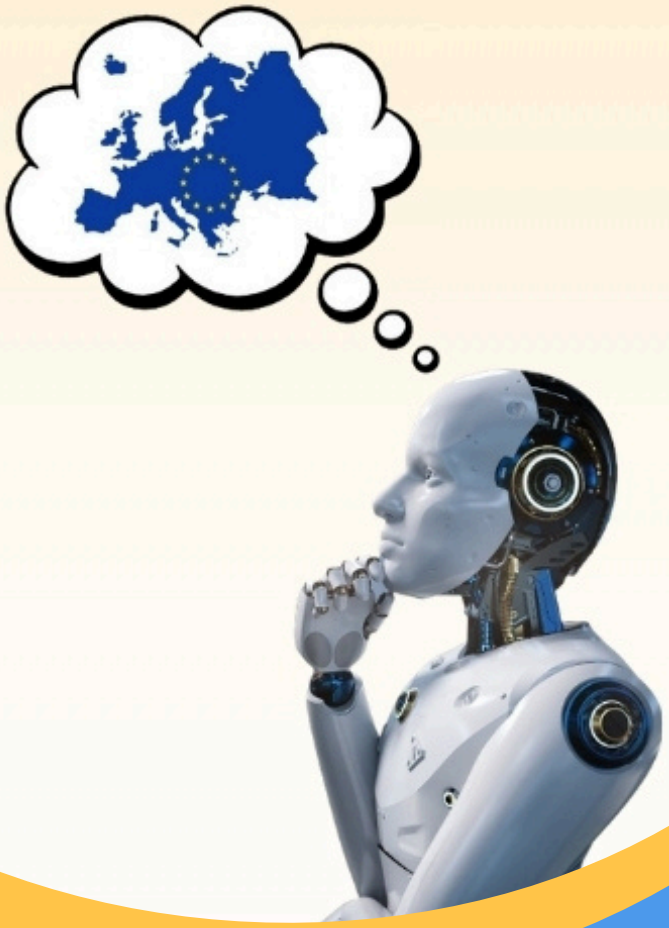
ROBO-THINKERS & ROBO-SAPIENS

Exploring Robotics through Philosophy



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DROGA

Stowarzyszenie Wspierania Działań na Rzecz Osób Potrzebujących Pomocy DROGA w Olsztynku

Association Franco-Polonaise

Côtes d'Armor - Warmie et Mazurie

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TABLE OF CONTENTS

1 **PROJECT**

Introduction
Project Rationale
Project Objectives

2 **PARTNERS**

ACAWM
DROGA

3 **PEDAGOGICAL SCENARIOS**

1. Body OFF/ON — Can a robot have a body?
2. I see more than I see — How the mind fills in the gaps
3. The robot smiles — Is it really happy?
4. I lie — So what? The logic that devours itself
5. Robot at the crossroads — Who should survive? The trolley problem
6. Can robots trust each other? — The prisoner's dilemma

4 **SCENARIO TESTING PROCESS**

Insights from Testing and Scenario Development

ANNEX

Photo Gallery: Testing Sessions and Final Conference

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1

PROJECT

- INTRODUCTION
- PROJECT RATIONALE
- PROJECT OBJECTIVES

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PROJECT

The integration of robotics into educational programmes is becoming increasingly important. However, current pedagogical approaches often overlook the philosophical dimensions that could enrich the learning process.

The Robo-Thinkers & Robo-Sapiens project is based on the premise that integrating philosophy—particularly phenomenology—into robotics education creates an innovative teaching framework that fosters critical thinking, engagement, and a deeper understanding of the world among young people in vulnerable situations.

NEED FOR THE PROJECT

Young people who are outside the education system often lack access to appropriate educational tools that combine the development of digital skills with the cultivation of critical thinking. Youth workers need innovative training that goes beyond teaching the technical use of technology and also addresses the ethical and societal issues associated with its development, such as artificial intelligence, automation, and privacy.

The project responds to this need by combining hands-on robotics education with philosophical reflection.

OBJECTIVES

1. Develop new educational tools for professionals working with young people at risk of social exclusion.
2. Strengthen young people's digital and transferable skills through innovative training programmes.
3. Design curricula tailored to non-formal education and local community settings.
4. Disseminate the developed tools among public and private organisations working to prevent social exclusion.
5. Promote an interdisciplinary approach that combines technology, ethics, and critical thinking.

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2

PARTNERS

- ACAWM
- DROGA

PROJECT PARTNERS

The Robo-Thinkers & Robo-Sapiens project is implemented by two partners with complementary areas of expertise: ACAWM – Association Franco-Polonaise Côtes d'Armor – Warmie et Mazurie (Saint-Brieuc, France), the project coordinator, and DROGA – Association for Supporting Activities for People in Need (Olsztynek, Warmian-Masurian Voivodeship, Poland).

ACAWM — ASSOCIATION FRANCO-POLONAISE CÔTES D'ARMOR WARMIE-MAZURIE

Founded in 1982, ACAWM is a partner of the Côtes d'Armor Departmental Council. Its mission is to promote European cooperation and solidarity through projects and bilateral exchanges within the framework of the decentralised partnership between the Warmian-Masurian Voivodeship in Poland and the Côtes d'Armor Department in France. This cooperation traces its origins to a gesture of solidarity by the people of Brittany towards the crew of a Polish ship who sought political asylum in the port of Brest in 1982. Over the past four decades, this event has evolved into a lasting partnership supporting cooperation in education, youth, culture, and economic development.

ACAWM delivers activities for a wide range of target groups, including young people involved in social inclusion and intercultural exchange programmes, adults learning French, youth workers in the non-profit sector, and teachers from various educational settings.

The association has extensive experience in coordinating and participating in Erasmus+ projects. It has been involved as a partner in numerous Key Action 2 (KA2) cooperation projects with organisations from Portugal, Romania, Croatia, Italy, and Germany. ACAWM currently coordinates the RoboTIC4HUMANS project, which provides the methodological foundation for the Robo-Thinkers & Robo-Sapiens project.

DROGA — ASSOCIATION SUPPORTING ACTIVITIES FOR PEOPLE IN NEED

Founded in August 2010 in Olsztynek, DROGA is a non-governmental organisation specialising in the social reintegration of people facing difficult life circumstances. It implements activities supporting young people and families at risk of social exclusion, experiencing domestic and partner violence, behavioural addictions, and cyberbullying.

The organisation provides therapeutic, training, and support programmes, and regularly develops educational publications aimed at professionals working in the fields of social work and youth work.

DROGA brings together 18 members and associates representing various fields, including educators, psychologists, social workers, therapists, information technology specialists, and project managers. The association has recognised experience in implementing Erasmus+ KA2 projects and is currently involved in several initiatives addressing cyberbullying prevention, combating hate crimes, and protecting victims of gender-based violence.

LONG-STANDING FRENCH-POLISH COOPERATION

ACAWM and DROGA have been cooperating since 2016, when they jointly implemented the The Way to Better Skills project (KA1), which was recognised as an example of good practice after its completion. This trust-based relationship, built on shared values and proven complementarity of expertise, provides the foundation for their partnership within the Robo-Thinkers & Robo-Sapiens (R2P) project.

ACAWM contributes its experience in coordinating high-quality educational activities and engaging local and institutional stakeholders, while DROGA brings its practical expertise and experience in working with people facing difficult life circumstances, European cooperation networks, and the ability to develop robust and adaptable educational tools.

Together, the two organisations form a French-Polish partnership capable of implementing an ambitious project combining three key areas: robotics, philosophy, and social inclusion.

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3

PEDAGOGICAL SCENARIOS

1. BODY OFF/ON — CAN A ROBOT HAVE A BODY?
2. I SEE MORE THAN I SEE — HOW THE MIND FILLS IN THE GAPS
3. THE ROBOT SMILES — IS IT REALLY HAPPY?
4. I LIE — SO WHAT? THE LOGIC THAT DEVOURS ITSELF
5. ROBOT AT THE CROSSROADS — WHO SHOULD SURVIVE? THE TROLLEY PROBLEM
6. CAN ROBOTS TRUST EACH OTHER? — THE PRISONER'S DILEMMA

1. Scenario title

Body OFF/ON. Can a robot have a body?

2. General activity objectives and competencies

Lesson objectives:

- Philosophical: participants will explore the concepts of corporeality and embodiment from a philosophical perspective, understand the difference between “I have a body” and “I am a body,” and reflect on the boundary between human and machine.
- Robotics: participants will programme a robot to simulate selected aspects of corporeality.
- Life skills: developing critical and analytical thinking, reading comprehension, following reasoning and philosophical argumentation logic, self-reflection and reflection on others, deconstructing existing conceptual frameworks related to understanding the body and corporeality, improving communication and teamwork.

Competencies:

Competencies	Description
Learning to learn	Developing the ability to reflect on one’s own experience and perception of the world.
Personal and social competencies	Self-reflection, self-expression, recognizing one’s own emotions and needs and those of others.
STEM competencies	Working with robots, understanding sensors, developing logical thinking and coding skills.
Civic and cultural competencies	Understanding the role of the body and identity in culture, developing communication and discussion skills.
Creativity and entrepreneurship	Seeking non-standard solutions while working with robots, creating one’s own projects.
Information literacy	Formulating and recording one’s own thoughts, reflections, and experiences in a clear and coherent way.

3. Duration of the activity

The entire session is planned to last 90 minutes and includes:

1. Philosophical introduction (approx. 10 minutes)
   • Presentation of key concepts: the body as an object, the body as a subject, embodiment
   • Examples from everyday life and philosophical questions

2. Discussion (approx. 20 minutes)
   • Exchange of participants' observations, moderated by the facilitator's questions

3. Robot-based tasks (approx. 50 minutes)
   • Programming the robot's movement
   • Programming reactions to stimuli (light, touch, obstacle)
   • Reflection on the experience of "having" a body and "being" a body

4. Summary and reflection (approx. 10 minutes)
   • Summary of the work
   • Discussion of conclusions and participants' self-reflection

4. Required materials

Equipment:
• Educational robots (line-following, with light and touch sensors)
• Laptops or tablets with software for programming the selected robots
• Projector and screen or whiteboard

Teaching materials:
• Participant worksheet
• Teacher solution sheet

Optional:
• QR codes linking to supplementary materials

5. Session plan

A. Guidance for the teacher

Part 1: Philosophical introduction (approx. 10 minutes)

Having a body: the body as an object

Although our body is more visible to others than to ourselves, our perceptual access to it is limited. We cannot see it from the outside in the same way as other objects in the world. We see parts of our body in a specific foreshortened perspective, and some parts we cannot see at all, such as our head. The ability to see and touch our own body is crucial to the human experience of corporeality, because if we were unable to do so, our body would cease to be "our" body, losing its corporeal and human dimension.

The first-person perspective differs from the third-person perspective, in which the body is seen from the outside (for example, through a camera or through the eyes of others). Awareness of how others perceive us influences our body image.

Being a body: the self as a body

The body is not only an object in the world, but also the source of our perspective and our way of being in the world, or the "zero point of orientation." It is from the position of the body that we determine directions (here, there, left, right, near, far) and experience time and space. The body defines the way we perceive our surroundings, even when our attention is focused mainly on the world rather than on the body itself.

At the same time, the body is distinctive in that we experience it "from within," that is, through the senses and bodily sensations. "Bodily sensations," in the philosophical sense, include both local tactile impressions and general states such as pleasure, pain, tension, relaxation, fatigue, or a sense of relief. Moreover, emotions such as fear, joy, or anger have their source in bodily sensations, often difficult to localize but spreading throughout the whole body or concentrated in specific areas (for example, the chest or the abdomen). Emotions are therefore experienced as bodily resonance, felt as warmth, cold, tension, relaxation, trembling, and similar sensations.

Corporeality and Identity

The two aspects of bodily experience mentioned above—on one hand, the body I have (the objective aspect), and on the other, the body I am (the subjective aspect)—are closely linked, forming what is called the embodiment synthesis. This synthesis underlies our sense of personal identity.

A classic example of this synthesis is the phenomenon of “double sensation,” when I touch one hand with the other. In this experience, one hand acts as a tool of perception (the subject), while the other is the object of perception, yet both are simultaneously felt from the inside. I can also freely shift my attention from one hand to the other. This intertwining of experiencing and being experienced is key to understanding what a body is.

The synthesis occurs from a first-person perspective, not as an external, third-person view of the body, but as an internal, direct experience of the body as my own. Some philosophers speak of a combination of first- and third-person perspectives, where the crucial point is that even when I experience the body as an object, I still do so from a first-person perspective.

Philosophy distinguishes two types of this “synthesis”: active synthesis (conscious, based on attention and reflection) and passive synthesis (spontaneous, operating at a prereflective level). Embodiment synthesis is passive—it occurs automatically, without conscious effort, at a deep level of experience. To illustrate this, it is often compared to another fundamental passive synthesis: temporal synthesis experienced when listening to a melody, where we perceive music not as a series of separate notes but as a whole, through the spontaneous integration of present, past (retention), and future (protention). This is not a matter of memory or expectation, but a natural ability of consciousness to unify experiences.

Similarly, embodiment synthesis allows us to integrate the two aspects of bodily experience—the body as an object observed from the outside and the body as experienced from within—into a single, coherent experience of our own body. Without this synthesis, we could not function. Moreover, this integration is the foundation of our sense of identity, as without it we could not form a stable experience of ourselves as a single, bodily person.

Embodiment synthesis is fundamental for functioning because it links the experience of the body as an object (visible externally) with the body as experienced internally. This synthesis is crucial for personal identity, as it enables the experience of oneself as the same person over time. Diachronic identity (the sense of continuity of self over time) relies on a “prereflective sense of stability” and the “background sense of being alive.” This sense of stability is tied to experiencing the body as internally felt, even though these sensations change over time. Diachronic identity depends on embodiment synthesis, meaning that the experience of the body as an object (e.g., seeing hands in a mirror, feeling bodily tension) provides a stable reference point, while experiencing the body from within (e.g., feeling alive) provides a sense of subjective self. Both components of embodiment synthesis are necessary for a lasting sense of identity. Without the “body I have” (objective aspect), we would lack continuity over time; without the “body I am” (subjective aspect), we would lack the experience of ourselves as recognisable persons.

Practical Consequences of Philosophical Thinking

Various disorders of personal identity can arise from disruptions in one of the two components of embodiment synthesis: the body I have (objective aspect) or the body I am (subjective aspect). The first type involves a loss of familiarity with one's own body as an object. Normally, we recognise our body automatically, for example when seeing it in a mirror or touching it. If this recognition is disrupted (e.g., through a visual alteration of the hands into something foreign, like octopus arms), we experience shock and a sense of estrangement from ourselves, which would disrupt our identity continuity.

The second type concerns the loss of the internal sense of being alive—the "body I am" aspect. Cases are reported of people with schizophrenia or depersonalisation disorders losing the sense of a "living self." In extreme cases, such as Cotard's syndrome, patients deny their own existence or claim they are dead. Similar reasoning is presented, for instance, by Stanghellini and colleagues, using the concept of coenesthesia: the global experience of the body "from within," forming the basis for a sense of existence and separation from the world.

Embodiment synthesis is a conceptual framework that extends this picture, emphasising the body's role as an object in sustaining identity over time. In other words, identity exists as a kind of spectrum of embodiment synthesis, with varying intensities of experiencing the body as an object and the subjective sense of self, which may be highly individualised.

Summary of the main theses in the text:

1. **The body as an object** is an essential part of the experience of my body from a first-person perspective.
2. My body is a **publicly observable object**, more accessible to others than to myself (as my body, I do not have full perceptual access to it).
3. My body image also includes how others see my body.
4. The body as "self" is a fundamental element of experiencing my body both as a tool for perceiving the world and as a source of inner sensations.
5. **The body felt from within** manifests in many forms, ranging from local stimuli to emotional sensations spreading throughout the whole body, such as pain, pleasure, fatigue, and tension.
6. The experience of "being a body" becomes particularly salient during intense emotions (positive or negative), but it can also be cultivated through practices such as yoga or mindfulness meditation.
7. **Embodiment is a synthesis** at the level of first-person experience, meaning that I both **have a body and am a body**.
8. **This embodiment synthes** is the foundation of the sense of identity.
9. The component of "the body I am" (experienced from within) is responsible for the sense of being a "self".
10. The component of "the body I have" (visible as an object) is responsible for the **sense of continuity of identity over time.**

A. Solutions for the teacher

Part 1: Philosophical introduction (approx. 20 minutes)

1.Opening question:
Do you have a body, or are you a body? (this can be written on the board)
Ask participants to write down their first associations on the Worksheet, for example in the form of keywords or drawings.

2.Explanation of basic concepts:

The body as an object ("I have a body")
This is a way of thinking about the body as something we possess, like an object or a tool. The body is visible to others. We ourselves see it only partially and from a specific perspective (for example, looking down at our hands or seeing ourselves in a mirror). We cannot see our entire body, such as our own head, because we always perceive it from within the body. This "body as an object" is also something that others assess: they comment on our appearance, photos, or posture. It is the "external" body that is presented to the world.

The body as a subject ("I am a body")
This is a different way of thinking: the body is not only something we have; it is also who we are. Through the body we feel the world: pain, pleasure, hunger, fatigue. We experience reality from "inside" the body. If we could neither see nor feel our body, we would cease to be ourselves, because we would lose the bodily experience of the world. Emotions are also experienced through the body: for example, stress is felt as muscle tension, joy as lightness or a faster heartbeat.

Embodiment
Embodiment is the state of simultaneously having a body ("I have a body") and being a body ("I am a body")—being both the subject and the object of the same body at the same time. Embodiment is a synthesis of the body seen from the outside (by others or in a mirror) and the body experienced from within (through the senses and emotions). For example, when you touch one hand with the other, you experience at the same time being the subject (the one who touches) and the object (the one being touched). Embodiment is the foundation of our sense of identity: it allows us to feel that we are "ourselves" despite the passage of time and change.

Part 2: Additional exercises introducing the concepts “I have a body”, “I am a body”, and “embodiment”

The exercises below are not a mandatory part of the scenario. They are optional additions that can be introduced flexibly, depending on the group, the available time, and the facilitator’s working style. Their main aim is to embody knowledge—both literally and metaphorically. They help participants experience, through their own bodies, what will later be discussed in a more abstract way. Although the core of the session remains a philosophical discussion on corporeality, identity, and technology, it is worth—especially at the beginning of the facilitation process—creating space for bodily experience, which can prepare the ground for deeper reflection.

Exercise 1: introducing the concept of the body as an object (approx. 5 minutes)
Ask participants to take a photo (“selfie”) of themselves from an unusual perspective—one from which they do not normally see their body (e.g. the back of the head, an ear, the inside of the elbow, the soles of the feet).

1. While they carry out the task, encourage a brief reflection: “How do I feel when I look at this photo? Is this really my body? Do I recognise it immediately?”
2. Summarise together: What does it mean that the body can be seen “from the outside”? How does this affect the way we perceive ourselves?

Exercise 2: introducing the concept of the body as a subject (approx. 3 minutes)

1. Arrange the participants in a circle or invite them to take a comfortable position.
2. Ask them to close their eyes for a moment and focus on signals coming from the body. Ask guiding questions: “Do you feel tension in any part of your body?” / “Do you feel warm or cold?” / “Do you notice trembling, fatigue, calm, pain, pressure?” / “What emotions might these sensations be connected to?”
3. If the group feels safe, encourage participants to voluntarily share one word or one sentence describing their sensations.

Exercise 3: introducing the concept of embodiment (approx. 3 minutes)

1. Ask participants, still standing in the circle, to close their eyes and focus on themselves.
2. Then ask them to touch one hand with the other in any way they choose: gently, curiously, with pressure. Guiding questions: “Try to feel that you are touching—and being touched—at the same time.” / “What do you feel in the touching hand, and what in the hand being touched?” / “Can you experience both perspectives within a single experience?”

Discussion (approx. 20 minutes)

Guiding questions for the discussion:
• What does it mean to “have a body” and at the same time to “be a body”?
• Have you ever perceived your body more as an object (for example in a photo, in a mirror, or through other people’s comments)? What did that feel like?
• In which situations do you feel your body most strongly from the inside (for example pain, stress, joy)?
• Does your identity depend more on how you look or on how you feel? What does this depend on? Can this change over time?
• Can a robot “have a body” in the same way a human does? Why or why not?
• If your body were completely changed (for example into a robot body), would y**ou still be yourself?**

Part 3: Robot-based tasks (approx. 50 minutes)

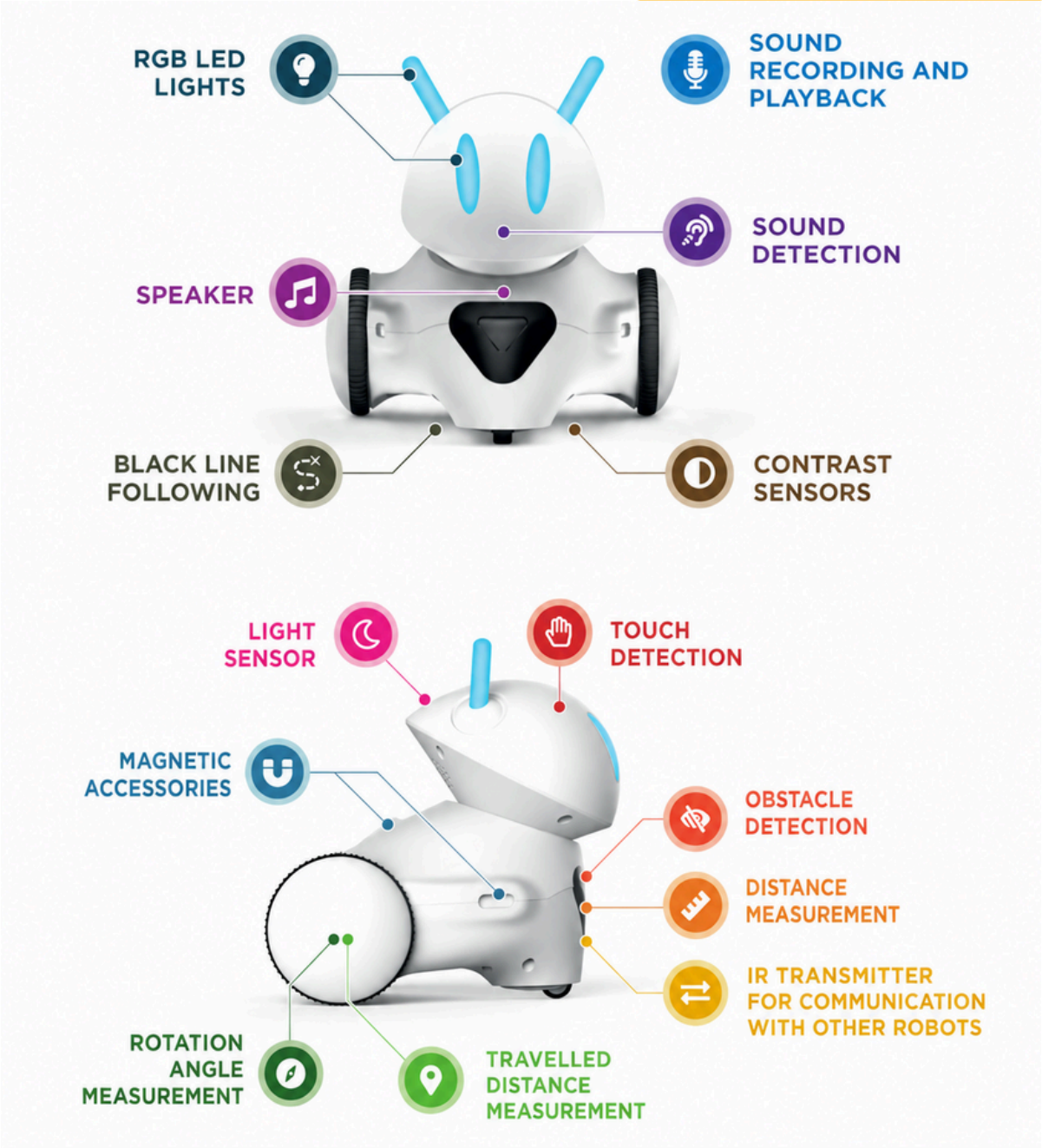
Task 1: The robot’s internal sensing

Objective:
To show participants that a robot has built-in components that allow it to register stimuli from the environment and respond to them, in a way similar to how humans register stimuli through their bodies.

Step 1: Introduction

Ask participants the following questions:
• What senses do humans have?
• How do we know that it is cold, bright, or loud?
• Can a robot “notice” that it is dark? How does it do that?
Explain to participants that a robot also has equivalents of “senses”, namely sensors.

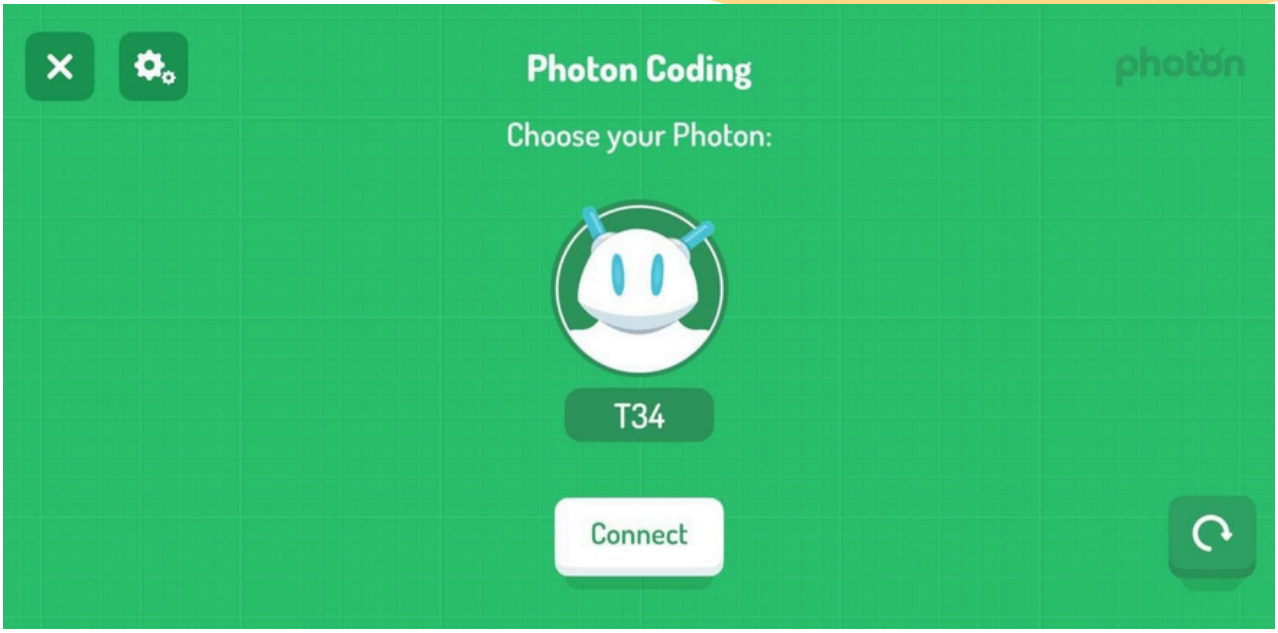
Examples of sensors that may be found in educational robots (mark which ones are present in the robots you are using):
• light sensor – registers light intensity, recognises darkness and brightness,
• touch / obstacle sensor – registers impact, touch, or proximity to an object,
• temperature sensor – registers changes in ambient temperature,
• sound sensor – registers noise or voice,
• line / colour sensor – recognises contrast or surface colour.



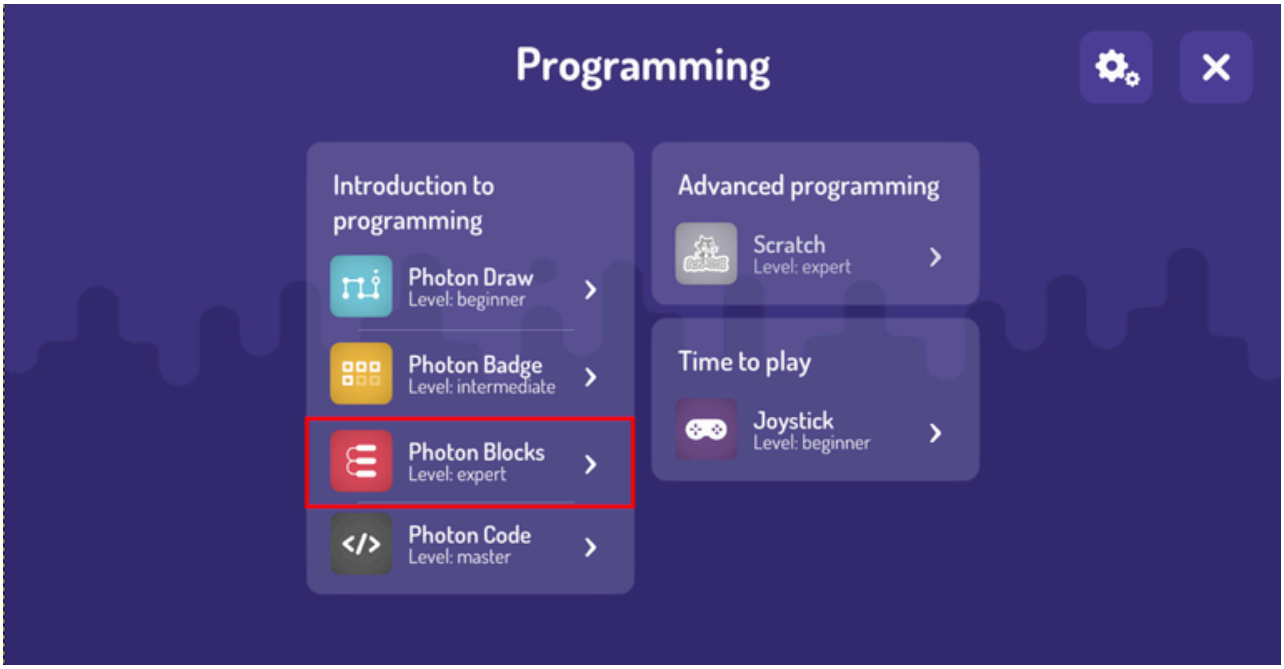
Step 2: Demonstrate how the robot works

GENERAL INSTRUCTIONS FOR USING THE ROBOT

Turn on the robot
To turn on the robot, press and hold the power button on its head until you hear a sound signal.
If you are controlling the robot with a phone or tablet, first install the Photon Coding app. After launching the app and pressing Start, it will search for nearby Photon robots.
Select the robot you want to control (its serial number can be found on the sticker underneath the robot) and tap Connect.



