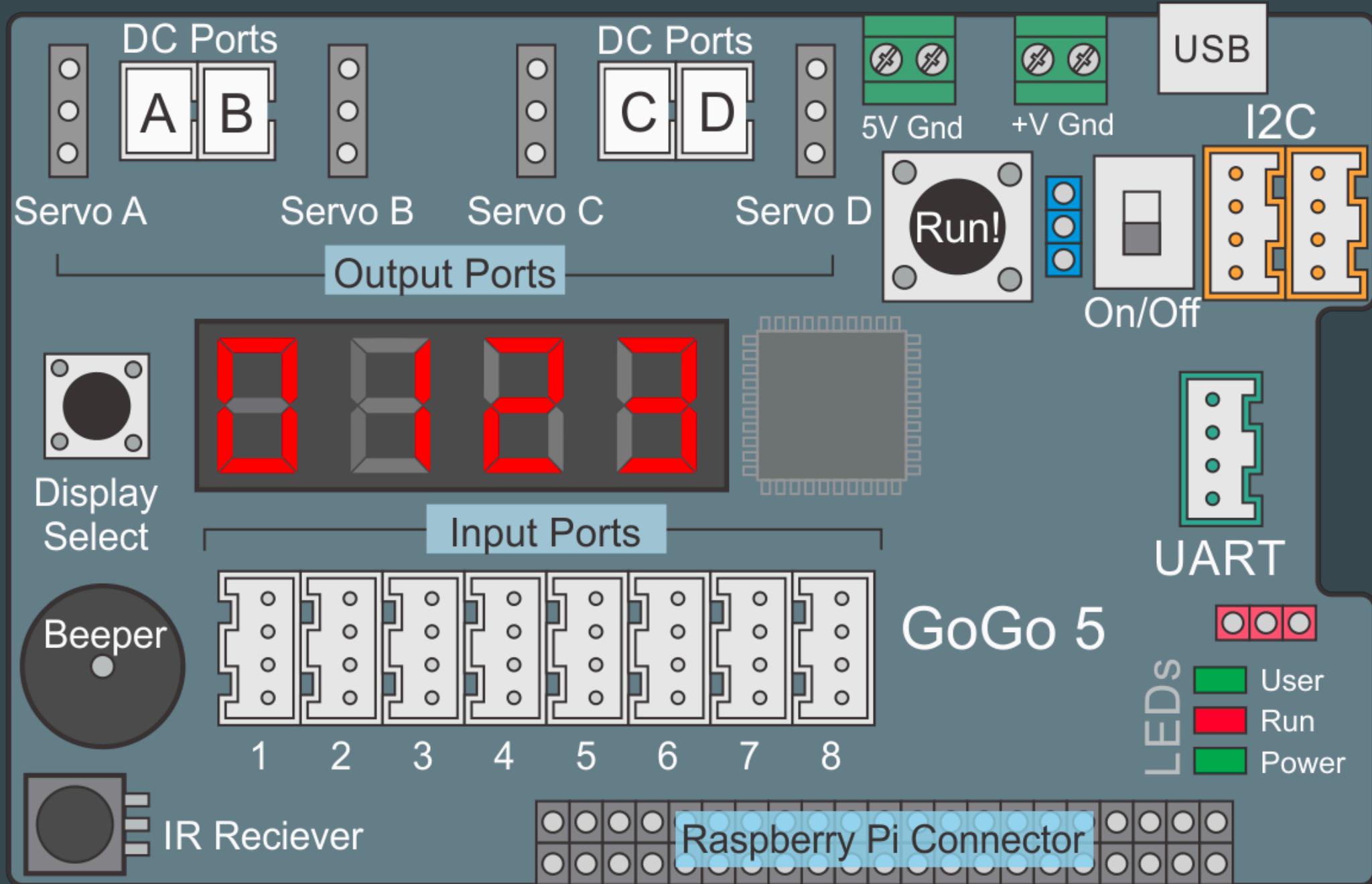
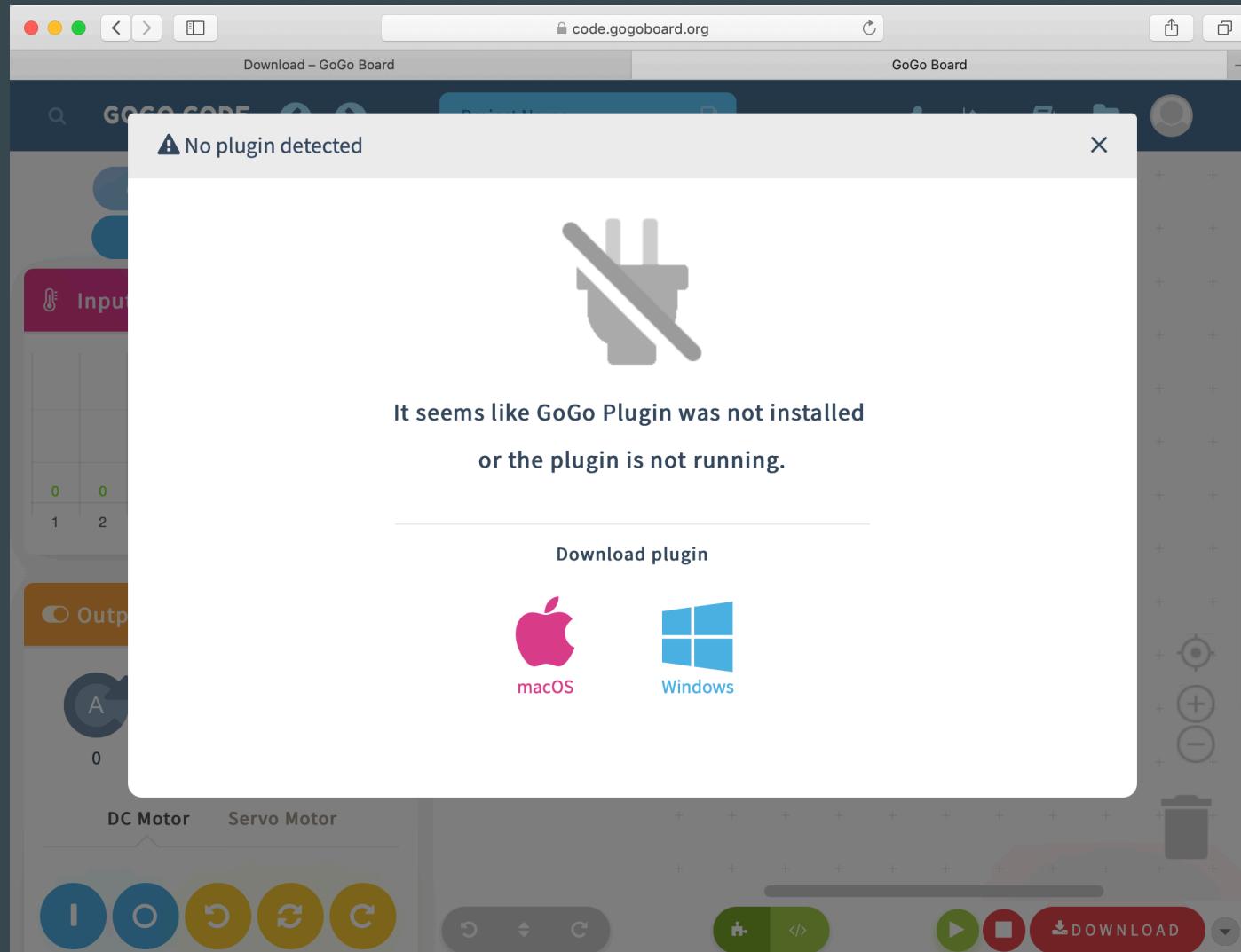


