senseBox

Environmental Measuring Station
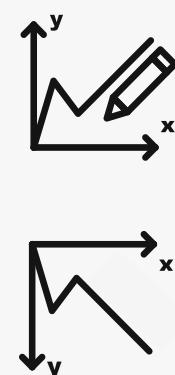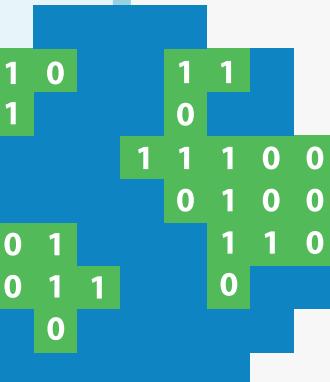
Blockly | Level: ★☆☆ | 20 min.

A glance at the weather app on your smartphone tells you today's temperature, the probability of rain, and the UV index. But where does this data actually come from? Extensive measuring stations operated by the German Weather Service collect these measurements throughout Germany and you can too!
In this project, you will build your own environmental measuring station.

iCODE
Coordinates

INFO: COORDINATE SYSTEM IN COMPUTER SCIENCE

You will use the senseBox display to read the measurements of your environmental station.
The display allows you to specify x and y coordinates for the position of the text. PS: be aware that the coordinate system of the display is "upside down"!
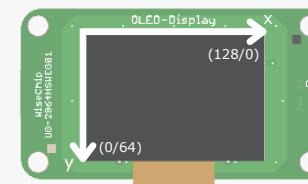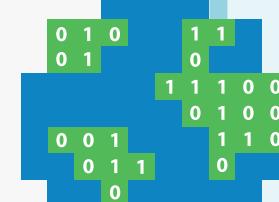
You probably know this coordinate system from math class, which has the point (0/0) at the bottom left.

However, in computer science the coordinate systems start at the top left. The values then go downwards on the y-axis into positive territory.

OLED-Display
(128/0)
(0/64)

Here you can see how you can translate the coordinate system used in computer science to a display with 128x64 pixels.
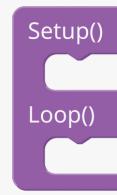
Note: A letter in font size 1 is approximately 10 pixels high.

<iC❂DE>MS

senseBox

Environmental Measuring Station

Connect the OLED display and the sensors to the microcontroller.

1) Create a program that shows temperature, humidity, brightness, and UV intensity measurements on the display.

2) Expand your program code so the measurements shown include their name and unit on the display.

Step 1A

1. For programming: blockly.sensebox.de

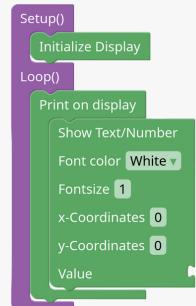2. In Setup, some components need to be activated once at the beginning of the program.

3. The display has to be initialized in the setup:

Initialize Display

Step 1B

1. To display the measurements on the screen, you need the blocks "Print on Display" and "Show text/number" in the loop.

2. Under "Value", insert the block for the respective sensor. Some sensors can measure two environmental phenomena simultaneously.

3. To display all four values, you need the "Show text/number" block four times. You also need to adjust the y-coordinate so that the values are displayed one below the other. The y-values can for example differ in steps of 15.
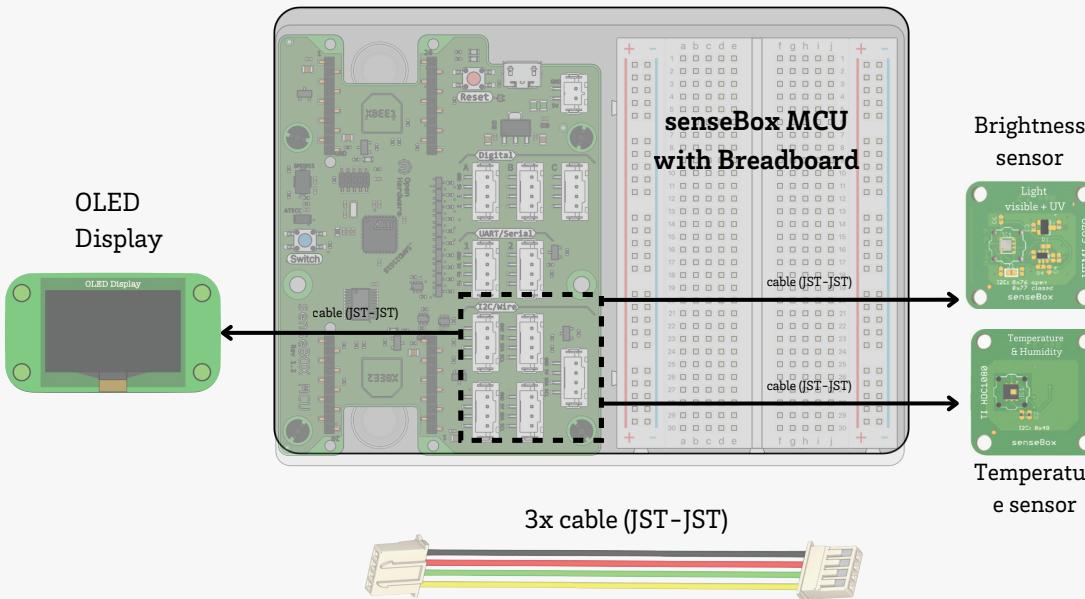
Test your code!

