Arduino Watering System

Developed by Danmar Computers

A Trainers Toolkit To Foster STEM Skills Using Microcontroller Applications

Co-funded by the Erasmus+ Programme of the European Union

Project No. 2019-1-RO01-KA202-063965

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Aim

Use the Arduino plant watering system to explain and help students automate the most essential process in nature.

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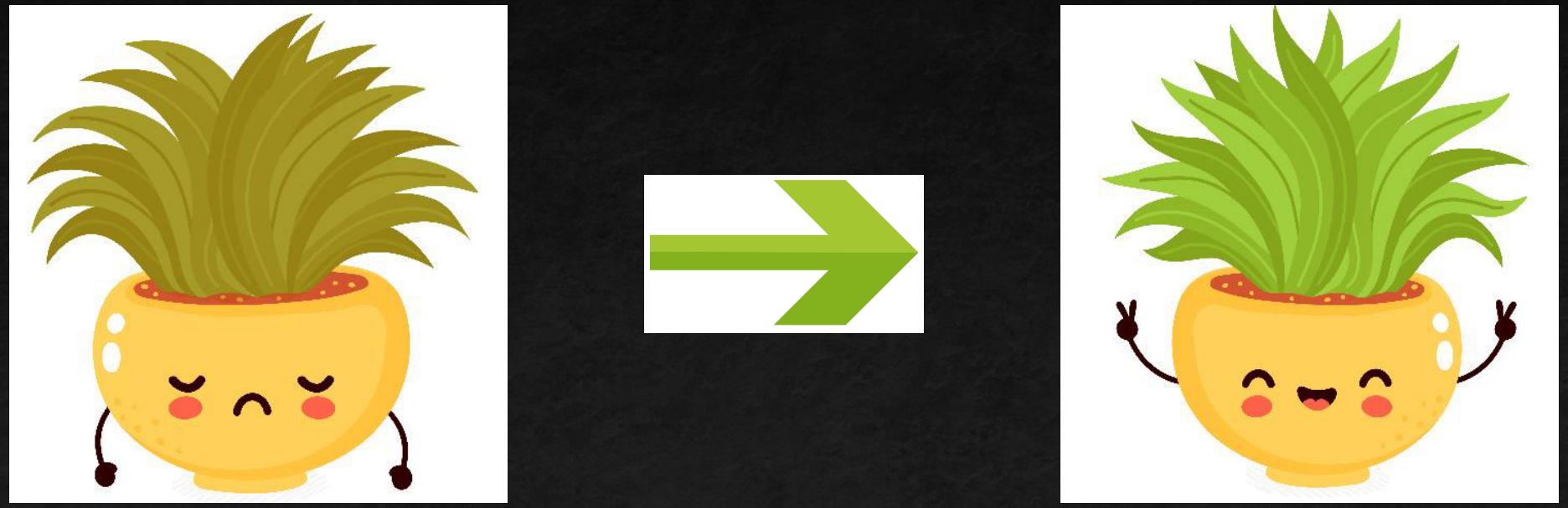
Description

- Plants need water to carry out the process of photolysis, in which water is split using light energy. Photolysis is part one of the steps in photosynthesis where the plant obtains energy.



Source: Freepik

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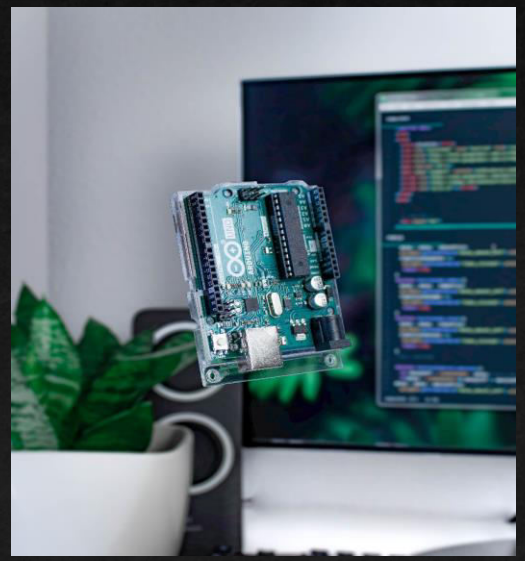
Description

- Arduino plant irrigation system consists of microcontroller, relay, moisture sensor, pump and power source.
- With these components, you can easily build an irrigation system powered by Arduino. In combination with the sensor, the dispenser responds to dry soil and provides life-giving water to the plants.
- In this simplest way, students will learn how microcontrollers can be used in everyday life. When they go on vacation or study camps, they won't have to worry about leaving plants behind.



Source: Unsplash

Source: Freepik

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Learning Goals

- Students understand the basic principles of electronics and biology
- Students understand the role of water in plant growth
- Students will understand how electronics can automate everyday activities

Source: Freepik

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Learning Methodologies

- Students discover how plants respond to a deficit, excess, or optimal amount of water supply.
- The teacher assigns groups to care for several plants. For comparison, one of the plants is cared for by an automated watering system.
- At the end of the project, the students draw conclusions as to which form suits them better, and which plant has achieved the best growth.

Source: Freepik

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Target Group

Primary and secondary school students

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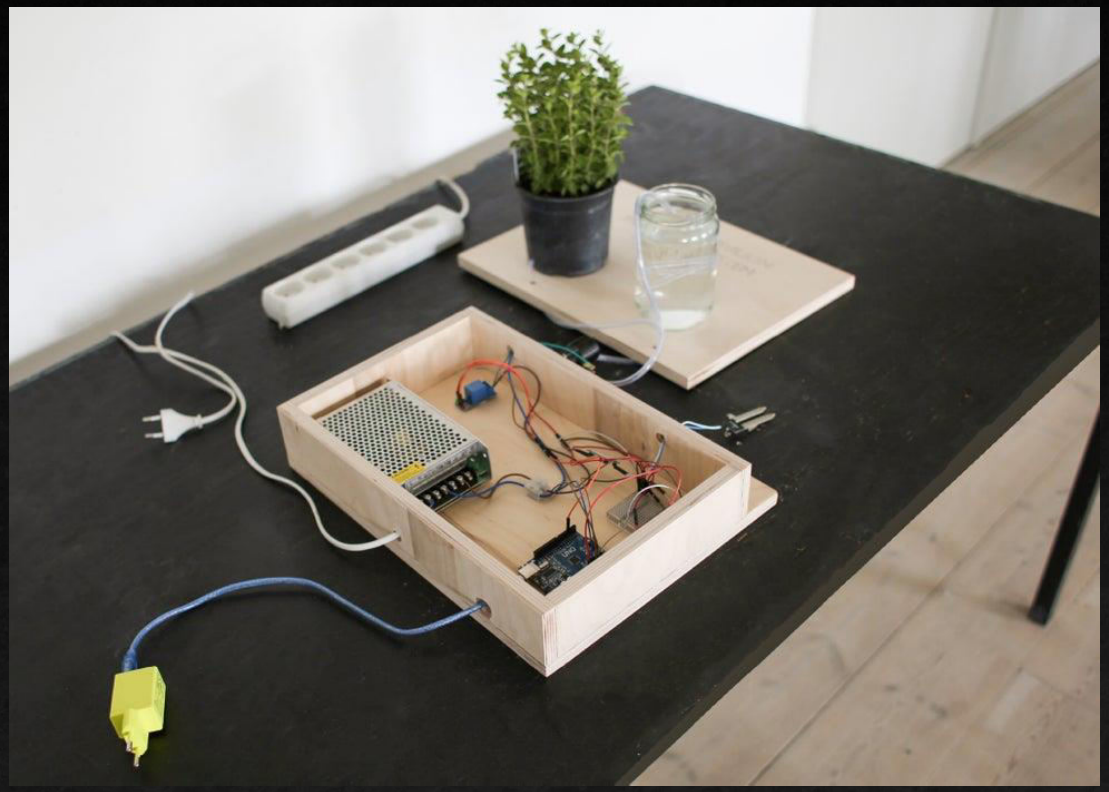
Learning Schema



Source: Instructables - Arduino Plant Watering System

- Learn the structure and requirements of the plant.
- Find the optimum sun exposure
- Install an automatic irrigation system

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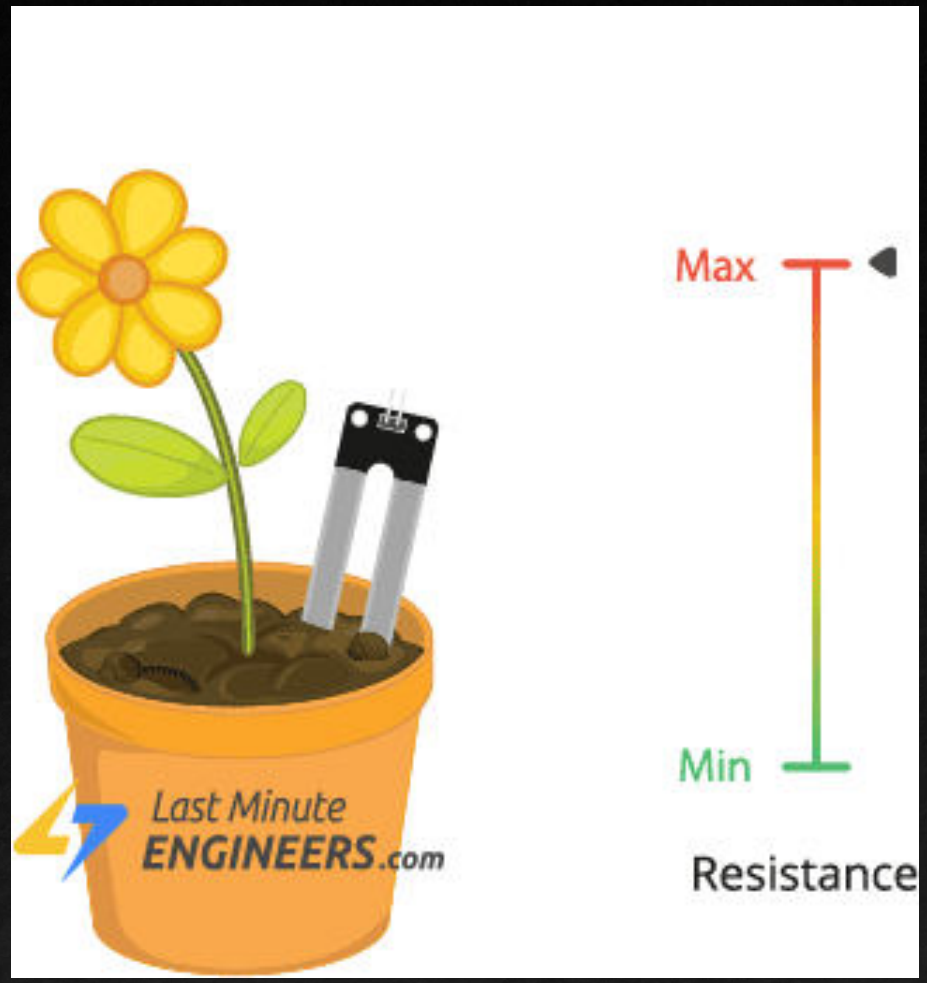
Solution



Source: lastminuteengineers

Soil moisture is measured by the electric current passing from one probe to another.
The resistance of the soil is measured, which the system converts into soil moisture.
The wetter the soil, the better the electric current flows and the lower the resistance.

However, when the soil is dry, the conductivity decreases. Soil needs watering!

The interpreter sends a signal to the pump, which injects the water.

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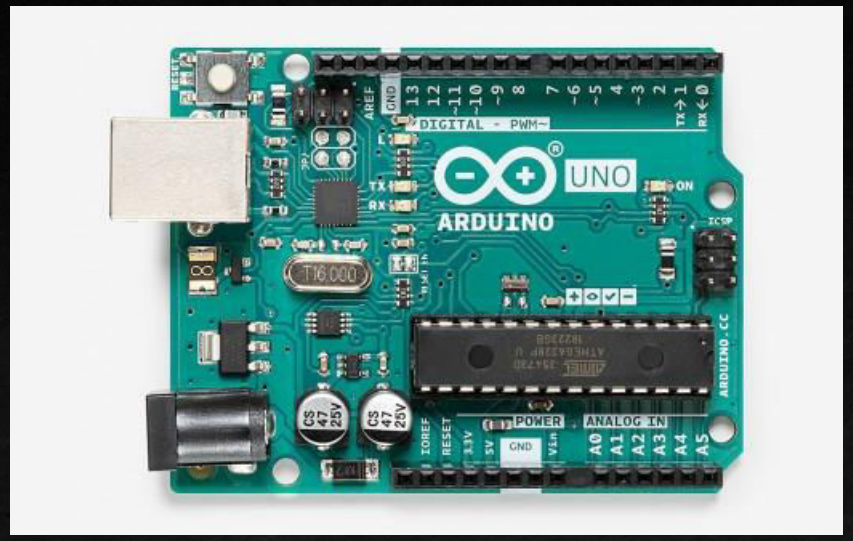
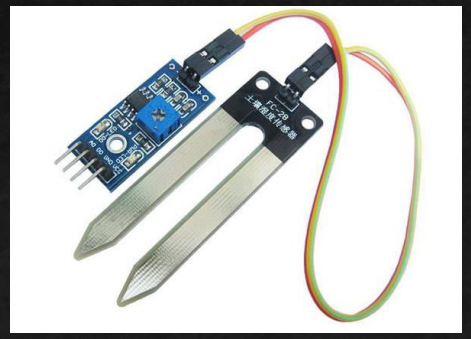
Solution

- The following components are required for preparation:



- ARDUINO UNO
- Relay
- Soil Moisture Sensor



- 12V water pump with hose
- Jumper Wires
- 12V power source

Source: Store.arduino.cc

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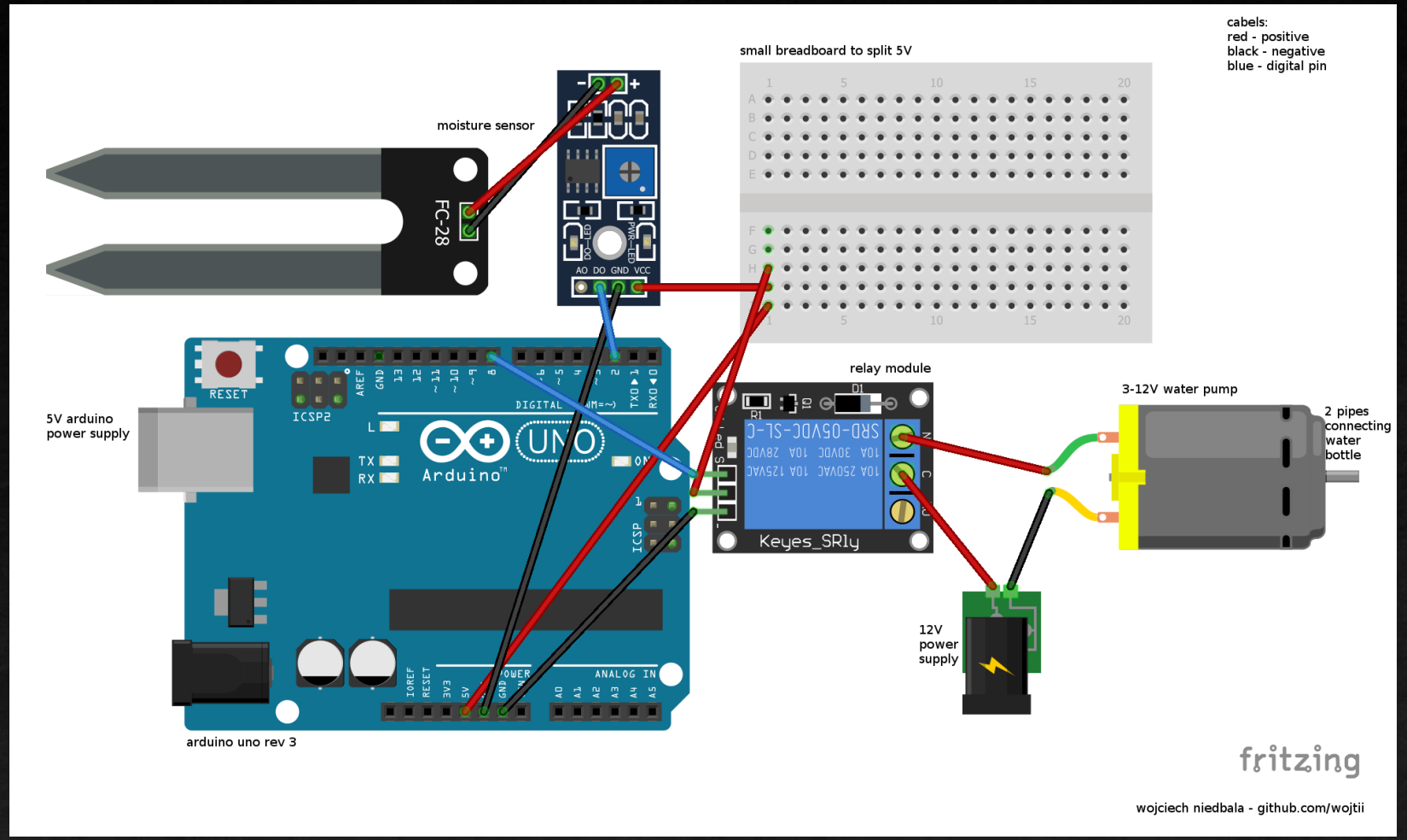
Solution



< Wiring diagram of all circuit components.

You can easily write the software to control the circuit yourself by reading the manual, or look for a ready-made project on the Internet.

Source: Github

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Scientific Areas Covered

Biology / Science

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Assessment

- The evaluation should be achieved through long-term student engagement.
- During the discussion, students can be debriefed on basic issues.
- The student should be able to identify basic relationships.

Source: Freepik

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