Engineering with the GoGo board

Claudia Urrea



<https://code.gogoboard.org/#/program>

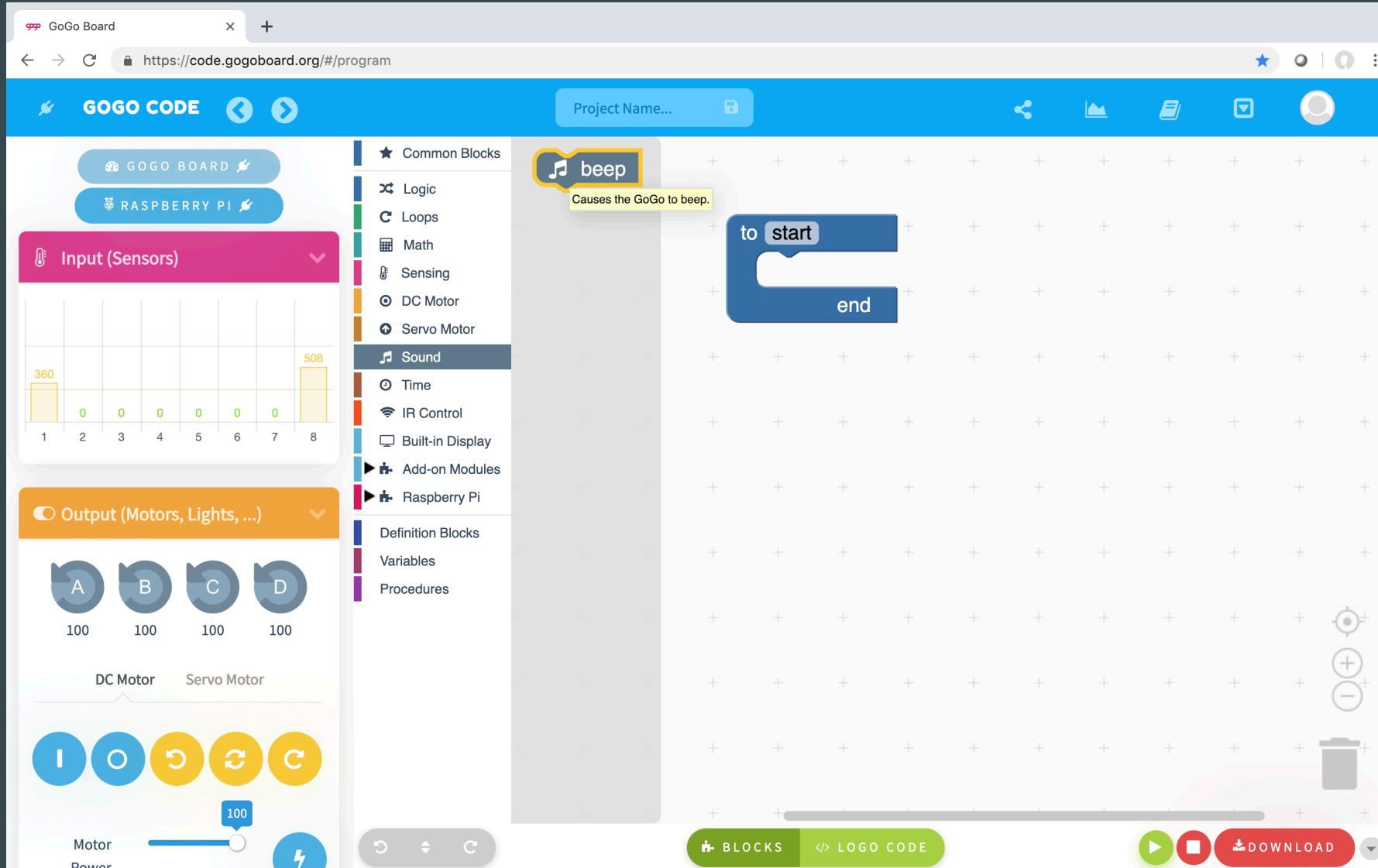


Control panels

The screenshot displays the GOGO CODE software interface, which includes the following sections:

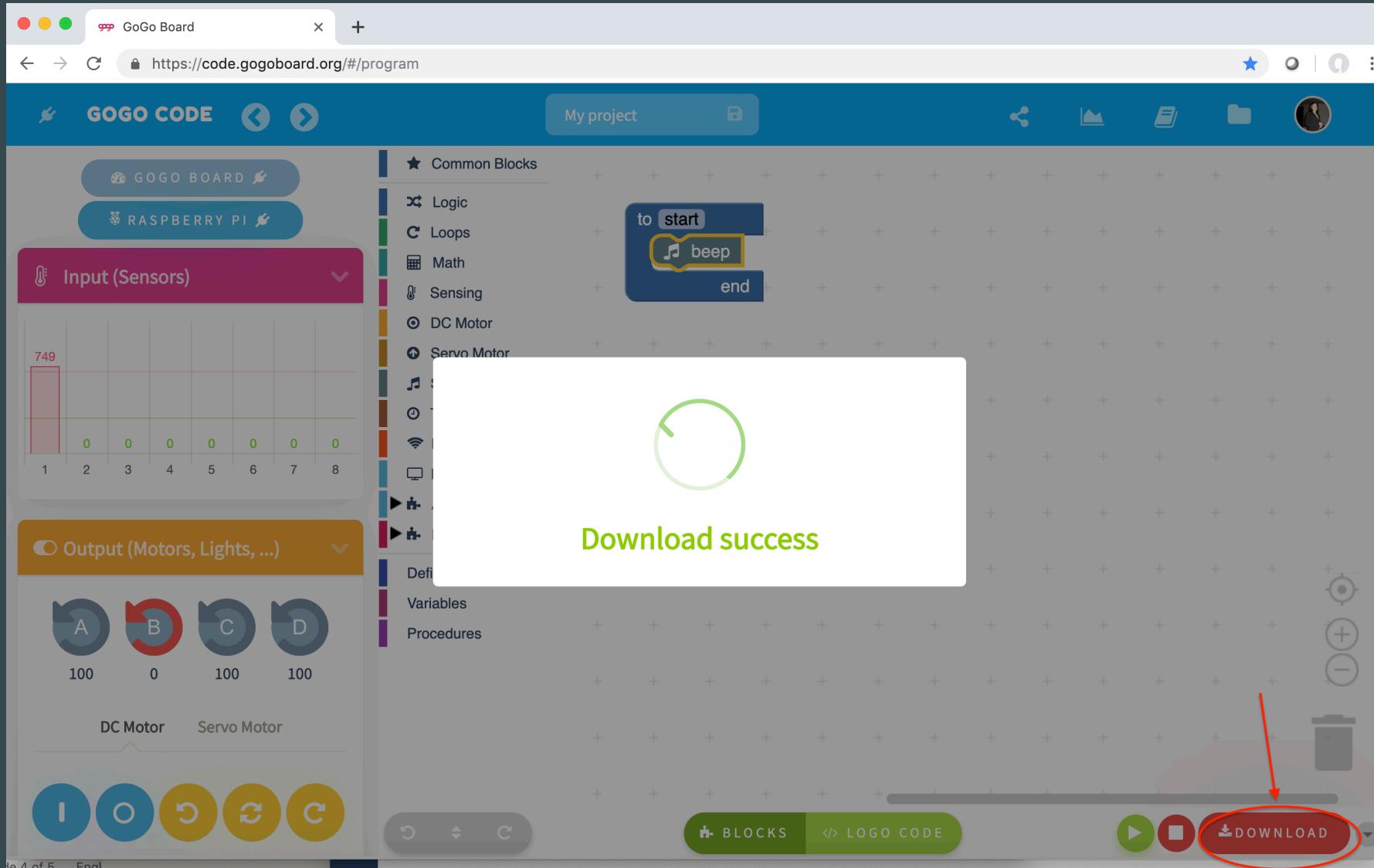
- Board is connected**: Shows the GoGo Board hardware with its various components labeled: DC Ports A/B, Servo A, DC Ports C/D, Servo B, Servo C, Servo D, 5V Grid, 12V Grid, I2C, USB, On/Off, Display Select, Beeper, Input Ports, IR Receiver, GoGo 5, and Raspberry Pi Connector. A digital display shows "0123". Below the board diagram, it says "Firmware version is 40".
- Test Your board**: Contains a bell icon and a text input field labeled "Text or Number t... SHOW". It also displays "IR Received Code 0".
- Output (Motors, Lights, ...)**: Shows four circular controls labeled A, B, C, and D, each set to 100. Below these are two sections: "DC Motor" and "Servo Motor".
- Input (Sensors)**: A graph showing sensor values for eight sensors. Sensor 1 has a value of 25, Sensor 8 has a value of 499, and all other sensors have a value of 0.

Simple procedure - Sound



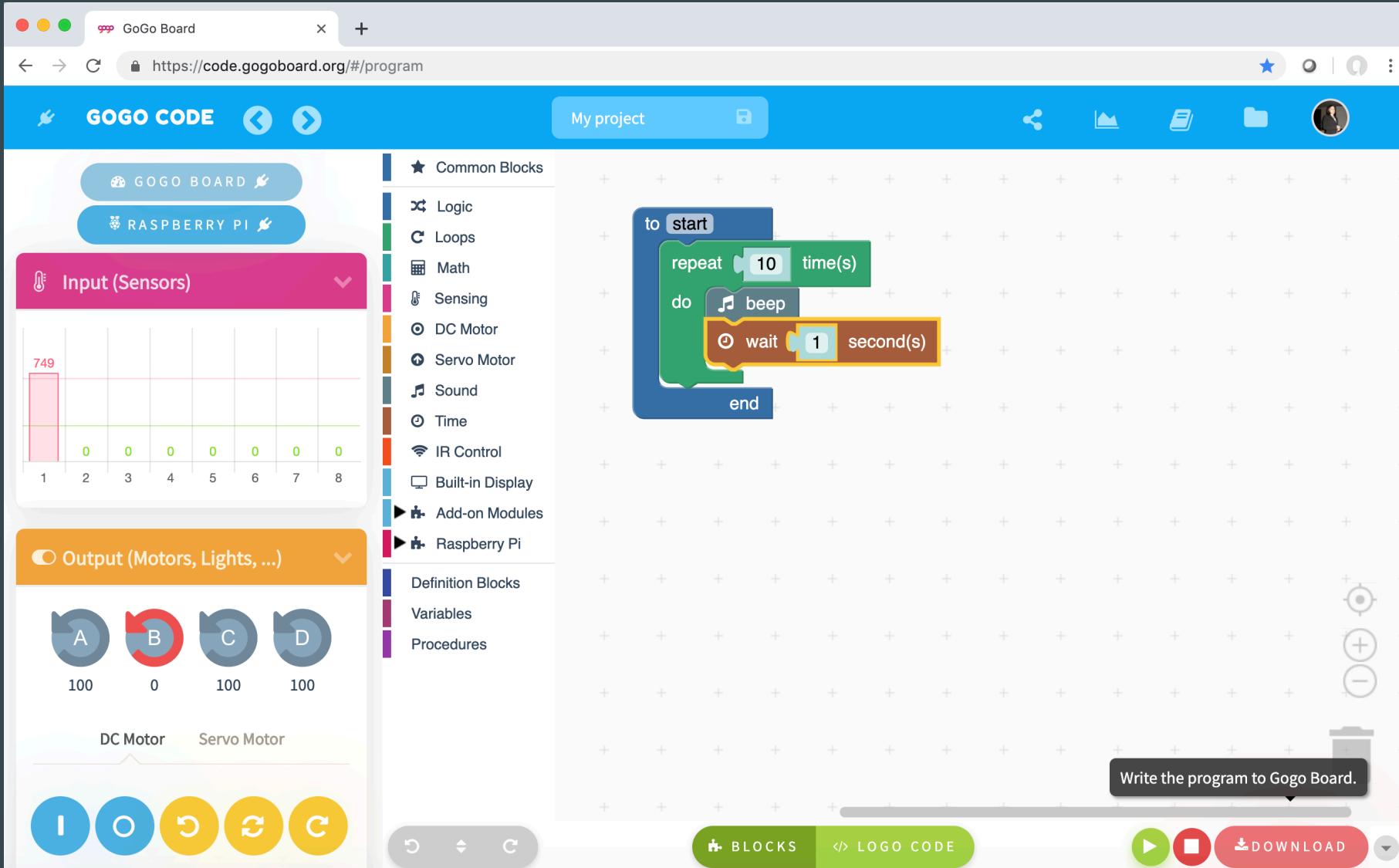
Insert a
"Beep"
block into
the
Procedure
block!

Simple procedure - Sound



”Download”
the
program to
the GoGo
Board!