Next, choose the programming level. For these activities, start with Expert Level, which uses the Photon Blocks programming language.



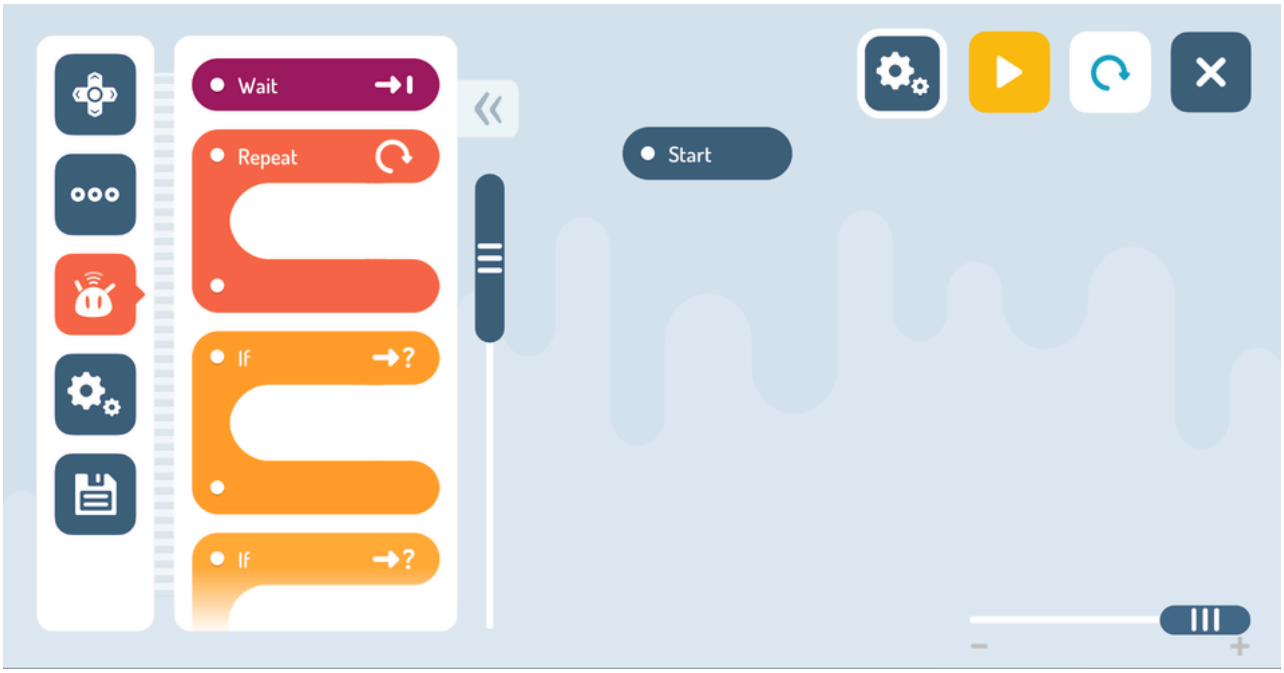
Step 3: Demonstrate how two of the robot's sensors work, for example:

When it gets dark → the robot turns on its LED lights

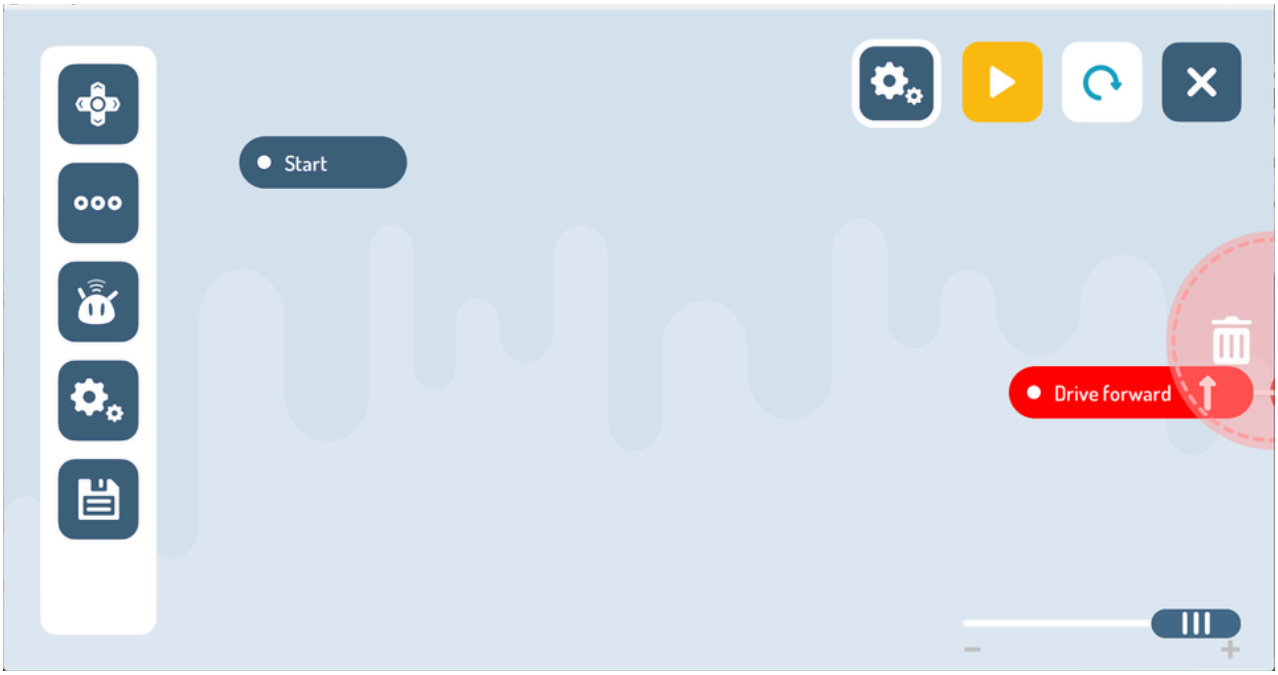
Our first program!

Every program starts with the Start block, which is automatically placed on the screen when creating a new program.

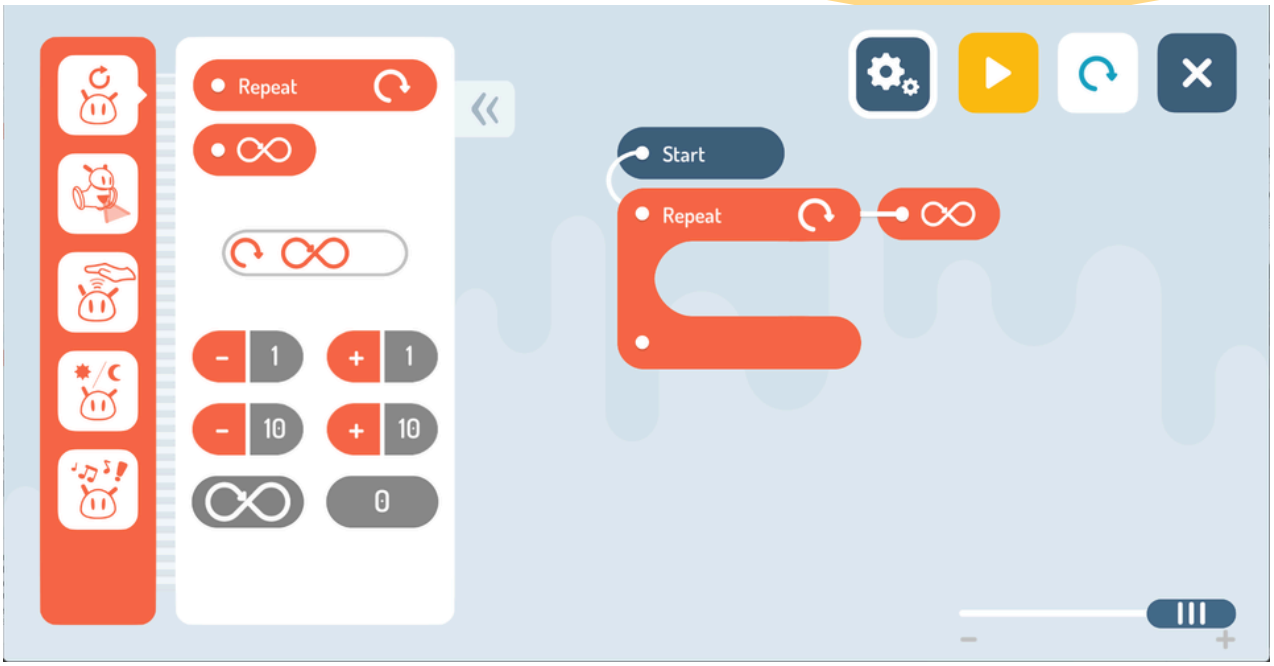
From the menu on the left, select the robot head icon, which contains loops and conditional statements.



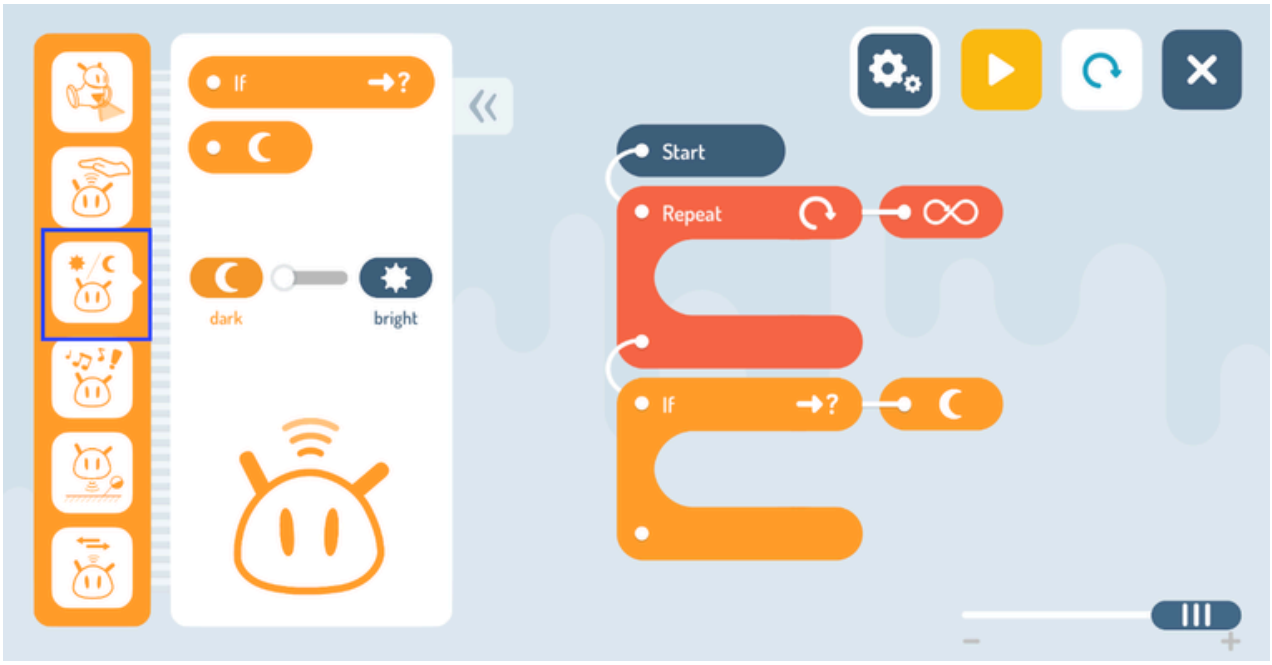
If you accidentally add the wrong block, simply drag it all the way to the right and drop it into the trash bin.



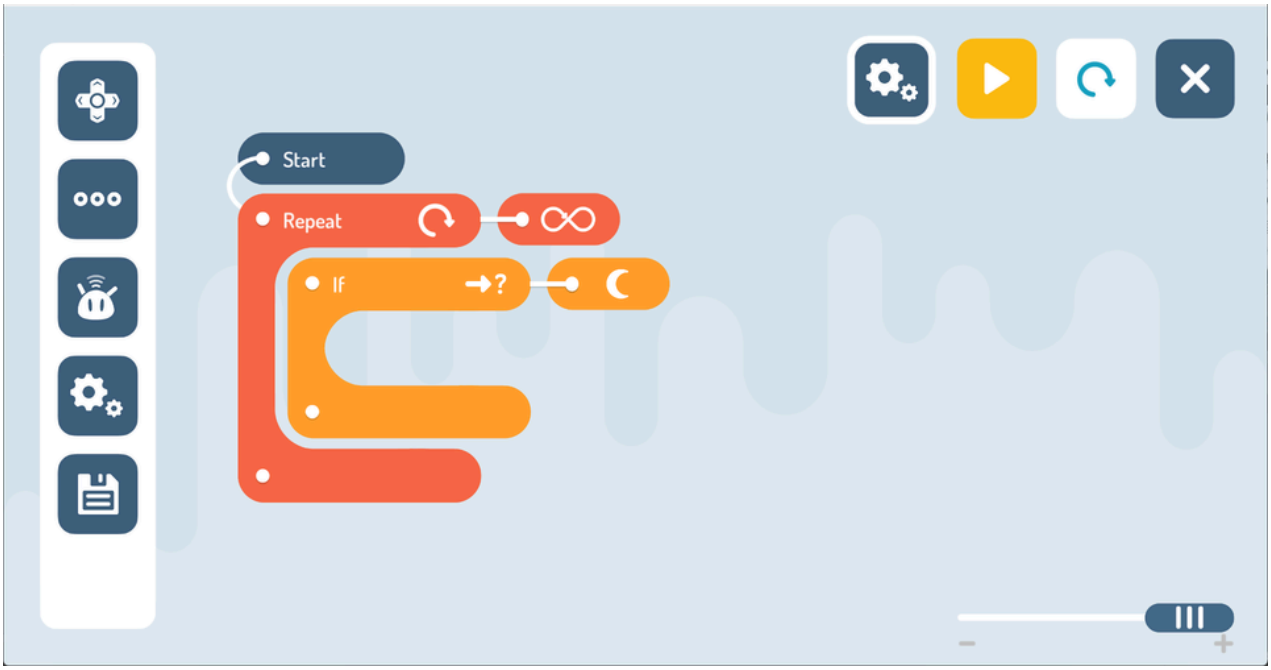
To demonstrate the sensor continuously, we need a REPEAT loop.
Select the Repeat block and specify how many times it should run. Since we want the robot to check continuously, choose the infinity (∞) symbol.



Now we need to check whether the robot detects darkness.
From the robot head menu, select the IF block.
Then, from the left menu, choose the Light Sensor (sun and moon icon) and select the condition you want to check.
Since we want the robot to react to darkness, select the moon symbol.



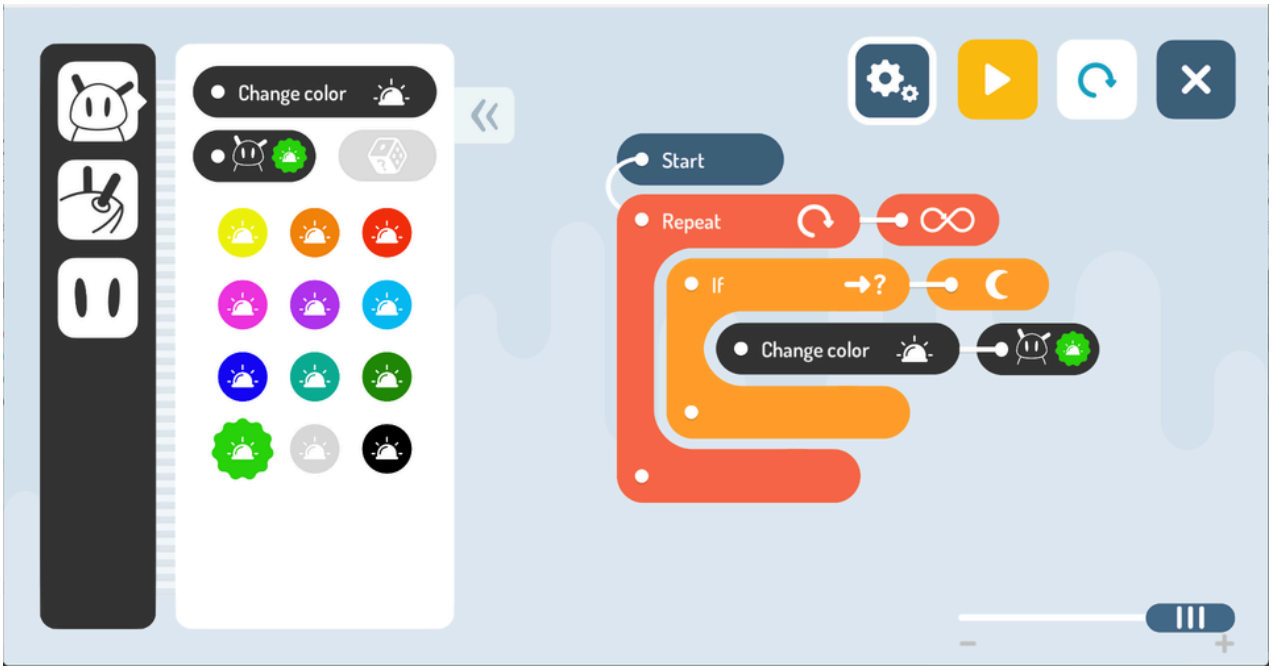
New blocks are automatically added to the end of the program.
You can drag them into the correct position manually. Alternatively, you can press and hold a block and drag it directly from the menu to the desired location.
Because we want the condition to be checked while the REPEAT loop is running, drag the IF block inside the loop.



Now we only need one final instruction.
From the menu on the left, open the three dots menu and select Change Color.
Choose the desired colour.
Depending on your selection, the colour can change for:

- the entire robot,
- the antennae,
- or only the eyes.

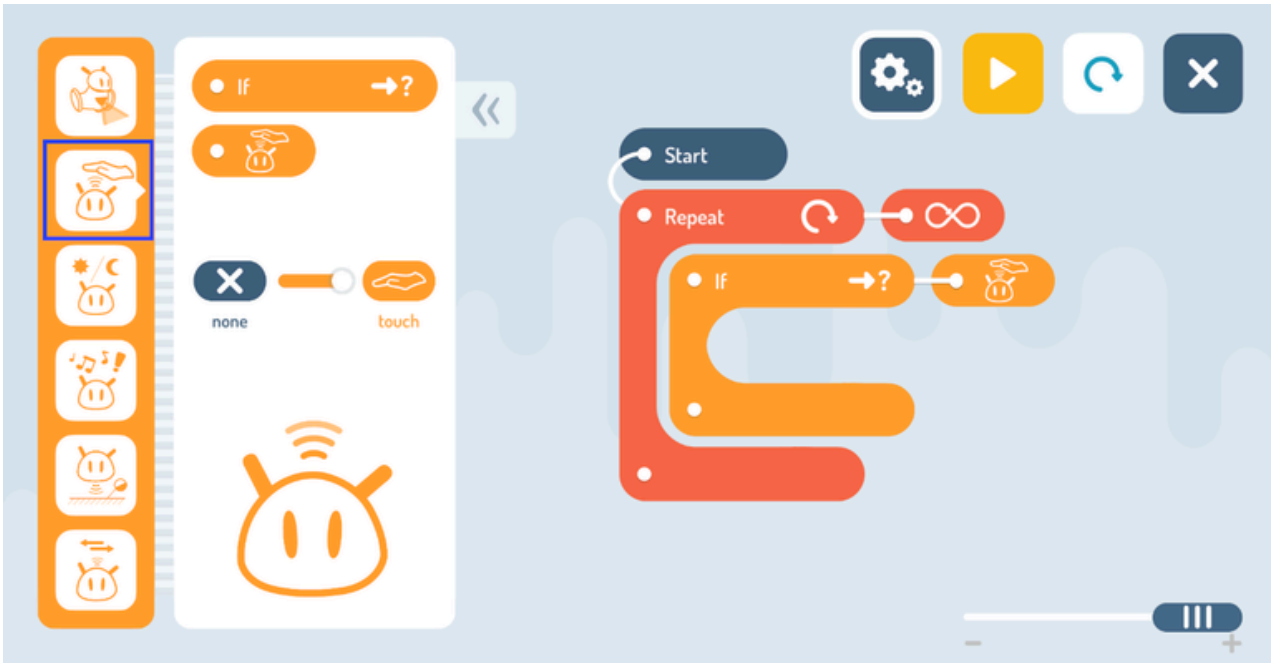
Finally, drag the Change Color block inside the IF Dark block so that the robot changes colour whenever it detects darkness.



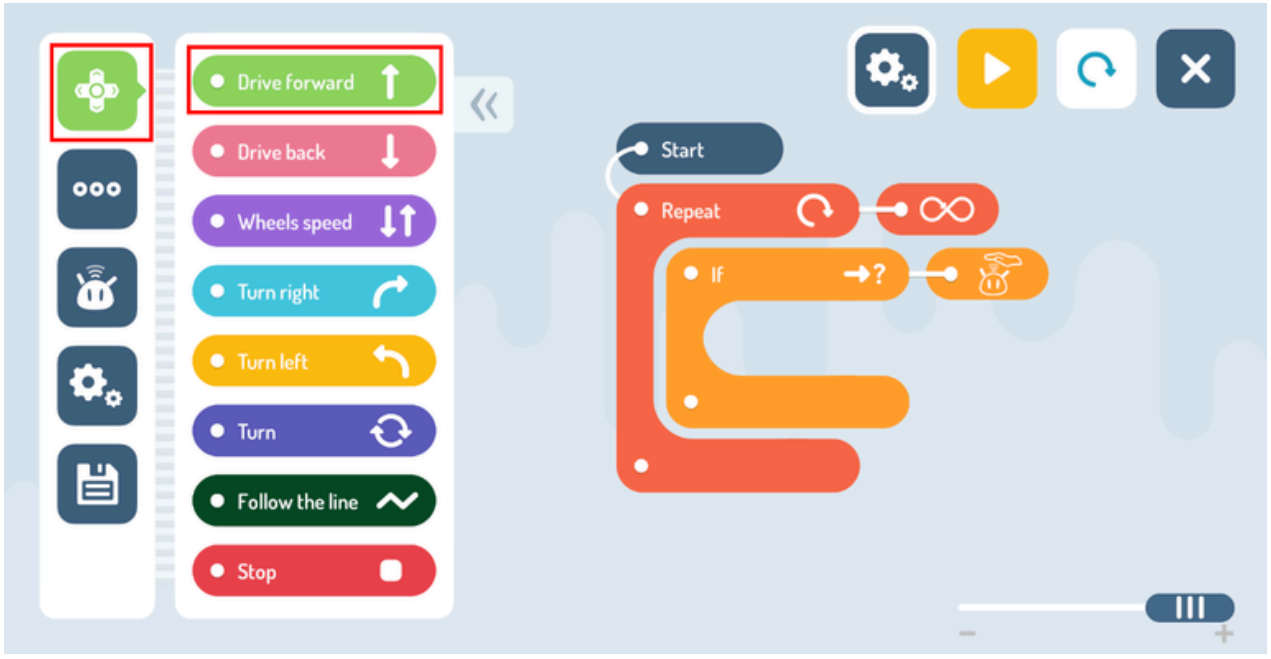
Your program is now complete.
To run the program, always press the orange button with the white triangle (Play).



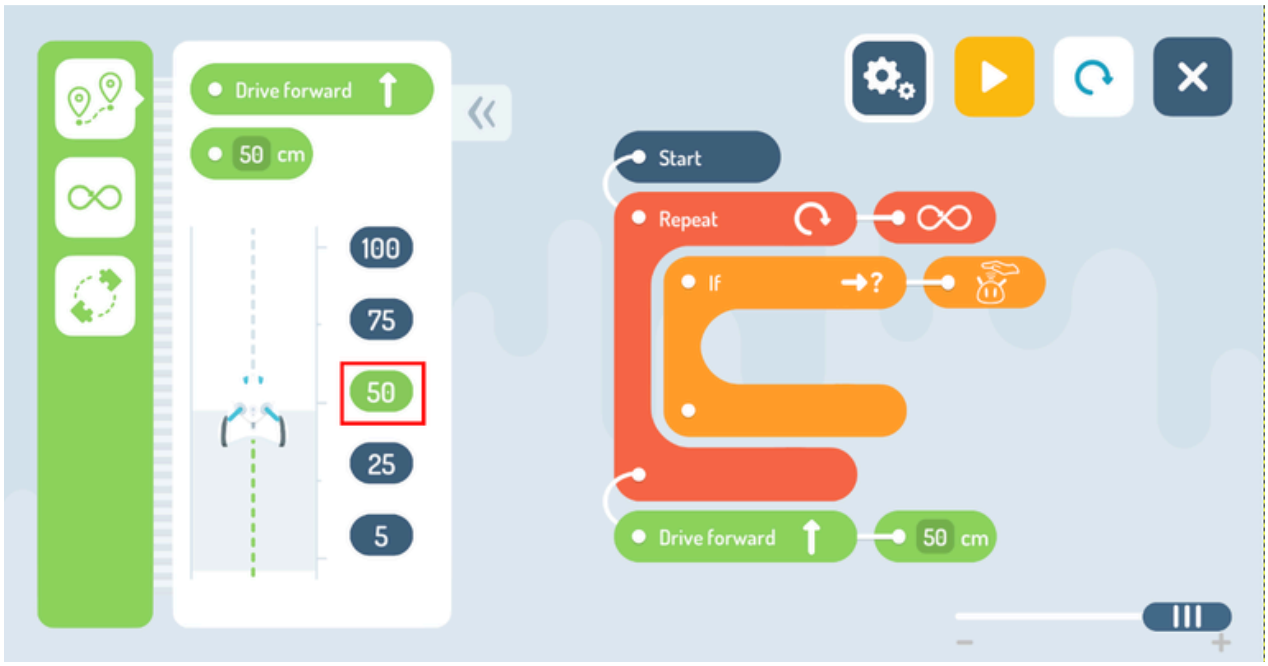
When the robot is touched → it moves forward 50 cm
Creating this program is identical to the previous one until selecting the sensor. This time, choose the Touch Sensor by selecting the icon showing a hand above the robot, then select Touch.



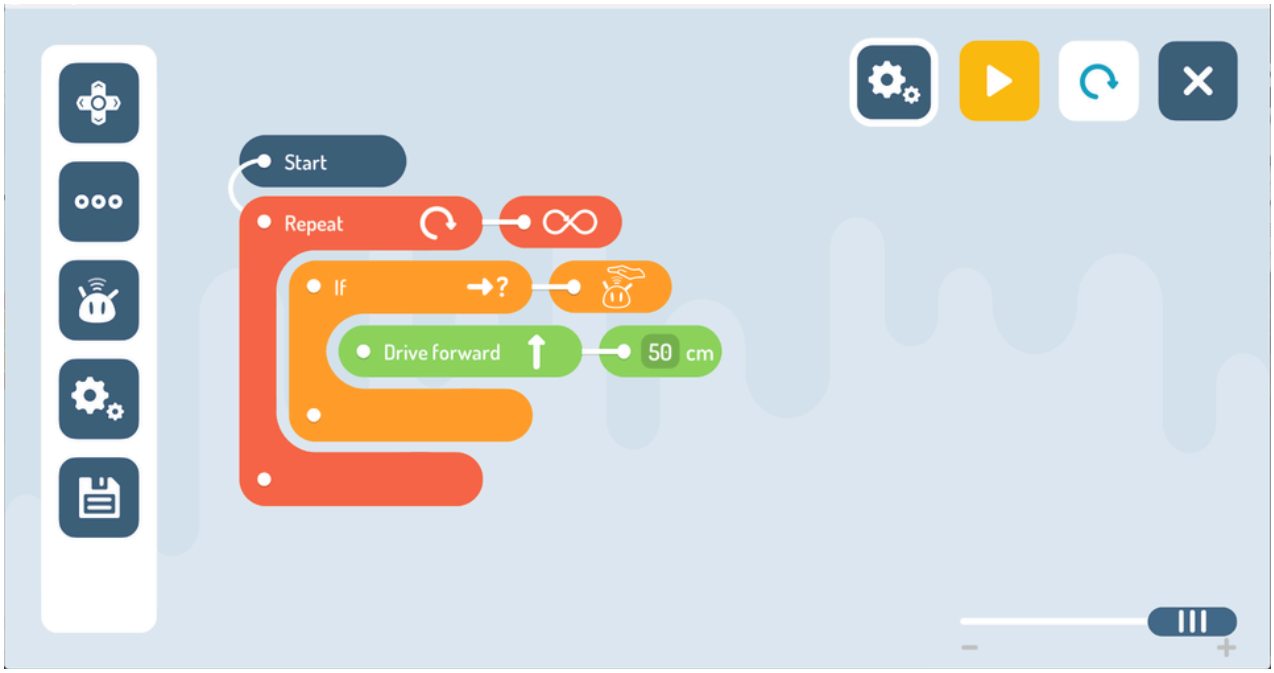
Now decide what the robot should do when it is touched.
All movement commands are located in the first menu on the left, represented by the movement arrows.



