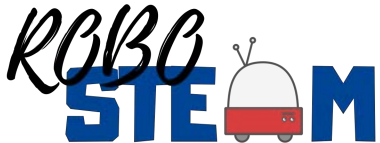


Participating students

5 BA-Students of engineering pedagogy, KIT

1 MA-Student of engineering pedagogy, KIT

17 school pupils/ apprentices of metal engineering,
Carl Benz school



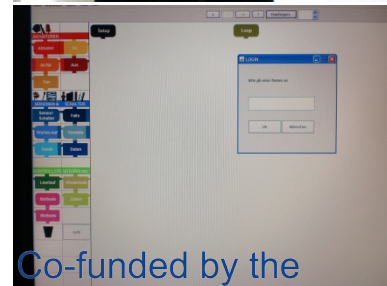
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Role of the students

1. Development of school project including all prerequisites and conditions (STEAM surveys, Quiz, observation, co-measure observation)
2. Moderation of lessons
3. Supervising /mentoring working groups of pupils

seminar requirements

1. Didactic approach and potential of Smart Textile for Learning science
2. Hands-on skills: Hard- und Software, objekt design (construction, wiring; programming)
3. Planning and moderating of lessons
4. Mentoring a working group of pupils and observing them with the observations sheets



Number of sessions

- 7 Blocks at KIT/ IBAP/ Westhochschule,
- Fridays, 10 a.m.-13 p.m.
- 18.10.2019, 25.10.; 8.11.; 15.11. 29.11. 13.12, 20.12.
- 5 Blocks At Carl Benz School, Karlsruhe, Steinhäuser Str. 23: jeweils Friday , 9.15 a.m. -12.30 a.m.
- 10.1.2020, | 17.1. | 24.1. | 31.1. | 07.2.

learning contents for students

1. Introduction to
2. the RoboSTEAM project and the concept of computational thinking
3. challenge based learning and collaborative prototyping with Arduino LilyPad technology
4. Hands on Arduino and Amici
5. lesson planning
6. mentor lessons
7. observation of pupils
8. how to use the observations sheets



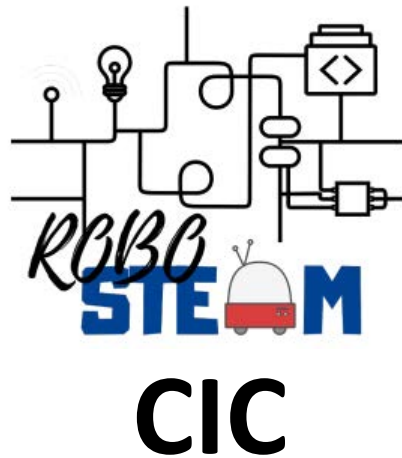
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What students got to know so far

- Design-oriented teaching and learning concept for the promotion of media education and understanding of technology and computer terms (algorithm, if-then condition structure)
- Issue of challenge based learning approach of the project and its application in the context of wearables
- Making the abstract model tangible : Media practice: Smart textile examples
- Identify hardware components, structure and pins
- Software programming environment, interface, functionalities,
- First tasks with informatics concepts (If...then; Loop)
- Sewing of joints is still pending



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Pandemic Situation

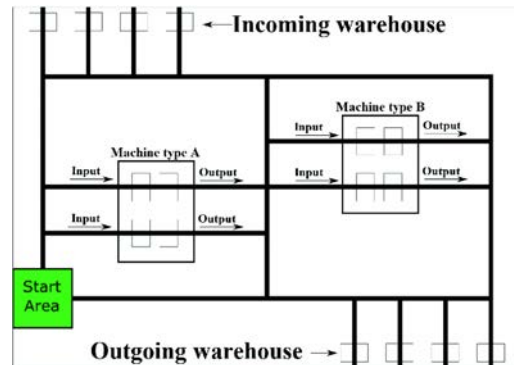


Challenges - - robot@factory lite

Logistic transport

MINICHALLENGES

- Pick and place
- Navigation



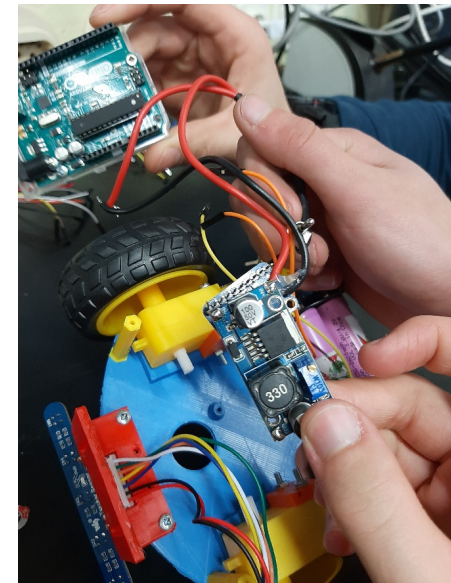
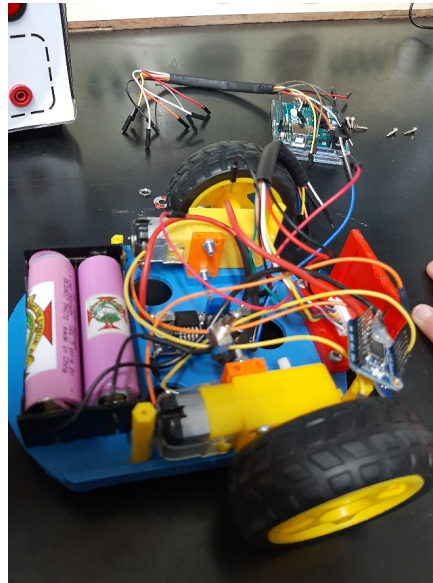
NANOCHALLENGE

- Part detection
- Part Grasping
- Follow Line
- Driving on Crosslines
- Follow the line on a turn





Assembly





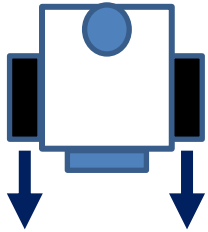
Assembly



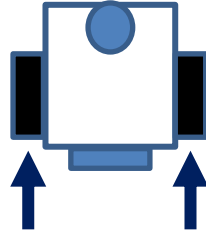


First Program to Test

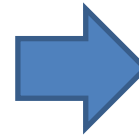
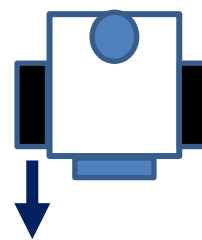
Forward



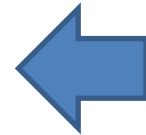
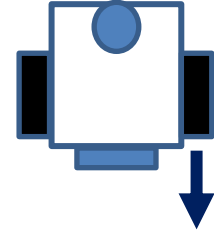
Back



Left



Right



Tests - - Movement



Dance





Programing robot to dance

```
teste_motores_com_botao | Arduino 1.8.7
Ficheiro Editar Rascunho Ferramentas Ajuda

teste_motores_com_botao

pinMode(PWB, OUTPUT);
pinMode(BP, OUTPUT);
pinMode(BN, OUTPUT);
pinMode(BT, INPUT_PULLUP);

//Iniciar tudo a 0
digitalWrite(PWA, LOW);
digitalWrite(AP, LOW);
digitalWrite(AN, LOW);
digitalWrite(PWB, LOW);
digitalWrite(BP, LOW);
digitalWrite(BN, LOW);
do{
  botao=digitalRead(BT);
} while(botao==1);
}

void loop() {

//Frente
digitalWrite(AP, HIGH);
```

```
Experimento | Arduino 1.8.7
Ficheiro Editar Rascunho Ferramentas Ajuda

Experimento

void loop() {
  //Motor A Frente velocidade máxima
  digitalWrite(ap, HIGH);
  digitalWrite(an, LOW);
  analogWrite(pwa, 255);

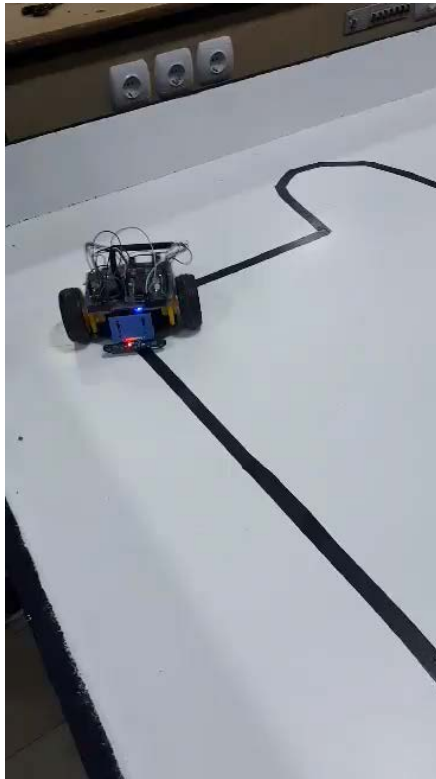
  //Motor B Frente velocidade máxima
  digitalWrite(bp, HIGH);
  digitalWrite(bn, LOW);
  analogWrite(pwb, 255);
  delay(2000);
  //Parar
  digitalWrite(ap, LOW);
  digitalWrite(bp, LOW);
  delay(500);

  //Motor A Trás velocidade máxima
  digitalWrite(ap, LOW);
  digitalWrite(an, HIGH);
  analogWrite(pwa, 255);

  //Motor B Trás velocidade máxima
  digitalWrite(bn, LOW);
```

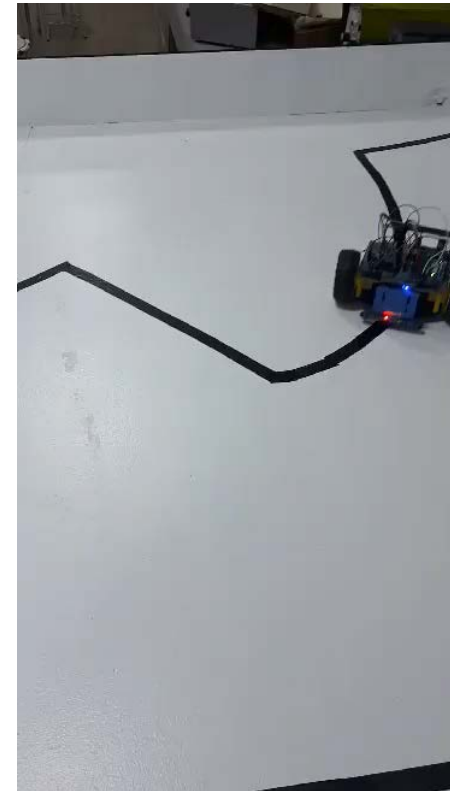


NANOCHALLENGE



- Follow Line
- Driving on Crosslines
- Follow the line on a turn

- *Part detection*
- *Part Grasping*





Programing robot to NANOCHALLENGE

```
teste_sensores | Arduino 1.8.7
Ficheiro Editar Rascunho Ferramentas Ajuda
teste_sensores

void setup() {
  pinMode(E2, INPUT);
  pinMode(E1, INPUT);
  pinMode(C, INPUT);
  pinMode(D1, INPUT);
  pinMode(D2, INPUT);
  Serial.begin(9600);
  while(!Serial);
  Serial.println("Início de Leitura");
}

void loop() {
  Serial.println("");
  Serial.println("E2 - E1 - C - D1 - D2");
  Serial.println(analogRead(E2));
  Serial.print("-");
  Serial.print(analogRead(E1));
  Serial.print("-");
  Serial.print(analogRead(C));
  Serial.print("-");
  Serial.print(analogRead(D1));
}
```