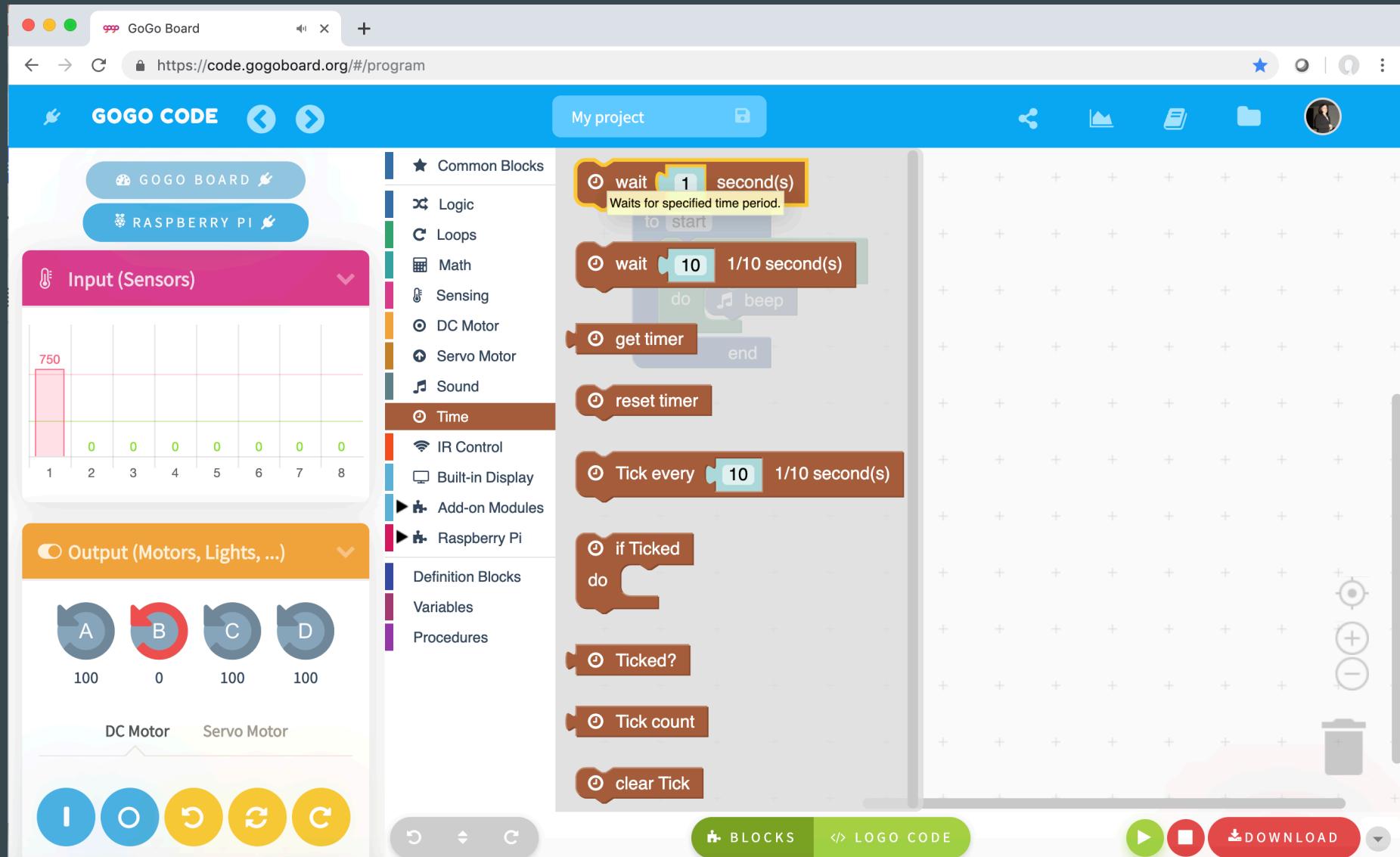
Simple procedure – Sound, insert a loop



Explore using a “Repeat” and