Lesson Plan: Connecting a Temperature Sensor to an Arduino Breadboard

Teacher: PEDRO BLAYA

Subject: Technology

Title : Lesson	**Time :** 45 minutes
Subject : ***temática***	
Aim: To introduce students to the basics of connecting a temperature sensor to an Arduino breadboard and displaying temperature data on a computer screen.	
Key CS elements: decomposition, pattern recognition, abstraction, algorithm design	
Age group : curso y edad alumnos	
Learning situations: classrooms	**Activity type :**

Resources :

- Arduino microcontroller
- Breadboard
- Temperature sensor
- USB cable
- Computer with internet access

Principles of Computational Thinking:

- **Decomposition:** Breaking down the process of connecting the temperature sensor into smaller, manageable steps.
- **Pattern Recognition:** Identifying common patterns in the connections and code used for the project.
- **Abstraction:** Focusing on the essential components and concepts involved in connecting the sensor and displaying temperature data.
- **Algorithm Design:** Creating a step-by-step plan (algorithm) for connecting the sensor and programming the Arduino.

Learning development:

Introduction (10 minutes):

1. Begin by discussing the importance of sensors in electronics and how they are used to measure various physical quantities like temperature.
2. Introduce the Arduino microcontroller and explain its role in processing data from sensors.
3. Discuss the goal of the lesson: to connect a temperature sensor to the Arduino breadboard and display temperature data on a computer screen.

Activity (25 minutes):

1. **Decomposition:**
   - Explain the step-by-step process of connecting the temperature sensor using the provided algorithm.
   - Divide the process into smaller steps and demonstrate each step to the students.

2. **Pattern Recognition:**
   - Encourage students to identify common patterns in the connections made on the breadboard and the code used in the Arduino IDE such as
     - connecting components to specific pins on the Arduino board.

- reading analog data from the temperature sensor using the analog pin.
- sending data over the serial port to communicate with the computer.

3. **Abstraction:**
   - Emphasize the key concepts involved, such as connecting sensors, reading analog data, and displaying data on a computer such as
     - understanding the role of the temperature sensor in measuring ambient temperature.
     - knowing the basics of Arduino programming, including reading analog inputs and sending data over the serial port.
     - recognizing the need to establish communication between the Arduino board and the computer for data visualization.

   - Discuss the importance of understanding these concepts in building more complex projects in the future.

4. **Algorithm Design:**

Step 1: Take the Breadboard and put it in the right position (pic1)
Step 2: Connect the temperature sensor on the Breadboard (pic1)
Step 3: Connect the red grounding cable to the Breadboard and Microcontroller (pic2)
Step 4: Connect the green data transmission cable to the Breadboard and Microcontroller (pic2)
Step 5: Connect the usb cable to the computer and the Arduino microcontroller to establish communication between them (pic3)
Step 6: Open the link arduinoblocks.com (pic4)
Step 7: Create variable to store the temperature values into the loop block (Control Category) (pic5, pic6)
Step 8: From the Input/Output category choose the Read Analogue Pin(A0). Pin 0 (pic7)
Step 9: In the SetUp block we put from the Communication / Serial Port we choose the Init Baudrate(9600) block (pic8)
Step 10: From the Communication / Serial Port we choose the Send block and put it into the Loop block together with the temperature variable (pic8)
Step 11: Press Upload (pic9)
Step 12: Press Console (pic9)
Step 13: Press Connect to display temperature data on the screen (pic9)

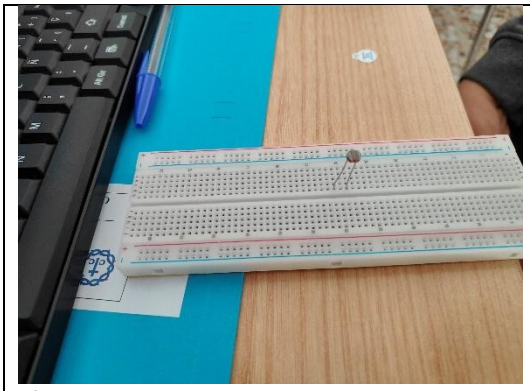
Hands-on Practice (10 minutes):

1. Distribute the materials to each group of students.
2. Allow students to follow the provided algorithm and connect the temperature sensor to the Arduino breadboard.
3. Assist students as needed and encourage them to troubleshoot any issues they encounter.

