Nuevo Foundation Workshop

Sun follower project

**Difficulty: Intermediate**

**I. Introduction**

* **A. Project Overview**
  + Brief explanation of what a sun follower (solar tracker) is and its purpose.
  + Story or use for this workshop
  + Overview of the project goals and components.
* **B. Importance of Solar Energy**
  + Discuss the benefits of using solar energy.
  + Explain how solar tracking can increase energy efficiency.

**II. Materials Needed**

* **A. Hardware Components**
  + 4 Light Dependent Resistors (LDR)
  + 2 Servo Motors (SG90)
  + Arduino Nano Board
  + Breadboard and Jumper Wires
  + Power Supply (battery or USB cable)
  + Base and Frame for Mounting Components
  + Solar cells (optional)
* **B. Software**
  + Arduino IDE

**III. Understanding the Components (could be an appendix)**

* **A. Light Dependent Resistors (LDR)**
  + How LDRs work and their role in the project.
* **B. Servo Motors**
  + Explanation of servo motors and their functionality.
* **C. Arduino Nano**
  + Introduction to Arduino Nano and its capabilities.
* **D. Solar Cells**
  + Basic principles of solar cells and energy harvesting.

**IV. Building the Circuit**

* **A. Setting Up the Breadboard**
  + Placement of Arduino Nano, LDRs, and connections.
* **B. Connecting the Servo Motors**
  + Wiring the servo motors to the Arduino Nano.
* **C. Integrating Solar Cells (optional)**
  + Connecting the solar cells to the circuit.

**V. Coding in Arduino IDE**

* **A. Introduction to Arduino IDE**
  + Overview of the software and basic functionality.
* **B. Writing the Code**
  + Step-by-step guide to writing the code for the sun follower.
  + Explanation of each part of the code.
* **C. Uploading the Code**
  + How to upload the code to the Arduino Nano.

**VI. Testing and Calibration (optional calibration)**

* **A. Initial Testing**
  + Powering up the system and observing the initial behavior.
* **B. Calibration of LDRs**
  + Adjusting the sensitivity of the LDRs.
* **C. Fine-Tuning the Servos**
  + Ensuring the servo motors respond correctly to light changes.

**VII. Extensions**

* **A. Project Extensions**
  + Ideas for further development and enhancements.
  + Adding features like data logging, remote monitoring, etc.
  + Added stand alone feature.

**VIII. Conclusion**

* **A. Recap of the Project**
  + Summary of what was learned and achieved.
* **B. Encouragement to Explore Further**
  + Motivating students to explore more projects in renewable energy and engineering.

**I. Introduction**

* **A. Project Overview**
  + A sun follower, or solar tracker, is a device that moves solar panels to follow the sun throughout the day. This helps the panels get more sunlight and produce more energy compared to panels that stay in one place. It's like how a sunflower turns to face the sun!
  + William Kamkwamba, a young innovator from Malawi, built wind turbines and solar trackers from scrap materials to generate electricity and improve life in his village. Inspired by his story, the Nuevo Foundation designed a sun follower workshop to teach students about renewable energy. This hands-on project not only educates them about solar technology but also motivates them to pursue STEM careers and use their skills to make a positive impact on their communities, just like William did.
* **B. Project goals**
  + Educate on renewable energy: teach students about the importance and principles of solar energy.
  + Hands-On learning: provide practical experience in building and programming a sun follower.
  + Inspire innovation: motivate students to explore STEM careers and think creatively about solving real-world problems.
* **C. Importance of Solar Energy**
  + Solar energy is really important because it is a permanent source of light and warmth that comes from the Sun .It’s a clean and renewable source of power that helps us create electricity without polluting the air or harming the environment. Unlike fossil fuels, which can run out and pollute, solar energy is endless and safe for the planet. By using solar energy, we can power our homes, schools, and gadgets while taking care of Earth. It’s a smart way to help fight climate change and make sure our world stays healthy for everyone.

**II. Materials Needed**

* **A. Hardware Components**
  + 4 Light Dependent Resistors (LDR) ~ 5 USD a pack on amazon
  + 2 Servo Motors (SG90) ~ 7 USD for 3 on amazon
  + Arduino Nano Board ~ 7 USD each on amazon
  + Breadboard and Jumper Wires ~ 10 USD on amazon
  + Power Supply (battery or USB cable)
  + Base and Frame for Mounting Components (cardboard)
  + Solar cells (optional) ~ 15 USD
    - *Prices can be way cheaper in low cost webpages*
* **B. Software**
  + Arduino IDE

**III. Understanding the Components (could be an appendix)**

* **A. Light Dependent Resistors (LDR)**
  + How LDRs work and their role in the project.
* **B. Servo Motors**
  + Explanation of servo motors and their functionality.
* **C. Arduino Nano**
  + Introduction to Arduino Nano and its capabilities.
* **D. Solar Cells**
  + Basic principles of solar cells and energy harvesting.

**IV. Building the Project**

* **A. Building the cardboard structure**
  + Cutting pieces and putting them together.
* **B. Setting Up the Breadboard**
  + Placement of Arduino Nano, LDRs, and connections.
* **C. Connecting the Servo Motors**
  + Wiring the servo motors to the Arduino Nano.
* **D. Integrating Solar Cells (optional)**
  + Connecting the solar cells to the circuit.

**V. Connecting and Coding in Arduino IDE**

* **A. Introduction to Arduino IDE**
  + Overview of the software and basic functionality.
* **B. Writing the Code**
  + Step-by-step guide to writing the code for the sun follower.
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