a “Wait” blocks

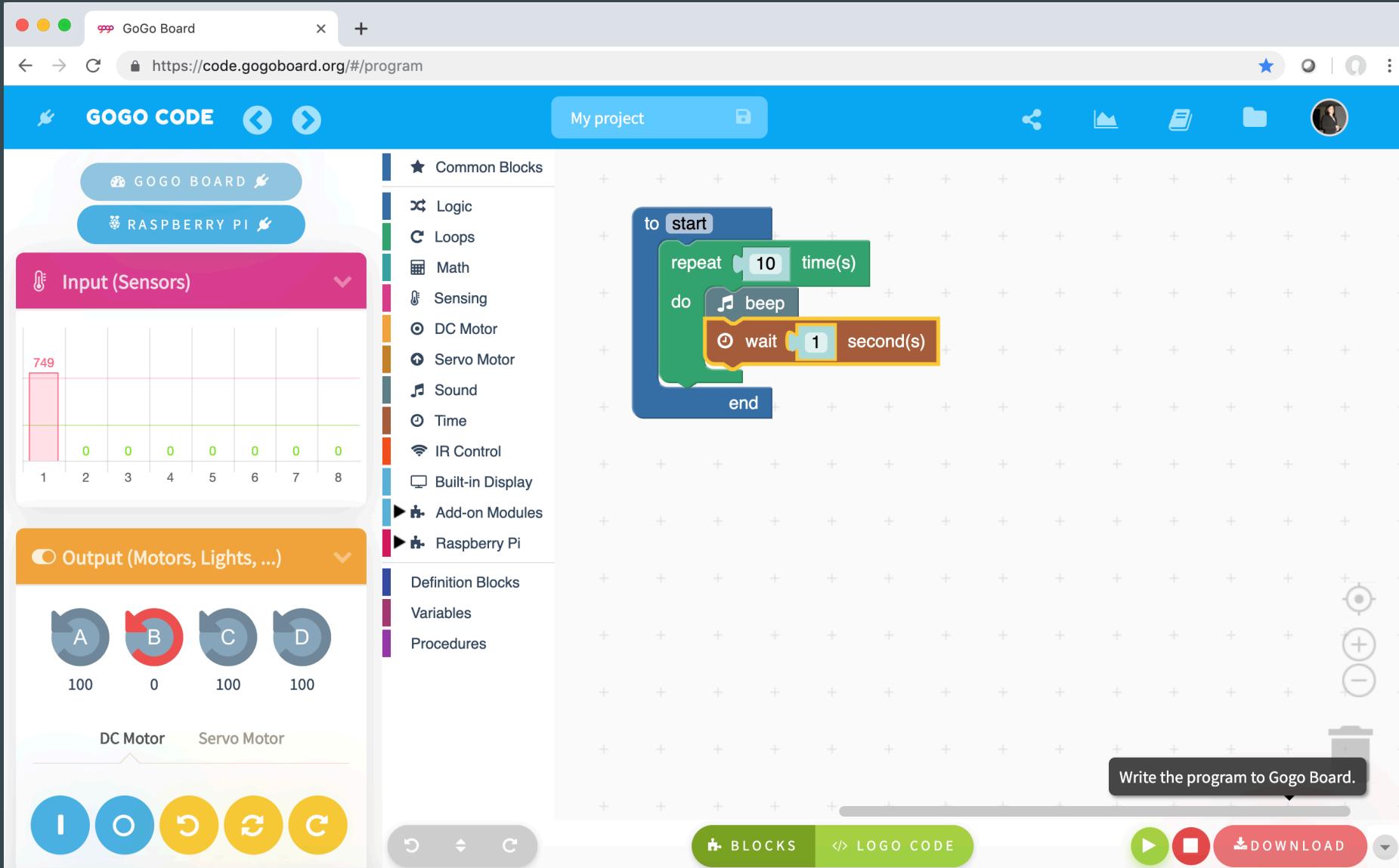
”Download” the program to the GoGo Board!

