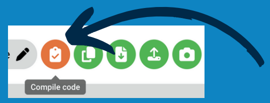
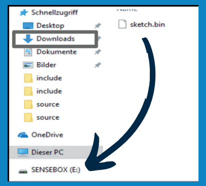
Info:
Uploading the program code



Compile the code

Press 2x Reset Button



Transfer the program code via drag-and-drop

Alternative: senseBox Connect App
Instructions for transferring the program code with a tablet

senseBox

Smart Street Lighting

Blockly | Level: ★★☆ | 30 min.

Streetlights bring light into the darkness—but they also consume a lot of energy! In Germany alone, up to four billion kWh of electricity are consumed each year to light streets, paths, and public spaces. To change this, in this project you will learn how to build and control smart street lighting.

The code isn't working?
Troubleshooting tips

- Are your cables plugged in exactly as shown in the illustration?
- Are your command blocks really connected like small "puzzle pieces"?
- Have you deleted all blocks that are not connected to your main block?
- Have you compiled the latest version of your program code and uploaded it again after making changes in Blockly?

Still having trouble?
Get in touch with a mentor!

iCODE
Propositions

INFO: PROPOSITIONAL LOGIC

"Turn on the lantern as soon as it gets dark AND/OR there are people nearby." The choice between AND & OR can make a big difference in whether a command is executed or not: In computer science, individual statements/propositions are evaluated as true (correct) and false (incorrect) and linked using the logical operators AND & OR. Here is an example of the conditions under which the command (turn on the lantern) is executed:

It is dark	...	People are nearby	Result
true	AND	true	true (lantern on)
false	AND	false	false (lantern off)
true	AND	false	false (lantern off)
true	OR	true	true (lantern on)
false	OR	false	false (lantern off)
true	OR	false	true (lantern on)

With the AND operator, both propositions must be true in order for the command to be executed.
With the OR operator, it is sufficient if one of the two statements is true.

<iCODE>MS

Kofinanziert von der Europäischen Union

Ministerium für Wirtschaft, Industrie, Klimaschutz und Energie des Landes Nordrhein-Westfalen

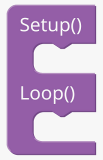
senseBox

Smart Street Lighting

Step 1A

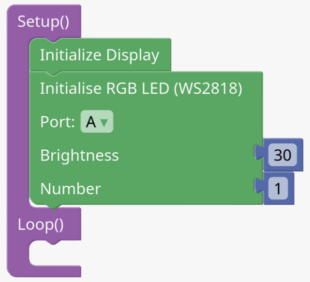
1. For programming: blockly.sensebox.de

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



Setup()
Loop()

3. Both the display and the RGB LED (Port A) have to be initialized in the setup:

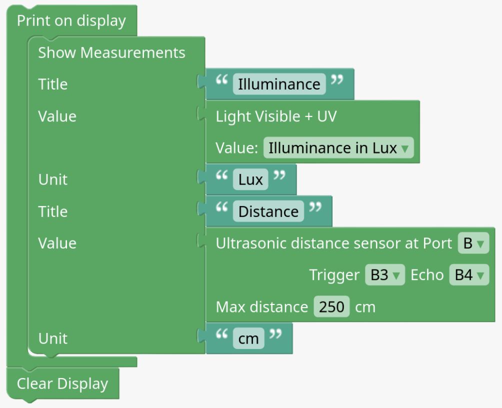


Setup()
Initialize Display
Initialise RGB LED (WS2818)
Port: A
Brightness 30
Number 1
Loop()

Step 1B

1. To display the measurements on the screen, you need the blocks "Print on display" and "Show Measurements" in the infinite loop.

2. Now use the blocks for the brightness and ultrasonic distance sensors to read the measurements, and label each value with a title and a unit:



Print on display
Show Measurements
Title " Illuminance "
Value Light Visible + UV
Value: Illuminance in Lux
Unit " Lux "
Title " Distance "
Value Ultrasonic distance sensor at Port B
Trigger B3 Echo B4
Max distance 250 cm
Unit " cm "
Clear Display