Select Move Forward, then choose the distance the robot should travel after being touched.
You can either select one of the predefined distances or drag the robot icon to the desired point on the distance scale.



Finally, place the Move Forward instruction inside the IF Touch block.



After running the program, every time the robot's head is touched (make sure you know where the touch sensor is located!), it will move forward 50 cm.
The program continues running until you press the Stop button (the white square on a red background).



Step 3. Present the Challenge

Divide participants into pairs or small groups.
Ask them to:

- Choose one "internal feeling" for the robot (e.g. fear, stress, happiness, calmness).
- Decide which sensor could trigger that feeling (e.g. darkness → fear).
- Decide how the robot should react (e.g. change colour, play a sound, spin around).
- Create a simple program that demonstrates this behaviour.

Encourage participants to explore additional options in the programming menu.
Invite each group to present their solution.

Step 4. Reflection and Discussion

Ask participants to reflect on the activity.
You may use questions such as:

- Does the robot really "feel" anything?
- Is its reaction similar to ours?
- Are there reactions in our own bodies that happen without conscious decision?
- How can we distinguish the behaviour of a machine from human experience?

Depending on the group's dynamics, hold the discussion either with the whole group or in smaller groups.

Activity 2. Body Under Control / Autonomous Body

This activity encourages participants to reflect on what the human body really is. Is it simply a tool that carries out the mind's commands, or is it an autonomous organism with its own "wisdom," rhythms and reactions?
An important part of the activity is examining everyday habits and automatic behaviours that we perform without conscious thought.
The discussion ultimately raises the question of the limits of control:
Do we truly have complete control over ourselves, or do we learn to cooperate with our bodies?

Objective
Help participants understand the difference between controlling a body from the outside and a robot acting independently through automatic responses.
Reflect on when the body is merely a tool and when it seems to "act on its own" without external commands.

Step 1. Introduction

Begin a discussion with participants.
You might ask:

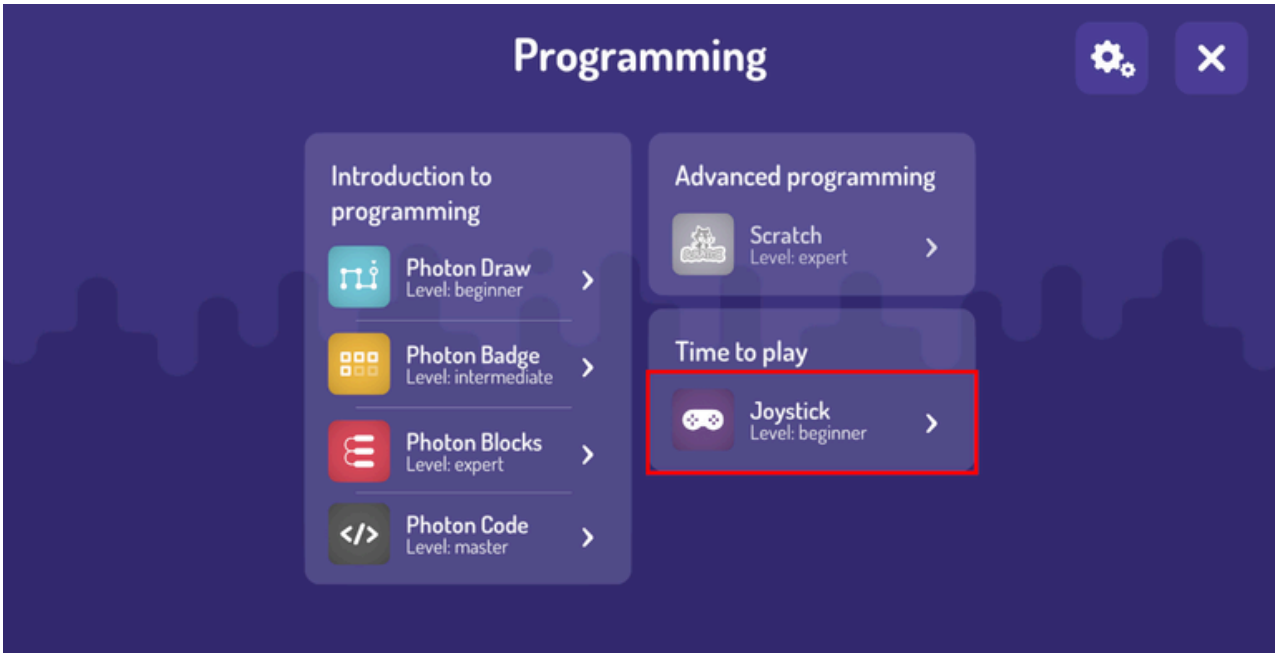
- When do we have complete control over our bodies?
- (Examples: walking, reaching for an object.)
- Are there situations when the body acts "on its own"?
- (Examples: pulling your hand away from something hot, blinking, heartbeat.)
- Does a robot have an identity? If not, use this opportunity to discuss the concepts of identity, embodiment, and the body as an object.

Tell participants that robots can also operate in two different ways:

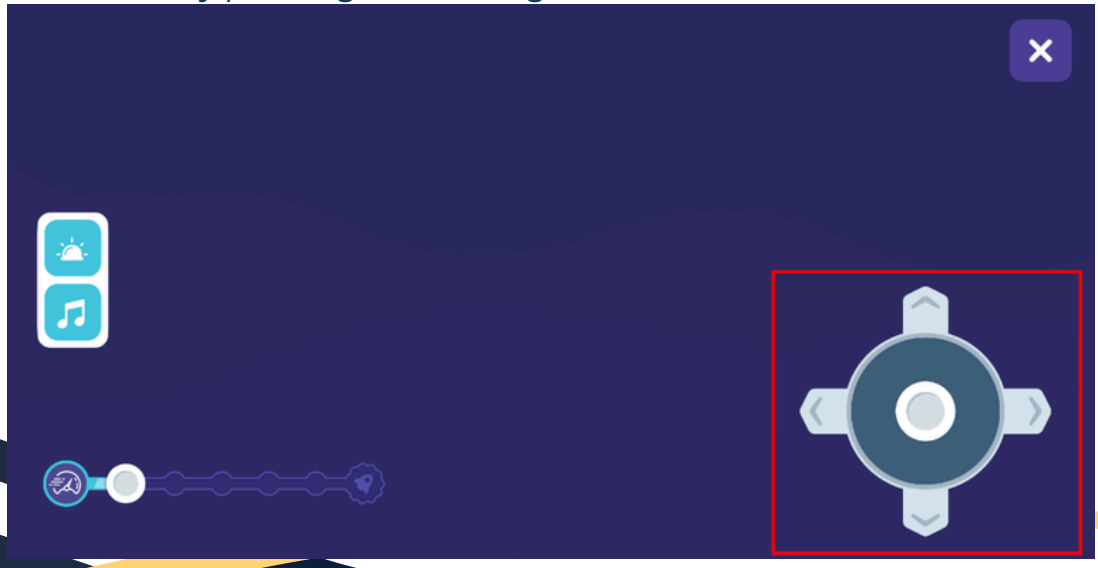
- Externally controlled – someone tells them what to do.
- Internally controlled (autonomous) – they respond independently to their surroundings.

Step 2. External Control

Prepare the robots in manual control mode.
When selecting the programming level, choose Joystick.



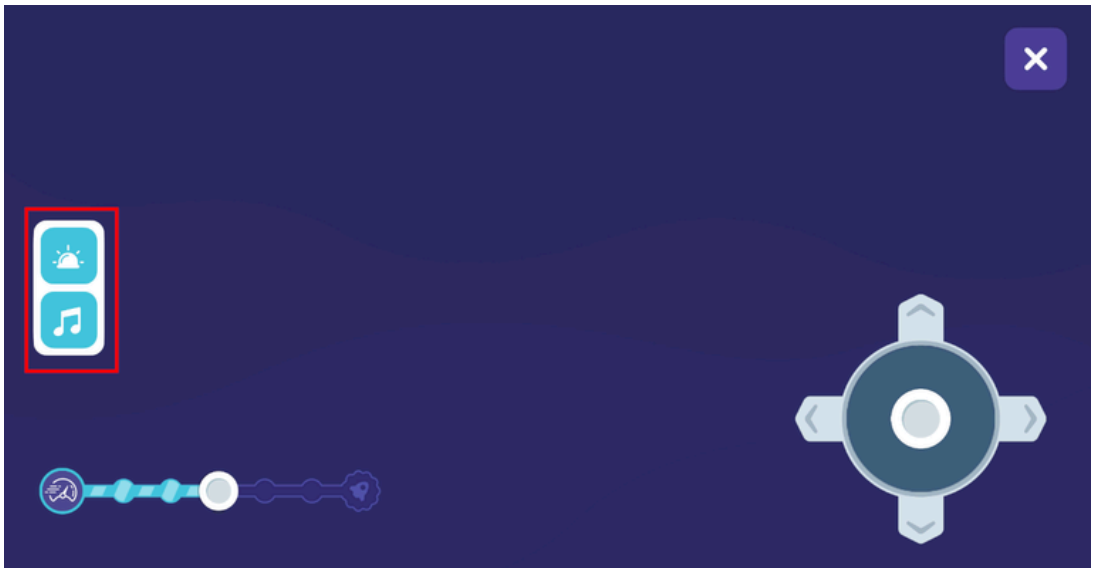
The robot moves by pressing and holding one of the directional arrows.



Its speed is controlled using the speedometer scale.
The closer the slider is to the rocket icon, the faster the robot moves.



The light controls are available under the light bulb icon, while sounds can be played using the music notes icon.



Ask participants to:

- Drive the robot along a designated route (for example, around an obstacle).
- Stop it at a specific location.
- Make it perform any movement or gesture.

Then ask:

- How did you feel when controlling the robot?
- Did the robot seem "alive"?
- Was it simply a tool? Why?

Step 3. Internal (Autonomous) Control – Optional Activity

Prepare robots with a preloaded program that makes them respond to environmental stimuli.
Example behaviours:

- If the robot encounters an obstacle, it turns right.
- It changes its light colour when touched.
- When it hears a loud sound, it reverses by a chosen distance.

An example program demonstrates this behaviour.
Point out that the REPEAT loop can contain many different instructions.
In this example, each instruction defines a response to a different stimulus.
At the beginning of the loop, the Move Forward Forever command makes the robot continuously drive forward until it is stopped or another movement command overrides it.

The program also includes the Distance Sensor.
Notice that you can specify the exact distance from an obstacle at which the robot should perform an action.



Ask participants to complete similar programming tasks in pairs or small groups.
Encourage them to predict what the robot will do and when it will react.

Step 3. Reflection and Discussion

Ask participants:

- What was the difference between controlling the robot yourself and watching it act autonomously?
- How did you feel in each situation?
- When did the robot seem more like a "body"?
- Are there things happening in our own bodies that we cannot consciously control?
- (For example: stress responses, sudden pain, reflexes.)

Depending on the group, hold the discussion either in small groups or with the entire class.

1. Scenario title

When we look, can we see the invisible? Perception as an associative act

2. General activity objectives and competencies

Lesson objectives:

- **Philosophical:** participants become familiar with the concept of associative perception, understand the difference between classical and contemporary approaches to perception, and reflect on how the body and mind cooperate in creating the meaning of the world. They discuss paradoxes of perception and consider whether robots can "see more than they see" thanks to sensors and programming.
- **Robotics**: participants program a robot to simulate limited perception (e.g. fragmentary vision through a sensor) and, on this basis, attempt to recognize the whole situation or an obstacle. They explore the difference between human and machine ways of "completing" an image.
- **Life skills:** developing critical and analytical thinking, the ability to associate information, skills of reflecting on one's own perception, working in pairs and groups, formulating conclusions, and conducting discussions.

Competencies:

Competencies	Description
Learning to learn	Developing the ability to connect different sensations and experiences into a coherent whole; deepening awareness of how perception works.
Personal and social competencies	The ability to cooperate in group tasks, recognize and name one's own ways of perceiving, and develop openness to different points of view.
STEM competencies	Working with robots, using sensors to simulate perception, and developing logical thinking skills and basic programming skills.
Civic and cultural competencies	Reflection on the role of perception in culture and communication, and the ability to engage in philosophical discussion while respecting different perspectives.
Creativity and entrepreneurship	Seeking non-standard solutions while working with robots, creating one's own projects.
Information literacy	Practising the ability to talk about sensory experiences, create descriptions and explanations, and formulate questions and arguments.

3. Duration of the activity

The entire session is planned to last 90 minutes and includes:

1. Philosophical introduction (approx. 10 minutes)
   - Discussion of classical and contemporary understandings of perception.
   - Introduction of the concept of associative perception and paradoxes of perception.
   - Examples from everyday life (e.g. seeing a house whose parts are hidden).

2. Discussion (approx. 20 minutes)
   - Moderated exchange of participants' observations.
   - Questions: how do we "complete" what is not visible? Do we all see the same thing? Can a robot "see more than it sees"?

3. Robot-based tasks (approx. 50 minutes)
   - Perceptual exercises in pairs and groups (identifying objects by touch, fragmentary perception, building an image from sounds).
   - Working with a robot: programming the robot to simulate limited perception (e.g. detecting obstacles only partially) and attempting to "guess the whole."
   - Reflection on the difference between human and machine ways of perceiving.

4. Summary and reflection (approx. 10 minutes)
   - Collection of conclusions from the exercises and work with the robot.
   - Participants' self-reflection: how my perception works, how the robot sees differently, what I have learned.

4. Required materials

Equipment:
- Educational robots with sensors.
- Laptops or tablets with software for programming the robots.
- Projector and screen or a board (for presenting examples and drawings).
- Speakers or a computer/tablet capable of playing audio recordings.

Teaching materials:
- Participant worksheet.
- Teacher's answer key.
- Sheets of paper and markers/pencils (for drawing diagrams, e.g. a house, a carpet, etc.).
- Sheets of paper with a cut-out hole or rolled into a tube (for exercises with a limited field of vision).
- A set of everyday objects for identification by touch (e.g. a sponge, a key, a phone, a piece of fabric, a pen).
-

Optional:
- QR codes linking to supplementary materials (videos, audio recordings, additional illustrations).
- Sets of audio recordings (street, forest, shop, train, etc.).

5. Session plan

A. Guidance for the teacher

Part 1: Philosophical introduction (approx. 10 minutes)

What is perception?

Perception is the way we experience the world around us: what we see, hear, touch, and feel. In the past, philosophers believed that perception worked like windows: the senses (sight, hearing, touch, etc.) simply “let in” data from the outside, and the mind then arranged these data into a whole. Humans were therefore treated as receivers, passively accepting what the world provided.

However, a question arises. When we see only particular parts of an object—for example, a house: doors, windows, a roof—how do these parts come together into a whole, if in seeing we perceive only elements? How, in perception, do we move from individual elements to the whole house, if we can see only elements that do not themselves constitute a whole? It seems that perception is something more than just combining individual parts.

You see something red, round, with a little stem. Your brain says: “an apple.” You do not need to touch it, smell it, or taste it. This is because what you see connects with earlier memories, such as eating apples, their smell, and their color. You see a little, and you “fill in” the rest.

This is why contemporary philosophy says something different: perception (for example, seeing) is not only the reception of information, but active participation in the world. This means that our body does not merely “receive,” but also creates the meaning of what we see. For instance, when you look at a house, you see only its front. Yet you still know that there is something at the back, even though you cannot see it. Why? Because your body remembers that houses have four walls.

Similarly, when you look at a room where there is a carpet on the floor and a sofa standing on it, in some way you see not only the part of the carpet in front of the sofa, but also the part behind it. What is more, without this seeing of the “invisible” part of the carpet, you might not even be able to recognize that the object on the floor is a carpet at all. You can imagine what the other sides look like, because you know that you can walk around the house.

Philosophers therefore say that perception is more than what the eyes see. It also involves movement, experience, memory, and being present in the world.

Synthesis and analysis.



You cannot see what the back of the house looks like, yet your brain infers it and creates a coherent image.

Perception as an activity of the body
Contemporary philosophy says: it is not “I have a body” but “I am a body.” This means: I see, but my body also “feels” that something is on the other side. I hear, but I also know where the sound is moving. I move, and through that, I learn about the world. My body is not just a tool; it shapes my view of the world. Body and mind work together, not separately.

What is associative perception?
This difficult term means that we connect different sensations, and through this, we understand what we see. For example: you see something red and round → you think: “apple.” You do not see the taste or smell, but your mind and body remember previous experiences. It is these associations—linking stimuli (like color and shape) with what you already know—that allow perception to create meaning.

But perception is not just associations.
It is also the awareness that we exist in the world, that we can move, touch, check, or approach something more closely.
Why is this important in robotics? A robot also “sees” through sensors. But can it “understand” the world like a human? Can it be programmed to know what is on the other side of an obstacle?

This is the philosophical problem of perception:
Can a robot be taught to “see more than it sees”? Is our consciousness just data, or is it something created through the body, movement, and presence in the world?

Summary of the main points in the text:

Perception, also called associative perception, is the way the body and mind together fill in what is not visible, using experience, memory, and movement. This allows us to see the world as a coherent whole, even if something is not immediately visible. Perception is not merely a product of associations, but a direct, embodied experience of being present in the world. Paradoxes appear here, revealing the limitations of classical understanding. They can be understood as paradoxes or, alternatively, as contradictions.

1. **Where does meaning come from?**

Problem:
How can I connect different sensations (e.g., color, shape, smell) if I do not yet know what they mean?

Paradox:
I cannot create meaning from "nothing." I must already have some experience or understanding to recognize anything at all. This means that my consciousness is not passive; it acts, seeks meaning, and detects significance.

Everyday example: When you see a new object for the first time (e.g., a strange tool in a workshop), just looking at it is not enough. Your brain searches for meaning, comparing it with what it already knows.

Explanation:
Association theory says that the mind links sensations—for example, I see something red, round, and hard → I think: "apple." But to combine them, I must **already understand what "red," "round," or "apple" means.**

2. **The world is not a patchwork**

Problem:
Why do I see the world as a whole (e.g., a house, a room, a person) rather than as a collection of shapes and colors?

Paradox:
We do not assemble the image step by step. We immediately know what we see—a house, a dog, a friend. This means perception is not only a set of associations but works like an instant grasp of meaning.

Everyday example: You look at a board with missing letters and still understand the word. Your mind "sees" the meaning, not just the letters.

Explanation:
If perception were only collecting stimuli (color, sound, shape), we would see the world as a patchwork of pieces. But this is not the case, because we perceive the whole immediately.

3. Do I only receive, or do I choose?

Problem:
Is perception just passive reception? Do I have any influence over what I pay attention to?

Paradox:
If perception were only passive associations, why can I ignore noise and focus on a book? Why, when looking at an image, do I sometimes see a face and other times a landscape? Perception is about focusing attention. I choose what from the environment becomes important to me.

4.Optical illusions

Example: Rubin's Vase



In the image, you can see either a white vase or two black faces looking at each other. The brain cannot see both at the same time—it chooses one interpretation.

Why does this work?

- Our mind always tries to organize fragments into a coherent whole.
- In this case, it decides whether the background is white (then we see the faces) or black (then we see the vase).

This is a great example of associative perception: we see "more" than the lines on the page because we fill in the shapes based on experience and expectations.

Questions for participants:

- What did you see first?
- Can you consciously change the way you look at it?
- Does the image really show a vase or faces, or is it just our interpretation?

Summary:
The associative model suggests that we simply react: a stimulus appears, and the mind connects it.
But in reality, we choose what we look at, what we listen to, and what we notice.

5.Everyday example:
You have a coffee cup on the table.You see only the top of the cup, not its bottom.

- Yet you know the cup has a bottom.
- Not because you see it, but because you remember that every cup must have one, otherwise the coffee would spill.
- Perception connects what you see with what you already know, creating a coherent whole.

Part 2: Additional associative perception exercises

The following exercises are not a mandatory part of the program—they are an optional supplement that can be introduced flexibly depending on the group, time, and the facilitator's style. Their main goal is to embody knowledge about perception—both literally and metaphorically. They help participants experience through their own senses what they will later discuss in a more abstract way.

Although the core of the session remains the philosophical discussion about how we see the world and how we create meaning from fragments, it is valuable—especially at the beginning of an educational journey—to provide space for simple sensory experiments. These allow participants to more easily grasp the paradoxes of perception, which will serve as a starting point for deeper reflection on whether it is possible to "see more than one sees."

Exercise 1: ecognizing the "invisible" – approx. 7 minutes

Goal: to experience how the body combines different sensations (hearing, touch, spatial memory) to create a whole.

Step by step:

1. Divide participants into pairs.
2. One person closes their eyes while the other gently guides them around the room.
3. The person with closed eyes tries to guess where they are in the room (for example, near the door, window, or desk).
4. After a short turn, the roles are switched.

Guiding questions:

- How do you know where you are if you are not using your sight?
- How did sounds, changes in temperature, and memory of the room help you?
- Did you feel confident or rather lost?

Reflection:
Participants notice that perception is an associative process—the body combines different pieces of information and creates a sense of space even without using the eyes.

Exercise 2: "What is this object?" – perception through touch – approx. 7 minutes

Goal: to experience how memory and sensory associations allow recognition of objects without sight.

Step by step:

- Participants work in pairs again.
- One person has their eyes covered. The other gives them various objects in turn (for example, a sponge, a key, a phone, a piece of fabric).
- The task of the person with closed eyes is to recognize what they are holding.
- After a few objects, the roles are switched.

Guiding questions:

- How do you know it is exactly this object?
- Was touching enough, or did you need to move the object?
- How did memory of previous experiences help you?

Reflection:
The body has a "touch memory"—it can recognize objects based on shape, texture, and weight, even without using sight.

Exercise 3: "Sensory storytelling" – building an image from sounds – approx. 8 minutes

Goal: to experience how perception combines fragments of stimuli into a coherent picture of a situation.

Step by step:

- The facilitator plays a short audio recording (for example, sounds of a street, forest, shop, or train).
- Participants listen to the recording and write down where they think they are, what is happening, and what might be outside the frame.
- Volunteers share their descriptions with the group.
- The facilitator compares the different interpretations and highlights their common elements.

Reflection:
Perception is not limited to what is given directly—our mind creates a coherent picture from fragments, based on memory and imagination.

Exercise 4: “Echo of memory” – sensory associations – approx. 5 minutes

Goal: to realize that a single stimulus (for example, a smell or a sound) can trigger an entire network of associations and memories.

Step by step:

- Participants work in pairs.
- The first person says a single sensory-related cue, for example, “the smell of freshly cut grass.”
- The second person responds with one association (for example, “sports field,” “grandparents’ summer holidays,” “PE class at school”).
- The roles are then switched.

Guiding questions:

- Why did this particular association come to your mind?
- Do others have similar or completely different images?
- Can a single stimulus trigger many different memories?

Reflection:
Our perception is not just the reception of data, but also the active recall of memories and the creation of meaning.

Exercise 5: “What does the robot see?” – perception with a limited field of view – approx. 8 minutes

Goal: to experience fragmentary perception and the role of imagination in “completing” an image.

Step by step:

- Prepare a sheet of paper with a small cut-out hole or a rolled paper tube (“periscope”).
- One person looks through the hole at a part of the surroundings.
- The other person shows them a selected object or place.
- The task of the person with the “periscope” is to guess what they see, even though they have access to only a small fragment of the image.
- After a short round, the participants switch roles.

Guiding questions:

- How did you manage to recognize the object, even though you could see only a part of it?
- What helped you guess: shape, color, context?
- Did you sometimes guess rather than actually see it?

Reflection:
Just like a robot with limited sensors, a human does not see everything. Yet we can “complete” the image through associations, movement, and memory.

Discussion (approx. 20 minutes)

Guiding questions for discussion:

- How is it that when I look at things, I see most of them only from the front, yet I include part of the invisible in my perception? For example, I see only the front of a house, but I perceive it as a whole. How is this possible?
- What I see is “mine,” yet others see the same thing. How is that possible?
- When you see an object partially hidden (for example, a car behind a wall), do you “see” the rest in your imagination? Why?
- How does the body help you “complete” what you cannot see?
- Do you trust your eyes or your memory more?
- If two people see the same object differently, who is correct?
- If you see the same object at night and during the day, which one is “truer”? Why?
- Can a robot “see” more than its sensors? Can it make associations?

Part 3: Robot tasks (approx. 50 minutes)

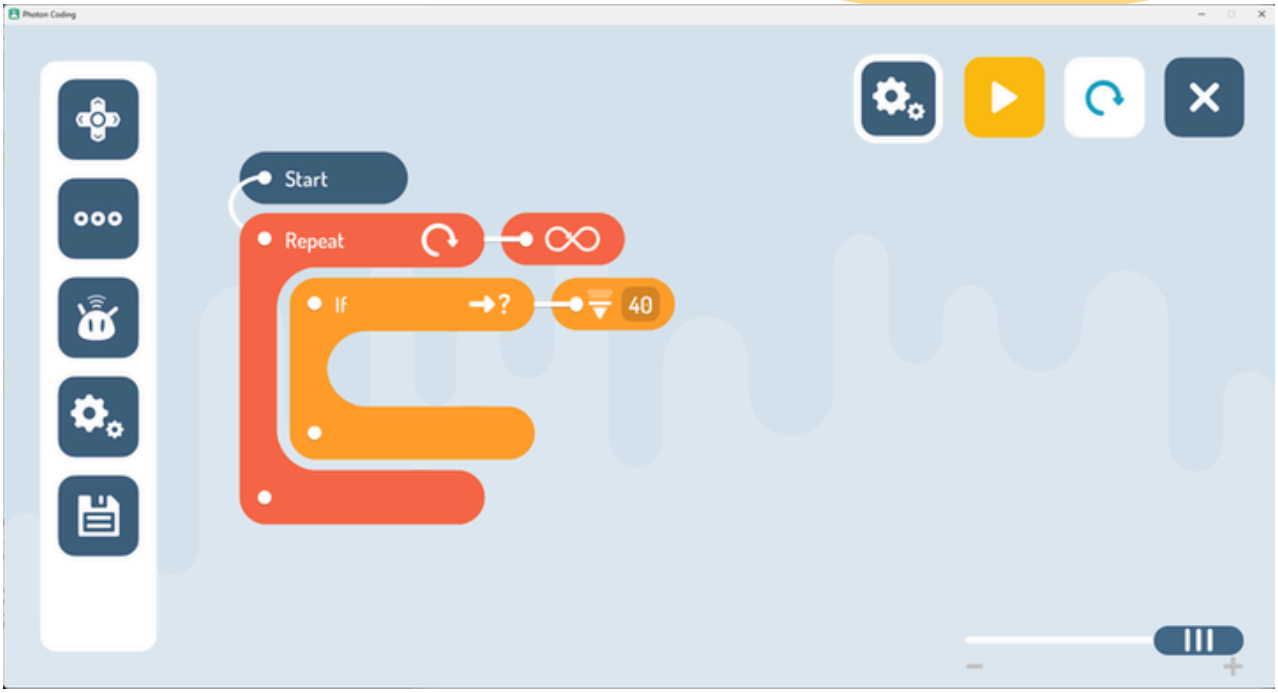
- Programming the robot to reconstruct a whole through the association of stimuli. The robot learns to “recognise” an object (e.g. a garage or a living being) by combining distance data with sound or light intensity information.
- Programming the robot for active stimulus filtering. Participants create a code in which the context (environmental brightness) determines which sensor the robot focuses its “attention” on while ignoring other data.
- Discussion of the difference between human, embodied meaning-making and machine-based signal filtering and the execution of an associative algorithm.

Exercise 1: Robot’s fragmentary vision

Goal: To help participants understand that perception is not merely the sum of stimuli, but an active process of matching fragments to familiar patterns (associations). The robot must “infer” what it is encountering by combining two different signals.

Step 1: Discussion
Explain the paradox to the participants: the world is not a collection of puzzle pieces, yet we perceive it as a whole. Give an example: if you see two glowing points in the dark and hear a purring sound, your brain immediately “sees” a cat rather than “two lights + a sound.” A robot must do the same thing — use code as its “memory” to combine separate pieces of data into a single conclusion.

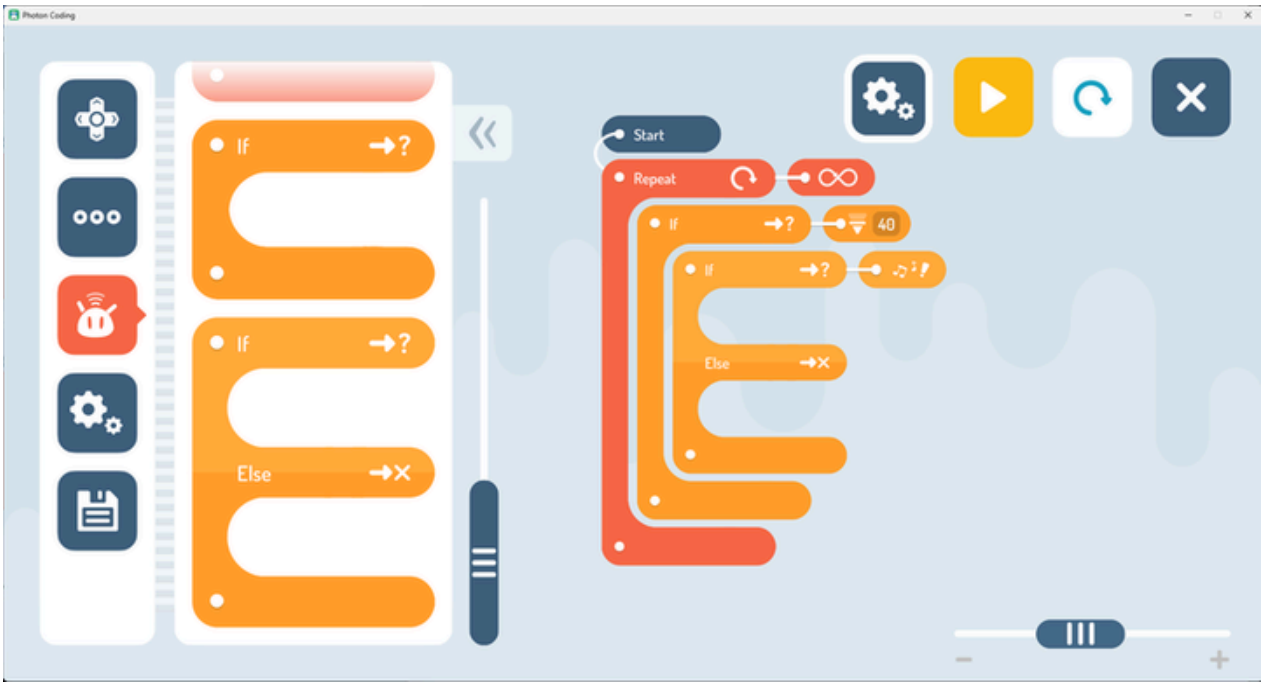
Step 2: Demonstrating How the Robot Works
Demonstrate a program in which the robot learns to “recognize” an object by combining data from two sensors.
From the menu, select the REPEAT loop, because the robot needs to operate continuously. We will therefore choose to repeat the instructions an infinite number of times.
Now, let’s decide which conditions need to be checked. Inside the REPEAT block, insert an IF conditional statement and select the option to check the space in front of the robot at a distance of 40 cm.
Our program currently looks like this:



Now we will add another condition to be checked.

WARNING! Nested instructions are very common in programming. Loops can contain other loops or instructions. Similarly, conditional statements can contain other conditional statements or loops.

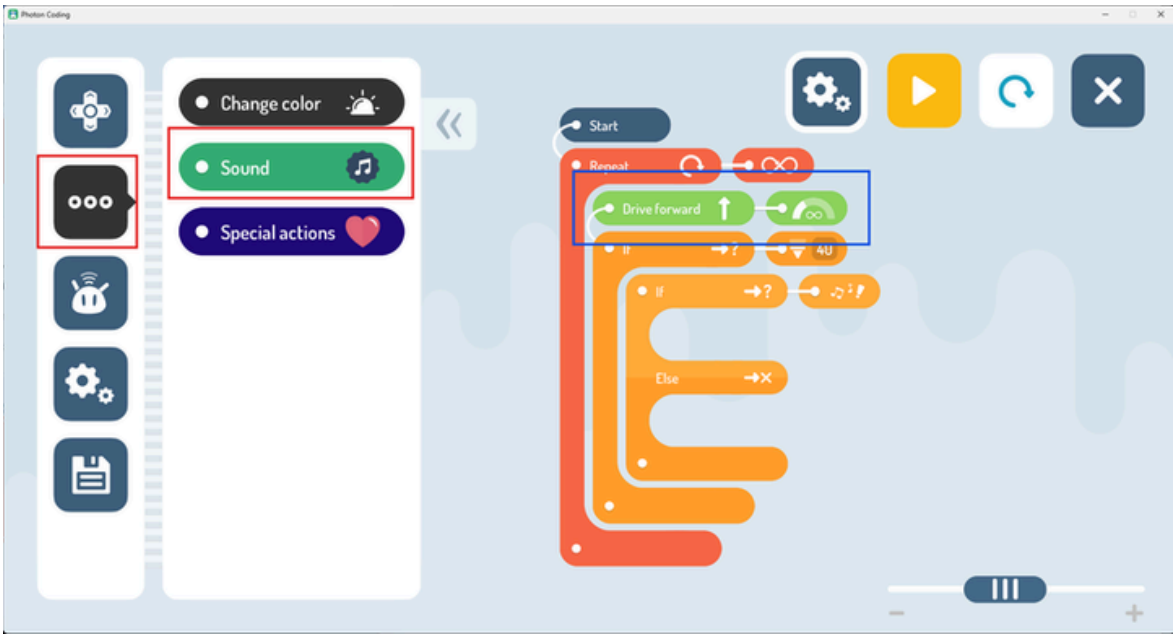
In our program, we will add a new block inside the IF block we inserted earlier. We can find it in the menu on the left, under the icon showing a robot's head.
This will be the IF/IF NOT block, in which we will add a noise detection check. This block works by executing different instructions depending on whether the specified IF condition is met.



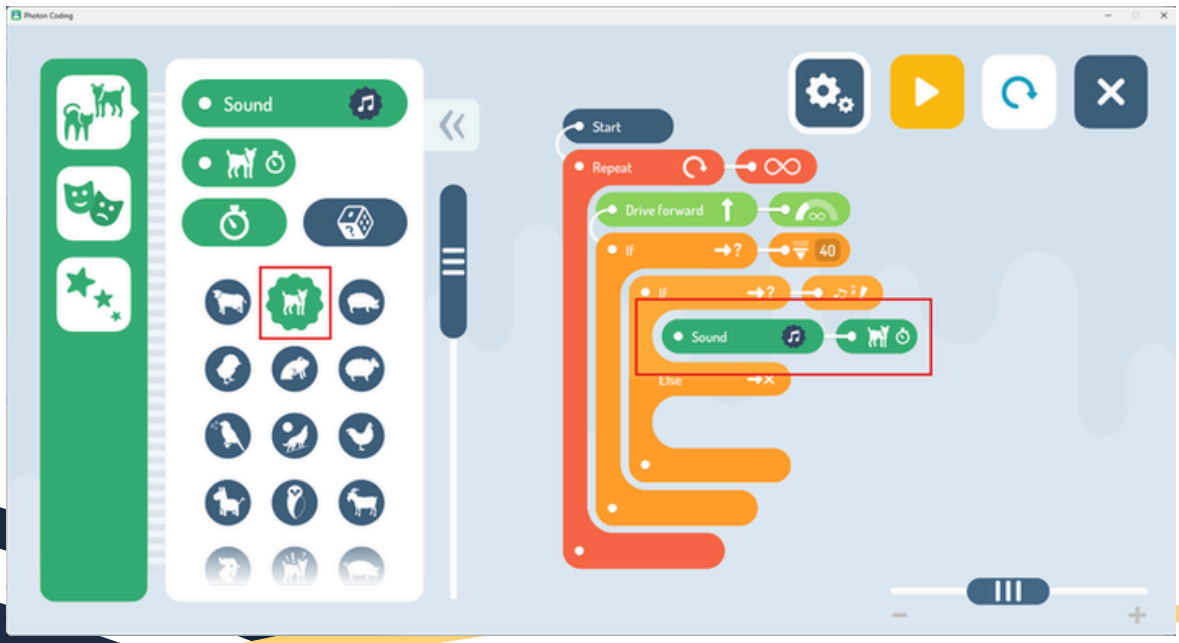
Encourage participants to compare whether the robot handles the situation similarly to a human who fills in the invisible parts.
Imagine that while moving, the robot detects an obstacle and hears a sound (we produce the sound ourselves while demonstrating how the program works, for example by clapping). This means that it has encountered some kind of “living creature” and is happy to have found it. It can express its excitement, for example, by barking and spinning around in circles.

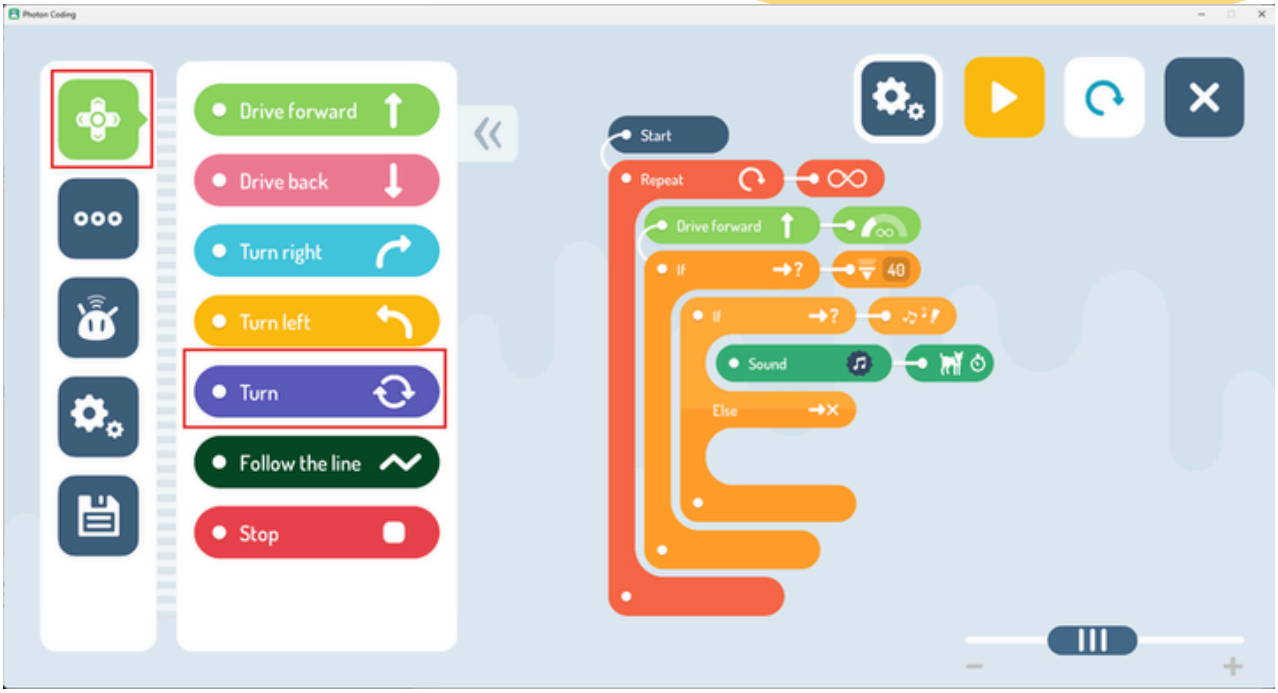
The robot needs to move continuously, so we add an instruction to move straight ahead indefinitely.

We can add a sound by selecting SOUND from the menu on the left, marked with the three-dot icon.

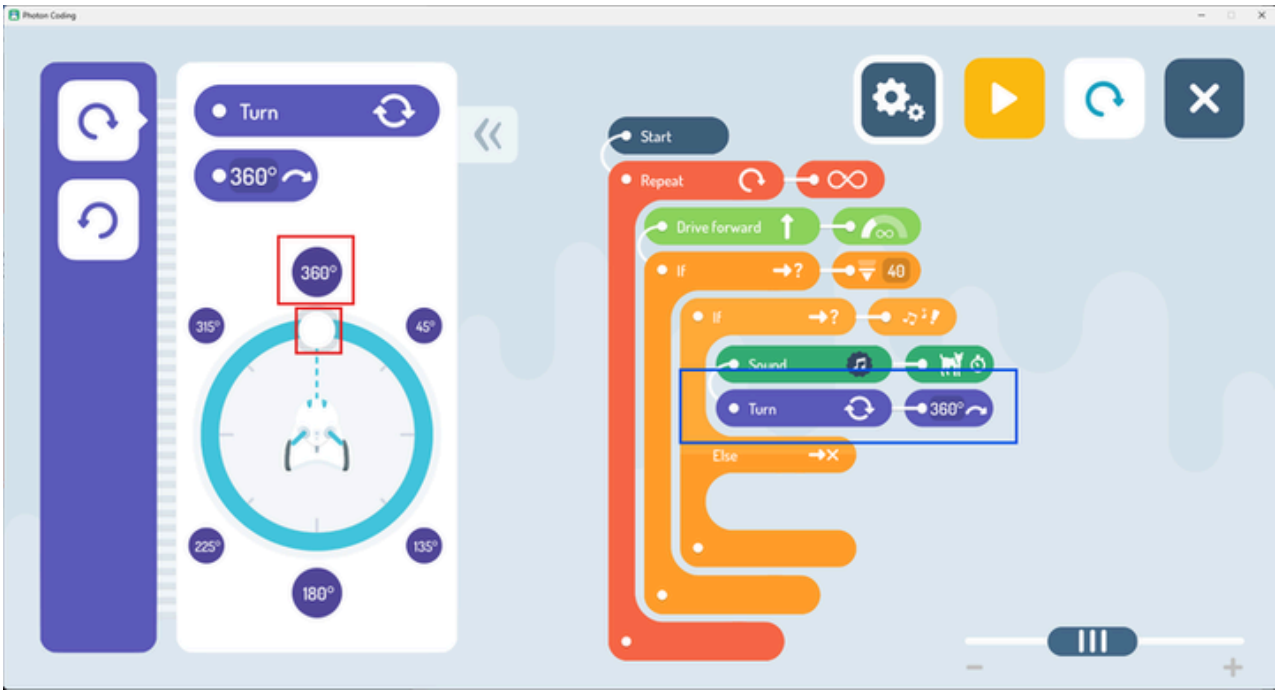


Next, select the sound you want and place it in the appropriate position in the program. In our case, it will go inside the IF noise condition.

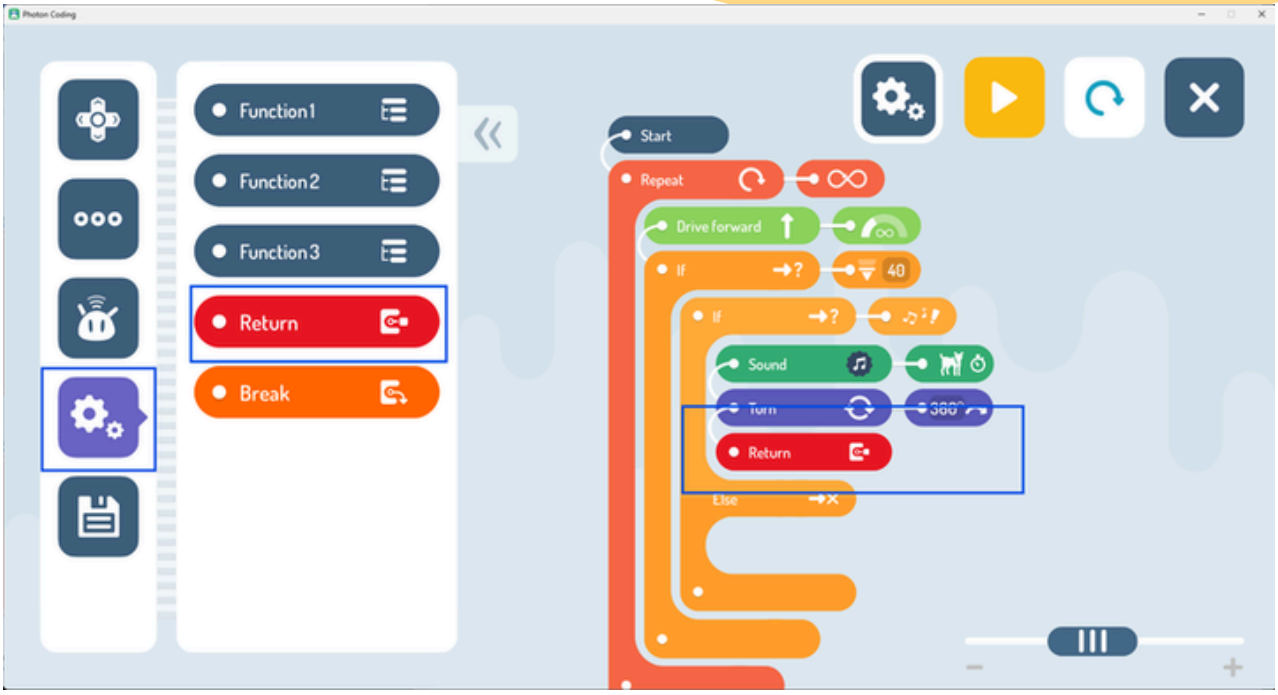




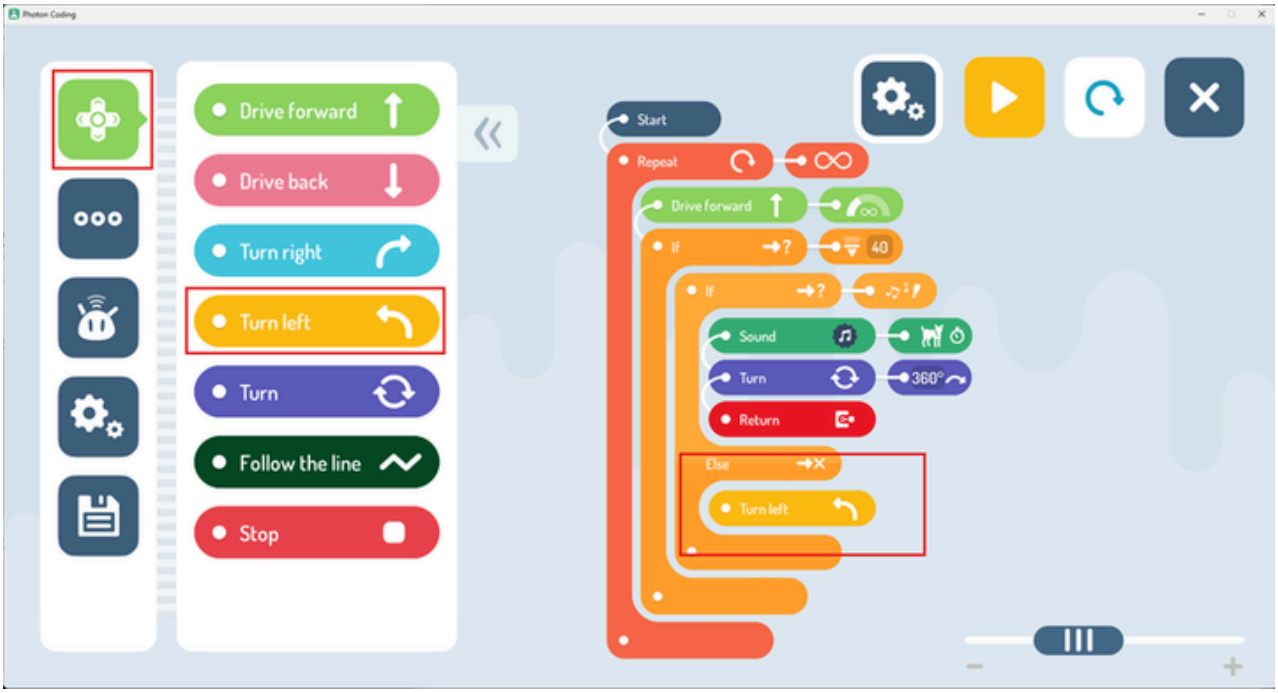
Next, select the desired angle by either rotating the Photon robot image by a specific number of degrees or choosing one of the predefined angles.
Place the ROTATE block in the program directly below the barking sound, as the same conditions must be met for the rotation to be executed.



If we want the robot to stop and end the program after “expressing its joy,” we must add the EXIT instruction after the rotation. We can find it in the menu on the left, under the gear icon.



Now, let's consider what happens if the robot encounters an obstacle but hears no sound. It may interpret this as an ordinary obstacle and try to avoid it by turning, for example, to the left.
To do this, we need to place a TURN LEFT block inside the ELSE section.
The condition in this section will be executed if the robot encounters an obstacle but does not "hear" any sound.



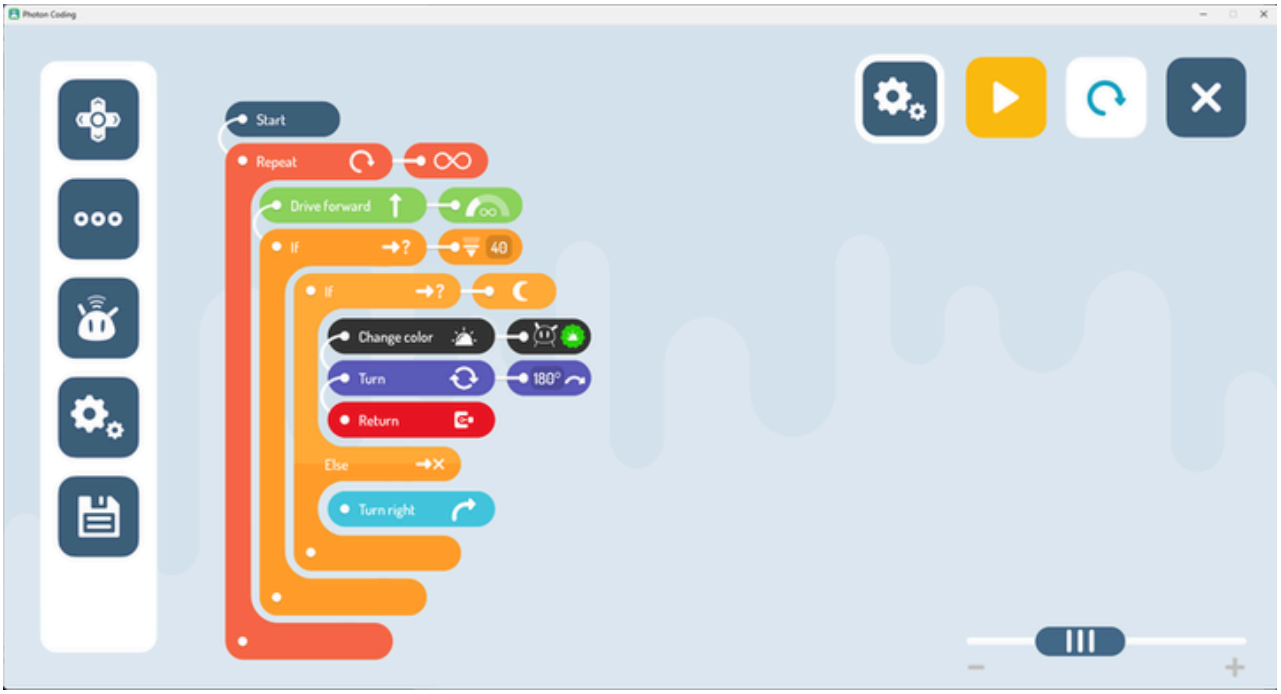
After turning left, we have not added an instruction to end the program, so the robot will continue moving until it encounters another obstacle.

Step 3: Task for Participants
Divide the participants into smaller groups.
Each group programs the Photon robot to “recognize” a room by combining data about light and distance.
The robot moves straight ahead continuously.

- “Parking”: IF the robot detects an obstacle AND the light sensor detects darkness (moon), the robot switches on its green LEDs, rotates 180 degrees, and stops, ending the program.
- “Obstacle in daylight”: IF the robot detects an obstacle but the environment is BRIGHT (sun), it identifies the obstacle as a tree or fence and avoids it by turning right.

Encourage participants to compare this exercise with other situations from everyday life.

Task Solution



Step 4: Reflection and Questions

- Does the robot really know what is behind the obstacle?
- What distinguishes it from a human looking at an obscured object?
- Does the robot work in a similar way to a human who mentally fills in the invisible parts?

Task 2: Selective Attention – Context Filter (Day and Night)

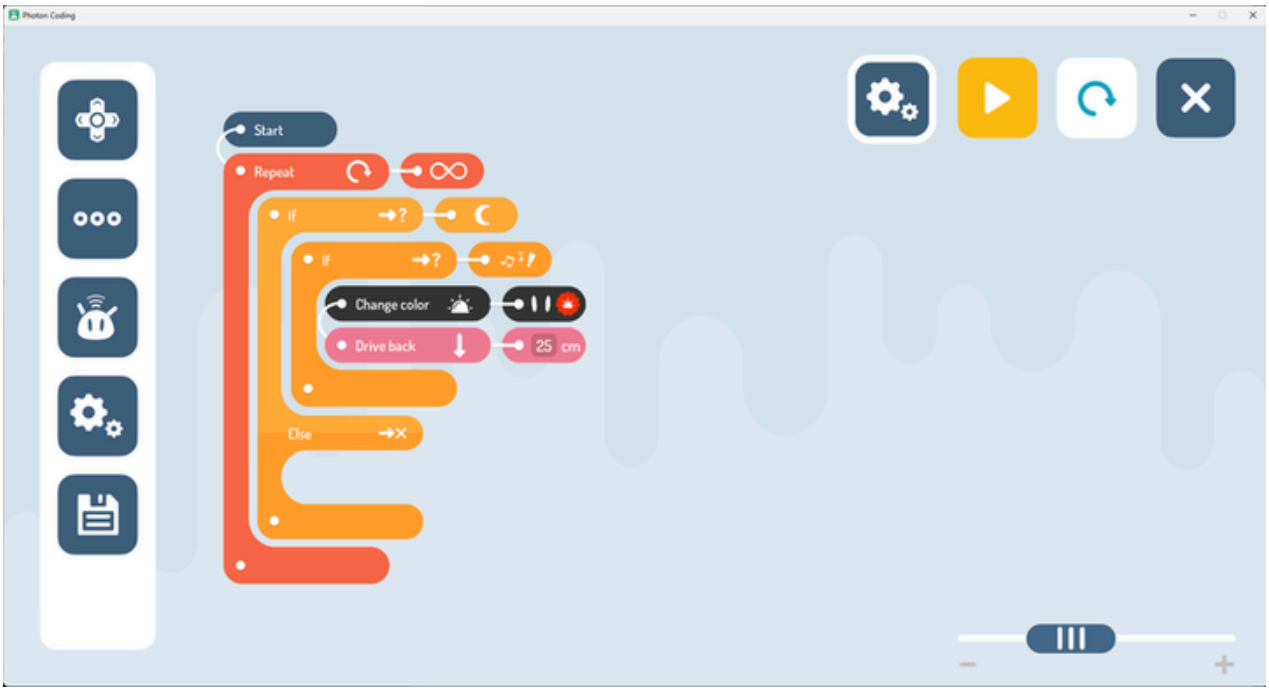
Objective: To show participants that perception is not about passively recording everything detected by sensors, but about actively filtering information. Like humans, a robot can "choose" what to focus on depending on its surroundings.

Step 1: Discussion
Ask participants: How is it possible for you to read a book while ignoring the background noise of people talking?

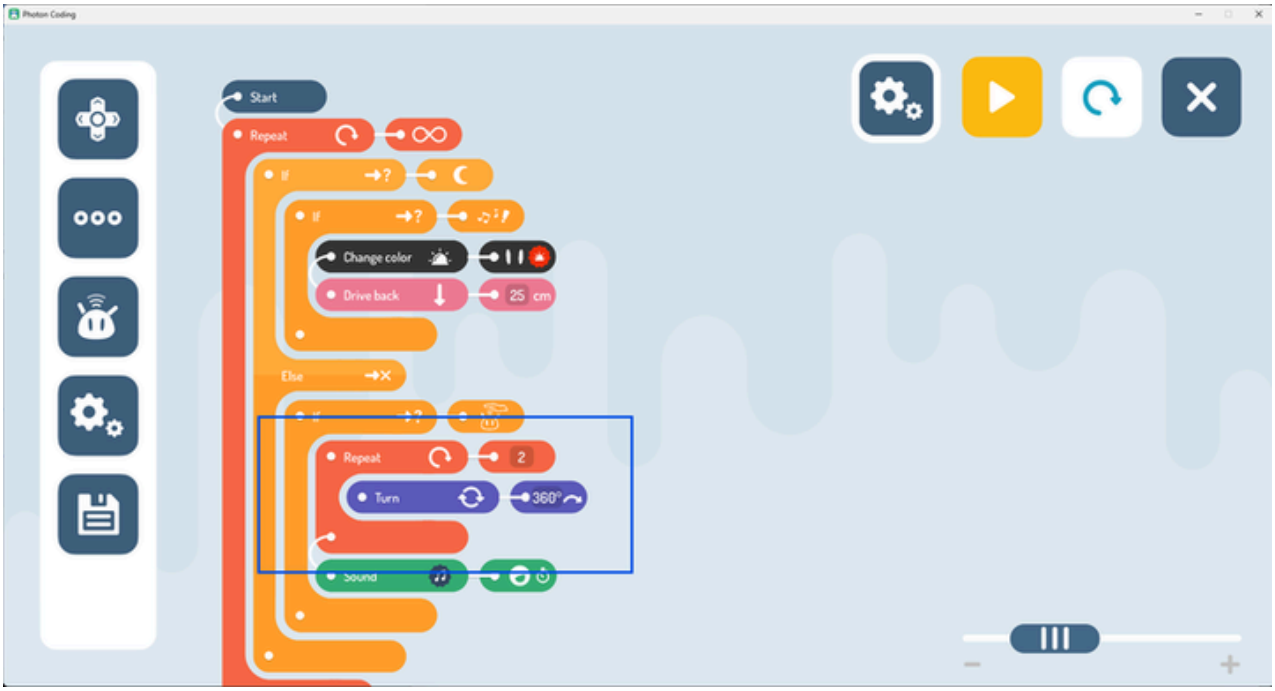
Explain that perception involves focusing our attention — we decide what is important. Suggest that light conditions (day/night) dramatically change what we pay attention to: at night, we tend to "trust" our hearing more, while during the day, we rely more on our sight.
The Photon robot can be programmed so that its "attention" switches between sensors depending on the brightness of its surroundings.