School closed

```
seguir_a_linha-todos_os_sensores | Arduino 1.8.7
Ficheiro Editar Rascunho Ferramentas Ajuda
seguir_a_linha-todos_os_sensores

  botao=digitalRead(BT);
} while(botao==1);
}

void loop() {

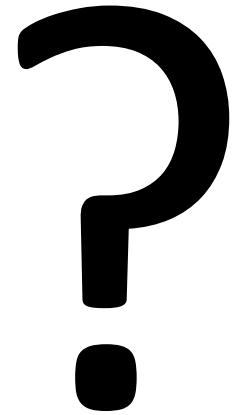
  if (analogRead(E1)<TH) {
    Esquerda(); }
  else if (analogRead(E2)<TH) {
    Esquerda(); }
  else if (analogRead(D1)<TH) {
    Direita(); }
  else if (analogRead(D2)<TH) {
    Direita(); }
  else {
    Frente();}
}

void Frente() {
  digitalWrite(AP, HIGH);
  digitalWrite(AN, LOW);
  digitalWrite(BP, HIGH);
  digitalWrite(BM, LOW);
}
```



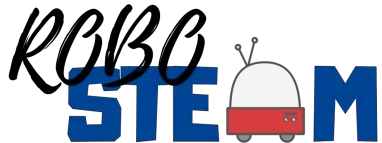
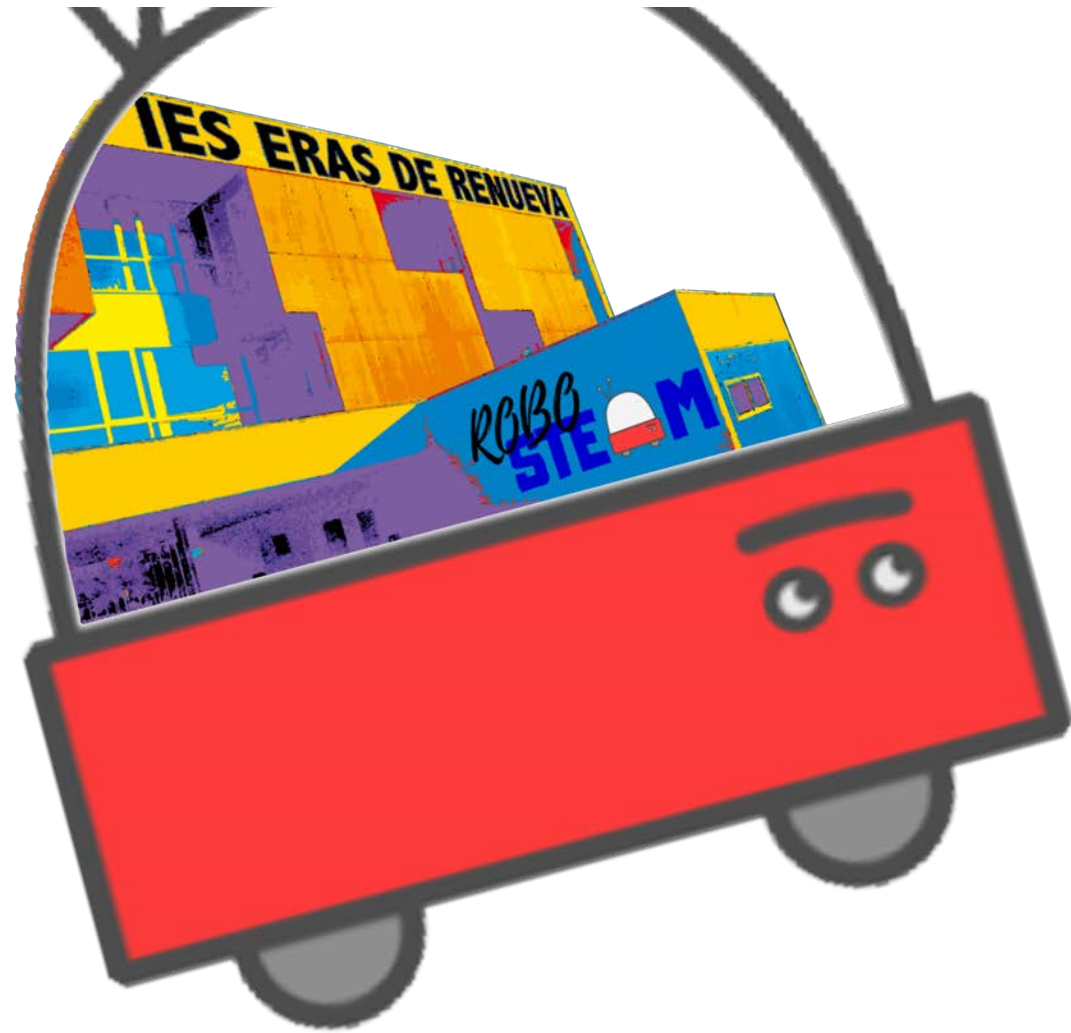
Situation Status

- Travel to Finland Canceled
- School open with working restriction
- School can close > distance learning
- Program developing
- Beginning the simulation platform
- Adapting to a new reality



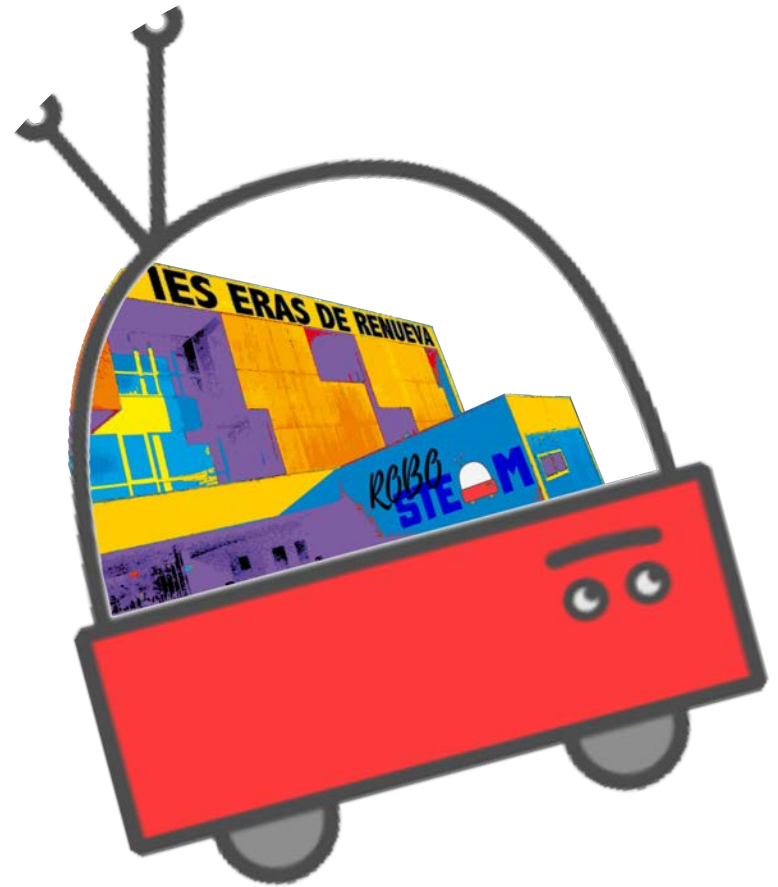
ROBOSTEAM ERASMUS PROJECT

IES ERAS DE RENUEVA
SPAIN



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of the European Union

PILOT PHASE 1



CHALLENGE

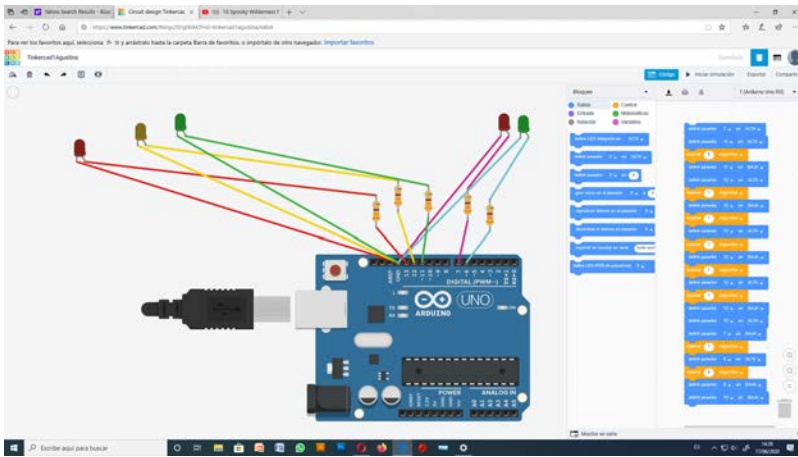
STUDENTS FROM 12 TO 16 ARE INVOLVED IN SOLVING THE FOLLOWING CHALLENGE:

- The school festival will be held in the auditorium. Students' relatives and friends will be welcome to the event. We want to signal how to get to the auditorium from the main entrance. To do this you will have to design the light signaling.
- Design a program to get 8 different color LEDs to turn on and turn off in a simple sequence. Insert them in a board to get the route correctly marked. It is required to use a simulator program before making the model.