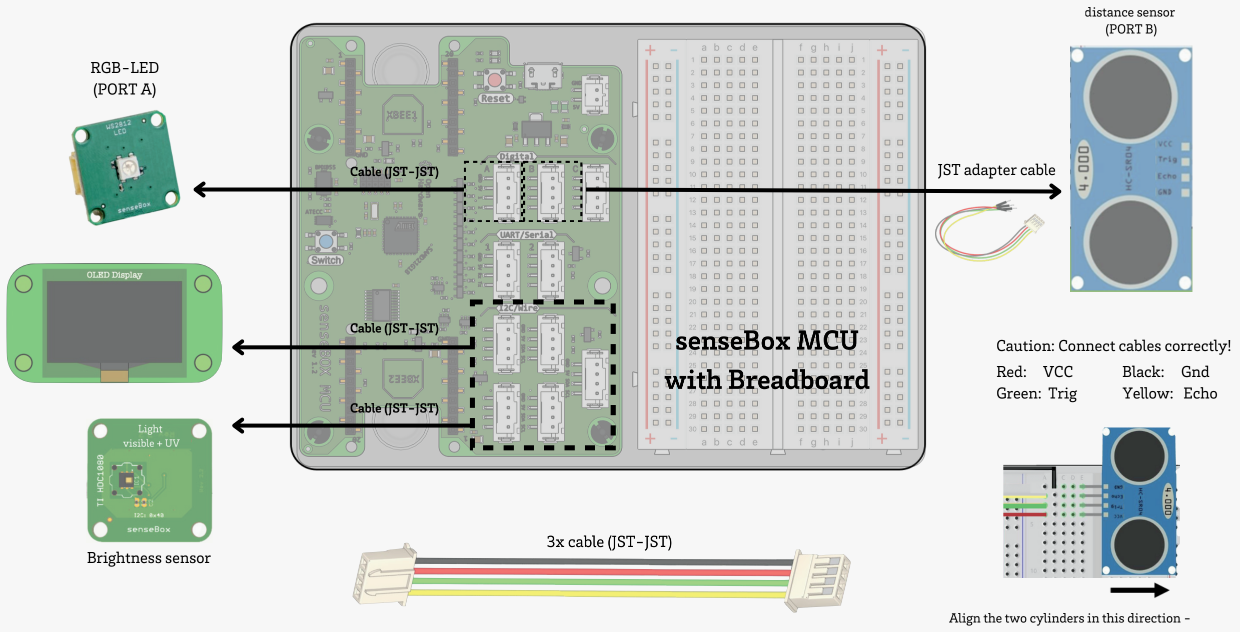
Test your code!

Connect the OLED display and the sensors to the microcontroller.

1) Create a program so that the measured values of the brightness and distance sensors are shown on the display.

2) Expand your program code so that the RGB LED lights up as long as it is dark and people are nearby.

Hardware-Setup



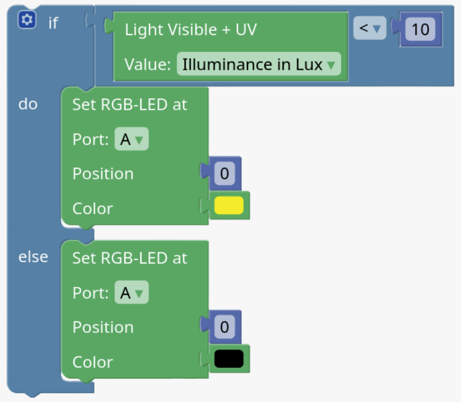
Caution: Connect cables correctly!
Red: VCC Black: Gnd
Green: Trig Yellow: Echo

Align the two cylinders in this direction -

Step 2A

To make the LED light up when it gets dark, you need an if, do... else condition from the category "Logic":

If: The illuminance is less than (< - category Logic) 10 (category Math) lux...
Then: The RGB-LED lights up yellow...
Else: The RGB-LED doesn't light up (color: black).

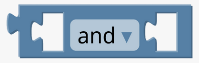


if Light Visible + UV
Value: Illuminance in Lux
< 10
do Set RGB-LED at
Port: A
Position 0
Color 🟨
else Set RGB-LED at
Port: A
Position 0
Color ⬛

Test your code!

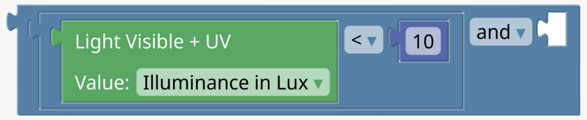
Step 2B

1. Now, the condition must be expanded to include the operator AND (category logic) so that the RGB LED only lights up when, in addition to darkness, there are people near the distance sensor:



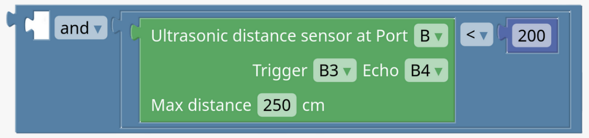
and

2. On the left side of the operator is the already used statement: the illuminance (brightness) is < 10 lux.



Light Visible + UV
Value: Illuminance in Lux
< 10
and

3. On the right side is the additional condition: The measured distance of the sensor must be less than 200 cm to execute the "do" action:



and
Ultrasonic distance sensor at Port B
Trigger B3 Echo B4
Max distance 250 cm
< 200

4. Now combine all the programming steps and test your code!

You can influence the brightness and distance by covering the brightness sensor with your fist or holding a sheet of paper at different distances in front of the distance sensor.