PHYSICAL COMPUTING WITH ARDUINO

THEME	Starting the programming of an Arduino board or similar
FORMAT	Groups or pairs
PREPARATION TIME	15 minutes
ACTIVITY LENGHT	1h30
DIFFICULTY LEVEL	Low-average

PEDAGOGIC GOALS

This activity seeks to introduce students to the control of analog outputs through the creation of an interactive artistic project. In this project, students will have the opportunity to work on a personal project, defined according to their interests, and to express their creativity in creating an artistic work.

This activity has as specific objectives:

- To offer opportunities for creative expression
- To understand the mechanism for programming PWM outputs and analog inputs

NECESSARY MATERIALS

For each group of students:

- 1 computer
- 1 Arduino board
- 1 breadboard
- 3 LEDs
- 3 220 Ohms resistors (to the LEDs)
- 1 LDR (luminosity sensor)
- 1 1 Kohm resistor (to the LDR)
- Male-male jumper wires
- Paper sheets, markers and colored pencils

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Preparation:

- Start by creating your own circuit for tests and for example: assemble a circuit with 1 LDR and 1 LED on the breadboard, and a program that controls the luminous intensity of the LED from the reading of the environment brightness.
- Prepare the sets of materials for each group.

Leading the activity:

- Start by presenting your project to the class, in which the light intensity of the LED is controlled from the brightness of the environment.
- Show the code used, and the command that controls the PWM output.
- Then, offer the materials to each group, who must create an interactive installation using a light sensor and up to 3 LEDs. Inform the class that there is no right answer expected, and that they can define how they will control the LEDs with the brightness sensor. Papers and pens (and, eventually, other artistic or scrap materials that you want to use) can be used for the artistic aspect of the project.
- Inform students that every 15 minutes, you will turn off the lights in the room. At these times, it will be possible to observe the LEDs behaving in different ways due to the change in the brightness of the environment. It is not necessary for students to complete their projects in 15 minutes - these are just moments of intermediate tests, in which students can contemplate the progress of their own projects and that of colleagues.
- At the end of the activity, organize a group exhibition moment, in which students circulate around the room to appreciate the projects created by the class.
- If Internet is available, students can consult the Code IoT platform materials for the development of the project.

Discussion and reflection:
- After completing the activity, ask each group to present the work created. At this point, groups can comment on things like:
    - What was the initial idea of the project? How has it changed over the course of its development?
    - How was the development process? What was more difficult? What was easy?
    - What did we learn in this project?
    - What would I do if there was more time?

Credits:
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