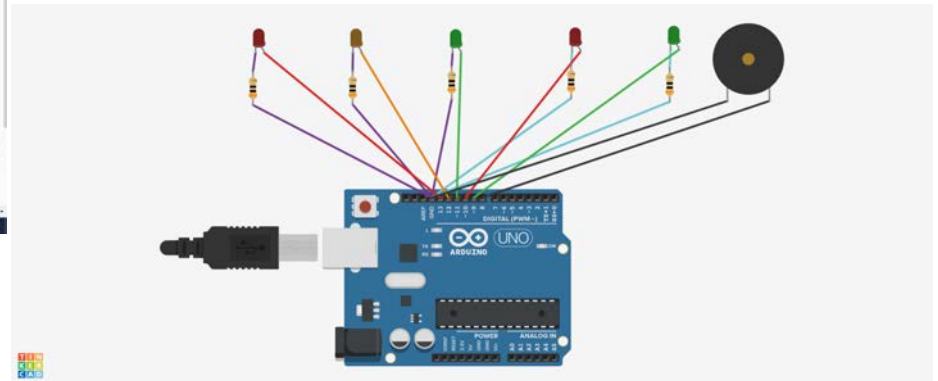
STEPS - NANOCHALLENGES:

- **Challenge 1: Make an LED turn on and off**
 - What type of component is an LED?
 - How is it connected? What resistor is required?
- **Challenge 2: Make an LED turn on and off with a switch or push**
 - What is a switch used for?
 - What is a push used for?
- **Challenge 3: Make at least 8 LED turn on and off using a switch**
 - Is it possible to light up only some of them?
 - Is it possible to light up all of them at the same time?
- **Challenge 4: Design the illuminated sign and the light sequence**
 - Model shape? Size? Required materials?
 - Programming light sequence

WARMING-UP EXERCISES WITH TINKERCAD



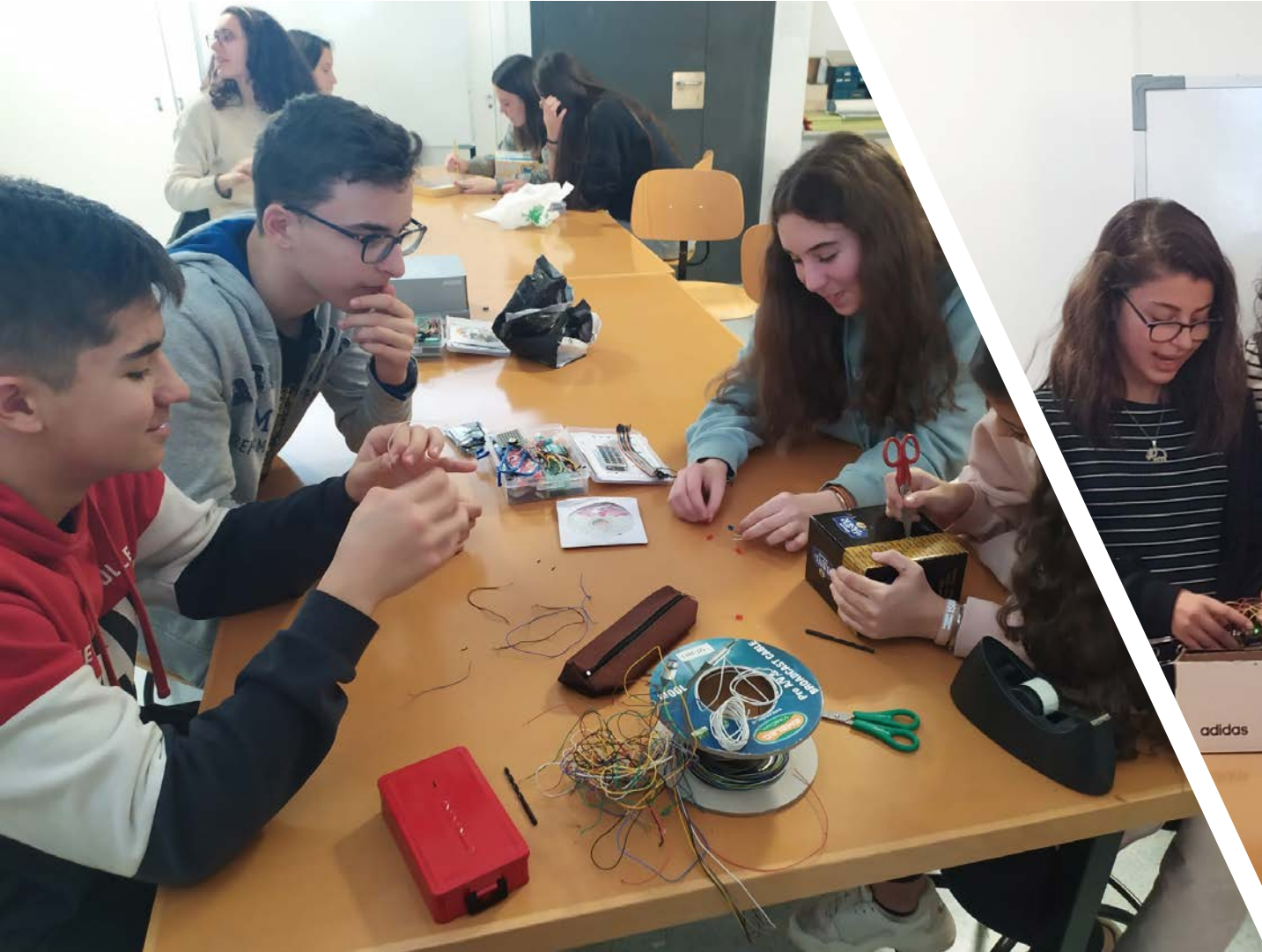
Simulation of a traffic light crossing

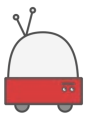


Simulation of a traffic light crossing with sound

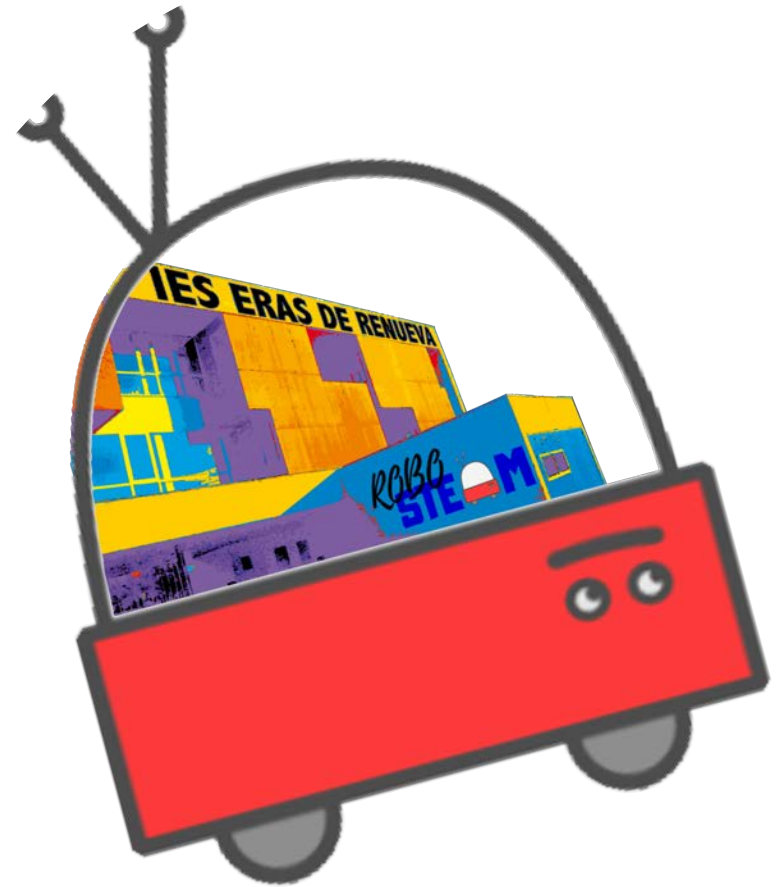


STUDENTS PROPOSALS





PILOT PHASE 2



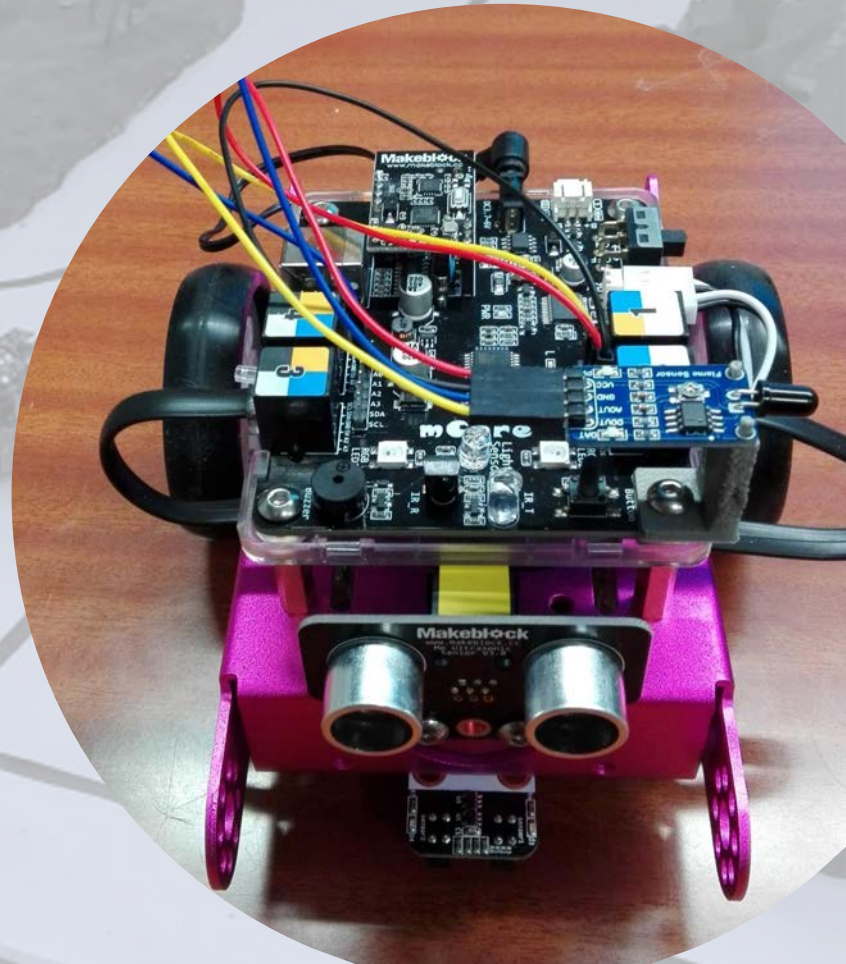
CHALLENGE DEVELOPED IN A DIFFERENT CONTEXT

OUR TEAMS APPLY THE SAME TOOLS USED IN PILOT 1 BY **PORTUGUESE TEAMS** IN THEIR CHALLENGE:

Researching about the impact of robotics on preventing and fighting fires

Robots are used to prevent and fight fires. All these robots use **sensors** to do their job:

- Follow a line → **line-follower sensor**
- Detect a flame → **flame detector sensor**
- Avoid an obstacle → **distance sensor**



CHALLENGE DEVELOPED IN A DIFFERENT CONTEXT

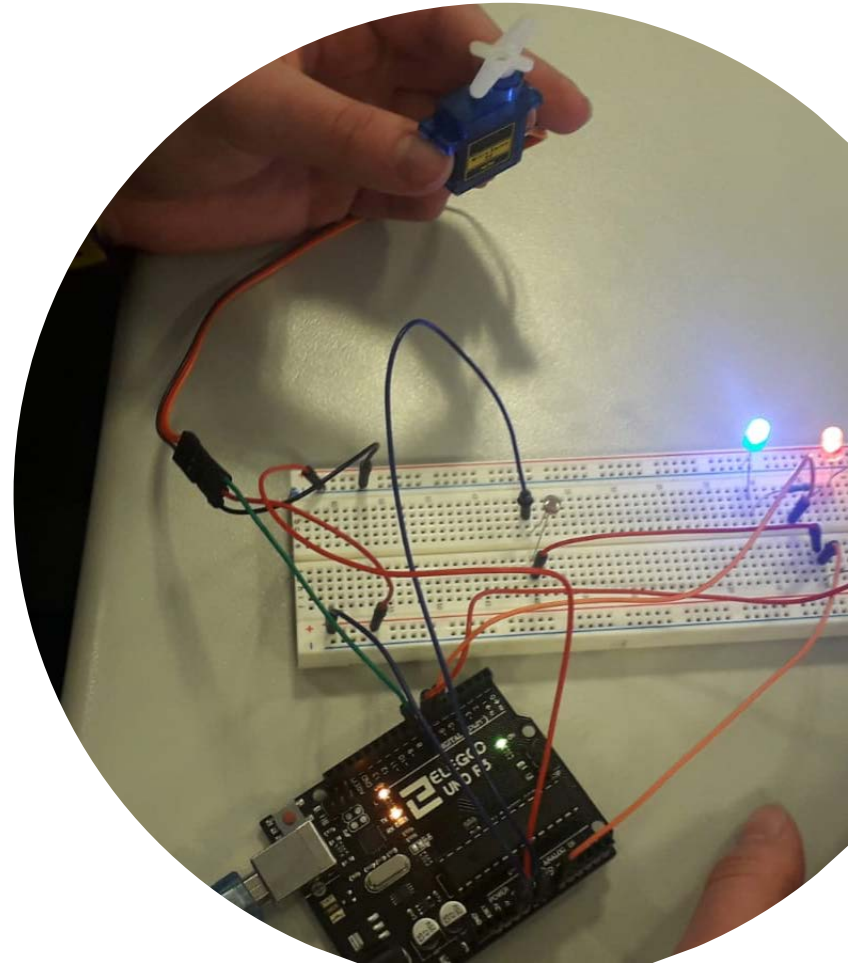
SPANISH TEAMS SOLVE NANO-CHALLENGUES USING SENSORS IN OUR SCHOOL CONTEXT:

The school wants to improve our energy consumption. You will have to design different solutions to control some situations.

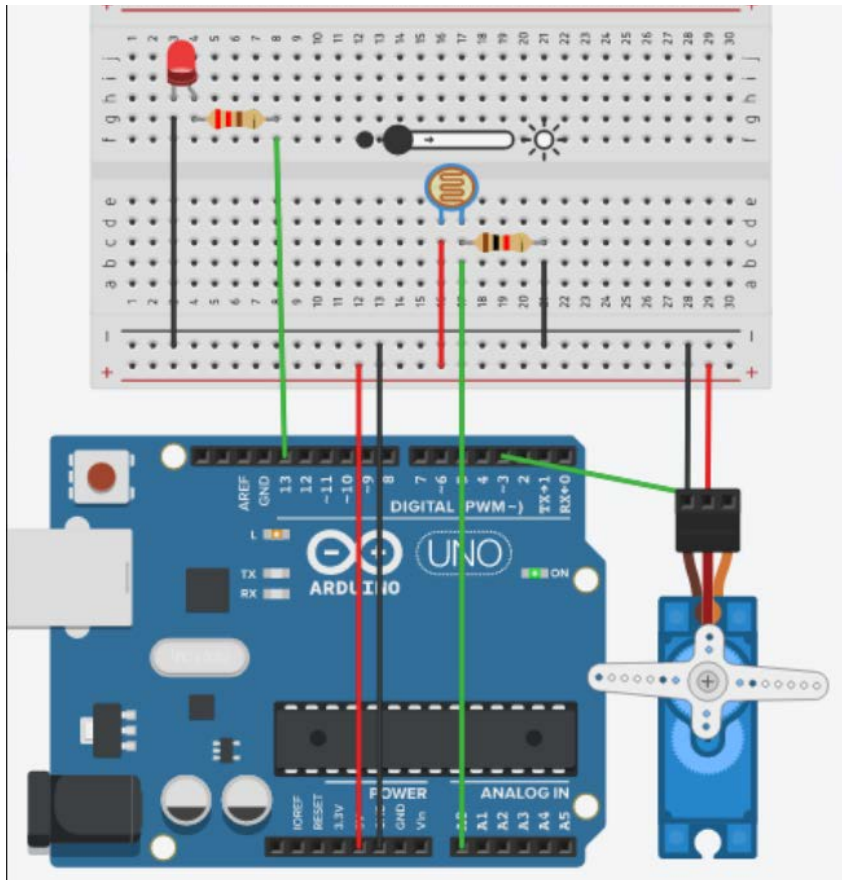
It is required to use a simulator program before making the model.

- Nano-challenge 1: Some LEDs turn on and off depending on the light → **light sensor**
- Nano-challenge 2: Blinds rise or fall depending on the light → **light sensor**
- Nano-challenge 3: Barrier motor stops when an obstacle is detected → **distance sensor**
- Nano-challenge 4: The heating turns on or off depending on the temperature → **temperature sensor**
- Nano-challenge 5: The bell rings when each class starts or ends → **programming a buzzer**
- Nano-challenge 6: The alarm sounds if it detects a fire → **flame detector sensor**

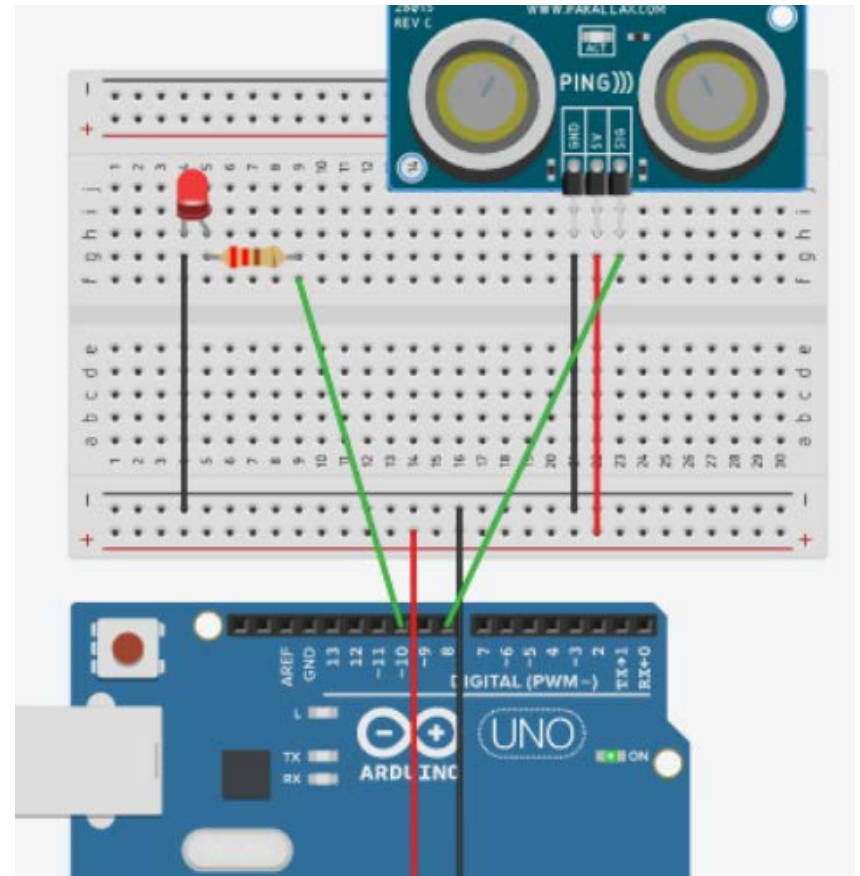
Each team develops a nano-challenge and share their results.