Step 2: Demonstrating How the Robot Works
Demonstrate a program in which the light sensor determines which of the other sensors becomes active (nested logic).

Since the robot needs to operate continuously, select the REPEAT loop and set it to repeat indefinitely. Because the robot's behaviour depends on whether it is light or dark, insert an IF/ELSE block inside the REPEAT block and select the light sensor (sun/moon icon).
Inside the IF "Dark" condition (moon icon), insert another IF condition to check the sound sensor (noise). Reaction: The robot "gets scared" by noise in the dark, changes its eyes to red, and moves backwards by 25 cm.



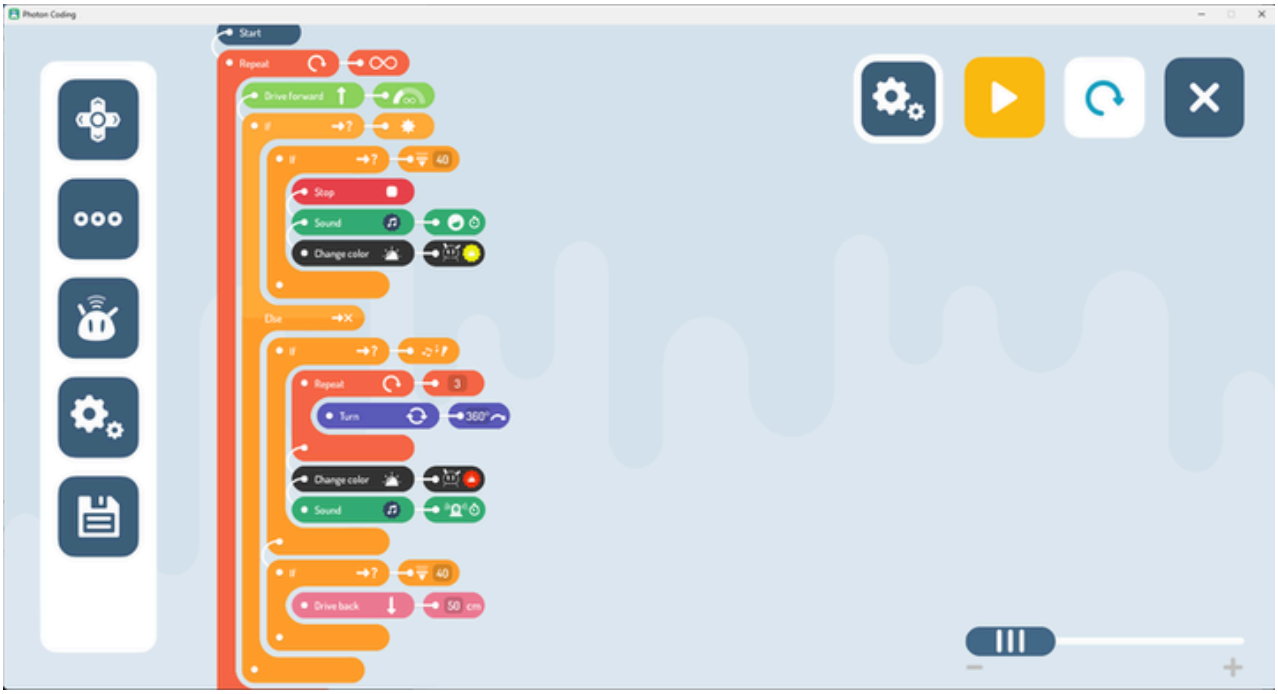
In the IF NOT section (i.e. when it is bright), we will add an IF condition to check the touch sensor.
Reaction: The robot is "sociable" during the day — when its head is touched, it performs two full spins on the spot and then makes a cheerful sound.



Draw participants' attention to the fact that there is a loop inside the conditional statement, which specifies how many rotations the robot should perform.

Step 3: Task for Participants
Divide the participants into smaller groups.
Ask each group to program Photon as a "Treasure Guardian in a Daily Cycle", using light as context to interpret sound and distance.
The robot moves continuously forward.
- "DAY" context (Bright): The robot is in "polite" mode.
  - IF it detects an obstacle, it should stop, play a cheerful sound, and light up yellow.
  - It must completely ignore noise (no reaction to clapping).
- "NIGHT" context (Dark): The robot switches to "alarm" mode.
  - IF it hears a noise, it should spin in place (3 rotations), light up red, and play a siren sound.
  - IF it detects an obstacle, it should make a sudden escape (move backward by 50 cm).

Task Solution:



Step 4: Reflection and Questions

- Does the robot really "choose" what to pay attention to, or did the programmer make that choice for it?
- What is the difference between signal filtering in a machine and conscious attention in humans?
- When the robot "ignores" noise during the day, does that mean it "cannot hear" it, or simply that it does not assign any significance to it?

In the IF NOT section (i.e. when it is bright), we will add an IF condition to check the touch sensor.
Reaction: The robot is “sociable” during the day — when its head is touched, it performs two full spins on the spot and then makes a cheerful sound.

1. Scenario title

Shared Thoughts and Feelings: The Secret of Intersubjectivity

2. General activity objectives and competencies

Lesson objectives:

- **Philosophical:** participants become familiar with the concept of associative perception, understand the difference between classical and contemporary approaches to perception, and reflect on how the body and mind cooperate in creating the meaning of the world. They discuss paradoxes of perception and consider whether robots can "see more than they see" thanks to sensors and programming.
- **Robotics**: participants program a robot to simulate limited perception (e.g. fragmentary vision through a sensor) and, on this basis, attempt to recognize the whole situation or an obstacle. They explore the difference between human and machine ways of "completing" an image.
- **Life skills:** developing critical and analytical thinking, the ability to associate information, skills of reflecting on one's own perception, working in pairs and groups, formulating conclusions, and conducting discussions.

Competencies:

Competencies	Description
Learning to learn	Developing the ability to connect different sensations and experiences into a coherent whole; deepening awareness of how perception works.
Personal and social competencies	The ability to cooperate in group tasks, recognize and name one's own ways of perceiving, and develop openness to different points of view.
STEM competencies	Shared Thoughts and Feelings: The Secret of Intersubjectivity
Civic and cultural competencies	Reflection on the role of perception in culture and communication, and the ability to engage in philosophical discussion while respecting different perspectives.
Creativity and entrepreneurship	Seeking non-standard solutions while working with robots, creating one's own projects.
Information literacy	Practising the ability to talk about sensory experiences, create descriptions and explanations, and formulate questions and arguments.

3. Duration of the activity

The entire session is planned to last 90 minutes and includes:

1. Philosophical introduction (approx. 10 minutes)
   - Discussion of classical and contemporary understandings of perception.
   - Introduction of the concept of associative perception and paradoxes of perception.
   - Examples from everyday life (e.g. seeing a house whose parts are hidden).

2. Discussion (approx. 20 minutes)
   - Moderated exchange of participants' observations.
   - Questions: how do we "complete" what is not visible? Do we all see the same thing? Can a robot "see more than it sees"?

3. Robot-based tasks (approx. 50 minutes)
   - Perceptual exercises in pairs and groups (identifying objects by touch, fragmentary perception, building an image from sounds).
   - Working with a robot: programming the robot to simulate limited perception (e.g. detecting obstacles only partially) and attempting to "guess the whole."
   - Reflection on the difference between human and machine ways of perceiving.

4. Summary and reflection (approx. 10 minutes)
   - Collection of conclusions from the exercises and work with the robot.
   - Participants' self-reflection: how my perception works, how the robot sees differently, what I have learned.

4. Required materials

Equipment:
- Educational robots with sensors.
- Laptops or tablets with software for programming the robots.
- Projector and screen or a board (for presenting examples and drawings).
- Speakers or a computer/tablet capable of playing audio recordings.

Teaching materials:
- Participant worksheet.
- Teacher's answer key.
- Sheets of paper and markers/pencils (for drawing diagrams, e.g. a house, a carpet, etc.).
- Sheets of paper with a cut-out hole or rolled into a tube (for exercises with a limited field of vision).
- A set of everyday objects for identification by touch (e.g. a sponge, a key, a phone, a piece of fabric, a pen).
-

Optional:
- QR codes linking to supplementary materials (videos, audio recordings, additional illustrations).
- Sets of audio recordings (street, forest, shop, train, etc.).

5. Session plan

A. Guidance for the teacher

Part 1: Philosophical introduction (approx. 10 minutes)

Intersubjectivity is the ability of people to communicate, empathize, and understand one another, even though each of us has our own thoughts, feelings, and perspective on the world. When you laugh together with a friend at the same joke, that is intersubjectivity. When you look someone in the eyes and see that they are sad, and you feel that sadness with them, that is also intersubjectivity. When you play a game together, you understand the rules and each other's actions because you share a common reality. Without intersubjectivity, there would be no conversation, no friendship, no way to act together—everyone would be trapped in their own world. Thanks to it, we feel that we are not alone, even if each of us thinks and feels in our own way.

Paradox description:

I experience other people as conscious, feeling, thinking subjects, even though I do not have direct access to their consciousness. Moreover, others exist for me as bodies in space, yet at the same time I attribute to them an inner presence, similar to my own. The paradox of so-called intersubjectivity lies in the tension between subjectivity (what I feel) and the possibility of accessing another subject's consciousness (what others feel).
Since consciousness is something internal, "given" only to me (as the "first person"), how can I acknowledge the existence and awareness of another "I," which is never directly accessible to me? In other words, how can I be sure that other people have minds and consciousness just like I do?
In traditional philosophy, I know only my own thoughts and experiences; another person is for me merely a body-object in space, meaning the consciousness of another human is invisible to me—always "behind a veil." If I am locked in my own consciousness, the other person is inaccessible. Yet, in daily life, I immediately recognize emotions, intentions, and the looks of others—so intersubjectivity is a lived fact.

Can I really know what another person feels?

Imagine sitting on a bench next to a friend. You see them smile, maybe even laugh. But how do you know they are truly happy? Perhaps they are only smiling to hide sadness. Or maybe they did it automatically, like a robot. And here arises the important philosophical question: can I ever truly know what someone else feels? This is called the paradox of intersubjectivity, that is, the difficulty of understanding and experiencing another person's consciousness. Even though we live together, talk to one another, and look into each other's eyes, we do not have access to other people's thoughts and emotions in the same way we have access to our own. Early philosophers used to say: "I think, therefore I am." This means that I can be certain only of my own mind. But does someone else—your friend, for example, or a robot—also have consciousness? This cannot be seen.

We can only guess by observing their behaviour.
It is a bit like with a robot: it may say that it understands you, it may look like a human, but does it really feel anything? Or is it only a set of well-programmed reactions? Contemporary philosophers have said something interesting: “I do not need to know what another person thinks. It is enough that I experience them in their gaze, their movement, their voice, and feel that they are a living being, like me.” When someone looks at you with anger or joy, you feel that emotion, even if you do not hear any words. This is how intersubjectivity appears—shared experiencing of the world with other people.
In robotics classes, we can build a robot that smiles, says “thank you,” and even tells jokes. But the question remains: does the robot understand what it is saying? Or does it only carry out commands? This dilemma shows how difficult it is to distinguish behaviour from genuine experience. Can a robot be my friend? Can it truly feel sad when I am sad?

Summary of the main points in the text:

The paradox of intersubjectivity lies in the tension between the fact that:

- I do not have direct access to another person’s consciousness, only to their body.
- And yet we experience the other as a conscious, present, feeling being, not as a robot or an object.

The body of another person is not just an object:

- When I see a gesture, a glance, a smile, I do not see only muscle movements, but also intention, emotion, and presence.
- Another person is present for me as a living consciousness, through their body.
- My body is alive and conscious, and the body of another functions like mine—that is, I recognize living intentionality in it.
- It is the body as a phenomenon of living action, not inert matter, that allows me to enter into a relationship with another.

Discussion (approx. 20 min)

I experience other people as conscious, feeling, thinking subjects, even though I do not have direct access to their consciousness. Moreover, others exist for me as bodies in space, yet at the same time I attribute to them an inner presence, similar to my own.

Encourage students to reflect: when was the last time they read someone else’s emotions? Use everyday situations (e.g., conversation, observing facial expressions). You can introduce a thought experiment: “Is a computer that shows emotions conscious?”

Guiding questions for discussion:

- How do I know that someone else has consciousness? I cannot see it, but I assume it exists.
- Are bodily reactions evidence of an “inner self” or “soul”? The body is external, but points to depth.
- Is empathy knowledge or inference? I recognize feelings I do not personally feel.
- Can a robot have an inner self/soul/feelings? It has a body and reactions, but does it have consciousness?
- Can I harm someone who does not show emotions?

Task 1: Photon’s Emotions – Real or Programmed?

Objective:
Encourage participants to reflect on whether external behavior and reactions are enough to consider someone (or something) as “feeling.” Show that we recognize emotions based on bodily signals, but we do not have access to the inner life—leading to the paradox of intersubjectivity.

Step 1 – Discussion:
Start a group conversation with these introductory questions:
How do we recognize emotions in other people?
Is face color, a grimace, or a sound enough to know what someone feels?
Does a robot that smiles and says “I’m happy!” really feel happiness?
Explain to participants that in this exercise we will consider whether a robot’s behavior is enough to attribute emotions to it.

Step 2 – Programming the Robot’s Emotions:
Divide participants into small teams or pairs. Ask each group to:
Choose one emotion (e.g., joy, sadness, anger, fear)
Program Photon to express this emotion through colors, sounds, and movement.
Encourage “natural” reactions—how might the robot express the emotion if it truly felt it?

Step 3 – Presentation and Interpretation:
Each group presents their “emotional robot” to the others. The audience tries to guess the emotion based on the robot’s behavior.

Step 4 – Reflection and Discussion:
Encourage discussion with questions such as:
Did the robot really feel anything?
What made you recognize a particular emotion?
Is empathy knowledge or inference?
Is a body and behavior enough to assume that someone has consciousness?

Summary:
This exercise highlights a key paradox—we recognize emotions in others based on their bodies, even though we do not have access to their inner life. Photon has no consciousness, yet we attribute experiences to it based on its behavior—just as we often do with people.

Task 2: Robot Conversation – Who Really Understands Whom?

Objective:
Encourage participants to reflect on the phenomenon of mutual "empathy." Is a sequence of actions and reactions enough to consider that "understanding" occurs between two beings (or robots)?

Step 1 – Discussion:
Invite participants to a group conversation. You can ask questions such as:

- How do we know that two people understand each other?
- Can two robots "communicate" with each other?

Step 2 – Programming Communication Between Robots:
Divide participants into small groups. Each group programs one robot for "conversation" (e.g., Photon A sends a message, Photon B reacts and responds).

Step 3 – Observation and Interpretation:
Participants watch the exchange of signals between the robots and consider whether it counts as a real conversation.

Step 4 – Reflection and Discussion:
Ask questions like:

- Was this a real conversation?
- Do we attribute intentions just because the behavior looks like communication?
- How do we know that someone truly understands us?

Summary:
This exercise shows that we assign intentions and a sense of presence to others based on their behavior—even if it is only a mechanical reaction. This is exactly the problem of intersubjectivity: how can we distinguish a real "You" from a well-programmed imitation?

Task 3: Do You Recognize Me? – Intention or Chance

Objective:
Encourage participants to reflect on whether the robot truly reacts “to me,” or is just executing programmed actions. Demonstrate that the experience of being recognized by Another is crucial for relationships and the sense of presence.

Step 1 – Discussion:
Ask questions such as:

- When do you feel that someone has “noticed” you?
- Can a robot really “see” me?

Step 2 – Programming the Robot:

- Participants program Photon to react to presence (e.g., using an obstacle sensor) and perform a programmed response (e.g., lighting up, saying “Hello!”).
- Test whether Photon reacts differently to a human than to an object. Reflect on whether its reaction seems directed toward a person.

Step 3 – Reflection and Conversation:
Ask questions such as:

- Did the robot react “to me” or “to something”?
- Did you feel that you were in a relationship, or did you just “trigger a reaction”?

Summary:
This exercise reveals a paradox: even though we have no proof that the robot has consciousness, its reaction can create a sense of relationship in us. This is a key aspect of intersubjectivity – the relationship is based on experiencing the presence of the Other, even if we have no access to their inner world.

Part 3: Tasks with Robots (approx. 50 min)

Task 1: Emotional Photon

Goal: Encourage participants to reflect on whether behavior and outward reactions are enough to consider someone (or something) as “feeling”. Show that we recognize emotions from bodily signals but have no access to the inner experience, which leads to the paradox of intersubjectivity.

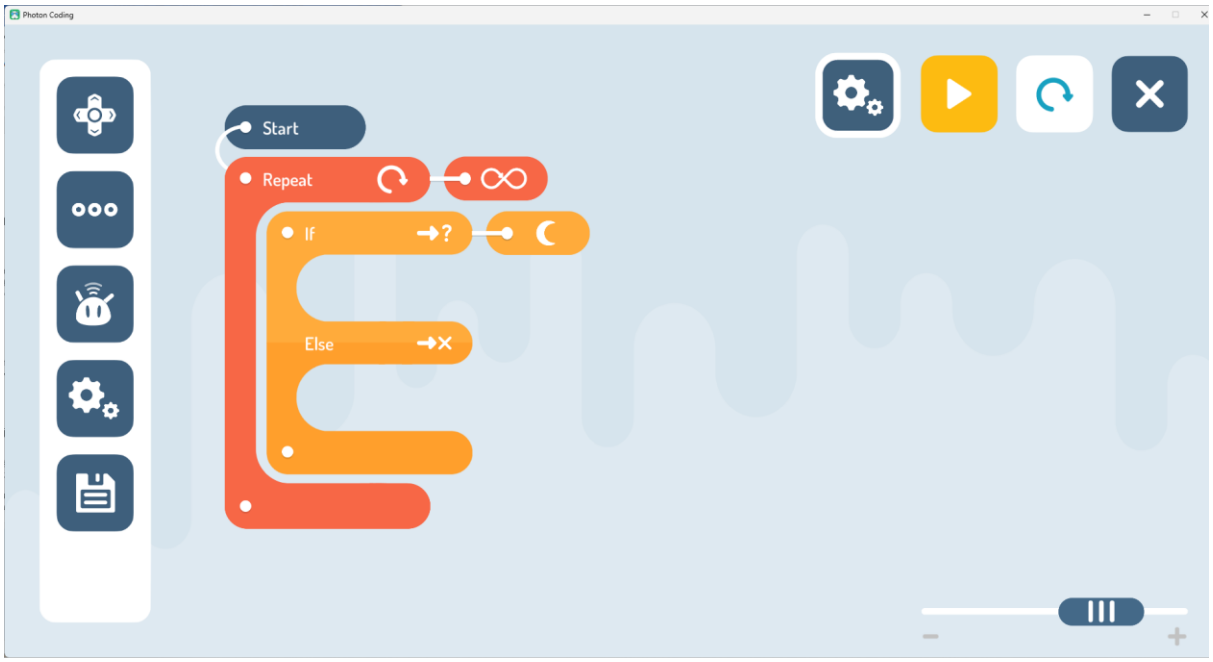
Step 1: Discussion

Ask: “How do you know your friend is really happy when they smile?” Explain that we cannot see other people’s thoughts, only their gestures and facial expressions. This is the paradox of intersubjectivity. In this exercise, we will consider whether a robot’s behavior is enough to attribute feelings to it.

Step 2: Robot demonstration

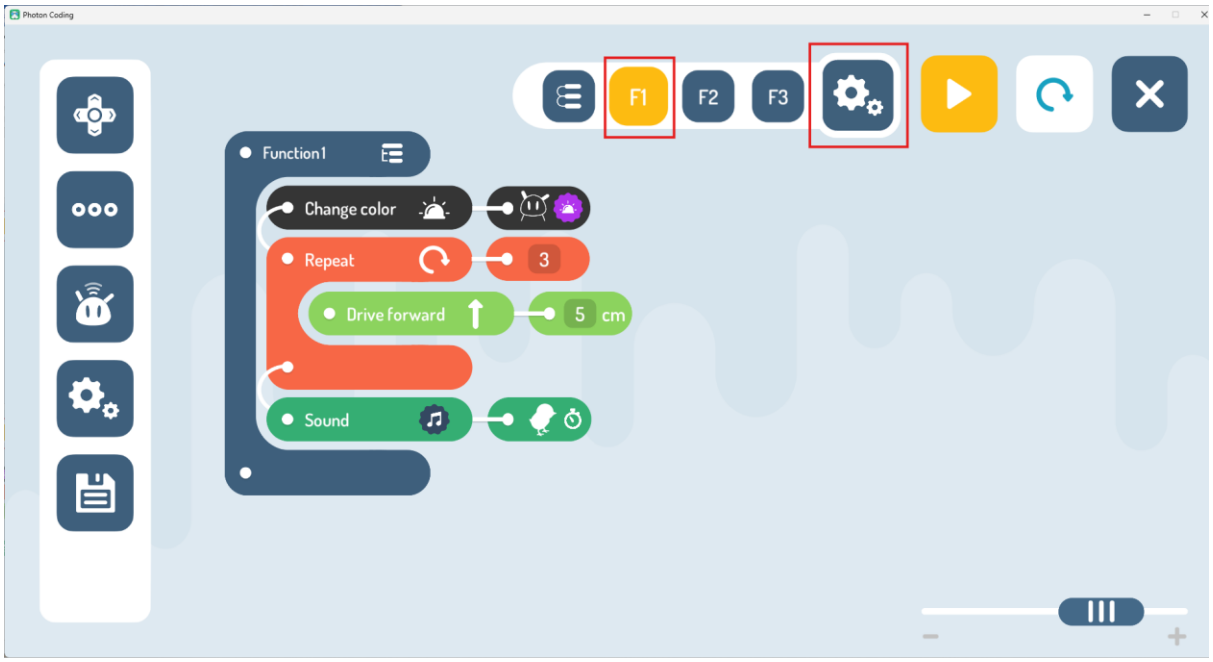
Demonstrate a program in which the robot shows fear or joy, depending on the data received from its sensors.

From the menu we choose the Repeat loop, because the robot should work continuously, so we select repeating an infinite number of times. Since Photon’s behavior depends on whether the surroundings are light or dark, we place a check of this condition inside the loop. To do this, we choose the conditional instruction If / Else from the menu and add a light check to it.

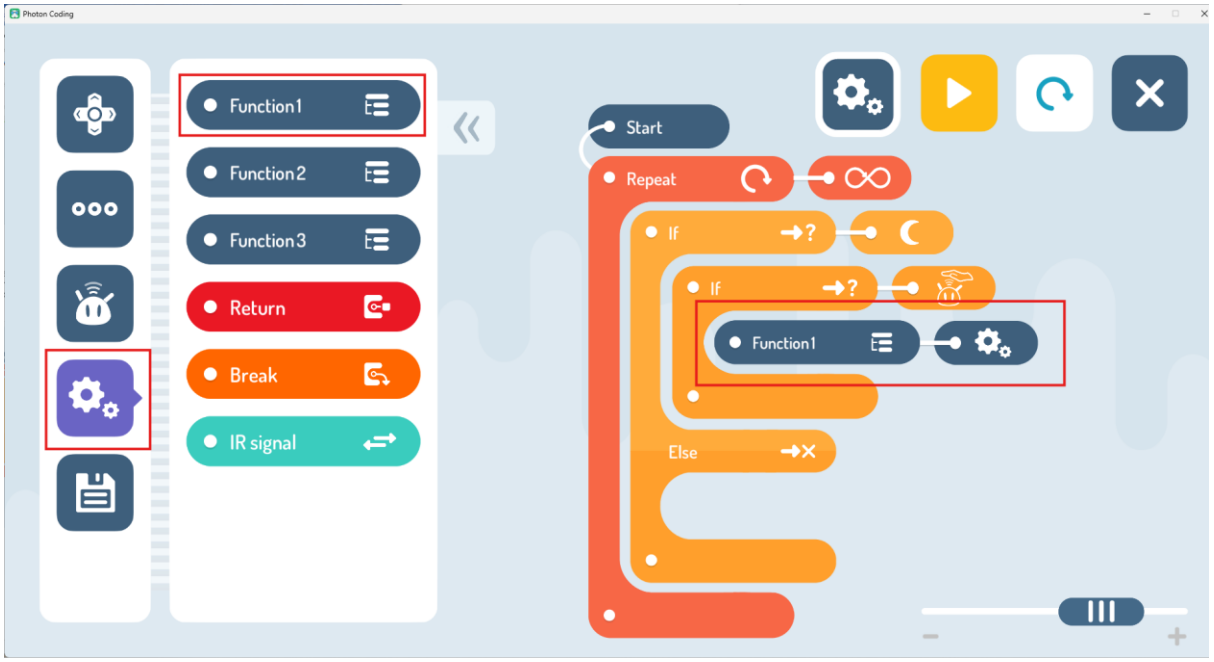


When someone touches us unexpectedly in the dark, it is easy to get frightened. Our robot will react in the same way: a touch in the dark will cause fear. Let's now decide how the robot can express fear. It could be, for example, trembling (3 short movements), changing color (e.g. to purple), and making a squeaking sound.

We will put the entire fear reaction into Function F1. In programming, a function is used to group a set of instructions that together form a logical whole. Functions can take different arguments and can be reused many times in a program. To switch between the program and the functions, select the gear icon at the top of the screen, then the icon with connected blocks to switch to the program, or the F1, F2, F3 icons to edit the individual functions. We choose F1 and place in this block all the instructions that are meant to imitate fear.



Now, if we want to use the set of instructions imitating fear in the program, we just need to add a call to Function1. To do this, we switch to the main program (the gear icon at the top of the screen, then the icon with connected blocks), then from the menu we select the gear icon and Function1, which we place in the appropriate spot in the program.



Notice that we have also added an If condition that checks whether Photon is being touched.

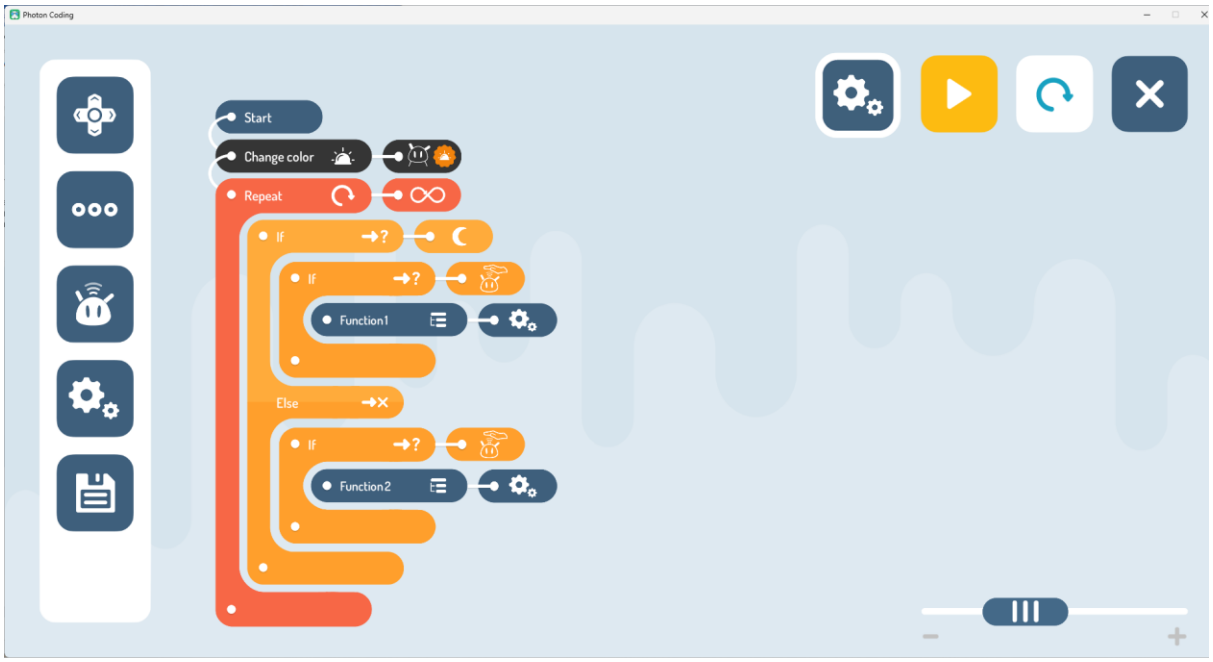
If it is light and someone strokes Photon, it could react with joy. Let's try to create a function that could imitate joy. We will use Function2 for this. Let the robot express joy by lighting up green, spinning around 2 times, and making an appropriate sound.