Simple procedure – Sound, insert a loop



What happens without a “Wait” block?

Simple procedure – Sound, insert a loop

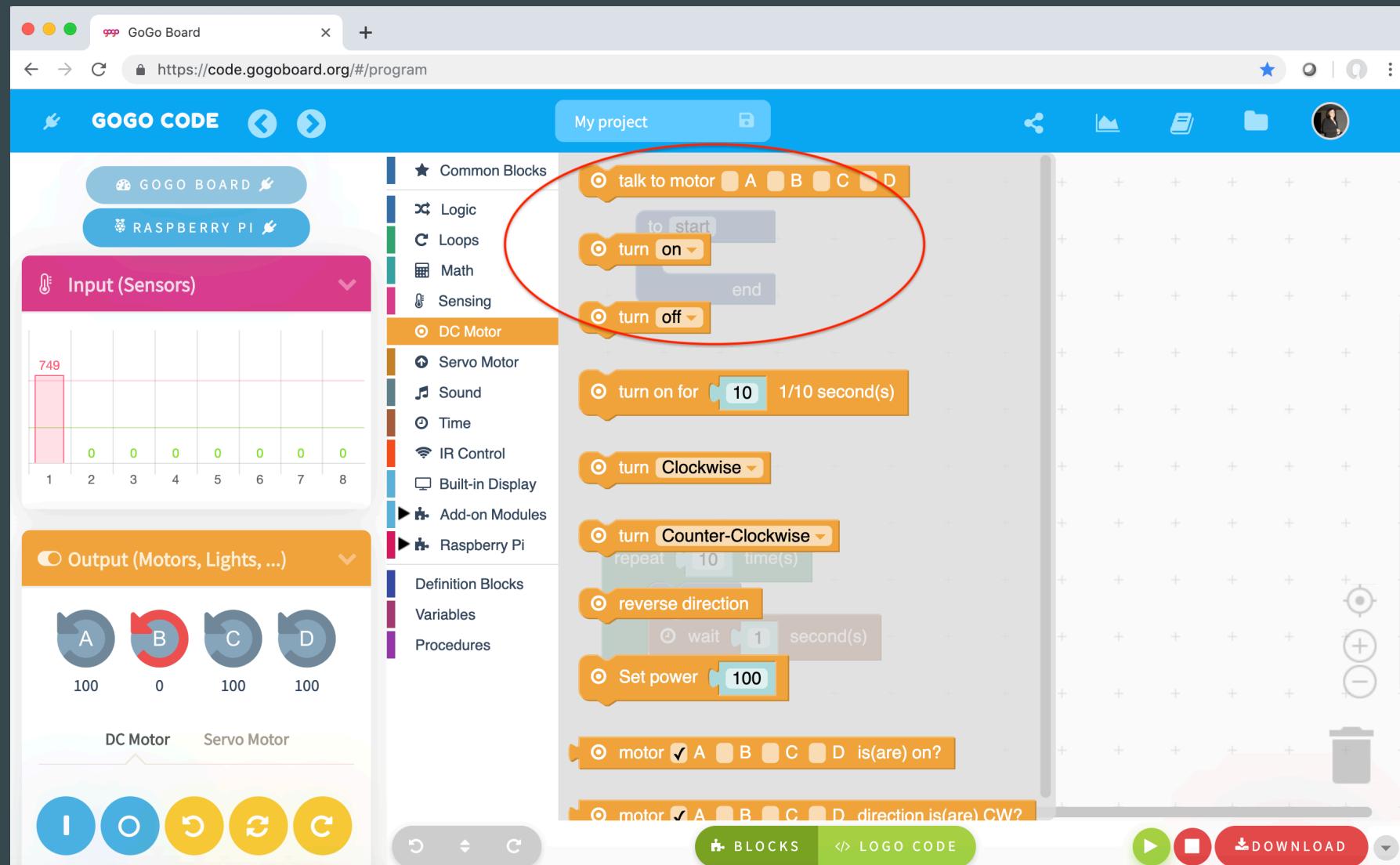


Explore using a “Repeat” and a “Wait” blocks

“Download” the program to the GoGo Board!