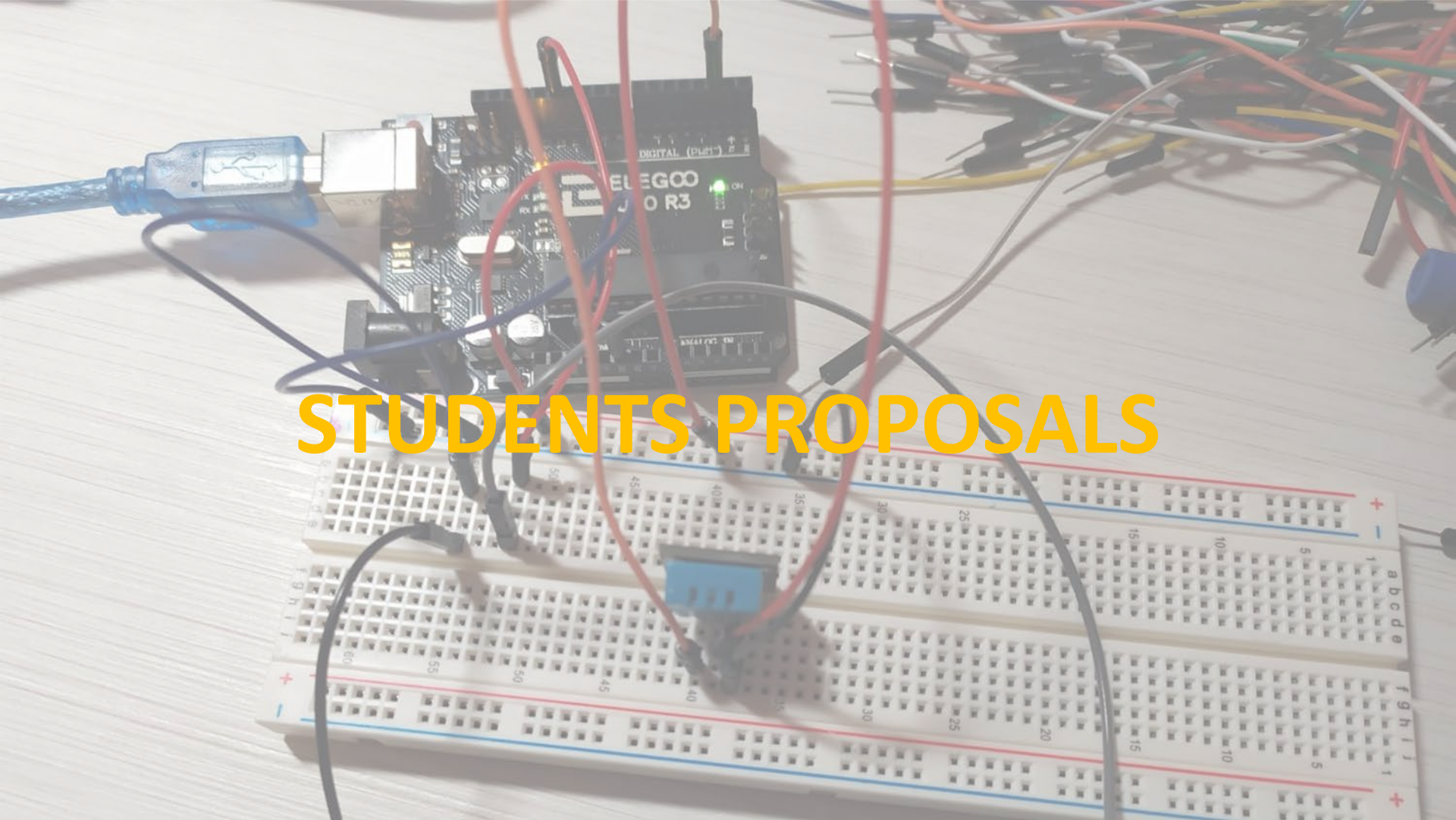
WARMING-UP EXERCISES WITH TINKERCAD



Controlling a motor depending on the light

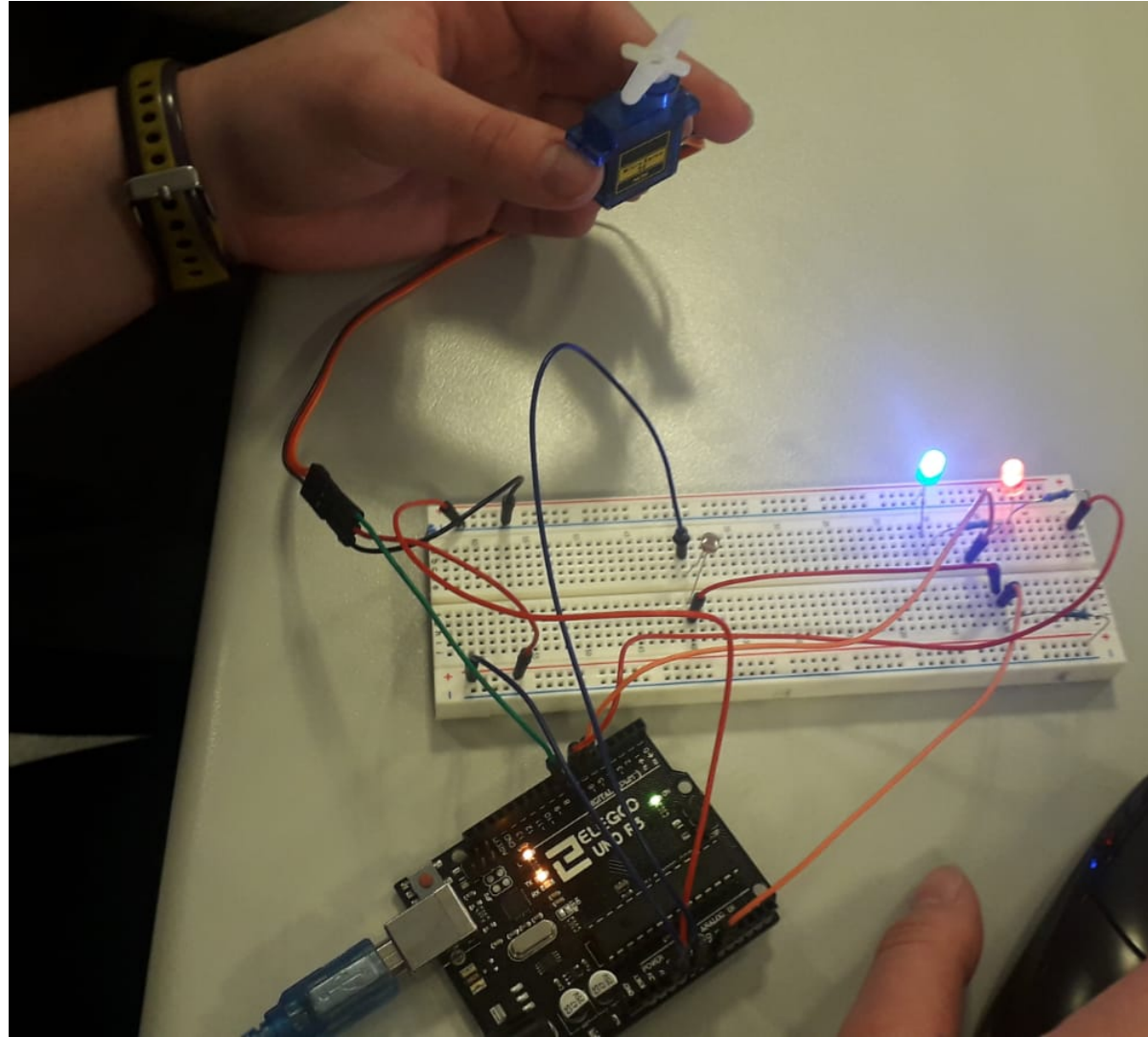


Controlling an LED depending on the distance

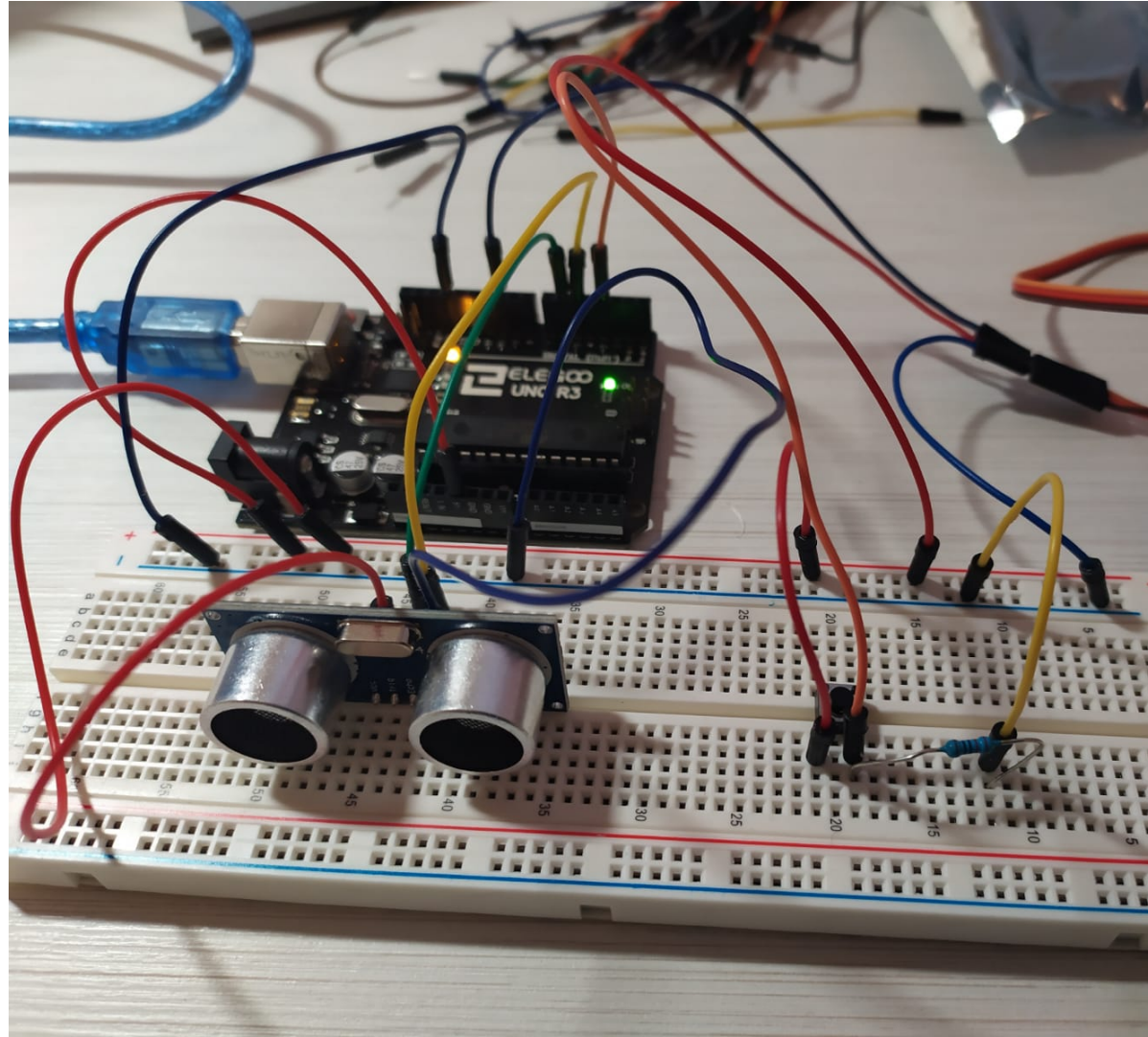


STUDENTS PROPOSALS

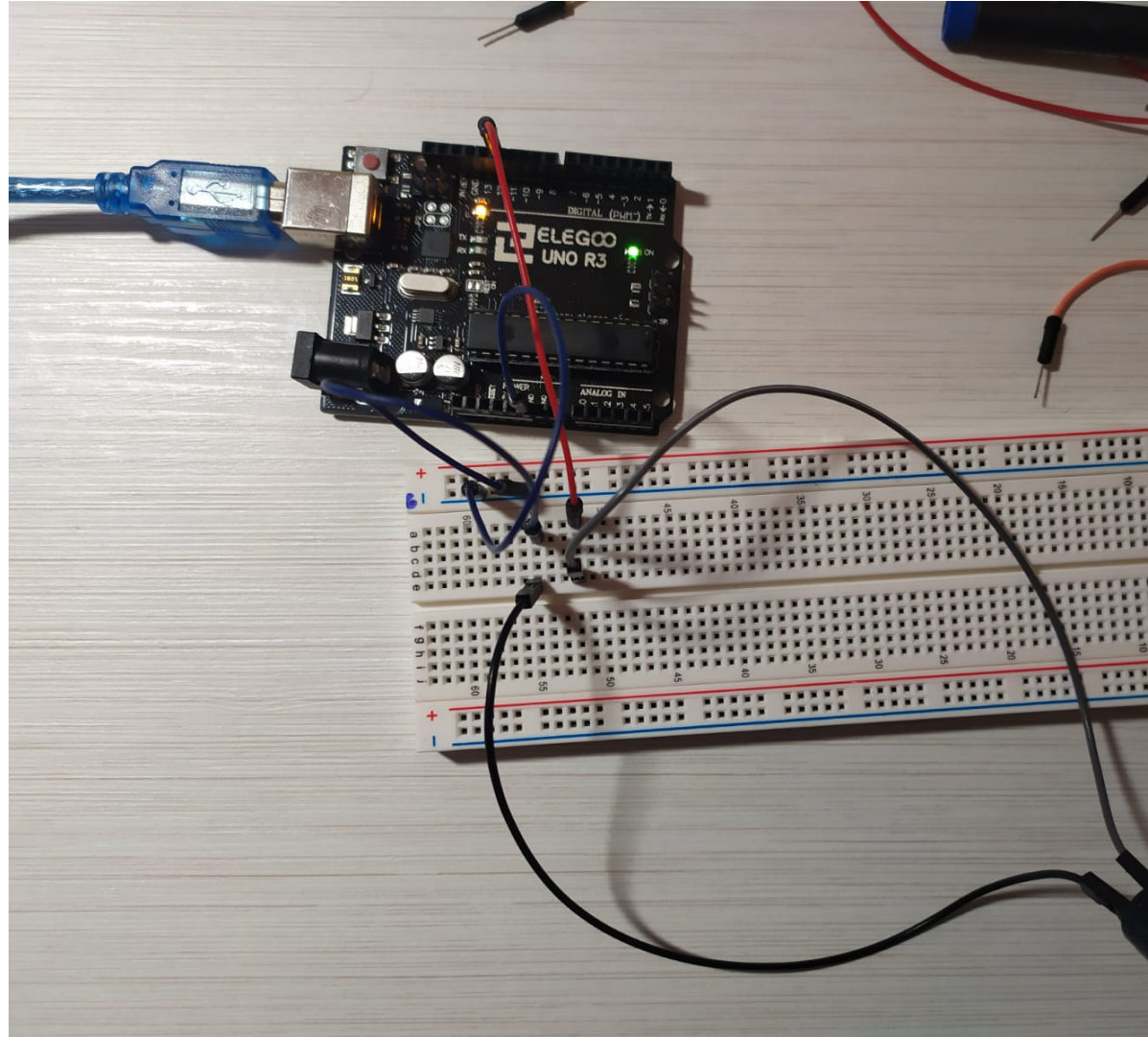
RAISING AND LOWERING WINDOW BLINDS - LIGHT SENSOR



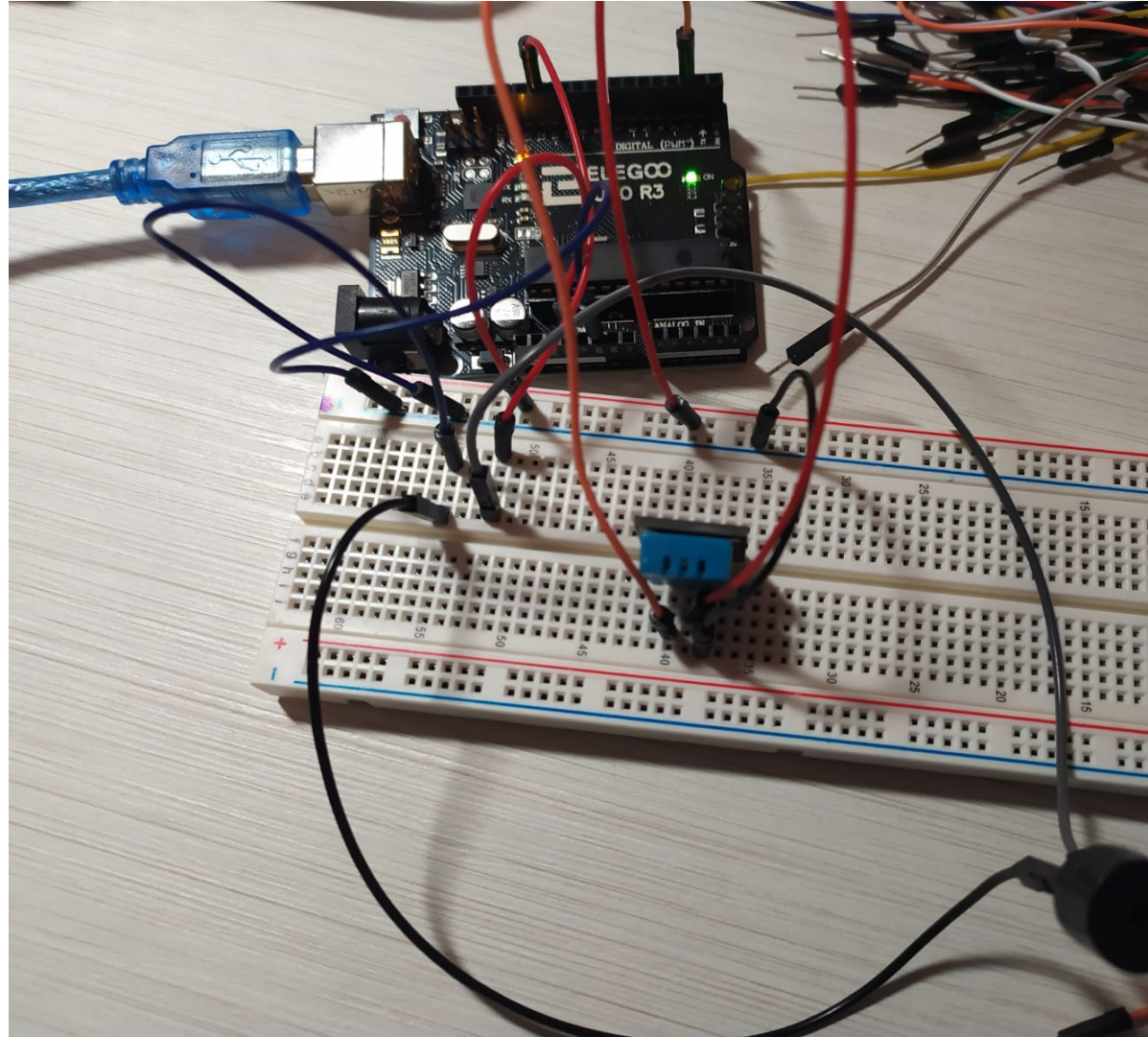
PARKING BARRIER – DISTANCE SENSOR



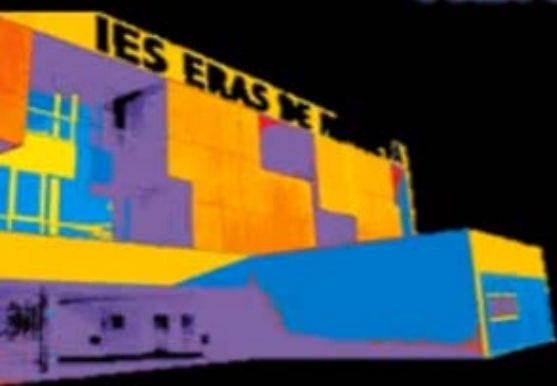
BELL SYSTEM



FIRE ALARM - FLAME DETECTOR SENSOR



AUTOMATIZACIÓN DE ALGUNOS PROCESOS PARA LA OPTIMIZACIÓN DEL CONSUMO ENERGÉTICO DEL IES ERAS D RENUUEVA



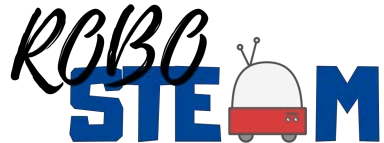
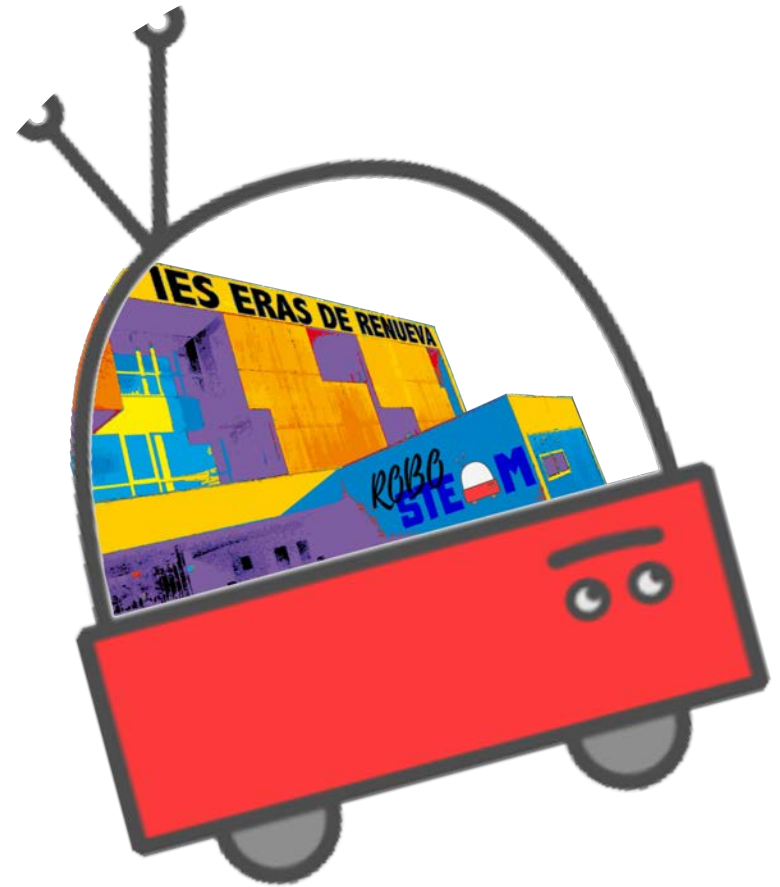
Por: Iris Fernán

**STUDENTS
CREATE A VIDEO
EXPLAINING THE
PILOTS PROCESS**

<https://www.youtube.com/watch?v=Aksu995nEUQ&feature=youtu.be>

PILOT PHASE 2

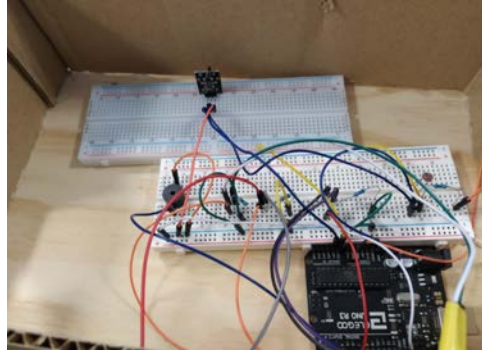
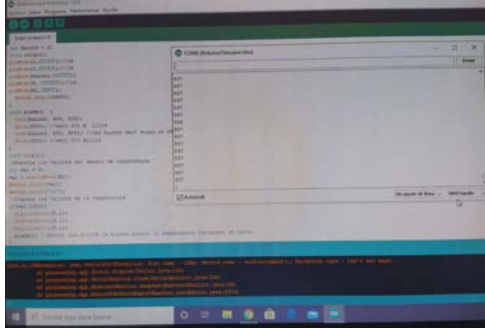
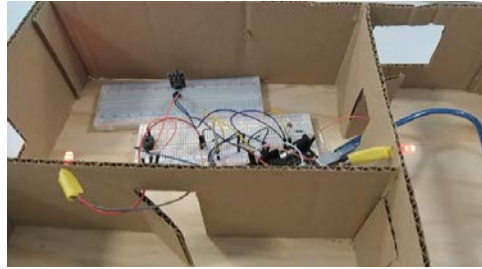
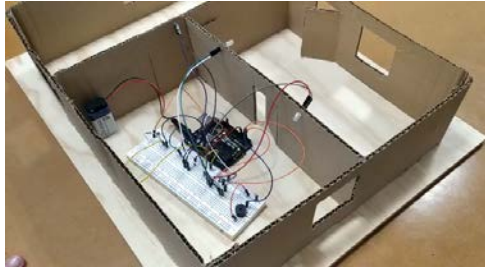
AFTER THE
LOCKDOWN



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of the European Union



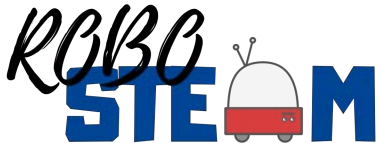
STUDENTS FINISH THEIR PROPOSALS



FINAL PROPOSALS

Outline

- Current context of the project
- Results
- Ongoing work after COVID break
- **COVID19 situation and changes to be done**
- Tasks to be done by the partners in the new situation
- Managerial Issues
- Quality Issues
- Dissemination Plan
- Summary of partners tasks



Co-funded by the
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of the European Union

COVID19 Situation and Changes

- Transnational meetings cancelled
 - Virtualization
- Pilots phase 1 and 2 have not finished
 - Possibility to finish the work with the same students
 - Possibility to finish the work with other students
 - Possibility to finish it virtually
- Multiplier events
 - Alternative approaches
 - Face to face repeated and with a low number of students
 - Virtually, but this can have an impact in the budget
- Training week
 - Virtually
- C6
 - Virtually using remote labs

COVID19 Situation IOs

- Enlarge IOs
 - O2.
 - Definition of virtual kits to be applied in pandemic situations
 - Analysis of such kits in schools
 - O3.
 - Collecting online tools to be applied in COVID Situation
 - Publish them in the repository

Outline

- Current context of the project
- Results
- Ongoing work after COVID break
- COVID19 situation and changes to be done
- **Tasks to be done by the partners in the new situation**
- Managerial Issues
- Quality Issues
- Dissemination Plan
- Summary of partners tasks

All partners

- Enter in project tools and repositories
- Contribute to the repository kits and tools (related and non related with the COVID)
- Send media news about the project to Ilkka
- Test the remote labs
 - Report errors and perceptions
- Complete the quality forms
- Anonymous STEAM Semantic Survey (Age range)
- Participate in the Virtual Training Week
 - Select two persons of your institution

Schools

- Complete pilot phase 1 and 2
- Report results pilots and exchanges
- Use their students in the C6 Virtual Meeting
- Test with their teachers and students the remote labs
 - Report errors and perceptions

Results from pilots

- Summary of the pilot activities
- Description of the context
- Description of the students involved
- Description of the mini-challenges (using template)
- Results using the instruments and other indicators
 - Grades, Times, Semantic survey, CT Questionnaire, Co-measure assessment tool)
- Provide photos
- Provide if possible teachers and students perceptions

Results from exchanges

- Description of the exchange
 - Context, number of students, ages, nano-challenges to be addressed, available kits
 - Cultural activities
- Signatures and Agenda
- Results using the instruments and other indicators
 - Most of you have used grades, times, semantic and commeasure survey
- Provide photos
- Provide if possible teachers and students perceptions

- Common activities and
 - Complete pilot phase 1 and 2
 - Report evidences of the piloting
 - Contribute to testing remote labs
 - Students and teachers
 - Participate in C6
 - Select two persons to participate in the training week
 - Send local media news

- Common activities and
 - Complete pilot phase 1 and 2
 - Report evidences of the piloting
 - Contribute by testing remote labs
 - Students and teachers
 - Participate in C6
 - Select two persons to participate in the training week
 - Send local media news

- Common activities and
 - Complete pilot phase 1 and 2
 - Report evidences of the piloting
 - Report evidences of exchanges
 - Review what you have sent
 - Contribute to testing remote labs
 - Students and teachers
 - Participate in C6
 - Select two persons to participate in the training week
 - Send local media news

UEF – Education School

- Common activities and
 - Complete pilot phase 1 and 2
 - Report evidences of the piloting
 - Manage C6 exchange
 - Report evidences of exchanges
 - Signature list of some the exchanges are not completed
 - Contribute to testing remote labs
 - Students and teachers
 - Select two persons to participate in the training week
 - Send local media news

Universities

- Support the development of remote labs
- Study the current landscape for remote labs that simulate robotics and/or hardware in the loop
- Facilitate instruments to test the remote labs
- Define manuals to use the remote labs
- Test the remote labs with experts

- Common tasks and...
 - Develop or adapt a hardware in the loop simulator
 - Provide manuals to use it
 - Participate in the definition of the landscape for simulators
 - Participate in the testing by experts of remote labs
 - Test with experts and report results
 - Manage E3 Hackaton

-
- Common tasks and...
 - Complete the reports of Carl Benz School Pilots
 - Participate in the definition of the landscape for simulators
 - Search for instruments to assess the remote labs
 - Participate in the testing by experts of remote labs
 - Manage E5 local dissemination event
 - Manage C1 training week

- Common tasks and...
 - Participate in the definition of the landscape for simulators
 - Test with experts and report results
 - Manage E6 local dissemination event
 - Collect dissemination evidences
 - Provide dissemination reports

- Common tasks and...
 - Continue with Management
 - Define a remote lab simulator
 - Participate in the testing by experts of remote labs
 - Analyse results of testing in schools
 - Manage E2 mainstreaming conference
 - Elaborate progress reports

- Common tasks and...
 - Coordinate the definition of the landscape for simulators
 - Search for instruments to assess the remote labs
 - Test with experts and report results
 - Adapt quality instruments to COVID situation
 - Elaborate quality reports

Outline

- Current context of the project
- Results
- Ongoing work after COVID break
- COVID19 situation and changes to be done
- Tasks to be done by the partners in the new situation
- **Managerial Issues**
- Quality Issues
- Dissemination Plan
- Summary of partners tasks

Managerial Issues

- Main goal
 - Finish the project successfully
 - Not to give money back
 - Probably we will not receive the complete remaining 20% of the budget
- Up to a 60% can be moved
 - From events and training activities
- Move budget to IO

Managerial Issues

	Trasnational Meetings	IO	Multiplier Events	Travel	Individual support
	<i>Spent</i>	<i>Justified</i>	<i>Justified</i>	<i>Spent</i>	<i>Justified</i>
ULE	€ 2.300,00	€ 4.780,00	€ -	€ -	€ -
AEEG	€ 575,00	€ 986,40	€ -	€ 1.260,00	€ 2.510,00
CIC	€ 575,00	€ 986,40	€ -	€ 1.260,00	€ 2.510,00
ERAS	€ 1.150,00	€ 986,40	€ -	€ 1.260,00	€ 2.510,00
IPB	€ 575,00	€ 4.780,00	€ -	€ -	€ -
KIT	€ 575,00	€ 2.739,20	€ -	€ -	€ -
UEF	€ 2.670,00	€ 3.252,80	€ -	€ 7.420,00	€ 5.020,00
USAL	€ 1.150,00	€ 5.376,80	€ -	€ -	€ -

Budget already spent and/or justified

Managerial Issues

	Trasnational Meetings	IO	Multiplier Events	Travel	Individual support
	<i>Left (Lost)</i>	<i>Left</i>	<i>Left</i>	<i>Left (Lost)</i>	<i>Left</i>
ULE	€ 1.520,00	€ 4.780,00	€ 8.000,00	€ 550,00	€ 1.060,00
AEEG	€ 760,00	€ 986,40	€ -	€ 4.260,00	€ 3.570,00
CIC	€ 760,00	€ 986,40	€ -	€ 4.260,00	€ 3.570,00
ERAS	€ 760,00	€ 986,40	€ -	€ 4.260,00	€ 3.570,00
IPB	€ 1.335,00	€ 4.780,00	€ 4.600,00	€ 550,00	€ 1.060,00
KIT	€ 1.150,00	€ 2.739,20	€ 2.000,00	€ -	€ 1.060,00
UEF	€ 760,00	€ 3.252,80	€ 2.000,00	€ 1.100,00	€ 2.120,00
USAL	€ 1.335,00	€ 5.376,80	€ -	€ 550,00	€ 1.060,00

Remaining part of the budget, some lost!

Managerial Issues

	Trasnational Meetings	IO	Multiplier Events	Travel	Individual support
	<i>Justifiable (Spent)</i>	<i>Justifiable (100%)</i>	<i>Justifiable (100%)</i>	<i>Justifiable (Spent)</i>	<i>Justifiable (15%)</i>
ULE	€ 2.300,00	€ 9.560,00	€ 8.000,00	€ -	€ 159,00
AEEG	€ 575,00	€ 1.972,80	€ -	€ 1.260,00	€ 3.045,50
CIC	€ 575,00	€ 1.972,80	€ -	€ 1.260,00	€ 3.045,50
ERAS	€ 1.150,00	€ 1.972,80	€ -	€ 1.260,00	€ 3.045,50
IPB	€ 575,00	€ 9.560,00	€ 4.600,00	€ -	€ 159,00
KIT	€ 575,00	€ 5.478,40	€ 2.000,00	€ -	€ 159,00
UEF	€ 2.670,00	€ 6.505,60	€ 2.000,00	€ 7.420,00	€ 5.338,00
USAL	€ 1.150,00	€ 10.753,60	€ -	€ -	€ 159,00

Part of the budget that can be justified

Managerial Issues

	Trasnational Meetings	IO	Multiplier Events	Travel	Individual support
	<i>Received (80%)</i>	<i>Received (80%)</i>	<i>Received (80%)</i>	<i>Received (80%)</i>	<i>Received (80%)</i>
ULE	€ 3.056,00	€ 9.560,00	€ 6.400,00	€ 440,00	€ 848,00
AEEG	€ 1.068,00	€ 1.972,80	€ -	€ 4.416,00	€ 4.864,00
CIC	€ 1.068,00	€ 1.972,80	€ -	€ 4.416,00	€ 4.864,00
ERAS	€ 1.528,00	€ 1.972,80	€ -	€ 4.416,00	€ 4.864,00
IPB	€ 1.528,00	€ 9.560,00	€ 3.680,00	€ 440,00	€ 848,00
KIT	€ 1.380,00	€ 5.478,40	€ 1.600,00	€ -	€ 848,00
UEF	€ 2.744,00	€ 6.505,60	€ 1.600,00	€ 6.816,00	€ 5.712,00
USAL	€ 1.988,00	€ 10.753,60	€ -	€ 440,00	€ 848,00

Part of the budget already received (80%)

Managerial Issues

80%	Received	Justified	%	Justifiable	%
ULE	€ 20.304,00	€ 7.080,00	35%	€ 20.019,00	99%
AEEG	€ 12.320,80	€ 5.331,40	43%	€ 6.853,30	56%
CIC	€ 12.320,80	€ 5.331,40	43%	€ 6.853,30	56%
ERAS	€ 12.780,80	€ 5.906,40	46%	€ 7.428,30	58%
IPB	€ 16.056,00	€ 5.355,00	33%	€ 14.894,00	93%
KIT	€ 9.306,40	€ 3.314,20	36%	€ 8.212,40	88%
UEF	€ 23.377,60	€ 18.362,80	79%	€ 23.933,60	102%
USAL	€ 14.029,60	€ 6.526,80	47%	€ 12.062,60	86%

Calculated at 80%

Managerial Issues

100%	Total	Justified	%	Justifiable	%
ULE	€ 37.380,00	€ 13.080,00	35%	€ 26.019,00	70%
AEEG	€ 21.401,00	€ 8.331,40	39%	€ 9.853,30	46%
CIC	€ 21.401,00	€ 8.331,40	39%	€ 9.853,30	46%
ERAS	€ 21.976,00	€ 8.906,40	41%	€ 10.428,30	47%
IPB	€ 26.070,00	€ 8.355,00	32%	€ 17.894,00	69%
KIT	€ 17.633,00	€ 6.314,20	36%	€ 11.212,40	64%
UEF	€ 35.222,00	€ 21.362,80	61%	€ 26.933,60	76%
USAL	€ 23.537,00	€ 9.526,80	40%	€ 15.062,60	64%

Calculated at 100%

Managerial Issues

- Worst scenario: 38% lost (average)
- Best scenario: 4% lost (average)
 - ➔ Extra work is needed!
- No more lost expenses?
 - Send to camino.fernandez@unileon.es
- Each partner:
 - Send copy of all the expenses

Outline

- Current context of the project
- Results
- Ongoing work after COVID break
- COVID19 situation and changes to be done
- Tasks to be done by the partners in the new situation
- Managerial Issues
- **Quality Issues**
- Dissemination Plan
- Summary of partners tasks

Updating of the Quality Assurance Plan

- Current situation
 - The lockdown affected all the mobilities and the organization of face-to-face activities with the consequent redefinition of many scheduled activities
 - Transnational project meetings, dissemination events, pilot and activities with schools
 - National Agency approved the extension period for the project execution, so the new deadline is January 31, 2021

Updating of the Quality Assurance Plan

- As a result, the quality plan needs to be updated as follows
 - Specific evaluation questionnaires for online meetings alongside the previous questionnaire used for face-to-face meetings
 - Updating of the interim evaluation questionnaire (now it includes the evaluation of the period carried out in lockdown)
 - Rescheduling of the periodicity of the reports. The final report is due according to the new execution period
 - Tools for the evaluation of outputs, events and staff / students mobilities will be adapted to the new schedule and situation

Assessment of the project implementation

The interim report for the period M13 – M24 is available at

[ROBOSTEAM interim survey Google form](#)

Assessment of the meeting

The ROBO-STEAM Virtual Transnational Meeting (28th September 2020) - Evaluation Questionnaire is available at

[ROBOSTEAM online meeting September 2020](#)
[Google form](#)

Next steps to assess the project achievements

- Considering that all the transnational face-to-face activities of the RoboSTEAM project have been canceled, the evaluation of outputs and activities described in the quality assurance plan needs to be adapted to the new situation
- New tools and new procedures will be developed according to the description of the ongoing work after the COVID-19 break and the tasks to be done in the new situation agreed in this meeting
- The coordinator will prepare a summary with the new distribution of tasks and activities

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Dissemination

- Some of the metrics (KPI) are lacking behind, especially in social media
- Need to activate them during the last period of the project
- Ilkka will prepare explicit guidelines on this (incl. Twitter account details and hashtags to use)
- Send pictures and newspaper / online appearances to Ilkka

Outline

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- Managerial Issues
- Quality Issues
- Dissemination Plan
- **Summary of partners tasks**

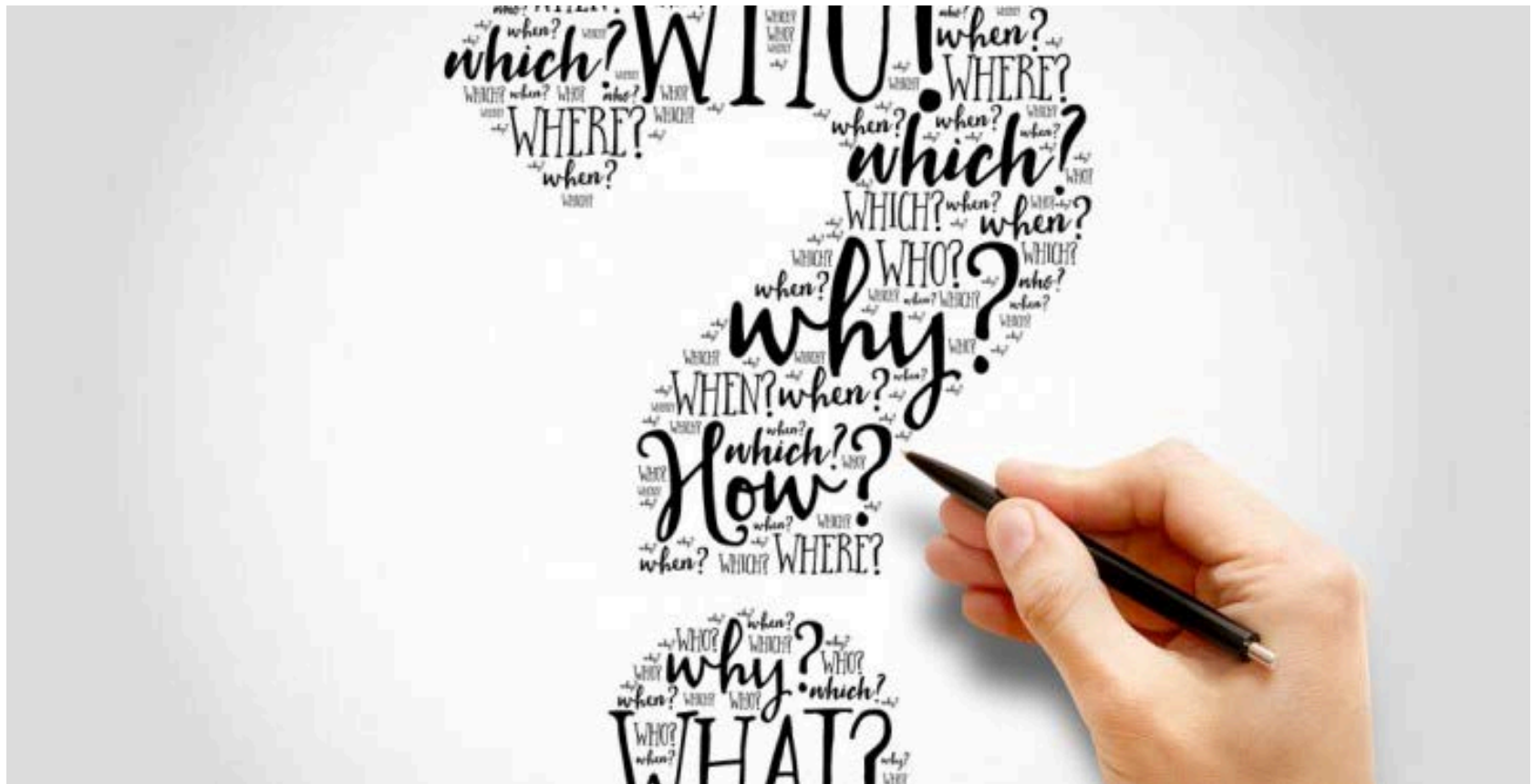
To do

- Check your tasks and ask if you have doubts
- Try to provide those results that do not depend on others tasks ASAP
- Try to provide missing reports ASAP
- Lost expenses related to Finnish travel ASAP

All partners

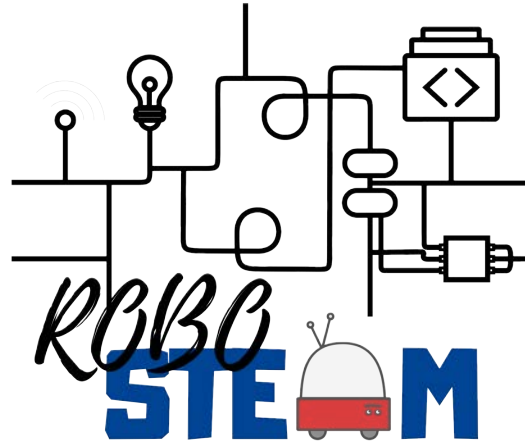
- Enter in project tools and repositories
- Contribute to the repository kits and tools (related and non related with the COVID)
- Send media news about the project to Ilkka
- Test the remote labs
 - Report errors and perceptions
- Complete the quality forms
- Anonymous STEAM Semantic Survey (Age range)
- Participate in the Virtual Training Week
 - Select two persons of your institution

Questions





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Universidad de León

Virtual Transnational Meeting