Now let's place the call to the joy function (Function2) in our program.

It is good practice to set some starting parameters at the beginning of the program. In our case, this will be making the robot glow orange. It is not essential, but it makes it easier to see whether the program is working correctly. Without these settings, the robot would glow in whatever color it had been set to last.

The complete program looks like this:



The program will run until it is stopped.
Step 3. Present the task:

Divide the participants into smaller groups.
In their groups, participants independently choose one complex emotion (e.g. anger, shyness) and program Photon to express it using a sequence of colors, sounds, and a specific movement. They also decide for themselves under what conditions such an emotion might be shown. At the end, each group presents its Photon's behavior. The other groups try to guess which emotion Photon is expressing.

Step 4: Reflection and questions

- What made you believe in its emotion?
- Are a body and behavior enough to conclude that someone is conscious?
- Did the robot really feel something, or did it just execute code?

Task 2: Robot Conversation – Who Understands Whom?

Goal: Encourage participants to reflect on the phenomenon of mutual "empathy". Is a sequence of actions and reactions enough to conclude that "understanding" is taking place between two beings (or robots)?

Step 1: Discussion

Invite participants to a shared conversation. You can ask the following questions:

- How do we know that two people understand each other? Is it only a matter of words, or something more?

- If robot B reacts to a signal sent by robot A, can we say that it “understood” it?
- Explain that intersubjectivity means sharing a common reality. We will see whether robots can create such a “shared space” using code.

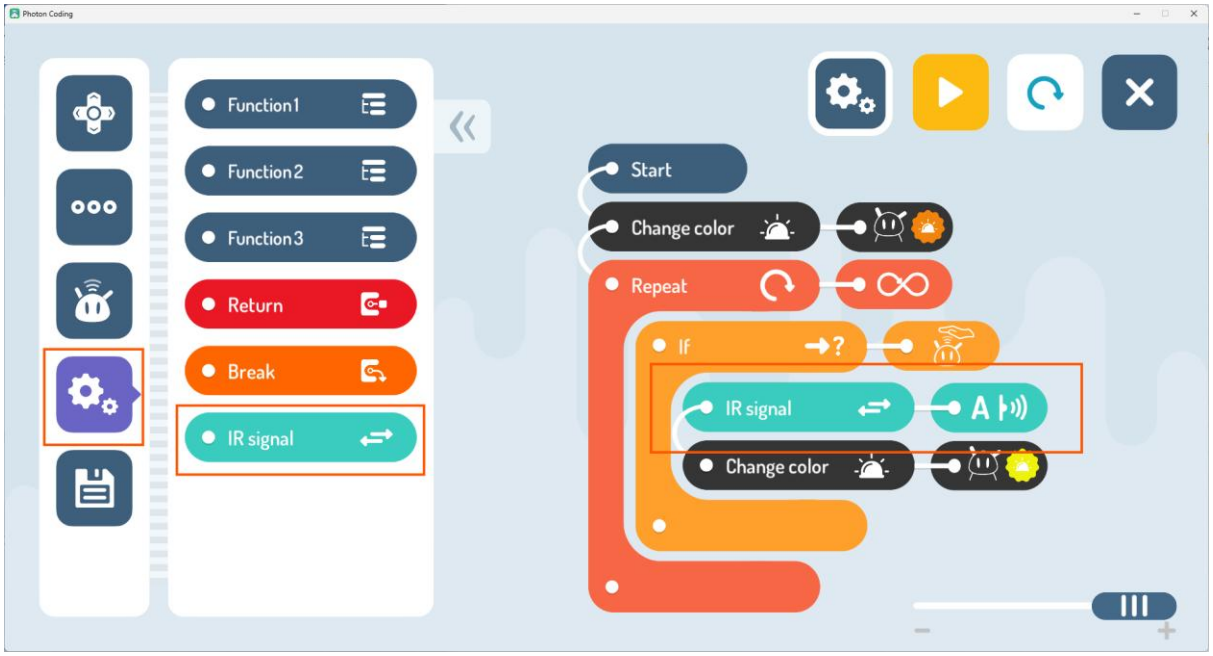
Step 2: Robot demonstration

Demonstrate a conversation between robots using functions.

The demonstration must be done with two robots. Remember that the signal transmitter is located at the front of the robot, while the receiver is located at both the front and the back of Photon. Make sure that the robots are on a shared surface during the presentation.

We start by changing the robot’s lights to orange. This will help us be sure that the appropriate signals have been sent. Then, in an infinite loop, Photon will wait for a touch. If it is touched, it will notify the other robots and change its color to yellow.

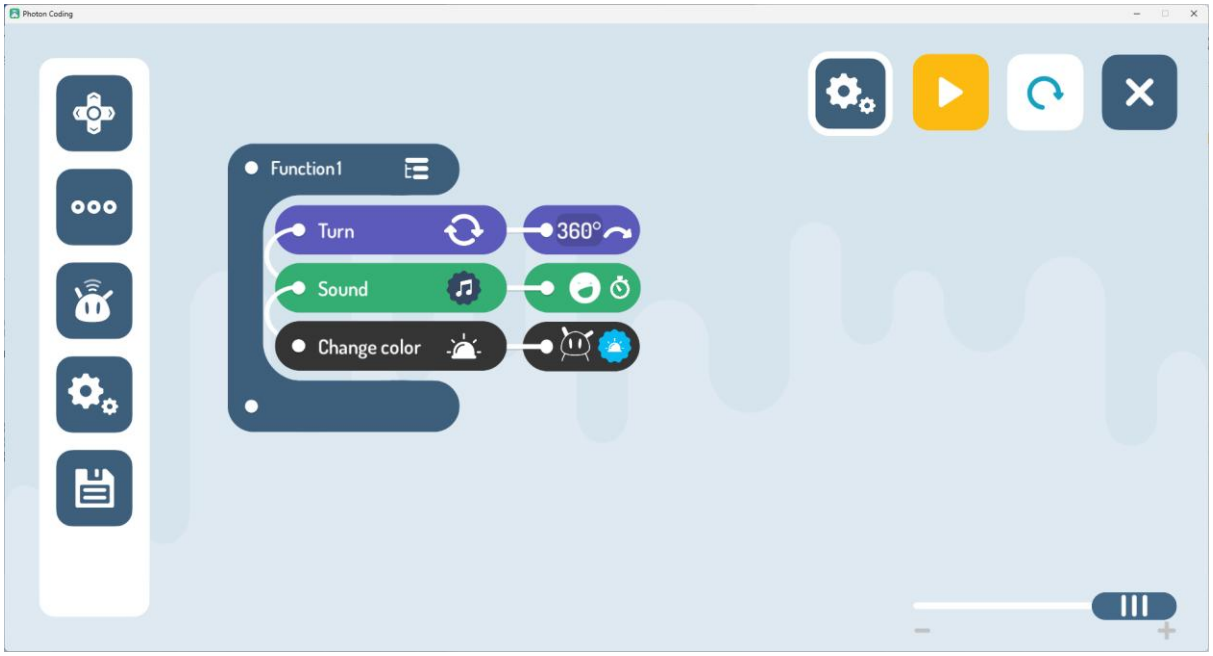
To send a signal, select the gear icon from the menu, then IR signal, and place it in the right spot. Photon can send 3 different signals, named A, B, and C. In this case, we will send signal A.



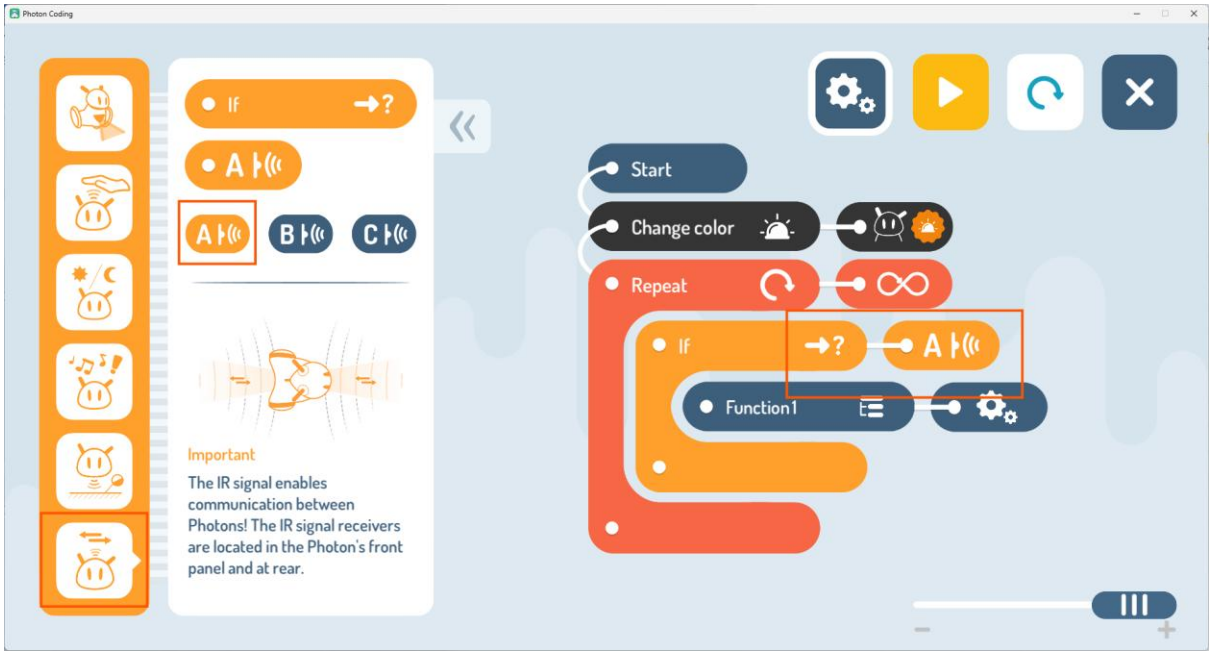
The second Photon will wait for this signal and, when it receives it, will perform the actions planned in Function1 (these can be any actions, e.g. a turn, a cheerful sound, and a color change).

Remember that we are now uploading the program to the second robot! It is easiest to use a different tablet/phone/computer for each robot.

Let’s first prepare the appropriate function.



Now let's move on to the program. As before, we change the color of this robot's lights to orange. In an infinite loop, we place a condition waiting for signal A sent by another robot. We choose If, then the icon of a robot with arrows above it, and signal A. In the condition we place Function1, which will be executed after the signal is received.



Step 3. Present the task:

Divide the participants into smaller groups. Give the groups the names A, B, and C, which indicate which signal each group's robot will send; letters may repeat. In their groups, participants independently decide under what conditions the robot will send its signal and how it will react to the other signals. Each robot sends one signal and can react to the other two. The reactions should be placed in functions. The groups test the "conversations" between their robots.

Example program sending signal B and receiving signals A and C:



Step 4: Reflection and questions

- Was that a real conversation?
- The IR signal is invisible to us, but crucial for the robots. Is this a good metaphor for intersubjectivity, where we “see” only the body (of the robot), while what matters most (the message or intention) happens “underneath”?
- How can we be sure that our friends don’t react to us just as automatically as these robots react to an IR signal?

1. Scenario title

Liar's Dilemma

2. General activity objectives and competencies

Lesson objectives:

- Philosophical: understand why "This sentence is false" destabilises the true/false distinction (the family of the liar paradox).
- Robotics: identify identity-based "trap statements" (self-protection, dissonance, self-deception) and learn how to shift to a meta-level.
- Life skills: link these loops to belonging and reputation within the group (a central issue in school disengagement).

Facilitation approach

- We do not "unmask": we unpack the function of a statement.
- No forced confession: we work with typical statements ("a young person might say…").
- True/false is not the goal: the goal is "what does this statement produce?".

Competencies:

Competencies	Description
Learning to learn	Developing the ability to reflect on one's own experience and perception of the world.
Personal and social competencies	Self-reflection, self-expression, recognizing one's own emotions and needs and those of others.
STEM competencies	Working with robots, understanding sensors, developing logical thinking and coding skills.
Civic and cultural competencies	Understanding the role of the body and identity in culture, developing communication and discussion skills.
Creativity and entrepreneurship	Seeking non-standard solutions while working with robots, creating one's own projects.
Information literacy	Formulating and recording one's own thoughts, reflections, and experiences in a clear and coherent way.

3. Duration of the activity & the required materials

Recommended duration: 1.5 hours (can be adapted to 2 hours)

1.Introduction and experiential hook (approx. 10 minutes)
Presentation of Epimenides and the liar paradox.
Participants are confronted with true/false dilemmas to experience logical deadlock.

2.Philosophical input: the liar paradox (approx. 12 minutes)
Clear, concise explanation of the paradox, self-reference, and limits of true/false reasoning.
Introduction to the distinction between language and meta-language.

3.Core activity: "trap statements" (approx. 33 minutes)
– Collection of typical statements (5 minutes)
– Sorting into functional categories (8 minutes)
– Meta-analysis using the "meta sheet" tool (12 minutes)
– Role-play contrasting true/false responses with meta-level responses (8 minutes)

4.Social dimension: place in the group (approx. 20 minutes)
Analysis of how statements protect status, reputation, and belonging.
Links to engagement, school disengagement, and group dynamics.

5.Synthesis and take-away tools (approx. 15 minutes)
Identification of three key professional gestures.
Reflection on transfer to practice and immediate posture changes.

Optional extension (if moving to 2 hours):
Robot-based exercise illustrating paradox, rule inversion, and contextual logic.

4. Required materials

Equipment:

- Whiteboard + markers
- Post-it notes (2 colours) + pens
- A4 sheets (handout below)
- Optional: printed "trap statement" cards

5. Session plan

A. Guidance for the teacher

Part 1: Philosophical introduction (approx. 10 minutes)

We are going to talk to you about Epimenides: the "Cretan", a semi-legendary Cretan figure (often placed in the 7th–6th century BC), described as a seer and a poet. We're going to play with a famous sentence attributed to this character.

5.1) On the board, write the following and specify that these two statements are independent:

1. "All Cretans are liars." (Said by Epimenides, a Cretan)
2. "This sentence is false."

5.2) Instructions (2 min)
"You must choose: true or false. No other option."
5.3) Quick debrief (8 min)
Questions:
– "What happens when you are forbidden any third option?"
– "What kind of feeling does this create (irritation, playfulness, blockage, challenge)?"
– "Do you tend to struggle within the statement, or to step back from the statement?"
5.4) Transition: "In logic, this blockage has a name: the liar paradox."
A wink for Walt Disney fans: a famous leader... and you could always tell when he lied... PINOCCHIO

2. Micro philosophy input (short, 10–22 min)

Key message to convey (max 12 min)
(The facilitator uses and appropriates the content below and adapts it to their audience during the session.)

The Liar Paradox consists in saying "I am lying" or, in a more precise form:
"This sentence is false."
• If this sentence is true, then it is false (since that is what it says);
• and if it is false, since that is precisely what it says, it is true!
It is impossible to assign it a truth value ("true" or "false") in a coherent way.

This is a paradox (the argument appears valid, yet its conclusion clashes with common sense), but it is not yet a contradiction. What does it show? A sentence is called a proposition (in the logician's sense) if it has a truth value. We have therefore shown, by reductio ad absurdum, that "this sentence is false" is not a proposition. One might think this is not a serious problem: after all, many sentences are not propositions in the logician's sense (for example, imperative sentences like "Let's try!" or interrogative ones like "How?" are neither true nor false).

However, a slight reformulation shows that there is a real problem here. Consider the sentence:
“This sentence is false or devoid of a truth value.”

It cannot be true (because then it would be neither false nor devoid of a truth value, contrary to what it says); and it cannot be false or devoid of a truth value (because then it would be true, since that is what it says). This sentence is therefore neither true, nor false, nor devoid of a truth value.

One might try to escape by assuming the existence of other truth values besides true and false: the sentence would then have one of these values. But this does not eliminate the problem. Consider this variant (which encompasses the previous ones):

“This sentence is not true.”

If it is true, then it is not true (since that is what it says); and if it is not true, since that is precisely what it says, it is true! Yet it must either be true or not true; but each option implies the other, so it is true and not true: a genuine contradiction! (From this point on, when I speak of paradoxes, I will in fact be referring to true contradictions.)

One could attempt yet another escape by saying: “this sentence”? But which sentence? It refers to itself, which refers to itself, and so on: this infinite regression ultimately refers to nothing; the sentence runs on empty and is devoid of meaning. We will return to this question of self-reference, but we can already see that this objection does not resolve the problem. In the sentence (“This sentence is not true.”), the expression “this sentence” clearly refers to the sentence (“This sentence is not true.”), which does indeed exist: it is written down, we can see it, it is grammatically correct and intelligible. (source: ...)

The oldest known formulation of the liar paradox is attributed to Epimenides the Cretan (7th century BC) in the statement “All Cretans are liars”, even if the paradox it raises did not necessarily appear immediately at the time. This sentence seems to escape the principle of non-contradiction, because the following two possibilities are absurd:

• if Epimenides is telling the truth, then he is lying (since he is a Cretan);
• if he is lying, then Cretans are not liars, so they tell the truth – and Epimenides in particular.

Aristotle offers a solution to the problem in his Sophistical Refutations: one can lie in general while telling the truth about a particular point. The contradiction disappears as soon as the proposition is understood as: “I am telling the truth when I say that I am lying”: the truth in question is no longer absolute, but relative to a specific content.

An ambiguity therefore arises from the confusion between language and metalanguage (the language used to talk about the language one is using at the moment of speaking). (Source: Wikipedia)

Explanations:

The liar paradox calls into question the idea that every sentence must be either true or false. If a statement asserts its own falsity, then it cannot logically be either true or false.

Getting out of the paradox?

– The paradox rests on self-reference plus the demand for a "true/false" verdict.
– A classic way out: distinguish between language and metalanguage (Tarskian intuition: a language that is "closed" with respect to its own truth produces antinomies). ("Metalanguage" is probably the most unfamiliar word you will see today. It is very useful for learning a language, but first, what does it mean? Although it sounds complicated, its meaning is quite simple: metalanguage refers to words; it allows us to talk about words, their use and grammar.)
– The most relevant response to these paradoxes is to find ways to value and sustain both values, even if this may appear – and feel – impossible. Paradoxes are made up of two desirable values that seem to oppose each other but are, in reality, complementary.
– Another way out (Kripke): accept that some sentences remain without a truth value (truth-value gaps), and distinguish between grounded and ungrounded sentences.

Bridge sentence (to say aloud)

"In psychology, many identity-based statements function like 'LIARS': if I take them as true/false, I …"

3.Core workshop: "Trap statements" (a tool transferable to young people) (22–55 min)

- **Step A (5 min) — Statement bank (without exposing individuals)**

Hand out Post-it notes.
Instruction: "Write down 2 statements that a disengaged young person might say (or that are often heard). One per Post-it."
Examples (display these as well):
– "I don't care."
– "School is pointless."
– "I'm useless."
– "Everyone judges me."
– "If I come, I'll lose it."
– "I could succeed, but I don't feel like it."

- **Step B (8 min) — Sorting into 3 categories (on the wall)**

Create 3 columns on the board:

1. Loop / dead end (it goes round in circles)
2. Attack / reputation (saving face)
3. Disguised distress (hidden request)

Participants stick up their Post-its and each justifies one statement.

- **Step C (12 min) — The "meta sheet" (core tool)**

Hand out the following sheet (or copy it onto the board).

SHEET – Moving from true/false to meta

1. Statement: ...
2. If I take it literally, what does it produce? (conflict, exclusion, paralysis...)
3. What it protects (fear of failure, shame, abandonment, loss of status...)
4. What it asks of the group / the adult (respect, distance, proof, safety...)
5. Meta version (reformulation):
6. – "When I say X, I'm trying to..."
7. – "What I'm trying to avoid is..."
8. – "What I would need is..."

You move around the room: you help write meta versions that do not ridicule.

- **Step D (13 min) — Role-play (2 roles): "Adult 1 / Adult 2"**

Prerequisite: group agreement on how to avoid humiliation or escalation and how to establish epistemic trust.

In pairs:

- Adult 1 responds in "true/false / moralising" mode (which escalates).
- Adult 2 responds in meta mode (which opens up).

Example (to give):

- Young person: "I don't care."
- Adult 1: "Stop lying, you do care."
- Adult 2: "When you say 'I don't care', is it to avoid feeling judged? What would be more bearable right now?"

Theoretical anchor: self-deception = maintaining a false belief under motivation/emotion despite contrary evidence (minimal definition).

And cognitive dissonance = tension when incompatible cognitions → reduction strategies.

4.Social dimension "place in the group" (disengagement as an issue of belonging) (55–75 min)

Mini-map (on the board): Belonging – Status – Reputation – Safety – Autonomy

Exercise (10 min)

Choose 2 phrases from the wall and ask:

- "What does this phrase do for their place in the group?"
- "What status does it protect?"
- "What social risk does it avoid?"

Input (10 min)

- The sense of school belonging is linked to motivational, socio-emotional, behavioural, and academic variables (meta-analysis).
- Engagement ⇔ problem behaviours ⇔ risk of disengagement: reciprocal links in longitudinal studies.
- There are intervention reviews targeting “connectivity / belonging / engagement” (useful to discuss “evidence”).

5.Summary + “field tool” (to take away) (75–90 min)

The 3 key actions to remember:

- Name the logical trap: “If we stay in true/false, we’re stuck.”
- Move to meta: “What is this phrase protecting?”
- Restore a place: “Here you can exist without losing face.”

Closure (2 questions)

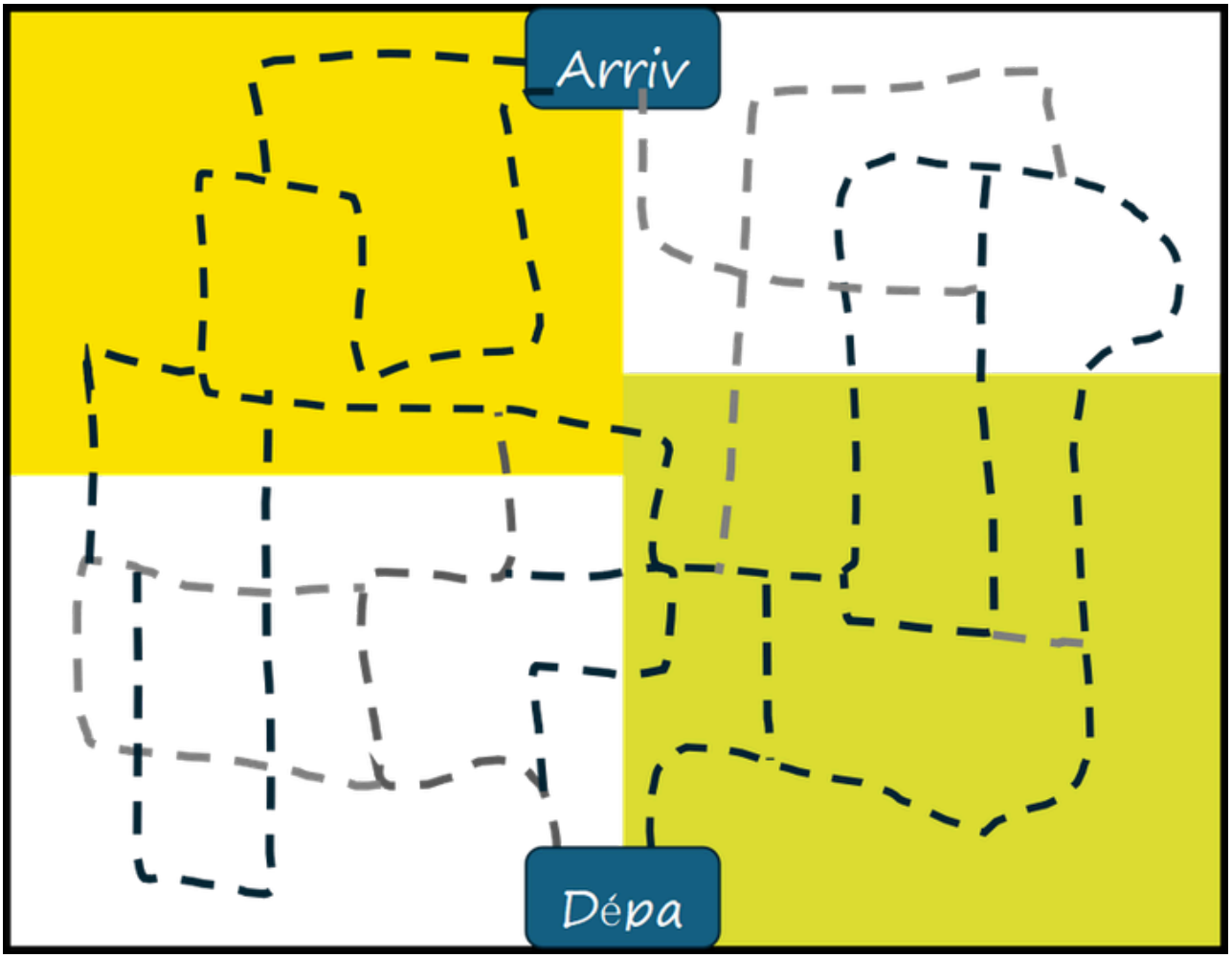
- “Which trap-phrase do you hear the most? Which meta version do you feel able to propose starting tomorrow?”
- “Which micro-change in posture will you try?”

Exercise with the robot:

The field is A0 in size and consists of 4 quadrilaterals, two of which are coloured. The two coloured quadrilaterals have an overlapping area.
Within each quadrilateral, black lines are drawn to represent paths for the robot to follow.

The goal of the exercise is to move from the starting point to the finish area.
The program to be written must allow the robot to autonomously reach the designated zone.

- In the white zone, the robot will do the opposite of the given command.
- In the coloured zone, the robot will follow the instructions and execute the programmed commands.


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THE TROLLEY DILEMMA

1. Explanation of the Scenario: The Trolley Dilemma

Situation –

Today we will look at an imaginary situation that nevertheless raises a real-life question: **what do I do when I have to make a choice?** And above all: **does doing nothing really mean not acting?**

Imagine a tram speeding along the tracks. It is going straight ahead and can no longer brake. The driver has had a heart attack and has collapsed onto the controls, and the passengers cannot get into the cab. No one can operate the brake. On the main track, five people are repairing the rails at the exit of a bend, so they will not see the tram approaching. If the tram keeps going, it will hit them.

But ahead of you, on the track along which you are travelling, there is a switch. If someone operates it, the tram will change tracks. It will miss the five people. However, on the other track there is also a person who cannot get away from there. The tram will hit that person. It is a homeless man who has built himself a makeshift shelter.

So you have several options.

1. The first option is to **do nothing**. You do not touch the switch. The tram goes straight on. But note: even if you have done nothing, something happens anyway. Your inaction allows the situation to run its course.
2. The second option is to **take action**. You throw the switch. You change the tram's course. You save five people, but your action directly puts another person in danger.
3. The third option is to consider whether there is **another solution**: to prevent, to slow down, to stop, to think of something else. But this solution requires reflection, cooperation and not getting stuck in the face of the problem.

This dilemma is not about who is good and who is bad. It helps us understand how we make decisions when no solution is ideal. In life we sometimes face less spectacular situations that work in a similar way: not replying to a letter, …, not asking for help, letting others act for us.

We may have the impression that we are not making a choice. Yet the consequences keep unfolding, just like the tram on the tracks.

With the help of the Photon robot we will make this situation visible. The robot will represent the tram. The rails will be built on the floor. Your group will have to make a decision: let the robot carry on, change its direction, or look for another possibility.

An important question for this session will therefore be:

When I do nothing, do I really have no influence on the decision? Or do I simply let things decide for me?

2. General Objectives of the Exercise and Competences

Lesson objectives:

- **Philosophical:** participants discover that we are constantly making choices, consciously or unconsciously. Not choosing then turns out to be a choice. The aim is individual awareness of one's actions and their consequences.
- **Robotics:** participants program the robot to simulate choices, based on a decision, a colour test, a total number of occurrences, or by leaving it to chance.
- **Life skills:** becoming the master of one's own choices, developing a new awareness, understanding the notion of what is at stake, not letting our surroundings influence us, becoming aware of choices suggested by advertising or by other members of the group, and being aware of pressure to follow the customs of the group.

Required competence areas:

Competence area	Description
Learning and the ability to learn	Developing the ability to reflect on one's own experiences and perception of the world. Understanding a complex situation, identifying possible options, testing a solution, learning from mistakes.
Personal and social competences	The ability to reflect on oneself and on the influence of the group, to express oneself, to recognise one's own emotions and needs as well as those of others.
Personality development	The ability to be assertive; developing awareness in the face of conscious and unconscious group pressure.
STEM skills	Working with robots, discovering how sensors work, developing logical thinking and coding skills.
Civic and cultural skills	Understanding the significance of the body and identity in culture, developing communication and discussion skills.
Creativity and entrepreneurship	Looking for unconventional solutions when working with robots, creating one's own projects.
Skills in understanding and creating information	The ability to formulate and record one's own thoughts, reflections and experiences in a clear and coherent way.

