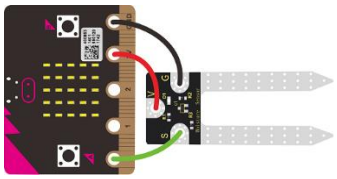


Activity:

Soil Sensor Function

Description:

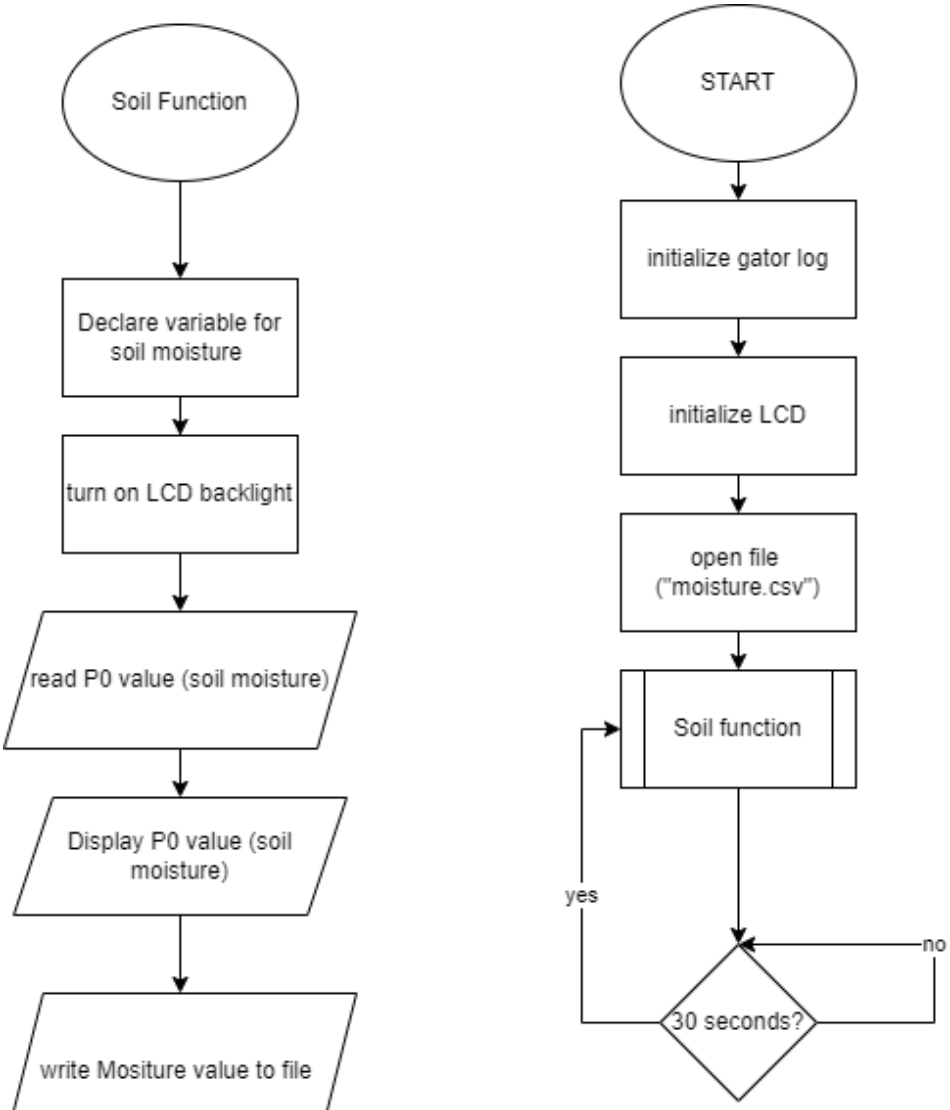
Build a program that will have a function read the soil moisture value, log the reading to the SD card, and display the value onto the LCD screen using a loop. The soil moisture value will be read with a given soil moisture sensor.

