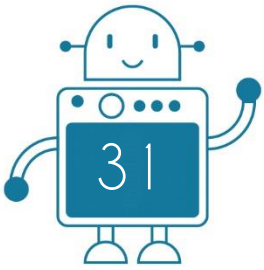


THE ASSISTANT MBOT

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

THE ASSISTANT MBOT

ABSTRACT

In this project, the aim is to serve people who have permanently or temporarily lost their ability to speak by accident, paralysis, etc.

In the second versión of the activity, we will connect two mBots through the IR sensor that are integrated in the mCore board and a message will be sent from one of the mBots to the other.

Another activity that we will carry out will be through the Wi-Fi module for mBots, which can send messages within the same Wi-Fi network.

DIDACTIC OBJECTIVES

Students gain sensitivity to older and disable people.

Infrared remote control - mBot and LCD panel connection established.

Students will know different types of connections, such as connectivity through Infrared and Wi-Fi.

STEM Subject: Science☐ Technology ☒ Engineering☐ Mathematics☐

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

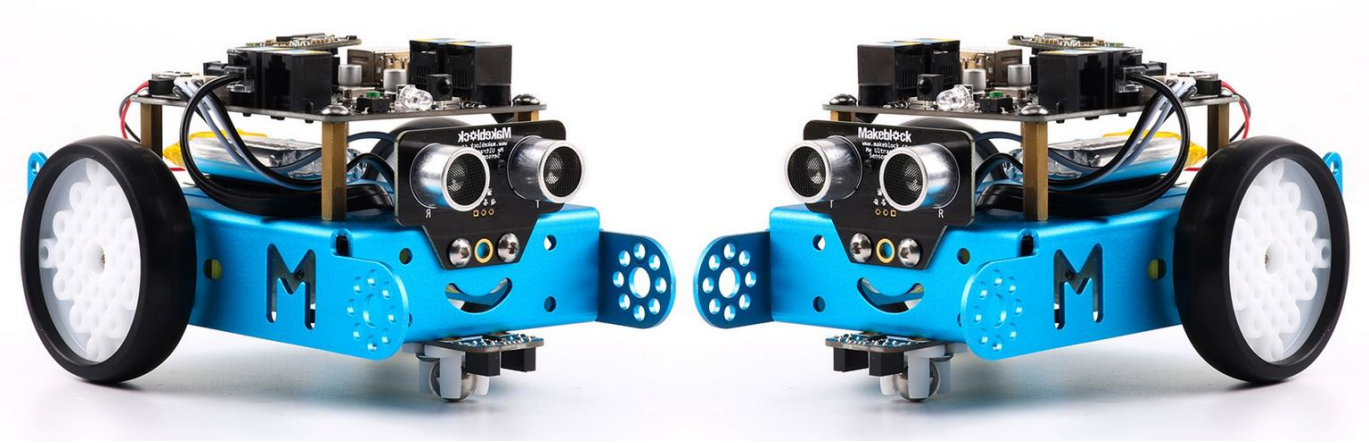
PROBLEM STATEMENT

People cannot express their needs who have permanently or temporarily lost their ability to speak.

Students are always connected through the Internet on their smartphones, but they do not know how this connectivity occurs.

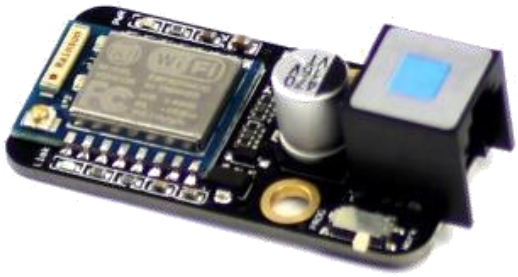
BOM (Bill of Materials Needed)

- (x2) mBots => Ref. 90054



- (x2) Me **LED Matrix 8 × 16** or / and **TFT LCD screen:**

- Me **WIFI Sensor**:



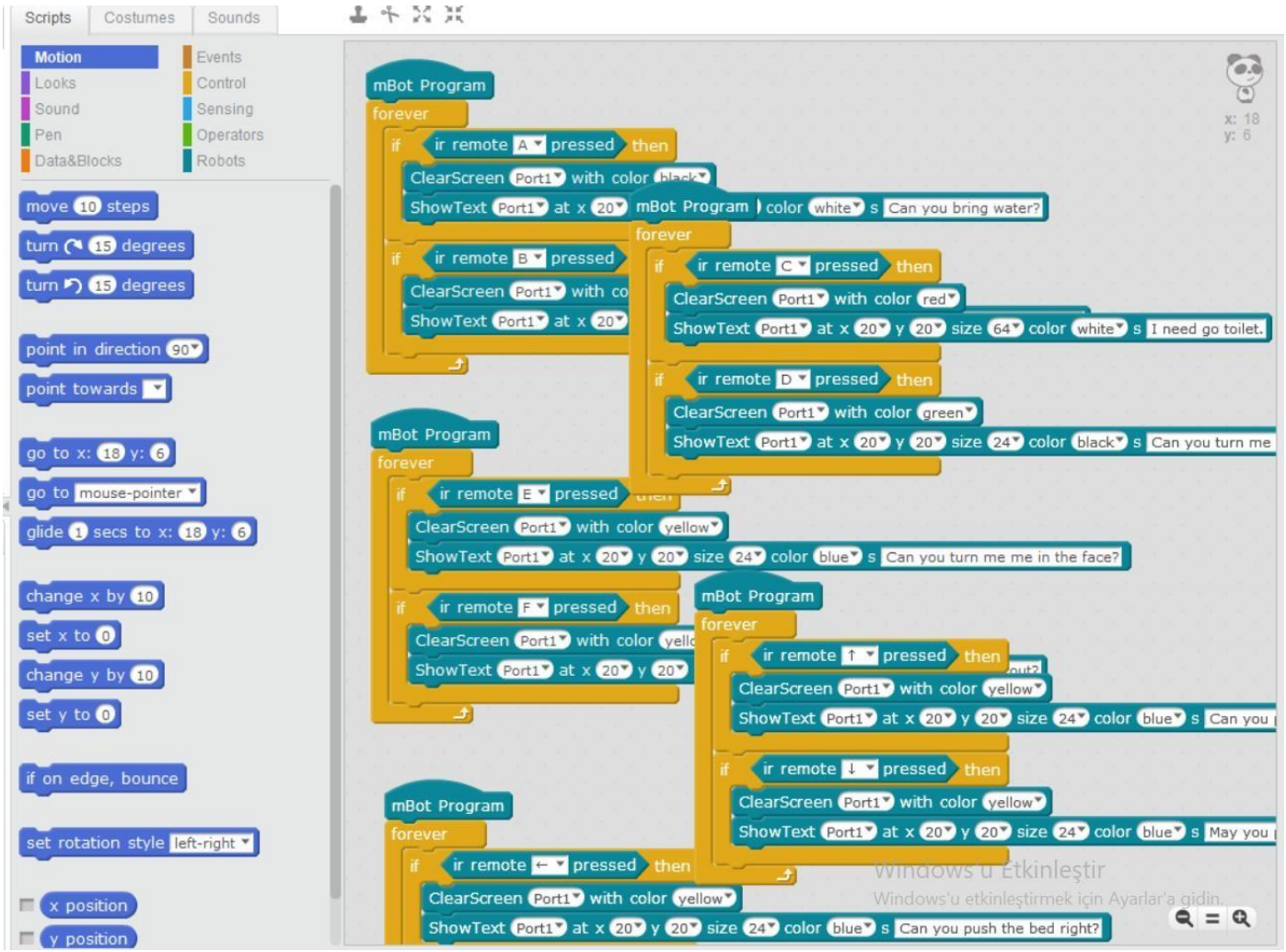
- Tablet.

ELEMENT	ID	CABLE	AMOUNT	PORT 1			PORT 2			PORT 3				PORT 4				P.MOT1	P.MOT2
				Y	B	W	Y	B	W	Y	B	W	Bl	Y	B	W	Bl	W*	W*
Mbot Robot 2´4G			2																
Motor 1	W*																	W*	
Motor 2	W*																		W*
Me RJ 25 adapter	Y																		
	B																		
	Bl																		
Mini Pan-Tilt kit																			
It has 2 servos.																			
We have to connect the servo to a RJ25 adapter																			
Mini Gripper																			
We have to connect the servo to a RJ25 adapter																			
Me TFT LCD Screen	B	(1)	1								B								
Me Led Matrix 8x16	B	(2)	2												B				
Me Ultrasonic sensor	Y																		
Me Temperature Sensor - Waterproof	Y																		
Me Line Follower	B																		
Me Flame sensor	Bl																		
Me PIR Motion sensor	B																		
Me Sound sensor	Bl																		
Me Touch sensor	B																		
Mini Fan Pack	B																		
Me Temperature and Humidity sensor	Y																		
Me 130 Motor Fan Pack	B																		
RJ25 cables			3																
Structures and beams																			
Laptops																			
Attrezzo (not essential)																			

ACTIVITY DESCRIPTION

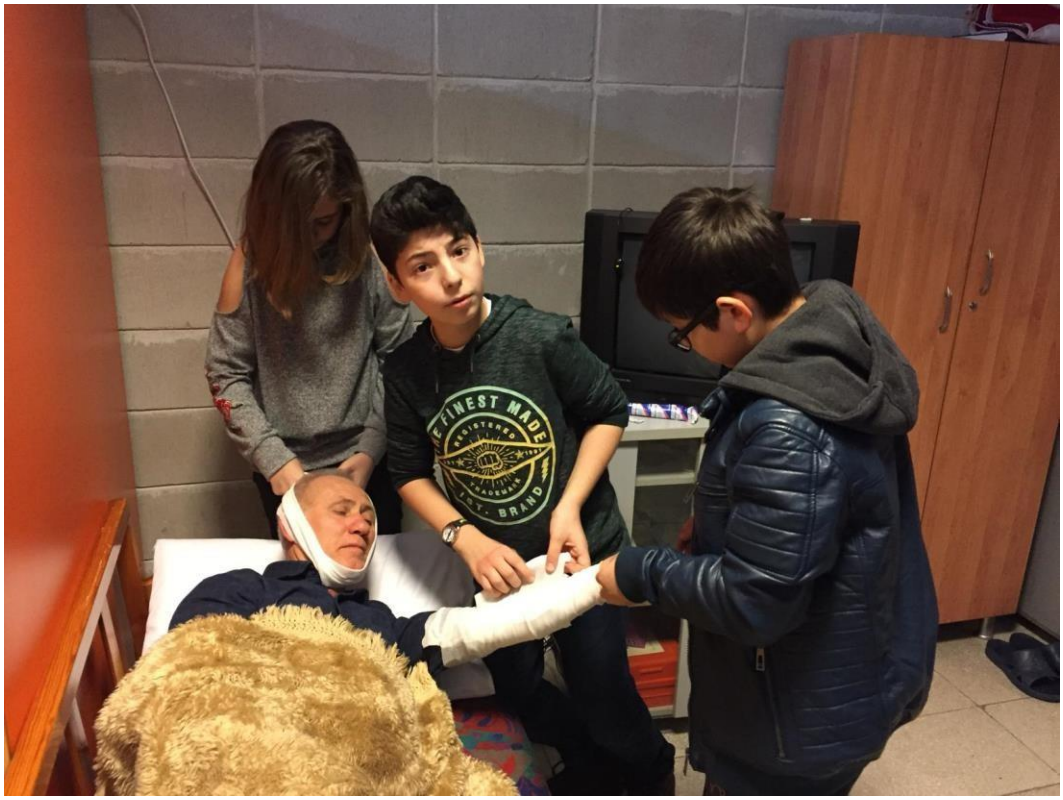
First version

Step 1: Algorithm and Codes



Step 2: PC - LCD Panel – mBot - Tablet Connection

Step 3: Preparing the patient care environment



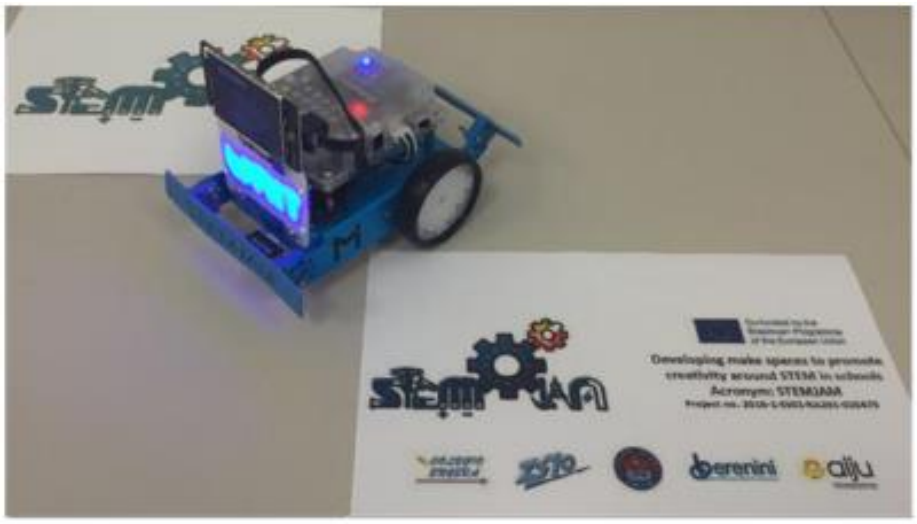
Step 4: The patient informs the nurses with the mBot and LCD panel

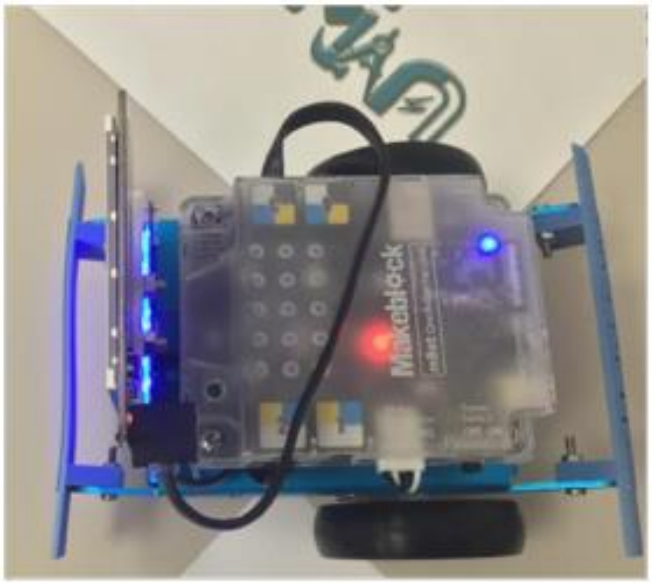
Step 5: Satisfying to patient needs

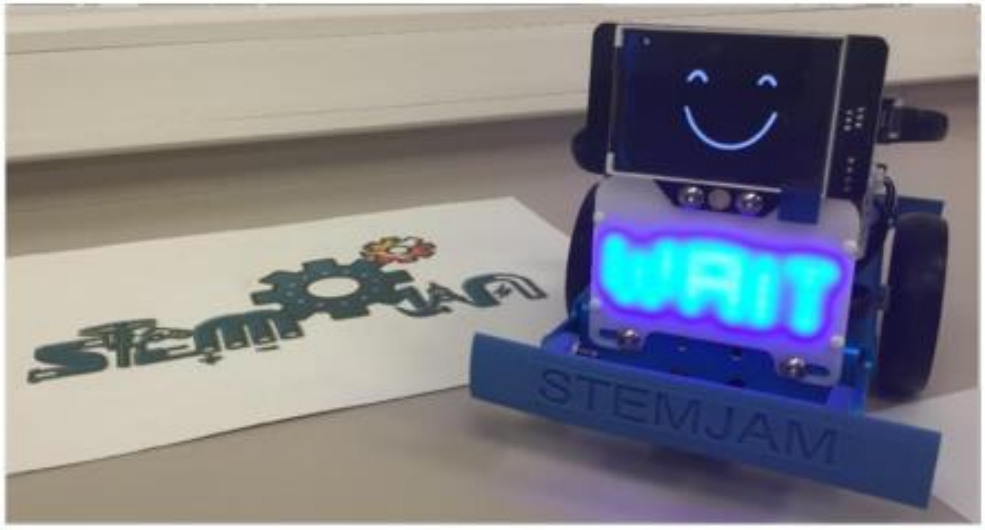
Second version

For this activity, two parts have been developed, one that will consist in communicating to two mBots through the IR sensor and another through the Wi-Fi module.

We can incorporate to mBot the LED Matrix or the TFT LCD screen to see the messages and when they are sent and receive these.

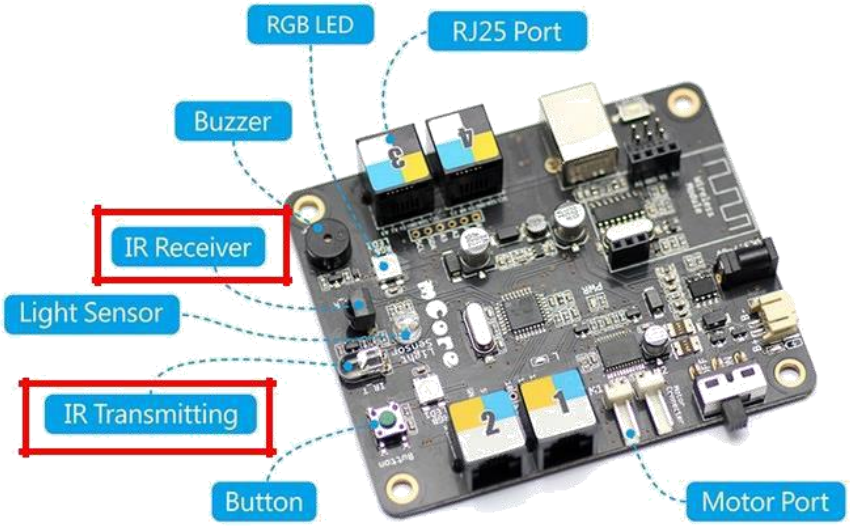






1. Connecting mBots through the IR sensor:

The mCore board incorporates two IR (infrared) sensors, one that sends (IR Transmitting) and one that receives (IR Receiver), as we can see in the image.



To select the message that we want to send, we have created a list with the messages assigned to the numbers from 0 to 9:

STEMJAM MESSAGE INDEX

When you press one of the 9 numbers of the remot control, it will be appears the next messages:

1 – The SCREEN doesn't turn on

2 – The PRINTER doesn't not print

3 - The KEYBOARD doesn't work well

4 - The MOUSE doesn't work well

5 - I have a VIRUS on my computer

6 - MAIL does not work

7 - My computer WORKS very slow

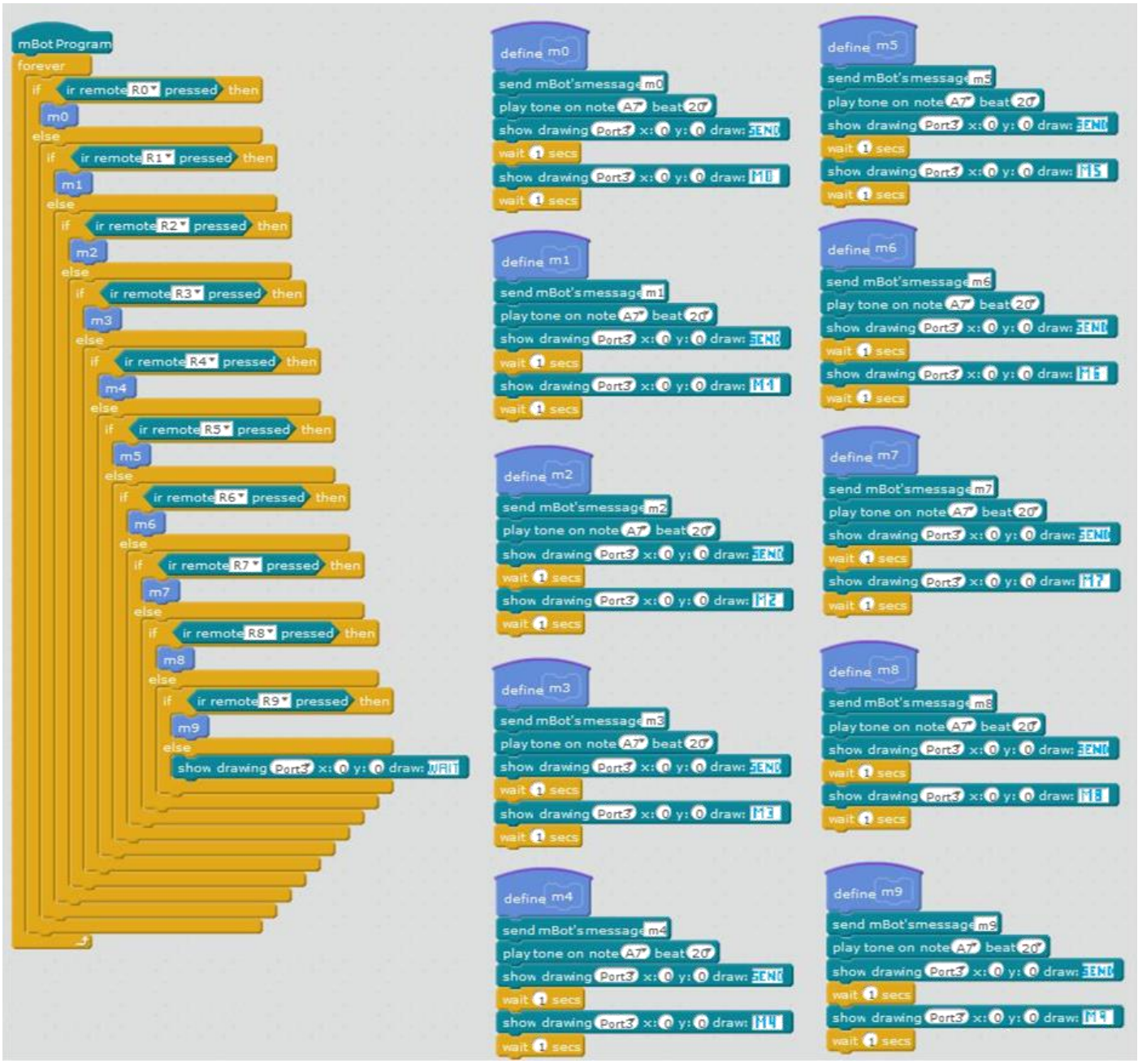
8 - The computer SOUND isn't heard

9 – Other computer problems

As you can see, the messages are from the computer world, so we will use the mBot to send and receive possible computer failures.

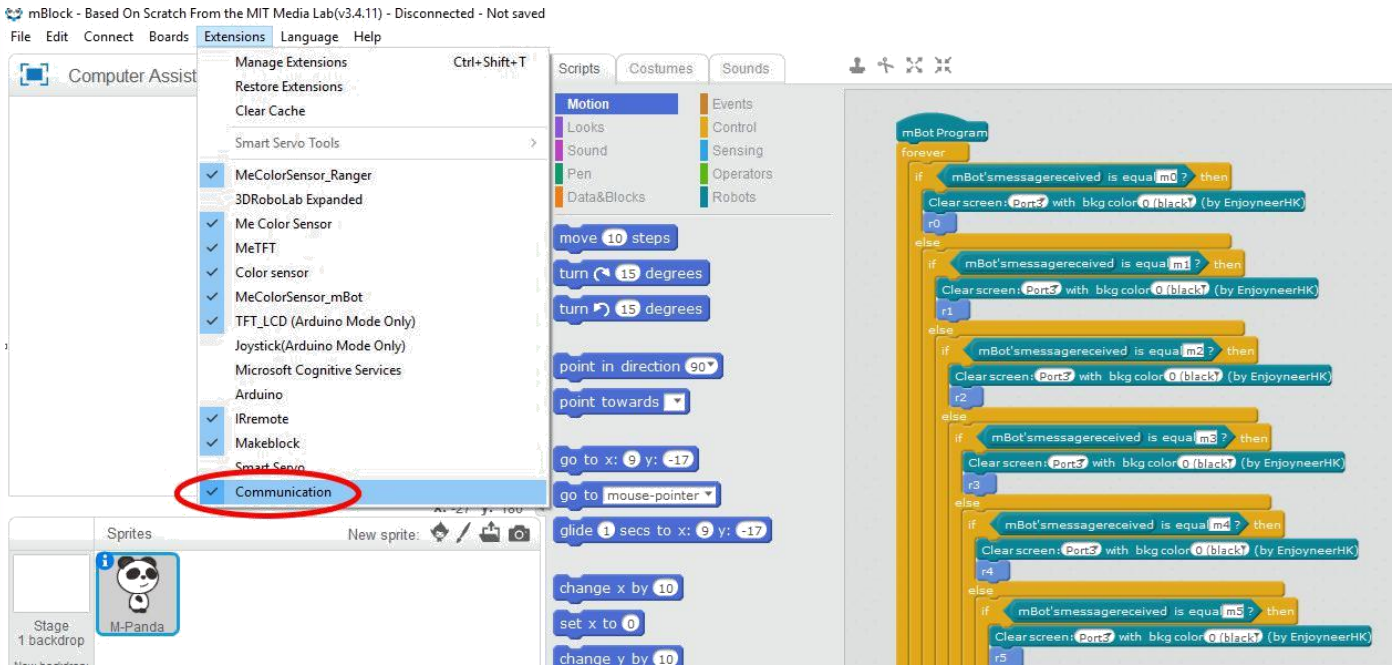
To choose the message we will use the mBot remote control:

Next, we will show the code to see how the messages are sent:



As you can see, the main code will always be ready to send the signal, and when you press a number on the remote control, the corresponding function will be activated, which will be responsible for send the message.

To receive the message, we need to activate in the mBlock software, in Extensions, the Communication section:

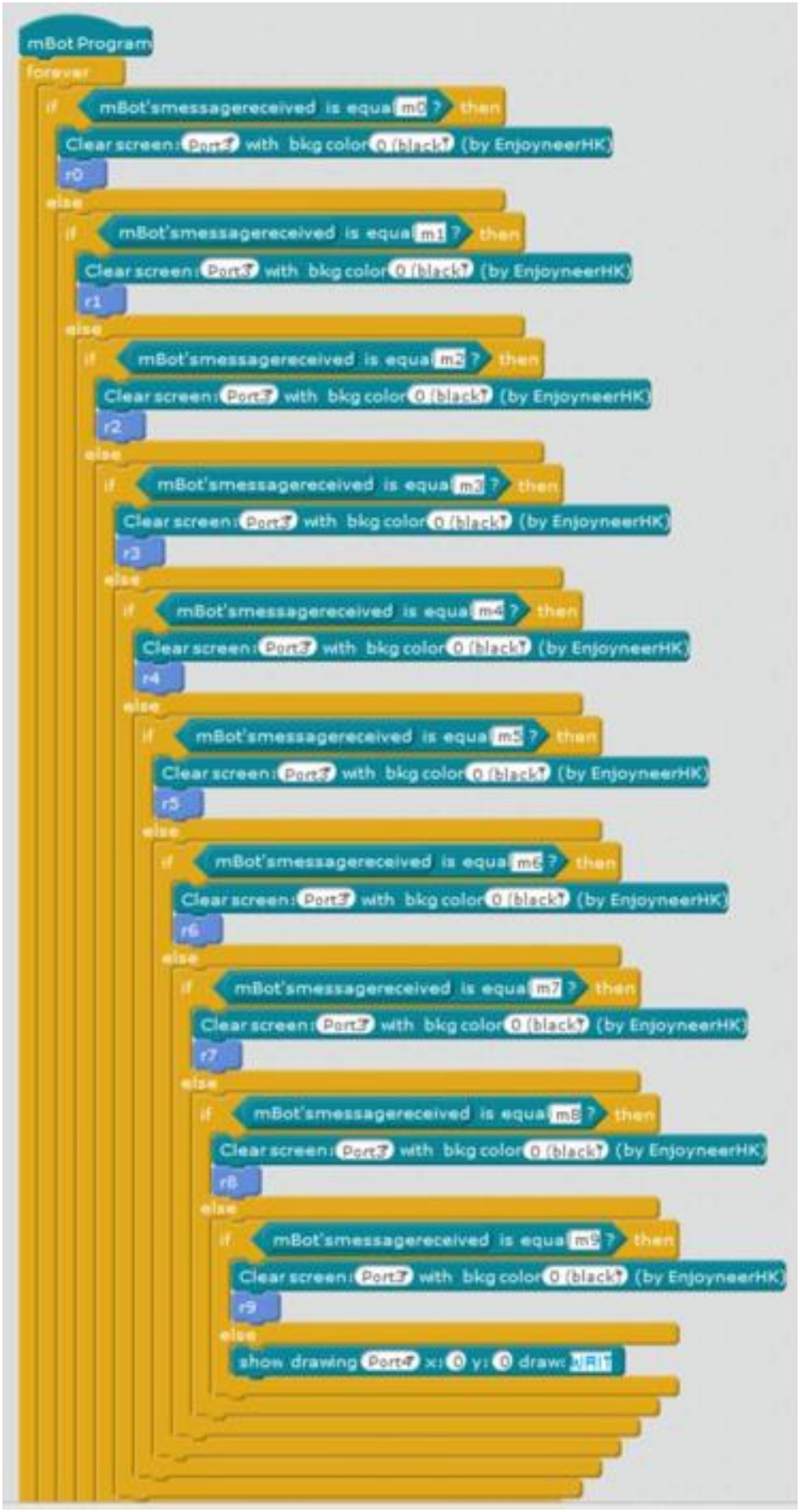


Now, we can receive the messages.

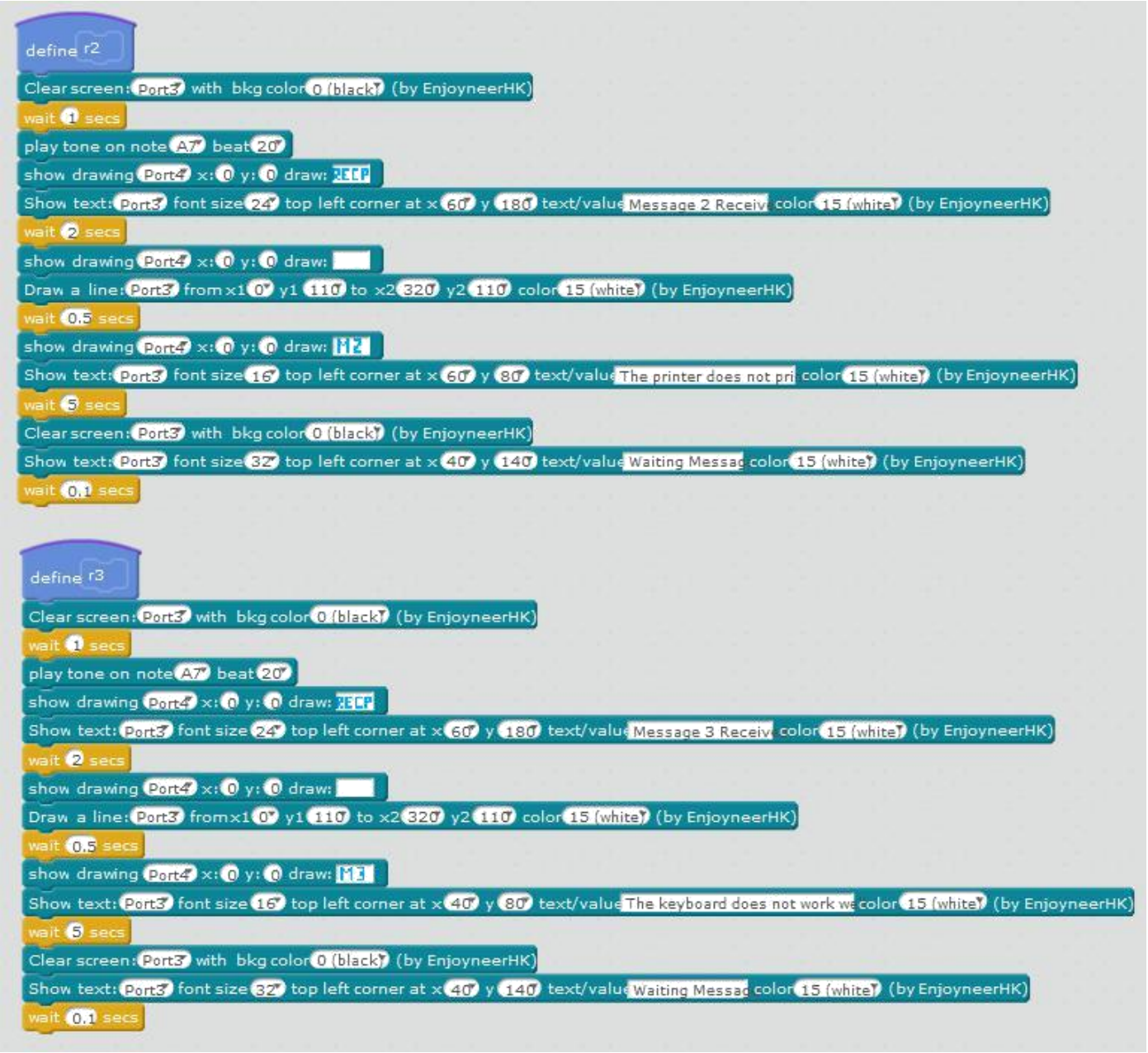
The number of the received message will be displayed in the LED Matrix and the message text will be displayed on the TFT LCD Screen.

A sound will also be emitted and the mBot lights will change, so that the notification would be more perceptive as possible.

The receiver mBot will always be listening, and the moment it receive a message, the function of the message in question will be activated.


mBot Program
forever
if mBot'smessagereceived is equal m0 ? then
Clear screen: Port7 with bkg color 0 (black) (by EnjoyneerHK)
r0
else
if mBot'smessagereceived is equal m1 ? then
Clear screen: Port7 with bkg color 0 (black) (by EnjoyneerHK)
r1
else
if mBot'smessagereceived is equal m2 ? then
Clear screen: Port7 with bkg color 0 (black) (by EnjoyneerHK)
r2
else
if mBot'smessagereceived is equal m3 ? then
Clear screen: Port7 with bkg color 0 (black) (by EnjoyneerHK)
r3
else
if mBot'smessagereceived is equal m4 ? then
Clear screen: Port7 with bkg color 0 (black) (by EnjoyneerHK)
r4
else
if mBot'smessagereceived is equal m5 ? then
Clear screen: Port7 with bkg color 0 (black) (by EnjoyneerHK)
r5
else
if mBot'smessagereceived is equal m6 ? then
Clear screen: Port7 with bkg color 0 (black) (by EnjoyneerHK)
r6
else
if mBot'smessagereceived is equal m7 ? then
Clear screen: Port7 with bkg color 0 (black) (by EnjoyneerHK)
r7
else
if mBot'smessagereceived is equal m8 ? then
Clear screen: Port7 with bkg color 0 (black) (by EnjoyneerHK)
r8
else
if mBot'smessagereceived is equal m9 ? then
Clear screen: Port7 with bkg color 0 (black) (by EnjoyneerHK)
r9
else
show drawing Port7 x: 0 y: 0 draw: WAIT

Some of the messages that the mBot receives are shown:



In the file of the activity that you can download, you will see the complete code.

Below are some screenshots of the activity.

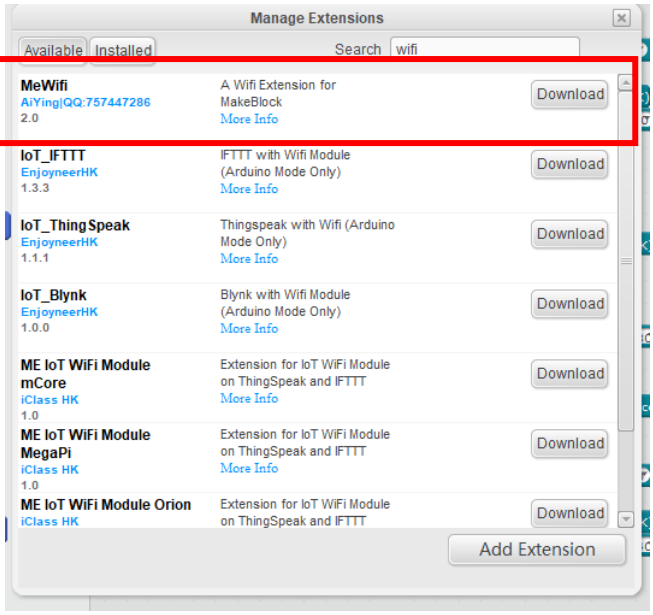

STEMJAM
Developing make spaces to promote creativity around STEM in schools
Acronym: STEMJAM
SEND
RECP
STEMJAM


STEMJAM
Developing make spaces to promote creativity around STEM in schools
Acronym: STEMJAM
RECP
STEMJAM

2. <u>Connecting mBots through Me WiFi Sensor:</u>

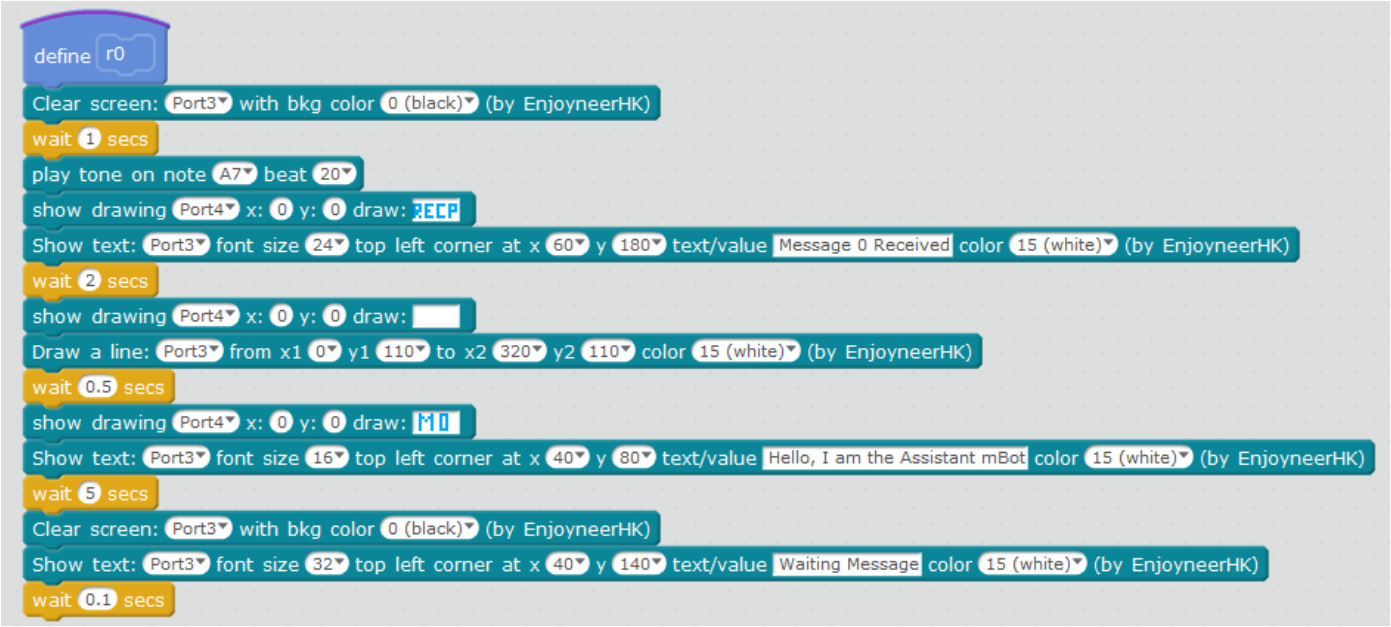
The code of the program would be the same as the previous one, but now we use the Wi-Fi module of Makeblock, which allows us to connect several robots within the same Wi-Fi network.

We also need to install the library in our mBlock Software in order to use this sensor:



The code to receive the messages would be very similar to the previous one, but now we use the sentence of the Wifi module:

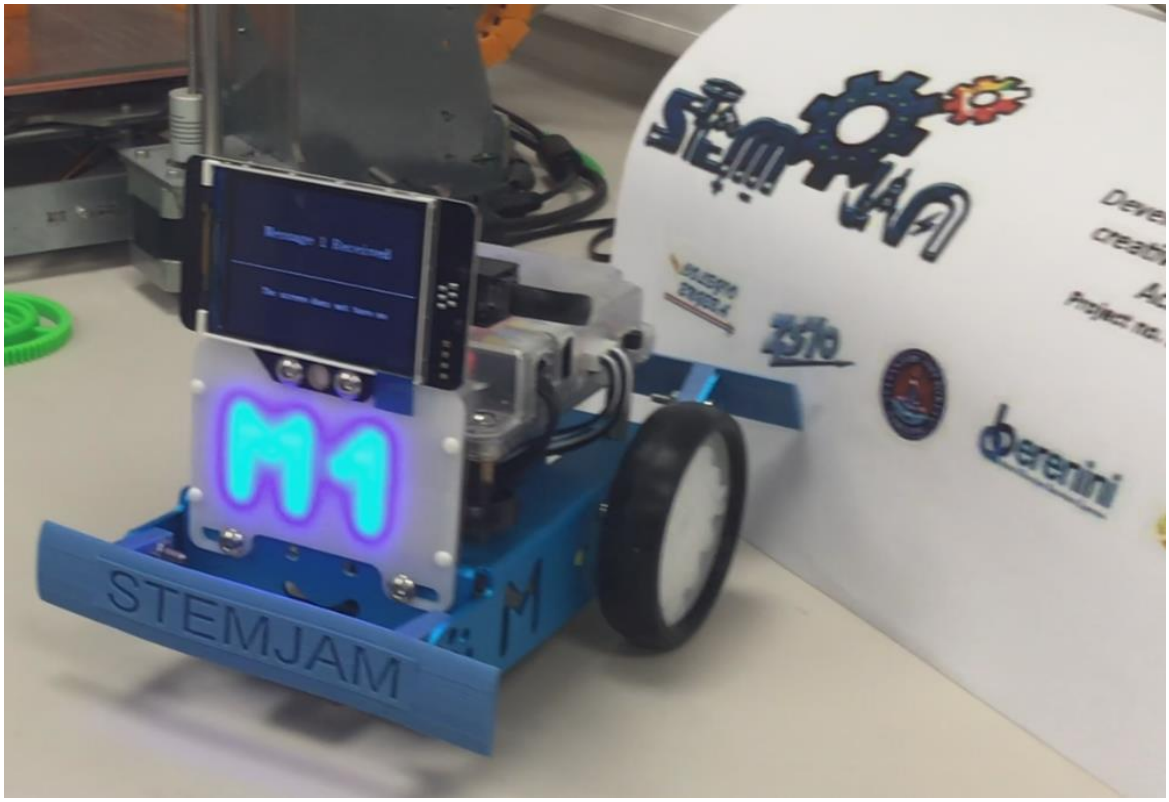
When the message is received, the corresponding function will be activated:



The message will be displayed on the TFT LCD Screen and the message code in the Led Matrix.

Below are pictures of the activity:

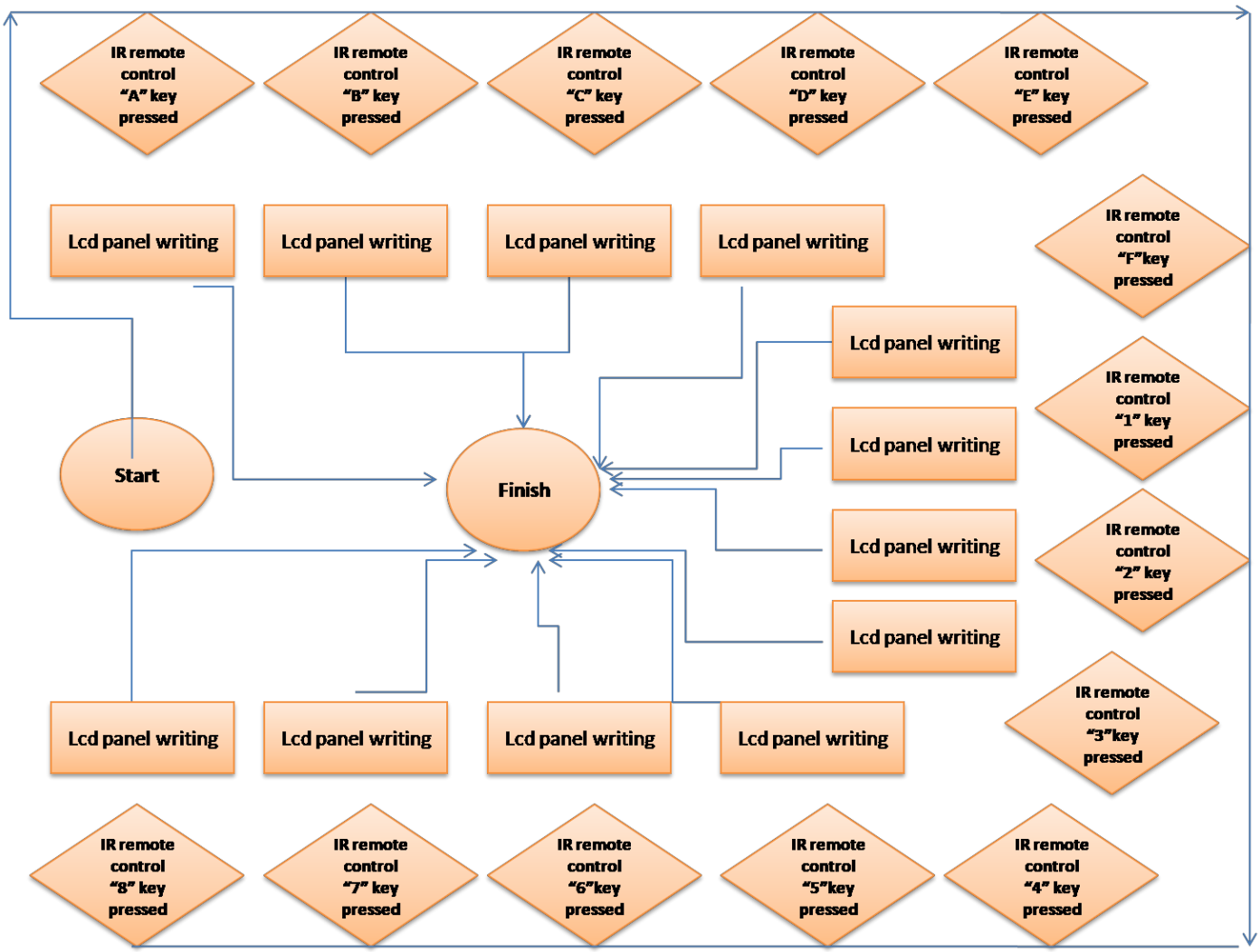
mBot send the signal



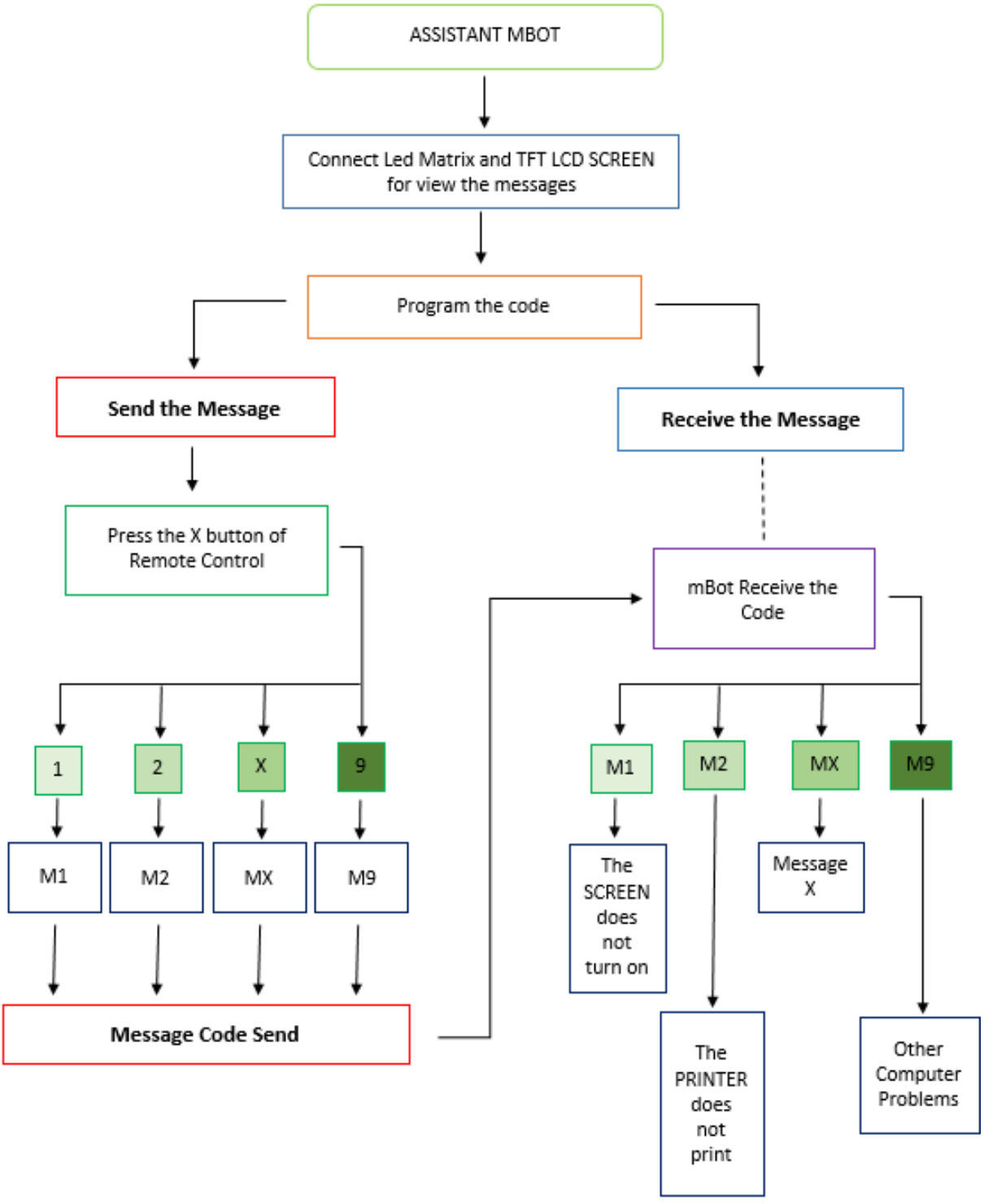
mBot receive the signal

FLOW CHART

First version



Second version



BIBLIOGRAPHY

http://cloud.makeblock.es/

http://www.mblock.cc/example/infrared-communication/