3. Organisation and Duration of the Session

The whole session lasts 90 minutes and includes:

1. Philosophical introduction (about 10 minutes)

- Presentation of the concepts: values, choice, action
- Individual exercise: choosing selected values
- Examples taken from everyday life and philosophical questions.

2. Discussion (about 20 minutes)

- Integration exercise
- Simulation of a situation in which participants can test and experience the initial phase of seeking autonomy in their choices: Why do I make these choices?

3. Tasks with robots (about 50 minutes)

- Programming the robot's movements.
- Configuring the robots' possible choices depending on the environment
- Programming reactions to stimuli (light, touch, obstacle).
- Reflection on earlier choices and predictable behaviours

4. Summary and reflection (about 10 minutes)

- Summary of the work.
- Discussion of conclusions and participants' personal reflections.

4. Required Materials

Equipment:

- Educational robots (line-following, equipped with light and touch sensors).
- Laptops or tablets with software for programming the chosen robots.
- Projector and screen or whiteboard.

Teaching materials:

- Participant worksheet.
- Answer sheet for the teacher.

Optional:

- QR codes linking to supplementary materials

Organisation of the space

- The room is divided into groups of four.
- Each group has a floor space on which it can build a track made of:

5. Course of the Session “The Trolley Dilemma”

Introduction

The facilitator begins by writing on the board:

“Not choosing is also a choice.”

The facilitator lets participants react freely.

Possible questions:

- Do you agree with this statement?
- Can you really decide not to choose?
- When we do nothing, does nothing happen?
- What are the effects of inaction in everyday life?
- Is putting something off a decision?
- Is not turning up to a meeting an action?

The facilitator then explains that during the session we will use a robot to make this issue visible.

The Photon robot moves, turns, stops, makes a sound or changes colour. However, it does not make decisions on its own. It carries out the commands it is given. This allows us to ask a key question:

> **If the robot does something serious, who is responsible for it? The robot? The programmer? The group? The person who gave the command?**

The Photon robot moves forward because it received a command. If no one stops it, it will keep going. If no one changes its trajectory, it will follow its own path. The robot thus makes it possible to understand an important idea in concrete terms:

> **The world does not stop just because we do not make decisions.**

Even when someone remains passive, events carry on. Passivity therefore has its consequences. Sometimes it can protect, but it can also make the situation worse.

Part 1: Philosophical Introduction

The Trolley Dilemma **Duration: about 20 minutes**

The facilitator presents the situation:

A tram is speeding along the tracks. It can no longer be stopped. There are five people on the main track. If nothing changes, the tram will hit them.

There is a switch. If we operate it, the tram will move onto another track. There is only one person on that track.

Three possibilities arise:

1. **Do nothing**: the tram carries straight on.

2. **Change the setting of the switch**: the tram will change tracks.
3. **Look for another solution**: trying to stop, slow down, warn, or change the situation.

The facilitator emphasises:

> The first possibility, “doing nothing”, is not neutral. It leads to a specific result. It is therefore also a way of acting.

Three Forms of Choice

1. Active choice

> I do something.
>
> I intervene directly.
>
> Example: I program the robot to turn right.

2. Passive choice

> I do nothing, but my passivity allows the situation to develop.
>
> Example: I do not change the program; the robot goes straight.

3. Creative choice

> I reject both imposed options and look for another possibility.
>
> Example: I program the robot to stop, emit a signal or slow down before an obstacle.

The Moral Question

The facilitator asks:

> **Am I responsible only for what I do, or also for what I allow?**

Participants give examples.

Examples from everyday life:

- I do not go to an appointment at the office.
- I do not answer my employer’s phone call.
- I do not look for an internship.
- I do not react when someone is being humiliated.
- I do not get involved in the group’s work.
- I do not ask for help when I get stuck.

In all these cases, inaction can have consequences. The aim of the session is therefore to raise awareness that freedom does not consist only in doing what one wants, but also in recognising the consequences of our action or inaction.

Exercise 1 – Working with Concepts

Duration: about 15 minutes

Aim

Participants should understand the main concepts of the session:

- choice;
- absence of choice;
- passivity;
- action;
- consequence;
- responsibility;
- intention;
- dilemma;
- third way.

Task

Participants work in groups of two or four.

Each group receives shuffled cards: 1. term, 2. definition, 3. example.

They must match these three elements.

The facilitator then asks each group to choose one concept and explain it with an example from everyday life.

Expected Answers for Exercise 1

Term	Definition	Example
Choice	A decision made from among several possibilities.	I decide to go to the meeting instead of staying at home.
Absence of choice	The impression that I am not making a decision, while a consequence appears anyway.	I do not answer the summons and my situation becomes more complicated.
Passivity	An attitude of letting things take their own course, without interfering.	I let others do all the work in the group.
Action	An intervention that changes the situation.	I program the robot to change its route.
Consequence	The result of an action or an omission.	The robot goes straight because no one stopped it.
Responsibility	Taking responsibility for what one does or allows.	The group explains why it did not change the trajectory.

Term	Definition	Example
Intention	What I want to achieve through my action.	I want to save as many people as possible.
Dilemma	A situation in which no solution is fully satisfactory.	Going straight endangers five people; turning endangers one.
Third way	A new solution that rejects both imposed choices.	The group programs the robot to stop before an obstacle.

Worksheet for Exercise 1: Cut-out Items

Term	Shuffled definition	Shuffled example
Choice	The result of an action or an omission.	I let others do all the work in the group.
Absence of choice	An intervention that changes the situation.	I program the robot to change its route.
Passivity	A new solution that rejects both imposed choices.	The group programs the robot to stop before an obstacle.
Action	A decision made from among several possibilities.	I decide to go to the meeting instead of staying at home.
Consequence	The impression that I am not making a decision, while the consequence follows anyway.	I do not answer the summons and my situation becomes more complicated.
Responsibility	What I want to achieve through my action.	I want to save as many people as possible.
Intention	A situation in which no solution is fully satisfactory.	Going straight endangers five people; turning endangers one.
Dilemma	The fact of taking responsibility for what one does or allows.	The group explains why it did not change course.
Third way	An attitude of letting things take their own course without interfering.	The robot goes straight because no one stopped it.

Exercise 2 – Programming the Dilemma with Photon

Duration: about 35 minutes

Aim

Each group must build a track and program the Photon robot to illustrate three possibilities:

1. **Do nothing**.
2. **Intervene**.

3. **Look for a third solution**.

The main aim is to show that every scenario has its consequences.

Situation

The facilitator reads out the following scenario:

The tram-robot is running.

It automatically carries passengers. A malfunction makes it impossible to stop it immediately. Five people are stuck on the main track. One person is stuck on the side track.

Your group's task is to program the switching system.

But note: you must test three different programs.

Program 1: Do Nothing

The robot goes straight.

The group programs neither a stop nor a change of direction.

Question to consider:

What happens when no one takes any action?

Expected answer:

Something is still happening. The robot keeps going. Inaction has consequences.

Program 2: Intervention

The robot goes forward, then turns onto the side road.

The group programs a turn at the junction.

Question to consider:

Does changing the trajectory make the group more responsible?

Possible answer:

Yes, because the group intervenes directly. However, the absence of intervention also had its consequences.

Program 3: Looking for a Third Way

The robot moves, makes a sound, changes colour and stops before the obstacle.

The group tries to come up with another solution.

Question to consider:

Can the imposed dilemma be rejected?

Possible answer:

Sometimes another solution exists. However, it requires imagination, cooperation and the showing of initiative.

Roles in the Group

Role	Task
Route designer	Prepares the tracks, junctions and obstacles.
Programmer	Creates the robot's three programs.
Effects observer	Notes what happens in each scenario.
Spokesperson	Presents the group's choice and its moral reflection.

Route to Build

On an A0 sheet of paper, draw the route using black adhesive tape.

Each group creates:

- a starting point;
- a main straight line;
- a fork;
- a side road;
- five objects on the main track;
- one object on the side track;
- a place where the robot can stop before the fork.

The Photon robot is at the start.

Programming Card

Program 1: Do nothing

Minimal instruction:

- go onto the main track;
- do not turn;
- do not stop before the danger zone.

Observation:
What are the consequences of not intervening?.....

Program 2: Intervene

Minimal instruction:

- move forward;
- turn right or left;
- move towards the side road;
- optionally, trigger a sound or light signal.

Observation:
What are the consequences of intervening?.....

Program 3: The third track

Possible instruction:

- start moving;
- slow down or stop;
- make a sound;
- change colour;
- report an emergency;
- avoid the two dangerous lanes, if the route allows.

Note:
Where does looking for another solution lead?.....

Philosophical Questions for the Group to Complete

1. Under which program does the group act in the most visible way?
   .....
2. In the “do nothing” program, are there nonetheless any consequences?
   .....
3. Can one bear responsibility for a consequence one did not intend?
   .....
4. Can passivity be comfortable? Why?
   .....
5. In everyday life, what situation resembles the “doing nothing” program?
   .....

Exercise 3 – Discussion and Reflection

Duration: about 20 minutes

Main Question for Discussion

Can one be held responsible for what one did not do?

The facilitator divides the group into three teams.

Team A: yes, inaction entails responsibility

Possible arguments:

- If I see danger and take no action, my silence or passivity matters.
- The absence of a decision allows the situation to develop.
- In everyday life, putting off action can make a problem worse.

- Passivity can have the same impact as action.

Example:
I do not go to an important meeting. “I did nothing”, but this may cause me to lose help, a job or an opportunity.

Team B: no, we are responsible only for what we do directly

Possible arguments:

- There is a difference between causing an event and failing to prevent it.
- One cannot be responsible for everything.
- Sometimes we do not know what to do.
- Fear, fatigue or lack of self-confidence can block action.

Example:
I see a difficult situation, but I am overcome by panic. I am not necessarily to blame for not being able to take action.

Team C: it depends on the situation

Possible arguments:

- If I could easily have taken action and did nothing, my responsibility is greater.
- If I had no ability to act, my responsibility is smaller.
- One must distinguish between passivity, powerlessness and refusal to act.
- The most important thing is learning to recognise the moment when a small action becomes possible.

Example:
I am not able to solve all my social problems in one day, but I can make the first phone call, come to the meeting, or ask for help.

Stages of the Debate

Stage 1 – Initial vote

Each participant chooses a position:

☐ Yes, one can be responsible for what one did not do.

☐ No, we are responsible only for what we do directly.

☐ It depends on the situation.

Step 2 – Preparing arguments

Each team prepares two arguments and one concrete example.
Duration: 5 minutes.

Step 3 – Presentation

Each team presents its position.
Duration: 2 minutes per team.

Stage 4 – Exchange of questions

Each team asks a question to another team.
Sample questions:

- Where does responsibility begin?
- Does fear always justify inaction?
- Is a small action better than none?
- Can inaction sometimes be reasonable?
- How do you tell passivity from being unable to act?

Step 5 – Final vote

Participants vote again.
The facilitator asks:

- Who changed their mind?
- Which argument made you reflect?
- Did any example from everyday life speak to you?

A. Teacher Materials

Main Didactic Message

The session should not lead participants to feel guilty.
The point is not to tell them: “If you are struggling, it is because you did nothing.”

The message is subtler and more constructive:

Even the smallest action can change the course of events.

The robot makes it possible to visualise this idea. The smallest instruction can change the whole course of events:

- move;
- stop;
- turn;
- wait;
- report;
- start again.

Similarly, in a person’s life a small decision can start a return to action:

- reply to a message;

- come to a session;
- arrange a meeting;
- prepare a sentence for a job interview;
- go for a ten-minute walk;
- send a job application;
- say that one needs help.

Matters Requiring Particular Attention

For people in a difficult situation, the notion of responsibility can trigger feelings of shame or a defensive attitude.
The facilitator must therefore clearly distinguish between:

- responsibility and guilt;
- passivity and inability;
- avoidance and the need for protection;
- conscious choice and a psychological block.

A useful sentence:

“Being responsible does not mean being guilty of everything. It means looking for what I can take into my own hands, even to a small degree.”

Accompanying Questions

The facilitator may use these questions during the session:

- What in this situation depends on me?
- What does not depend on me?
- What small action is possible today?
- What am I allowing when I do nothing?
- Did I really make a choice, or did I let the situation decide for me?
- Who can help me to take action?
- What would be the smallest instruction that could be given to the robot to change its path?
- What would be the smallest change in my life that would change my week?

B. Worksheet for Groups

Our Group

Group name:.....

Participants:.....

Our Three Scenarios

Scenario 1: Do nothing

What does the robot do?.....

What happens?.....

Is this an action? Why?.....

Scenario 2: Intervention

What does the robot do?.....

What happens?.....

Who is responsible?.....

Scenario 3: Looking for a third way

What does the robot do?.....

What happens?.....

Was it easy to find this solution?.....

Our Conclusion

We believe that inaction:

- ☐ is not an action;
- ☐ is sometimes an action;
- ☐ is always a form of action, because it has consequences.

Explain:.....

C. Observation Card

Name of the observed group:.....

Criterion	Yes	No	Notes
The group tested the “do nothing” scenario.	☐	☐	
The group tested the “taking action” scenario.	☐	☐	
The group proposed a third solution.	☐	☐	
The robot clearly carries out the program.	☐	☐	
The group explains the consequences.	☐	☐	
The group talks about responsibility.	☐	☐	
The group refers to everyday life.	☐	☐	

Question for the group:.....

D. Discussion Sheet

Question

Can one be held responsible for what one did not do?

Position at the start:

- ☐ Yes
- ☐ No
- ☐ It depends

Main argument:.....

After the Debate

Position at the end:

- ☐ Yes
- ☐ No
- ☐ It depends

Did I change my mind?

- ☐ Yes
- ☐ No
- ☐ A little

Why?.....

E. Summary

The facilitator writes on the board:

“When I do not make a choice, I let something choose for me.”

The facilitator then suggests a moment of personal reflection.
Each participant completes a sentence:

- Today I understood that doing nothing…
- In the robot, inactivity causes…
- In my life, a situation in which I let things happen is…
- A small action I can take this week is…
- To change the direction of my life, I can start by…

The facilitator may suggest a closing sentence:

“I cannot change everything today, but I can give the first command.”

F. Possible Extensions

This paragraph and the area Practical applications in everyday life are deliberately left to the facilitator’s judgement.

Possible extensions of the theme of “non-action” could concern drawing up, or not drawing up, a CV, as well as reactions to administrative formalities. This is a place to raise the topic of the participant’s competence and ability to act independently.

The same extension can be considered in relation to respect and the ability to turn up to a meeting. Realising that inaction remains a choice is an example drawn from participants’ everyday lives.

The last suggested extension concerns social life, and the question could be: “When I do not take part, is it a defeat or avoidance?”

G. Simplified Variant

For a group with very limited capacity, the session can be reduced to three stages:

1. the robot goes straight;
2. the robot turns;
3. the robot stops.

At each stage the facilitator asks:

What has changed? Who caused this change? What happens when no one intervenes?

Closing sentence:

“Inaction does not prevent consequences.”

H. Deepened Variant

For a group at a higher level, the facilitator can introduce three philosophical references.

Aristotle: Action Shapes Character

Our habits gradually shape who we become. Regularly doing nothing also becomes a way of being.

Kant: Moral Responsibility

A person should not be guided solely by their inclinations, tiredness or momentary interests. They should ask themselves what principle guides their action.

Sartre: The Choice of Not Choosing

According to Sartre, man is condemned to be free. Even when he refuses to choose, he is still choosing a way of being in the world.

I. Didactic Conclusions

In this session we use the Photon robot to make a key idea visible:
passivity sets the trajectory.

The robot keeps going if no one stops it. It holds its direction if no one changes it. It does what it has been programmed to do. Similarly, in everyday life, inaction often means that things take their own course.

For people undergoing social reintegration, this awareness is of fundamental importance. It should not be treated as an accusation, but as an opportunity to regain control:

- I can take certain actions;
- I can change direction;
- I can ask for help;
- I can take the first step;
- I can take responsibility again, without burdening myself with all the blame.

The trolley dilemma thus becomes an educational, philosophical and psychological tool. It allows us to move from an abstract question — “should one save five people by sacrificing one?” — to a very concrete existential question:

What happens when I take no action, and what small step can I take to change my direction?

6. Individual and Collective Assessment of Participants – 10–15 minutes

The assessment is common to all courses and proceeds in a similar way. It consists of an individual part and a collective part.

The individual part takes the form of a **competence portfolio**, which can accompany participants throughout the whole cycle of workshops. The competence portfolio is nothing more than a personal space that allows participants to reflect on their own development. It is not used for assessment, but for recording thoughts, observations and questions that arise during the sessions. Its main purpose is to strengthen self-awareness and to highlight competences that develop “in the background”: reflection, cooperation, communication, creativity, etc.

The trainer should not assess the portfolio, but can help participants by asking them questions, reminding them that it exists and encouraging them to pause during the process, devoting an appropriate amount of time to it during the sessions.

Course of the individual assessment:

1. Give each participant a **competence portfolio card**. The card consists of two parts, which can be used together or separately, depending on the time available during the session.
2. Individual working time: about 5–10 minutes.

PART 1: WORKSHOP SUMMARY (FOR GROUP OR INDIVIDUAL WORK)
Participants first write down what surprised them during the session and what they learned. This part can also be an opportunity for a short group discussion: participants can share their reflections in pairs or in a circle, if they wish.

PART 2: SKILLS I DEVELOPED TODAY (FOR INDIVIDUAL WORK) Here participants can indicate the key skills that they believe they developed. These might include: reflection, communication, teamwork, creativity, digital skills, etc. We encourage participants to add a short justification: in what situation did this skill show itself? This part can be completed at home, after the session, as part of a personal continuation of the process.

Course of the group assessment:

Print and cut out cards with the names of competences (1 card = 1 competence).

Procedure:

1. Participants draw a card at random (or the facilitator hands them out deliberately if they want to check a specific area).
2. Each participant reads their card, turns it over and answers the question aloud.
3. This can be done in pairs, in small groups or in a plenary (depending on the group and the time available).

Lesson plan: "Can robots trust each other?" – the prisoner's dilemma

The prisoner's dilemma is a fundamental problem in game theory and connects very well with robotics, because the question "cooperate or betray?" can literally be programmed and tested between two robots. The model follows the findings of the Olsztynek pilot: short robot cycles, followed by reflection, a ready-made script for the facilitator, and two difficulty levels.

1. Scenario title

Can robots trust each other? The prisoner's dilemma and the limits of cooperation.

2. General aims of the activity and competences

Aims of the session:

1) Philosophical: participants learn about the prisoner's dilemma as a classic game-theory problem, understand the difference between individual rationality (what is best for me) and collective rationality (what is best for both sides), and see why a lack of trust leads to a worse outcome for everyone, even when each person acts "logically".

2) Robotic: participants program two robots to play a multi-round version of the game (cooperate/betray) and observe how different strategies affect the result over time.

3) Life skills: developing critical thinking, the ability to recognise situations in which short-term self-interest harms long-term cooperation, building trust, and teamwork.

Competences:

Competence area	Description
Learning to learn	Analysing a situation in which each side's "rational" decision leads to a worse outcome for both.
Personal and social competence	Reflecting on trust, the risk of being deceived, and building relationships based on reciprocity.
STEM competence	Programming conditional strategies, working with a loop (multi-round game), basics of game theory.
Civic and cultural competence	Understanding the mechanisms underlying social cooperation, market competition and arms races.

Creativity and entrepreneurship	Designing one's own game strategy and testing it against others.
Literacy competence	Formulating and justifying a decision-making strategy.

3. Duration of the activity

90 minutes, 4 micro-cycles:

Micro-cycle	Time	Content
Cycle 1	approx. 20 min approx. 25 min	One round. First encounter with the dilemma
Cycle 2	approx. 20 min	The story of two prisoners: why "logic" fails
Cycle 3	approx. 25 min approx. 35 min	Multi-round game: is it worth trusting again?
Cycle 4	approx. 25 min	Designing your own strategy + tournament

4. Required materials

Equipment:

- Two educational robots per pair (pair A programs Robot 1, pair B programs Robot 2), max. 2 participants per robot
- Laptops/tablets with robot programming software
- A way for the robots to "communicate", e.g. the robot signals its decision with an LED colour (green = cooperate, red = betray) or with a sound, read by the other robot or by the participants
- Scoring table drawn on the board

Teaching materials:

- Participant worksheet with a table for recording the results of each round
- Solution sheet for the facilitator (scripts below)
- Payoff matrix card (to be handed to each pair)

Optional:

- Simple graphics: two prison cells and the results matrix as a recurring visual motif
- QR code linking to a 2-minute video on how the prisoner's dilemma applies in economics (e.g. price wars, arms races)

5. Course of the session

Explaining the dilemma

The prisoner's dilemma is one of the best-known problems in game theory. It shows that what seems the best decision for an individual does not always lead to the best outcome for both sides.

Situation

The police arrest two suspects in a crime. They are interrogated separately and cannot communicate with each other. Each of them has two options:

1) **Cooperate with the other prisoner** – stay silent
2) **Betray the other prisoner** – testify against them.

Prisoner A	Prisoner B	What happens?
Stays silent	Stays silent	Both receive a light sentence (e.g. 1 year each).
Betrays	Stays silent	The betrayer goes free, the other receives a heavy sentence (e.g. 10 years).
Stays silent	Betrays	Likewise – the betrayer goes free, the other receives 10 years.
Betrays	Betrays	Both receive a medium sentence (e.g. 5 years each).

Where is the paradox?

Each prisoner thinks in a similar way: "If the other stays silent, it pays for me to betray – I will go free. If the other betrays me, it is also better to betray, so as not to get the heaviest sentence." So from each individual's point of view, betrayal seems the most rational choice. The result? Both betray. But then both receive 5 years in prison. Meanwhile, if they had trusted each other and both stayed silent, each would have received only 1 year. An individually rational decision leads to a worse joint outcome. That is the paradox.

Why does this happen?

The problem comes from three elements:

1. **Lack of trust** – we do not know what the other person will do
2. **No way of communicating**
3. **Everyone wants to maximise their own benefit**

Uncertainty makes people choose the strategy that is safer for themselves, even if it harms everyone.

What does the paradox show?

The prisoner's dilemma shows that people do not always make decisions that lead to the best joint solution. Sometimes it pays more to trust and cooperate, but the fear that the other person will deceive us makes us choose the option that is safer for ourselves. As a result, both sides may lose. The model rests on a few simple assumptions:

- each person makes their decision independently and does not know what the other will do
- each person wants to achieve the best possible result for themselves
- there are only two options: cooperate or act solely in one's own interest
- every decision has consequences that depend on the choices of both sides
- cooperation gives the best result for both people, but only if both decide to cooperate
- lack of trust leads to worse outcomes, because both sides choose caution over cooperation.

A. Solutions for the facilitator

Cycle 1: One round. First encounter with the dilemma (approx. 25 min)

Task 1: First choice – the signal of trust

Aim: Familiarising participants with the mechanics of the dilemma in robotics practice. The robot must send its decision to the partner without knowing what the partner will choose.

Step 1. Introduction (5 min):

Explain the mechanism of the dilemma: "Cooperate" (stay silent) or "Betray" (testify)? Stress that in this round the robots have no knowledge of the other robot's earlier behaviour.

Present the scoring matrix.

	Robot 2: cooperates	**Robot 2: betrays**
Robot 1: cooperates	Robot 1: +3 pts, Robot 2: +3 pts	Robot 1: 0 pts, Robot 2: +5 pts

Robot 1: betrays	Robot 1: +5 pts, Robot 2: 0 pts	Robot 1: +1 pt, Robot 2: +1 pt

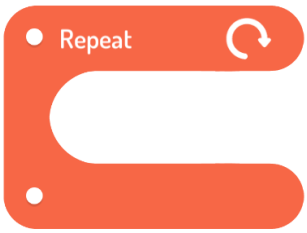
Step 2. Show how the robots work (5 min):

This time we will raise our programming level and use the Photon Code level (Level: master) for the tasks in this scenario.

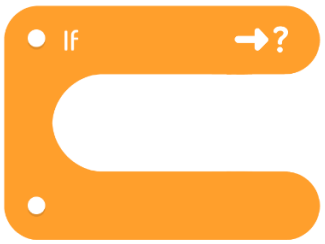


The coloured blocks with instructions will be replaced by blocks of the same shape with English-language labels. All blocks are in the same places in the menu as the blocks from the Photon Blocks level (Level: expert), which we used in the earlier tasks.

Because our program is to run continuously, we need to use the REPEAT block and set it to repeat an infinite number of times. Show participants what the block used earlier looked like and its equivalent at this coding level. We choose the number of repetitions as we have done so far in graphic mode; the system will enter the appropriate word in our instruction.



Next, we “insert” an IF block into the REPEAT block and choose the desired sensor from the graphical menu. In our case, let us decide that the signal to start presenting the “robot’s decision” will be touching it.

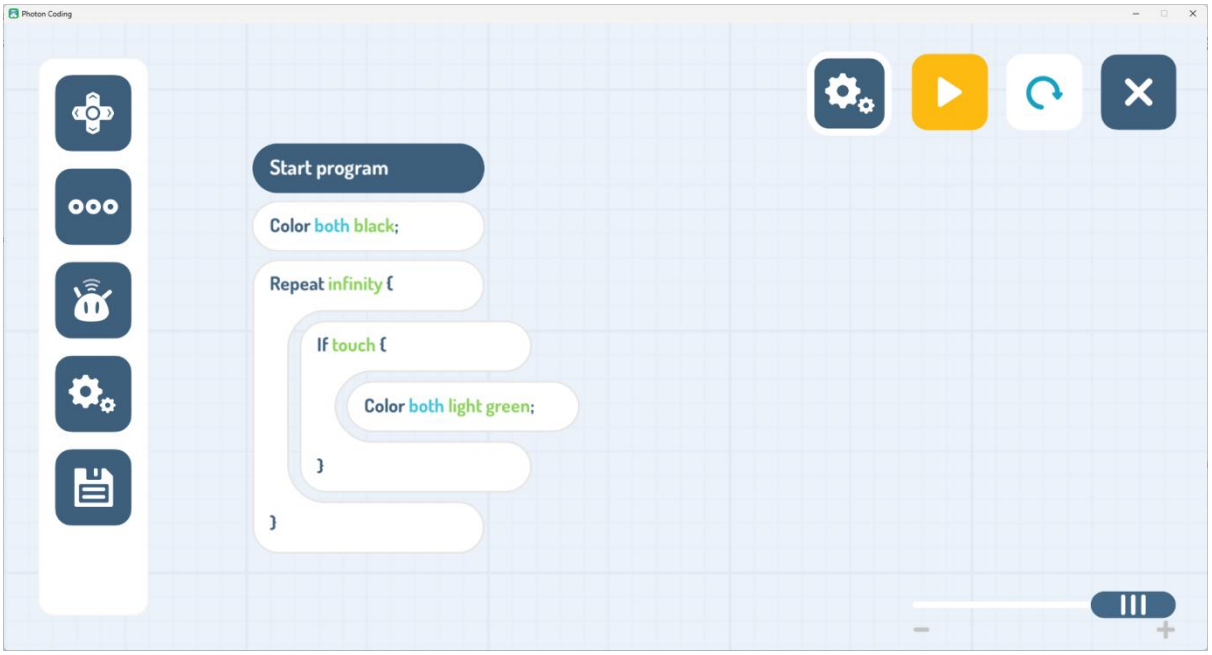


And we set the chosen colour



Remember to set a different colour at the start of the program, so that its change can be noticed.

An example of a finished program looks as follows:



Step 3. Present the task (5 min):

The young people split into two pairs; each pair programs one robot for a single “blind round”. They must decide on a starting strategy and code it. Each pair agrees on its decision privately, in secret from the other pair. The robot is to “decide” between two signals – green (cooperation) or red (betrayal) – and show the result by changing colour, without peeking at the other robot’s decision. Both pairs touch their robots at the same time to demonstrate the

decisions made by the robots (in this case, the decision made by the given pair). They record the score on the worksheet using the points matrix. We keep the programs they have written for the next task.

Step 4: The philosophical problem (summary script, 2 min):

What you have just played is a game-theory problem: the prisoner's dilemma. Imagine two criminals caught by the police and interrogated separately, with no way of contacting each other. Each has a choice: stay silent (cooperate with their partner) or betray them by incriminating them in testimony. If both stay silent, both get a low sentence. If both betray, both get a medium sentence. But if one betrays and the other stays silent, the betrayer goes free, and the one who stayed silent gets the highest sentence. Notice: you do not know the other side's decision, exactly like your robots.

Step 5: Discussion (8 min). Guiding questions:

- If you were a robot, would you trust the other side and choose cooperation? Why? *I would remove this question*
- Which decision gives the highest POSSIBLE individual result? And which is the safest when you do not trust the other side?
- Is "betraying" rational even if you both know that cooperation would give a better result for both of you together?
- What has this game taught you about building cooperation in situations where trust is risky?
- How many points did your group score? Do you regret your strategy?