Vocabulary and Concepts:

Soil Moisture Sensor: sensor that estimate volumetric water content
Iteration (Loop): A repetitive action or command typically created with programming loops. Loop action of doing something repeatedly.
LCD (Liquid Crystal Display): A type of flat panel display that can let light go through it or can block the light.
Function: A named piece of code that can be called as many times as possible, sometimes called procedures or method; a segment f code that includes the steps performed in a specified process.

Flowchart:

A flowchart is a way of representing the step-by-step process (algorithm) of your program. For this program, the flowchart is:


START
initialize gator log
initialize LCD
open file ("moisture.csv")
Soil function
yes
no
30 seconds?

Soil Function
Declare variable for soil moisture
turn on LCD backlight
read P0 value (soil moisture)
Display P0 value (soil moisture)
write Mositure value to file
clear LCD
Display Moisture Value on LCD
pause
End

Build the Circuit

Materials Required:

- gator:soil - micro:bit Accessory Board
- gator:log -micro:bit Accessory Board
- gator:bit v2.0 – micro:bit carrier board
- MicroSD card
- MicroSD USB reader
- Twelve Crocodile Clips
- Flexible Qwiic cable
- LCD screen
- Dry and wet soil

Hardware Hookup:

Contact from gator:soil	Connection to gator:bit	Connector
PWR (power)	OUT 3.3V	Crocodile Clip
SIG (signal)	P0	Crocodile Clip
GND (ground)	GND (ground)	Crocodile Clip

gator:bit

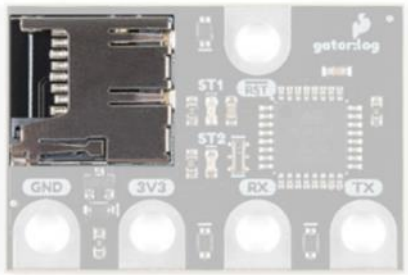
Contact from gator:log	Connection to gator:bit	Connector
RST	P13 SCK	Crocodile Clip
GND (ground)	GND (ground)	Crocodile Clip
3V3	OUT 3.3V	Crocodile Clip
RX	P15 MOSI	Crocodile Clip
TX	P14 MISO	Crocodile Clip

Contact from LCD	Connection to gator:bit	Connector (Qwiic Cable)
Connect qwiic cable in the back of LCD	OUT 3V (power)	Red wire
Connect qwiic cable in the back of LCD	GND (ground)	Black wire
Connect qwiic cable in the back of LCD	P20 (SDA)	Blue wire
Connect qwiic cable in the back of LCD	P19 (SCL)	Yellow wire

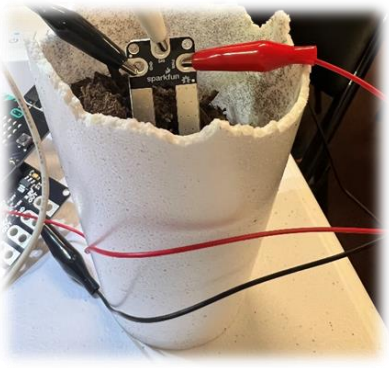
Instructions:

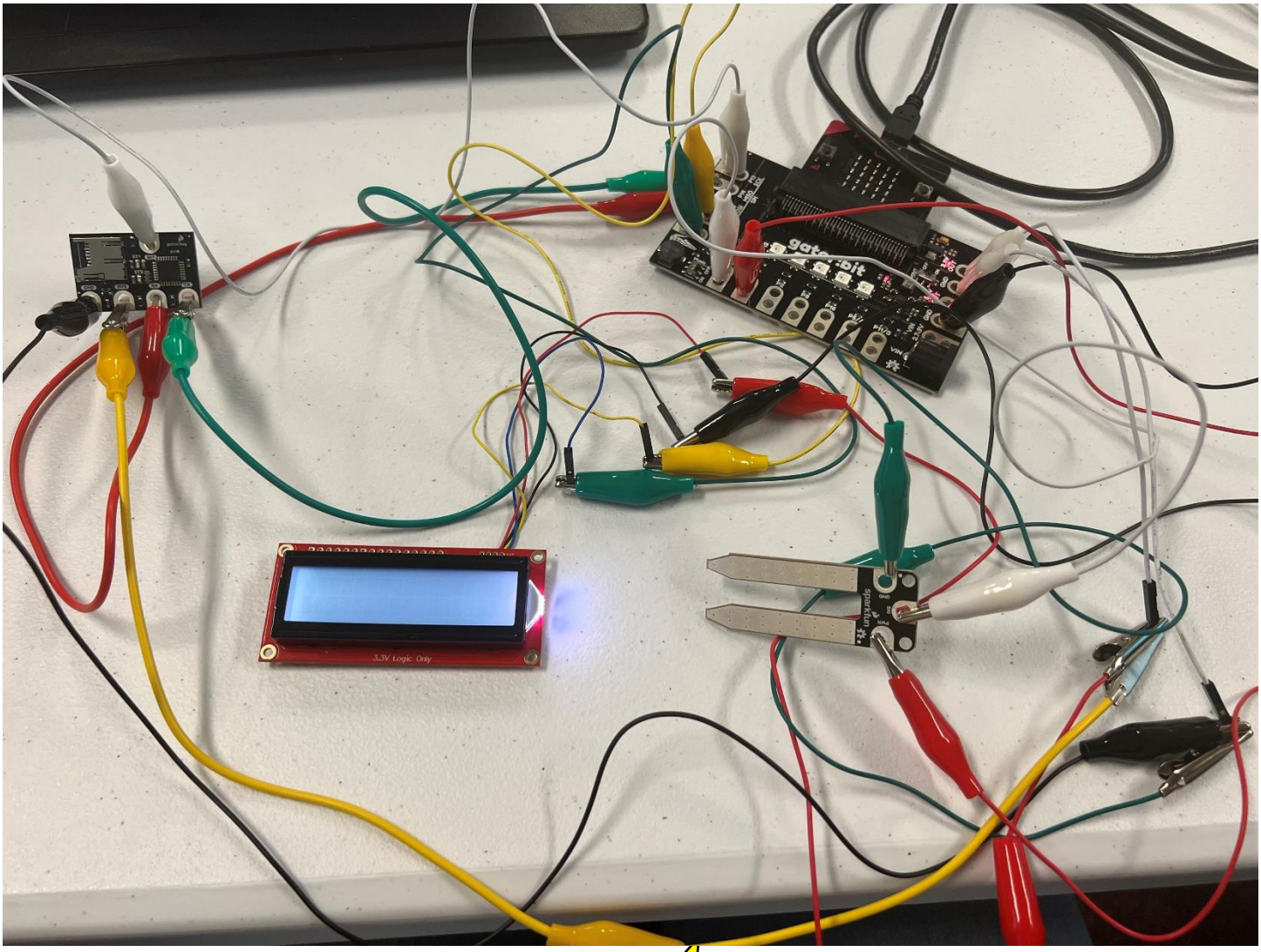
1) Turn on power switch located on

2) Place SD card in µSD Card Slot



3) Place gator:soil sensor in soil





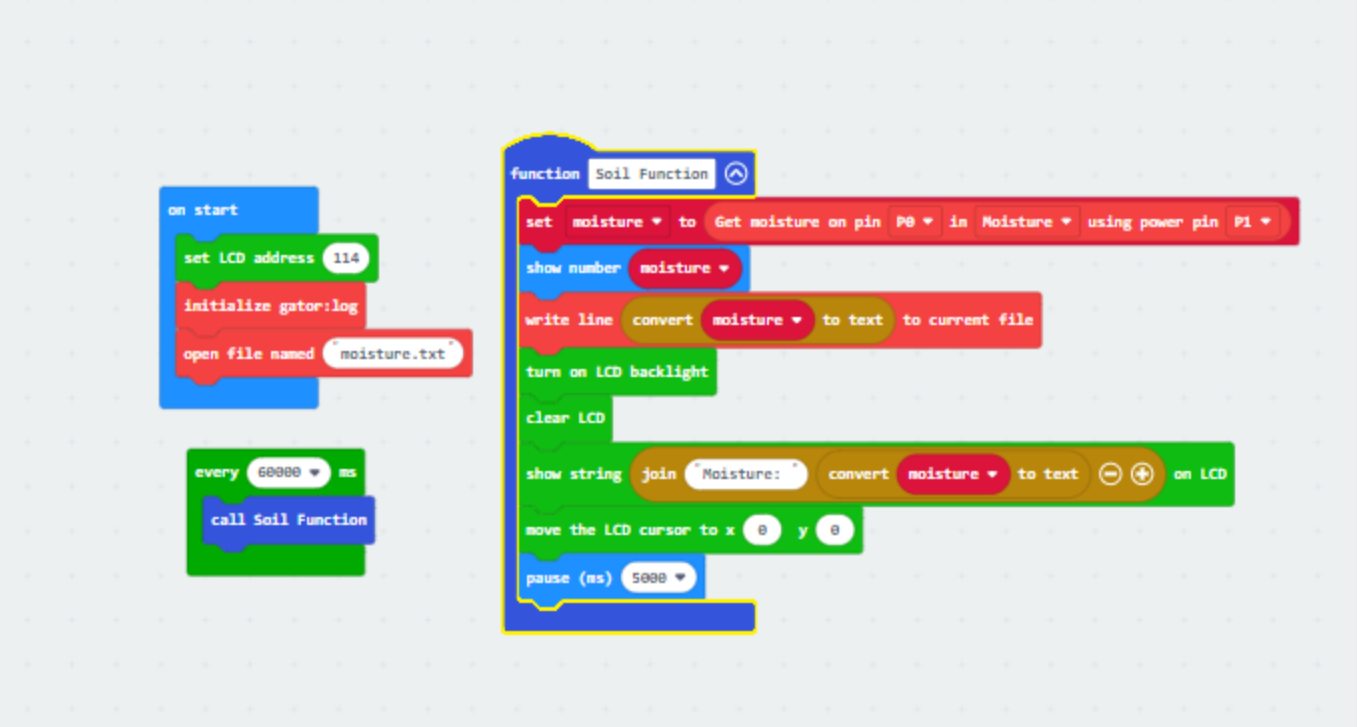
Let's Start Programming!

Step 1: Getting Started

First, copy the code from the LCD display (soil moisture) program. Next, go to functions tab and select make a function. Call the function, "soil function". Once created, it should create a block to grab. Grab the function block and place the remaining code within the block. Finally, grab an on start block and place a call soil function within the on start block.

Extensions:

- GatorSoil (search "gatorsoil" in extension search bar)
- GatorLog (search https://github.com/sparkfun/pxt-gator-log in the extension search bar)
- LCD (search https://github.com/evergreen22/pxt-lcd-rgb-16x2-i2c in the extension search bar)



Step 2: Selection Changes

Step 3: Test your Program using the Emulator

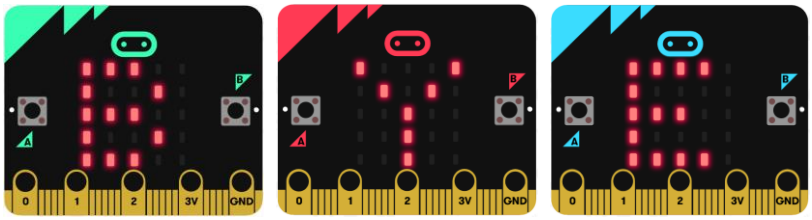
Step 4: Connect to your micro:bit

Step 5: Download the Program

Step 6: Running the Program on the micro:bit

Congratulations!

You have created your Soil Moisture Function program!!



References

LCD Display tutorial: https://www.youtube.com/watch?v=oov5Q48V844

Flowchart tool: https://www.draw.io/