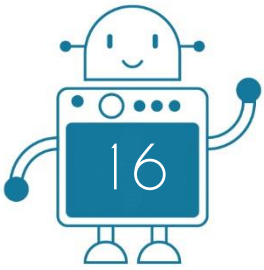


GREENHOUSE BOSS

STEMJAM Teaching Guide

Developing make spaces to promote creativity around STEM in schools

Acronym: STEMJAM
Project no. 2016-1-ES01-KA201-025470

www.stemjam.eu

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

GREENHOUSE BOSS

ABSTRACT

To needs the ideal humidity and temperatura to grow plants. We used mBot to humidity and temperature values of the plants in our school.

Comparison of temperature sensor readings and analog thermometers.

DIDACTIC OBJECTIVES

To increase the interest of the plants. To learn the growing plants.

Extension is added to Mbot programme. To learn to use Dht11 sensor.

To learn to use Me Tft Lcd.

STEM Subject: Science☒ Technology ☒ Engineering☐ Mathematics☐

Education Level: 12-14 years☒ 14-16 years☐

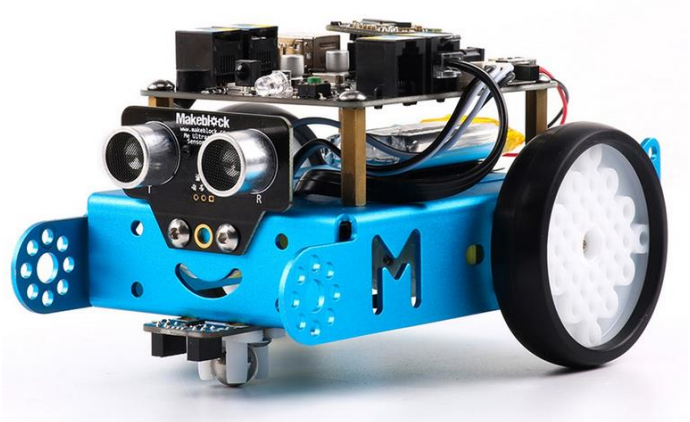
PROBLEM STATEMENT

Production loss and damage about growing plant.

Measure the temperature and humiture in arduino mode.

BOM (Bill of Materials Needed)

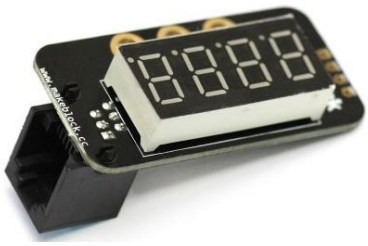
- mBot => Ref. 90054



❖ **TFT LCD screen:**

❖ Me **Temperature and Humidity Sensor**:

❖ Me **7-Segment Serial Display - Red**:



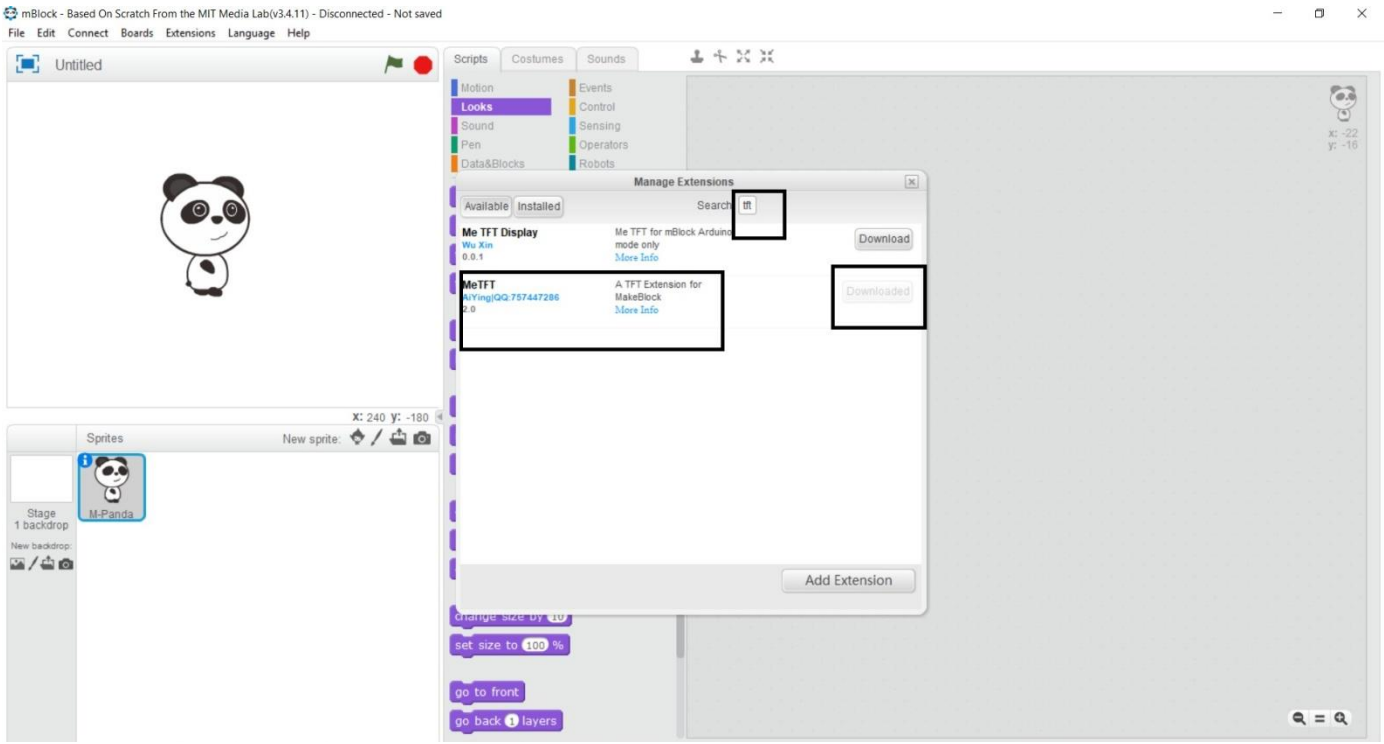
❖ Flowers and plants.

ELEMENT	ID	CABLE	AMOUNT	PORT 1			PORT 2			PORT 3				PORT 4				P.MOT 1	P.MOT 2
				Y	B	W	Y	B	W	Y	B	W	BI	Y	B	W	BI	W*	W*
Mbot Robot 2´4G																			
Motor 1	W*																	W*	
Motor 2	W*																		W*
Me 7-Segment serial display	B	(2)	2					B							B				
Me Temperature and Humidity sensor	Y	1	1							Y									
RJ25 cables			3																
Structures and beams																			
Laptops			1																
Attrezzo (not essential)																			

ACTIVITY DESCRIPTION

First version

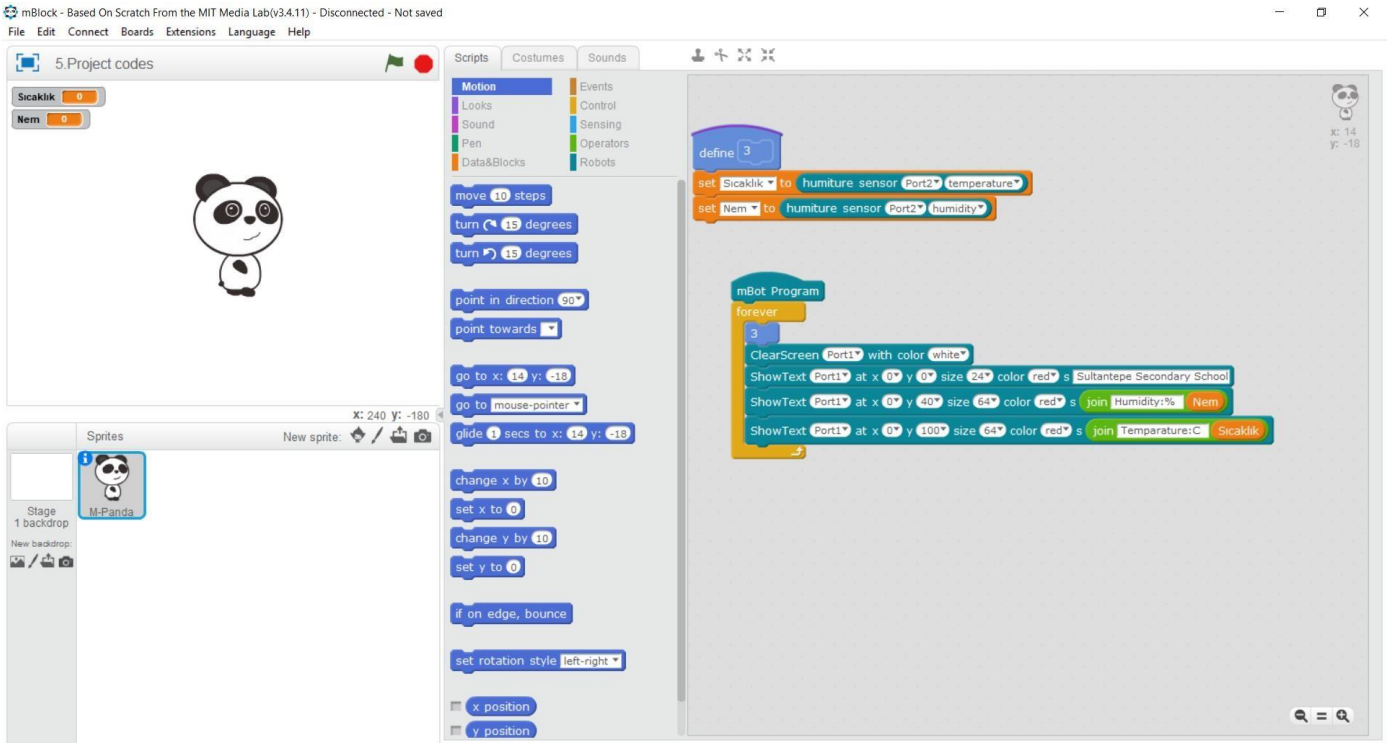
Step 1: Adding LCD extension to makeblock program.



Step 2: Display and sensor connected to the Mbot

Step 3: Investigation of temperature and humidity values for plants.

Step 4: Preparation of flow chart and writing of codes.

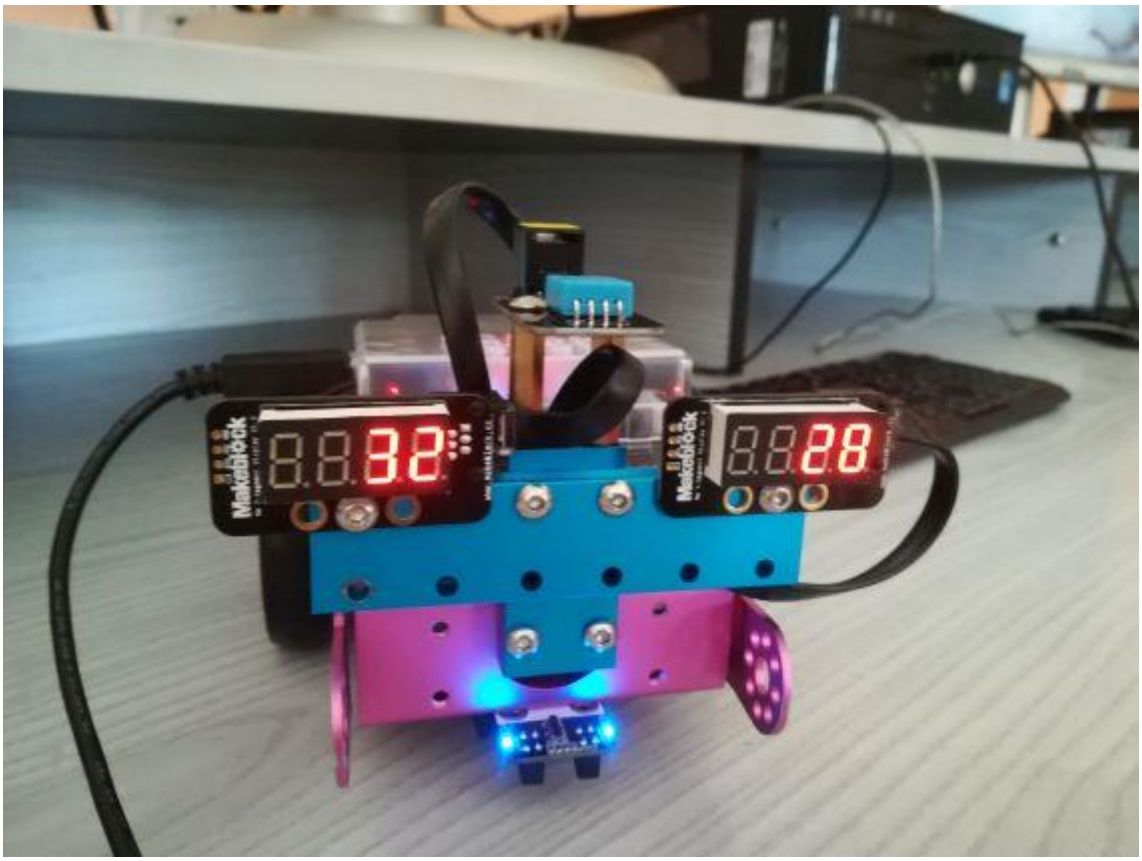


Step5: Experimentation in makerspace.

Second version

Part 1: Dht11 Me Temperature and Humidity Sensor

Mount the sensor and 7-segment displays

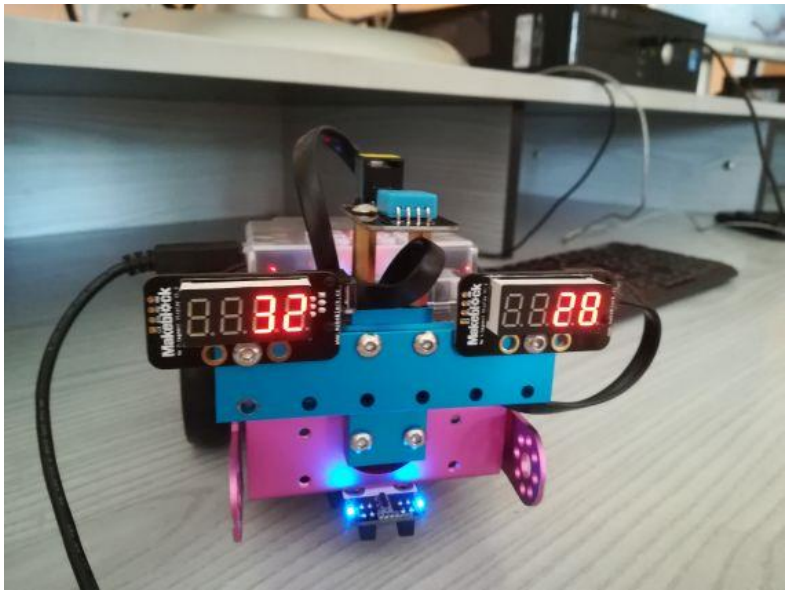


The program to read the temperature and humidity in Arduino language.

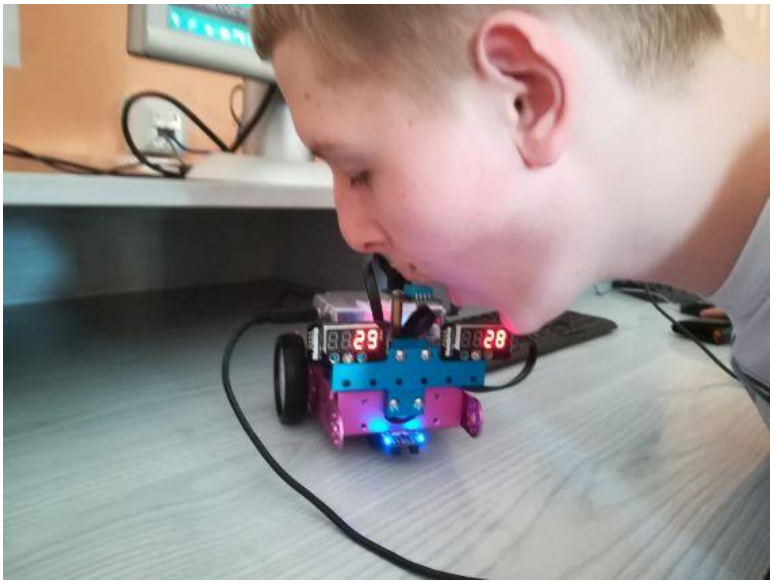
```
#include "MeMCore.h"
MeHumiturehumiture(PORT_3);
Me7SegmentDisplay disp(PORT_4);
Me7SegmentDisplay disp2(PORT_2);

void setup()
{
Serial.begin(9600);
}
```

```
void loop()
{
humiture.update();
disp.display( humiture.getHumidity());
  disp2.display( humiture.getTemperature());
  delay(1000);
}
```

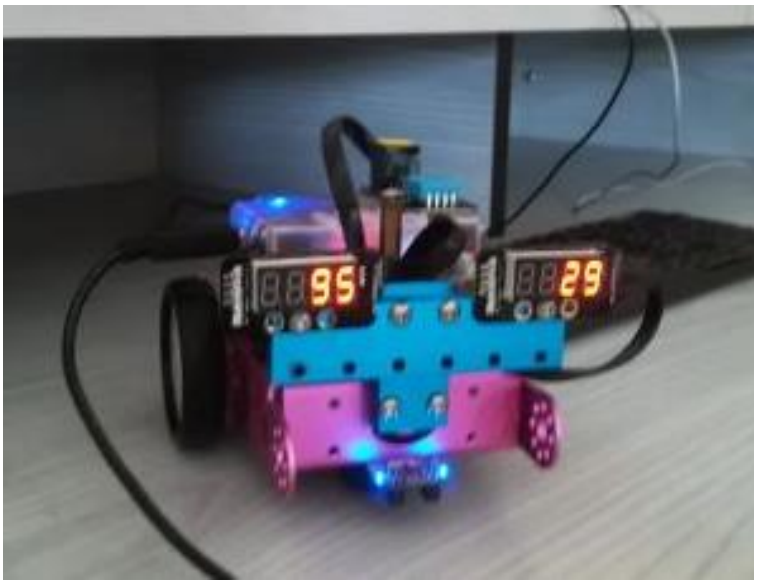
Trying the sensor:



The first reading is:
32 – humidity
28 – temperature (this value seems to be to high, the temperature in the room is about 22°C)



The student blows at the sensor

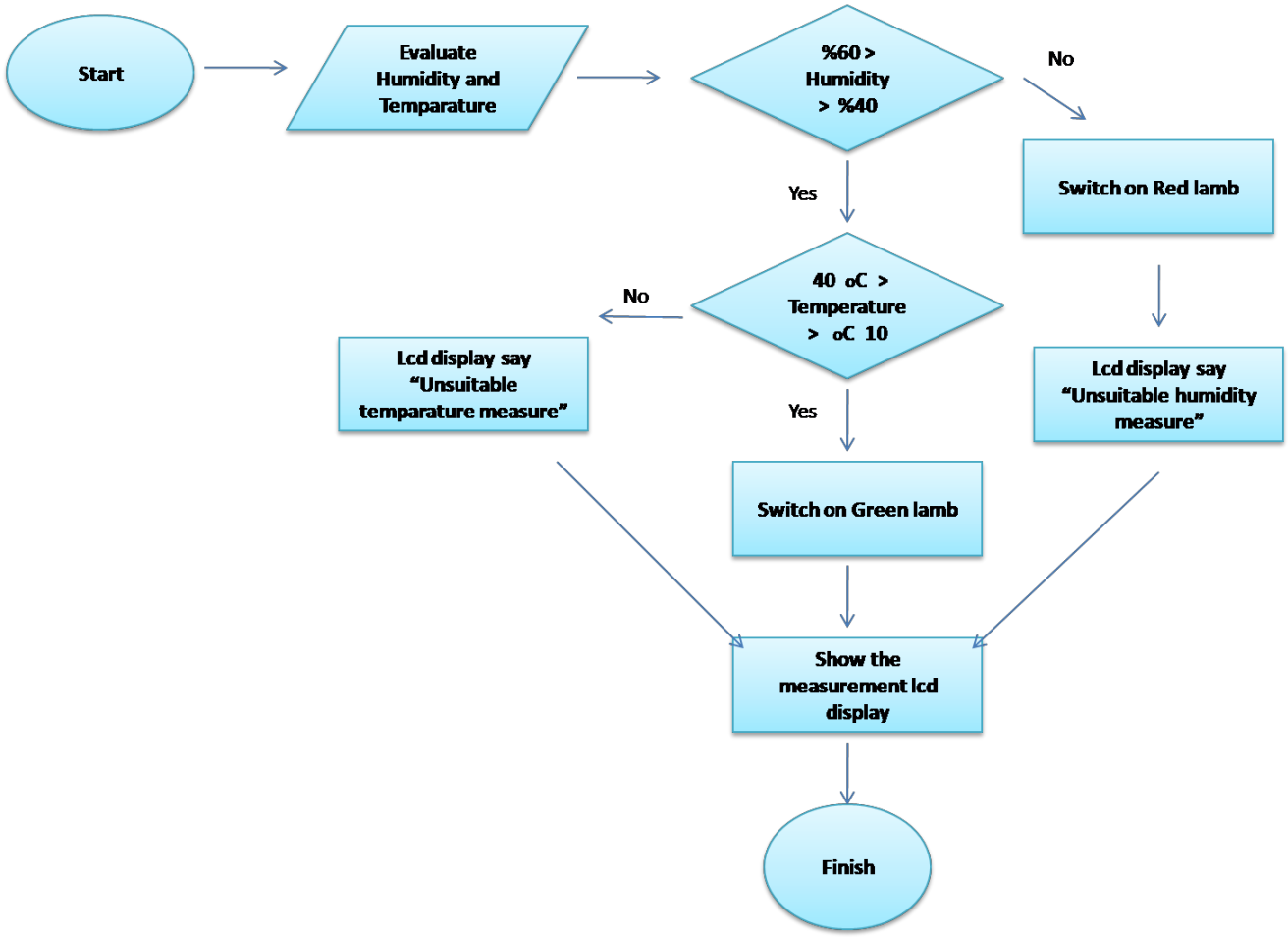


The sensor show the new value of the humidity – 95.

Part 2: Temperature sensor DS18B20

We try to use another temperature senor. It is waterproof DS18B20temperature sensor. To use it you need to use adapter. To compare the measurement we use kitchen thermometer. This tool show the right temperature of hot water in the mug. The readings are the same.

FLOW CHART



SCALABILITY

Students can compare the readings from Dht11 Me Temperature and Humidity Sensor and compare it with another tool.