Cycle 2: The story of two prisoners. Why does "logic" fail? (approx. 20 min)

Step 1: Deepening the problem (5 min, script):

The paradox is that each person individually, thinking purely 'logically', reaches the conclusion: 'whatever the other person does, it is better for me to betray': if the other side cooperates, I will get more by betraying (5 instead of 3). If the other side betrays, I will still get more by betraying (1 instead of 0). So betrayal always seems better from one person's point of view. The problem is that BOTH sides reason the same way, so both betray and both end up with a worse result (1 point each) than if both had trusted each other and cooperated (3 points each).

Step 2: Discussion (10 min). Guiding questions:

- How is it possible that each side behaves "rationally", yet together they achieve a worse result than if they had trusted each other?
- Do you know situations from life that work in a similar way? (e.g. two companies cut prices in a price war, two countries arm themselves instead of disarming, participants cheat instead of studying).
- What would have to change for both sides to start trusting each other?

Step 3: Recording on the worksheet (5 min). Participants write down one example from their own lives (family, group of friends) where a lack of trust leads to a worse outcome for everyone than cooperation would.

Cycle 3: Multi-round game: is it worth trusting again? (approx. 25 min)

Task 2: Strategy – The robot that remembers

Aim: Introducing the mechanics of a multi-round game and conditional logic based on "memory" of the opponent's previous move. Participants investigate how the repetition of interactions affects whether cooperation pays off

Step 1. Introduction (3 min):

In real life we rarely play only once – we meet the same people many times. That changes the game. If you betray once, the other side may remember it and betray you next time. Let's check whether this changes your strategy.

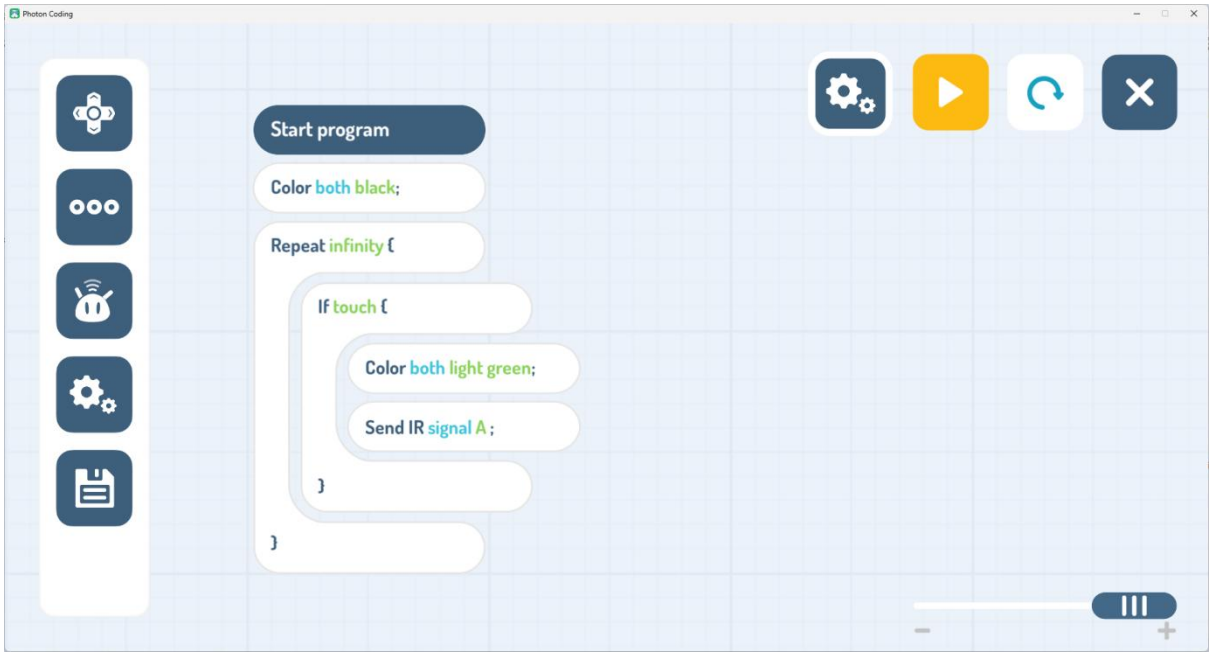
Step 2. Show how the robots work (10 min):

Remember to place the robots facing each other at the same height; this will help ensure correct communication between them.

Since the only way to react to what the robot has shown is to receive an IR signal from it, we will add to our previous programs the sending of a signal (signal A – if it "cooperates", signal B – if it "betrays").



Our example program that sends a signal to the other robot in the pair now looks like this:

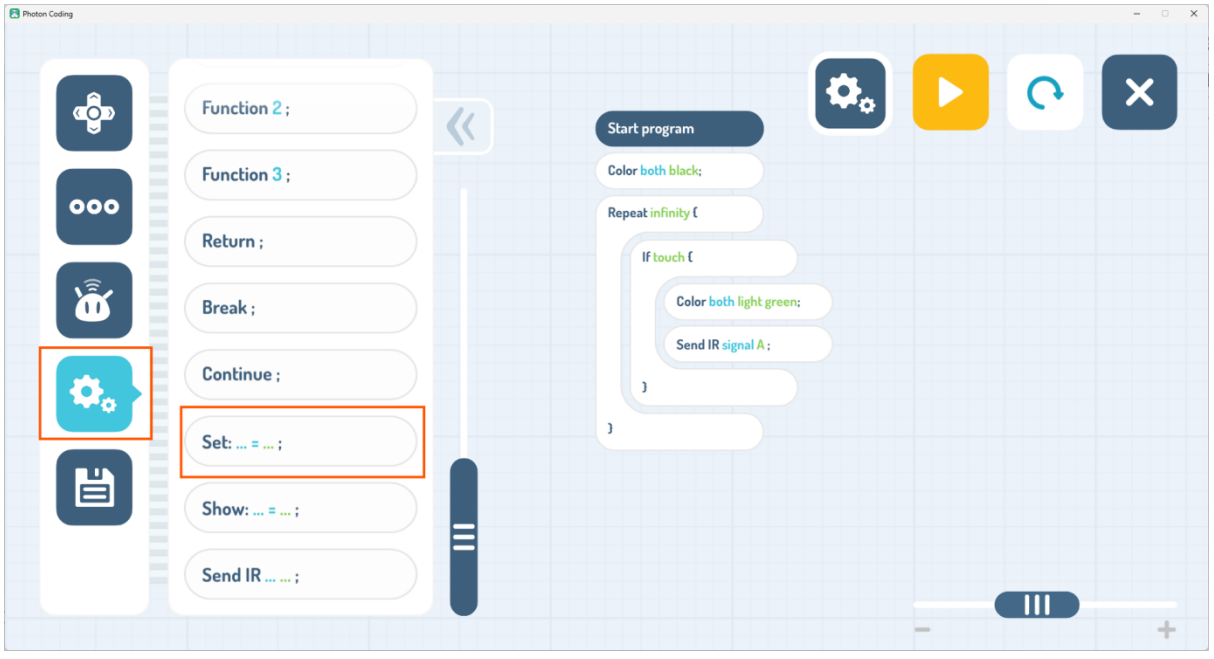


Because in the next round we want to refer to the signal sent in the previous round, we will save this signal in a variable.

In programming, a variable is a kind of “box” with a label, which is used for storing a specific piece of information that we want to come back to later. In our case, in variable X (box X) we will store the value 1 if its partner cooperated in the last round and the value 2 if in the last round it “betrayed”.

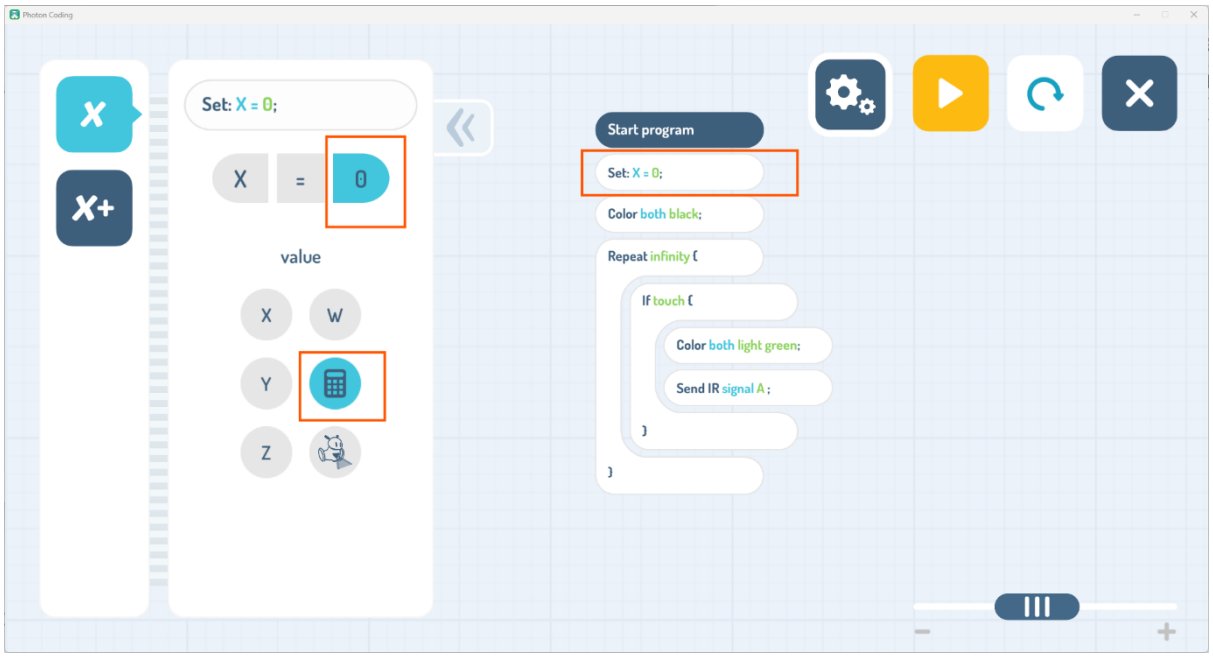
At the start of the program we set the initial value of the variable, so that we are sure what its state is.

We set the variable by choosing SET…=…; from the menu with the gear icon and placing its block at the start of the program.



In our case we will use variable X, to which we will assign the initial value 0 – meaning that no signal has been sent yet.

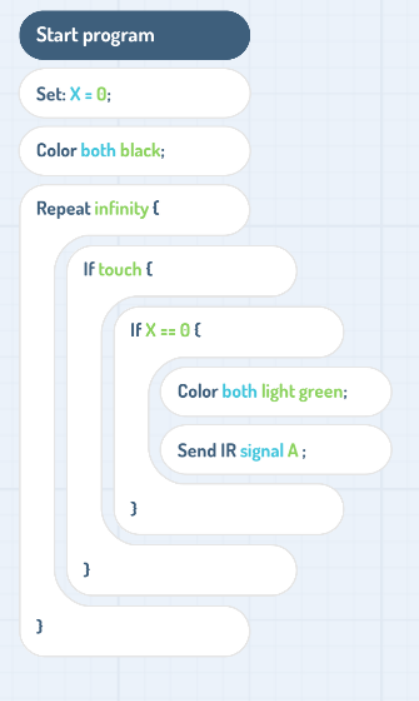
We choose the variable name by clicking on it, and its value by clicking on the value and then on the calculator, from which we select the appropriate number.



Next we add a condition to our previous program. Conditions that use variables are in the same block as the other types of conditions we have already used. Conditions relating to variables are hidden under the icon 

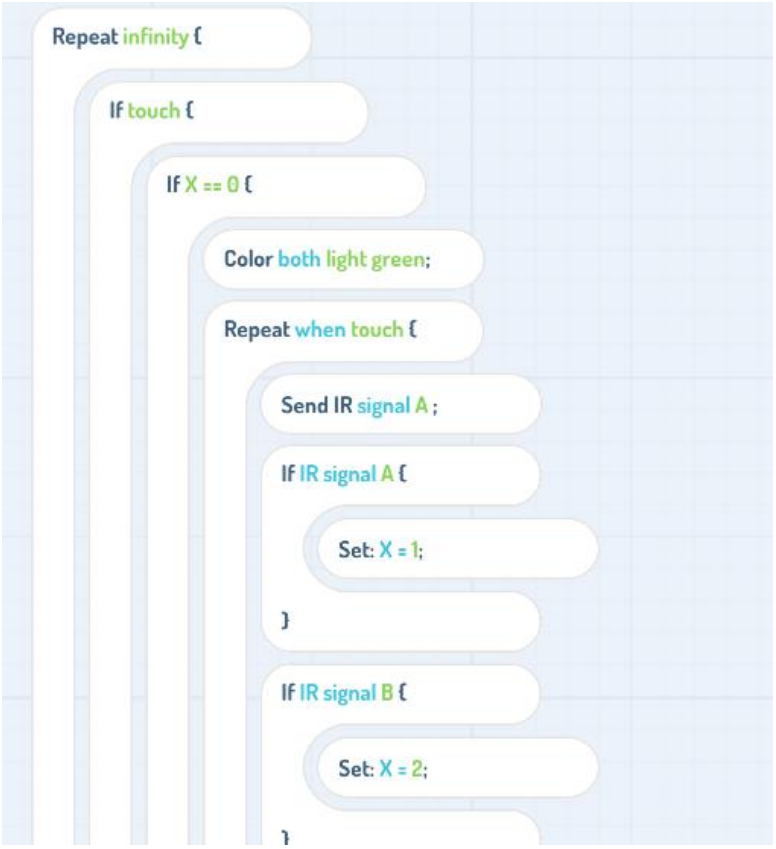
.

After adding a condition that checks whether this is the first turn, i.e. X==0 (in programming, comparing two values is usually done with two equals signs), our program looks like this:



Because of the Photons' communication limitations, we must make sure ourselves that both Photons send as well as receive the signal. The Repeat when touch loop will help us with this.

For as long as the Photon is touched, it will send and receive the signal, assigning the appropriate value to the variable; as agreed earlier, for "cooperation" this will be X=1, for "betrayal" X=2.



Let us agree that we touch the robots until both have received the signal. To show users that reception has taken place, let us add a change of colour to the starting colour (black) after the signal is received.

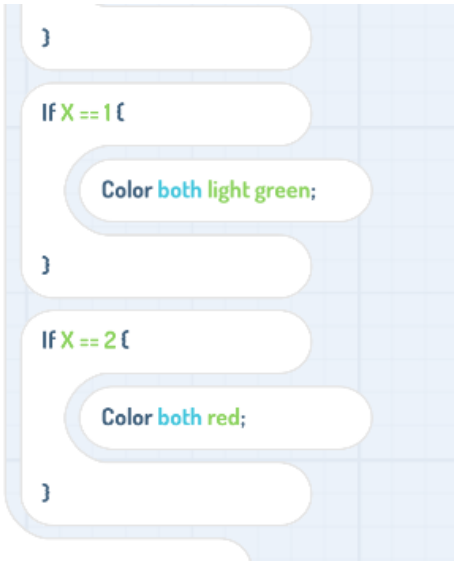


When both robots go dark, you can stop touching them and move automatically on to the second round.

We now know what answer the “partner” robot gave in the first round; we place our reaction in the appropriate conditional instructions: the response to “cooperation” goes in the instruction that checks whether X is 1, and the response to “betrayal” in the instruction that checks whether X is 2.



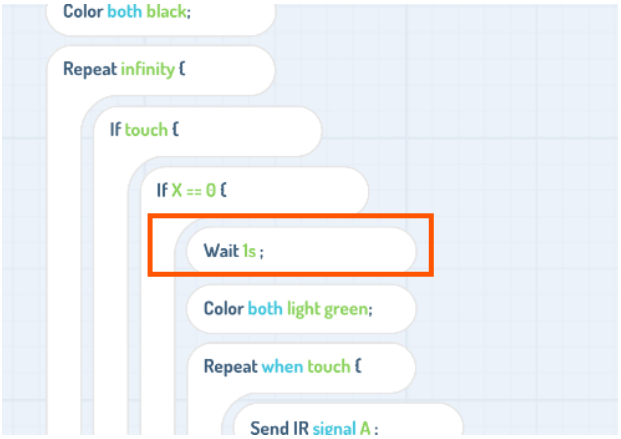
Let us assume that in our case we will respond to “cooperation” with “cooperation” (green colour), and to “betrayal” with “betrayal” (red colour).



Our program now looks like this:



Note: we will now add a change that should be made for only one of the robots: adding a 1 s wait at the start of round 1, so that the robots “understand each other” more quickly



Step 3. Present the task (15 min):

Pairs program the robots to play 2 rounds against the same opponent, this time with the ability to "remember" the opponent's previous decision. Each pair tests its own strategy: always cooperate, always betray, or "repeat what the opponent did in the previous round" (the "tit-for-tat" strategy). Both pairs touch their robots at the same time to demonstrate the decisions made by the robots, and hold them until the first round has finished. They record the score on the worksheet using the points matrix and compare it with each other.

Step 4: Discussion (7 min). Guiding questions: given the change to 2 rounds, we need to check whether these questions are still OK.

- Which strategy gave the best result in the longer game? Is that surprising?
- Does the "always betray" strategy lose its point when you play many times against the same person?
- Why does the "reciprocate" (tit-for-tat) strategy often win in the long run, even though it never achieves the maximum score in a single round?
- Did knowing that the "partner" robot would remember your move make you feel more responsible for your decision? How does this relate to building relationships and reputation in real life?

Cycle 4: Designing your own strategy + tournament (approx. 25 min)

Step 1: Design task (12 min). Groups design their own game strategy (it can be more complex than "tit-for-tat", e.g. "forgive one betrayal, but not a second") and program it into the robot. They record the strategy in words and in code.

Step 2: Mini-tournament (8 min). Each pair plays its strategy against two or three other pairs (5 rounds each); the facilitator adds up the results on the board.

Step 3: Final reflection (5 min). Guiding questions:

- Which strategy won the tournament? What did this teach you about trust and cooperation?
- Is it possible to “win” the prisoner’s dilemma by always betraying? And by always cooperating?
- One summarising sentence: what does this dilemma say about why it is sometimes hard to trust someone, even when cooperation would be better for both sides?

Difficulty variants

Basic variant (described above): ready-made payoff matrix, simple strategies (always cooperate/always betray/tit-for-tat), 5 rounds.

Extended variant: in Cycle 4 the group programs a strategy with an element of “forgiveness” (e.g. returns to cooperation after 2 rounds of punishment for betrayal) and tests it in a longer game (10+ rounds) and against a “random” strategy. This introduces participants to a real problem studied in game theory – why strategies that are too vengeful lose in the long run, while those that are too trusting get exploited, and how to find a balance between them.

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4

SCENARIO TESTING PROCESS

- TESTING PROCESS
- KEY FINDINGS FROM THE TESTS
- CHANGES AND IMPROVEMENTS INTRODUCED
- IMPACT ON THE FINAL VERSION OF THE SCENARIOS

TESTING AND VALIDATION PROCESS OF THE SCENARIOS

Testing Procedure

The scenarios were tested by the project partners with different groups of young people in order to assess their understanding, attractiveness, effectiveness, and potential for practical application. The testing covered both robotics activities and philosophy modules, with feedback collected from teachers, facilitators, and participants.

On the French side, testing was carried out at PRISME, a training organisation supporting young people and adults on their path towards professional integration. The activities were conducted with approximately ten young people, which also made it possible to test the scenarios with a group with diverse educational backgrounds and needs.

Testing was carried out particularly extensively at the Vocational School Complex in May 2026, where 10 modules were delivered to 80 students aged 15–17 from a vocational hospitality programme and a general upper-secondary school programme. Three teachers participated in the testing.

Key Observations

The testing revealed a clear difference in how the two components were received. The robotics activities generated a very high level of interest – students were eager to experiment, modify the robots' behaviour, and take on additional challenges. At the same time, it became clear that some tasks were too easy for students with previous programming experience. This indicates the need to introduce different levels of difficulty.

The philosophy component was considerably more demanding. Teachers pointed to the high level of subject-matter preparation required to deliver the activities, the overly abstract presentation of some topics, and the lack of sufficiently detailed step-by-step instructions. Students, meanwhile, had difficulty seeing the connection between the issues being discussed, their own experience, and their future profession, and their engagement decreased during longer theoretical sections.

At the same time, testing of individual scenarios showed that philosophical issues can be effectively understood when they are directly linked to practical experience. The scenario on perception (“A Matter of Perception”) was very well received, and the use of optical illusions, sensory experiences, and robotics helped participants understand the concepts. In contrast, the scenario on embodiment (“I Have a Body and I Am a Body”) proved more difficult for participants without previous experience in philosophy. However, the exercise involving the robot helped translate abstract concepts into a concrete experience.

Conclusions from the Testing

The most important conclusion is the need for a closer connection between philosophy and practical activity. The current model, in which a longer philosophical introduction precedes the work with the robot, may lead to a loss of interest and difficulties in understanding the concepts being discussed.

Therefore, an iterative model based on short cycles is recommended, in which working with the robot leads directly to philosophical reflection:

robotics task → observation → short philosophical question/problem → discussion → modification of the robot’s activity → reflection.

In this way, philosophy is not an abstract introduction, but becomes a tool for explaining an experience that the student has just had.

Improving the Scenarios

Based on the testing results, several key areas for change were identified:

- reducing lengthy theoretical content and replacing it with short questions, thought experiments, and concrete examples;
- dividing the scenarios into short, 15–20-minute micro-cycles instead of one extended theoretical section;
- preparing more detailed instructions for teachers, including ready-made questions and suggestions for how to facilitate discussions;
- making greater use of illustrations, videos, animations, audio materials, and other multimedia formats, including materials created using AI;

- making visual materials and QR codes a permanent element of the scenarios, rather than merely optional additions;
- adapting examples to the age, experience, and vocational profile of participants, for example by using hospitality-related contexts or other technical fields;
- preparing two levels of difficulty – basic and advanced – for both philosophical and programming tasks;
- adapting the organisation of work with the robots so that, ultimately, there are no more than two students per device.

More practical solutions were also introduced to facilitate the implementation of selected exercises, including alternative ways of conducting experiments and adding example programming solutions to the materials. The need to correct language and editorial errors in the materials was also identified.

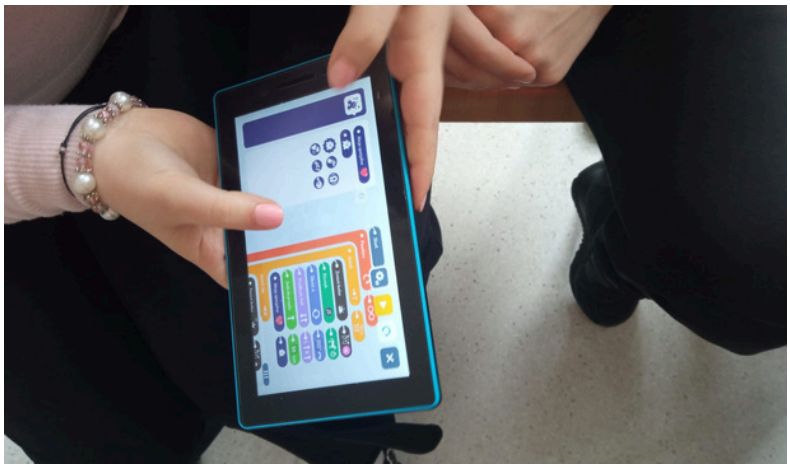
Impact of the Testing on the Further Development of the Project

The testing phase made it possible not only to verify individual scenarios, but above all to determine what an effective combination of robotics and philosophy should look like. The results indicate that the potential of this combination is significant, but that it requires a shift away from the traditional model of delivering philosophical content towards learning through experience, experimentation, and interaction.

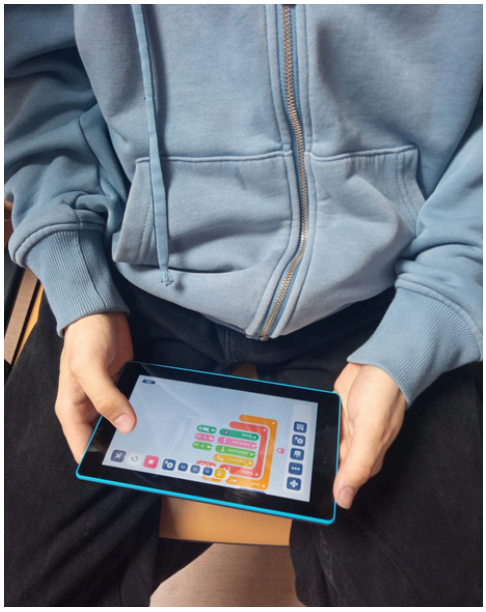
For the next version of the programme, it would be worthwhile to apply an iterative piloting model: after restructuring the scenarios, conduct another round of testing using the same methodology for observation and feedback collection. This would make it possible to compare the results of the two stages and determine whether the changes introduced actually improve participants' understanding and engagement.

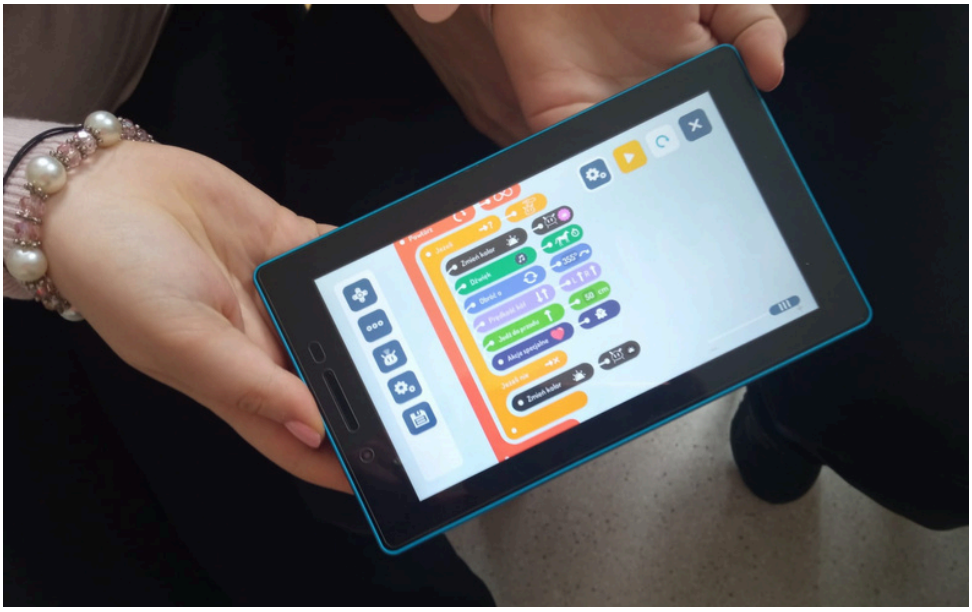
The testing experience also points to the need to treat teacher support as a separate element of the project output – through ready-to-use step-by-step scenarios, short instructional materials, sets of questions and examples, and opportunities for teachers from different countries to exchange experiences.

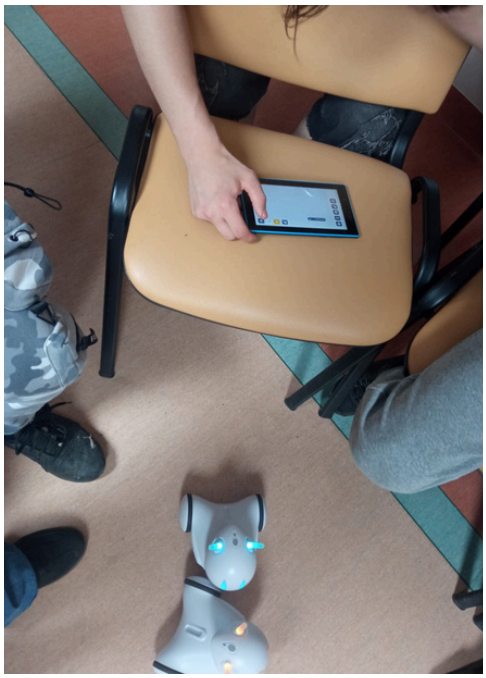
Photo Gallery: Testing Sessions





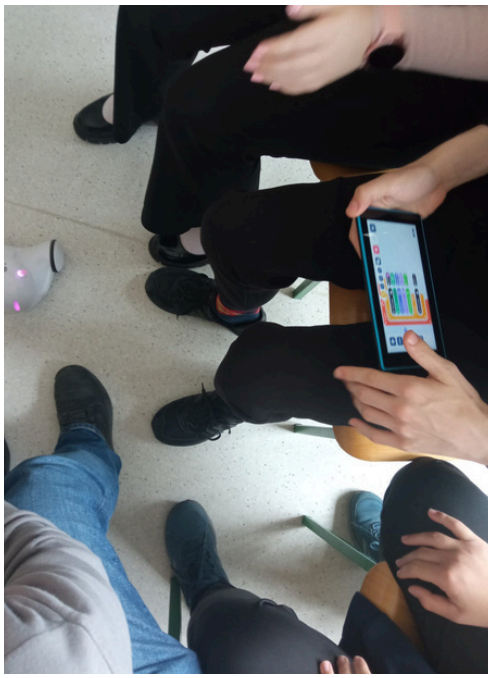












ANEXS



Photo Gallery: Testing Sessions & Final Conference













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