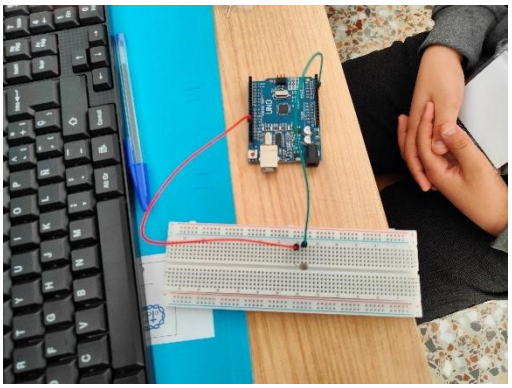
Conclusion (5 minutes):

1. Review the key concepts learned during the lesson, including decomposition, pattern recognition, abstraction, and algorithm design.
2. Discuss the importance of these concepts in problem-solving and project development.
3. Encourage students to explore further projects involving sensors and Arduino microcontrollers.

Pictures

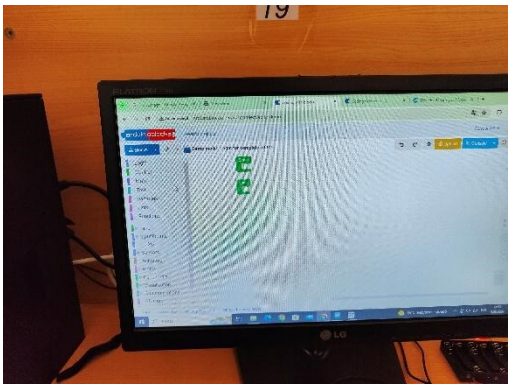


Pic 1

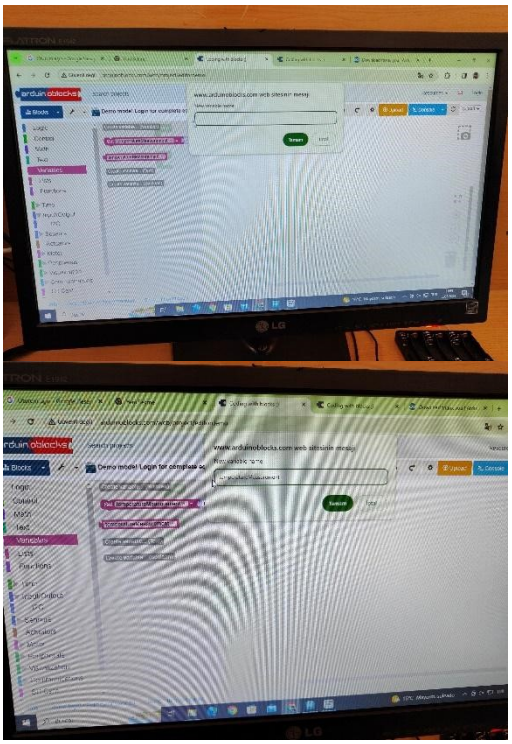


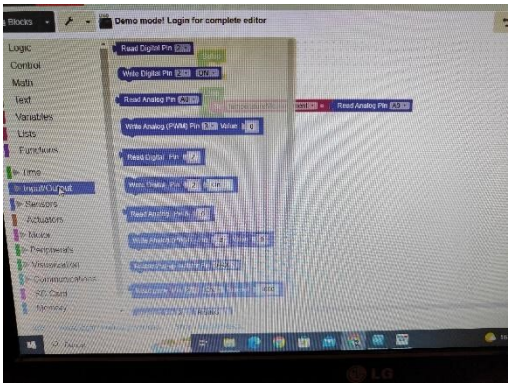
Pic 2

Pic 3

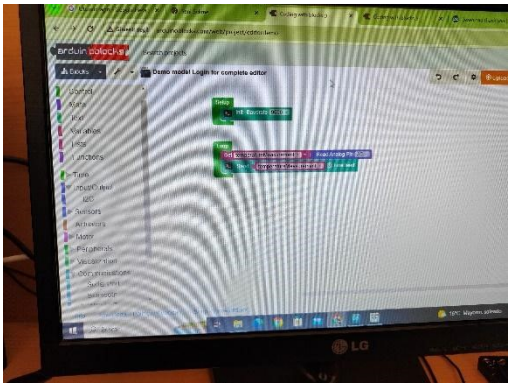


Pic 4

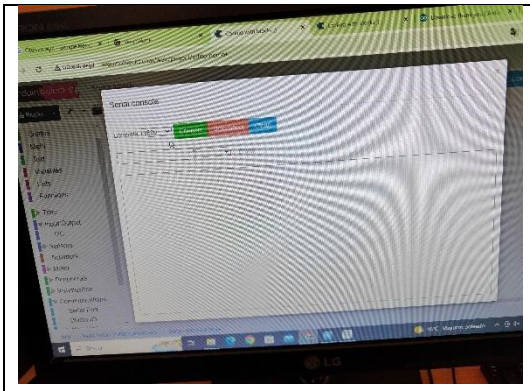




Pic 7



Pic 8



Pic 9

Assessment:

Expected results:

Notes: