Experiment 7 – Plant soil moisture detection

Instruction

People need water to survive, so do plants. Soil moisture indicates the moisture in the soil. As long as the soil moisture value is suitable for the plant, the plant can get water from the soil. Therefore, in this experiment, we will make a plant soil moisture detector to ensure that our plants can get enough water and grow.

Target

- Learn how moisture sensor work and use it to make a moisture detector with LED and buzzer.
- Learn how to draw icon on Micro: bit's matrix LEDs.
- Learn how to use if/else if/else statement.

Required Parts

- Micro:bit x1
- Crowtail-Base shield for Micro:bit x1
- Crowtail-Moisture Sensor x1
- Crowtail-LED(Yellow) x1

- Crowtail-Buzzer x1
- Crowtail-Cable x3
- USB cable x1

Hardware learning and connection

This Moisture sensor can be used to detect the moisture of soil and thus to monitor if the plants in your garden need some water.

This sensor uses the two probes to pass eletricity through the soil, and then reads the resistance to get the moisture level. More water makes the soil conduct electricity more easily(less resistance), while dry soil conducts electricity poorly(more resistance). Compares to the other moistures sensor using the same moisture test method, this module has super long legs, making it suitable for actual applications.

Connect Crowtail-Moisture Sensor, Crowtail-Buzzer and Crowtail-LED to P0, P1 and P2 ports of Crowtail-Base shield for Micro:bit. The hardware connections are as follows:
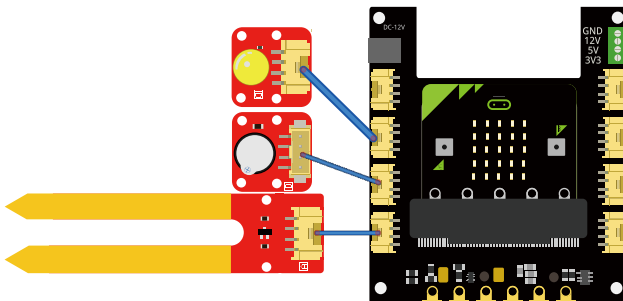
Programming and note

- **Show Icon:** We can use this **show icon** block to draw icons on the Micro:bit's matrix LEDs. Many icons have already been created in this block, so we just need to select the icon to be drawn.

- **If/else if/else statement:** If/else if/else is a logical structure that is very similar to if/else. Actually, it is derived from the if / else structure. It can resolve judgments when there are more than two cases. If the logical statement that is attached to if(analog read from P0 is less than 50) is true, then it will execute the code blocks inside of the **if**. If the logical statement that is attached to **else if** (analog read from P0 is more than 500) is true, then it will execute the code blocks inside of the **else if**. Else(analog read from P0 is larger than 50 and less than 500), it will execute the **else** blocks.

- **Download the program to micro:bit to see what happens.**

Result

When the soil moisture sensor is inserted into the dry soil, the buzzer will beep and the X icon will be displayed on the micro: bit matrix LED; when it is inserted into the Water-filled soil, the LED will light up and a sad icon will be displayed on the micro: bit's matrix LED; when it is inserted into the moist soil, the LED will not light up, the buzzer will not beep, and a happy icon will be displayed on the micro: bit's matrix LED.

Can we make an automatic watering system for plants after detecting low soil moisture? And how to make it?