Hardware-Setup

OLED Display

senseBox MCU with Breadboard

Brightness sensor

Temperature sensor

cable (JST-JST)

3x cable (JST-JST)

Step 2A

To label the four different measurements, use the block "Create text from" from the 'Text' category. Here you can add another empty space using the "+" sign.

You will also need two empty text blocks from the "Text" category, in which you can write any text you like, e.g., the name (temperature) and unit (degrees Celsius) of the respective measured value. Repeat this step four times.
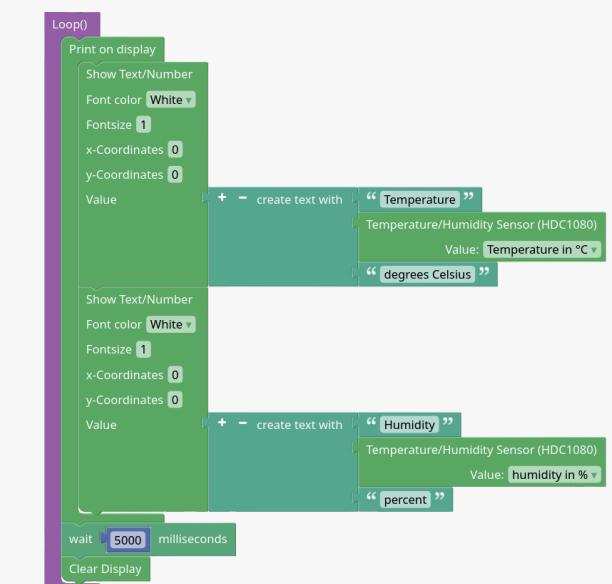
Step 2B

1. Due to the added text, not all measured values now fit on the display. To change this, two measured values should be displayed alternately on the display for 5 seconds each. To do this, you need the 'Wait 1000 milliseconds' block. Adjust the time here (note: 1000 milliseconds = 1 second).
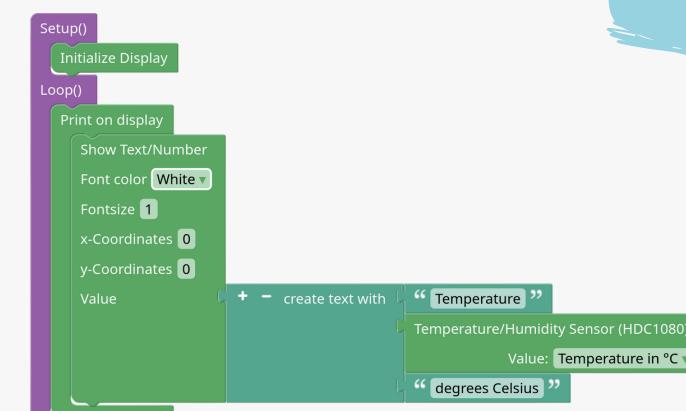
wait 5000 milliseconds

2. To clear the display after 5 seconds and show the next two measurements, you need the "Clear display" block. Then use the same blocks repeatedly to show the other two measurements (brightness & UV intensity). Also adjust the position of the text on the display by changing the y-coordinate.

Test your code!