Explore!!
(10 min)

Simple procedure - Motors

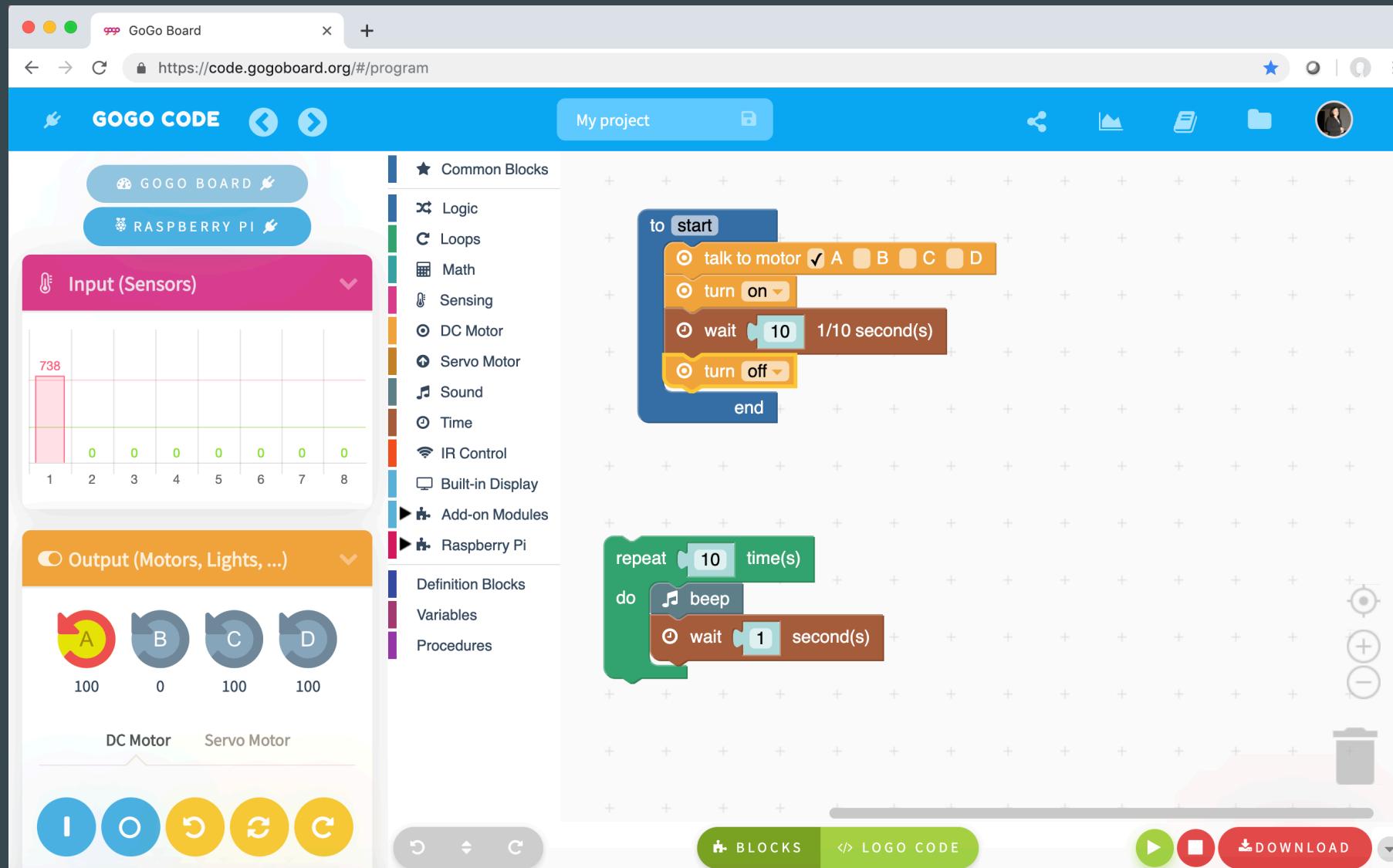


Connect
Motor(s)

You need to
a block to
“talk” to
the motor(s)

You need to
a block to
turn
motor(s) on
and off

Simple procedure - Motors

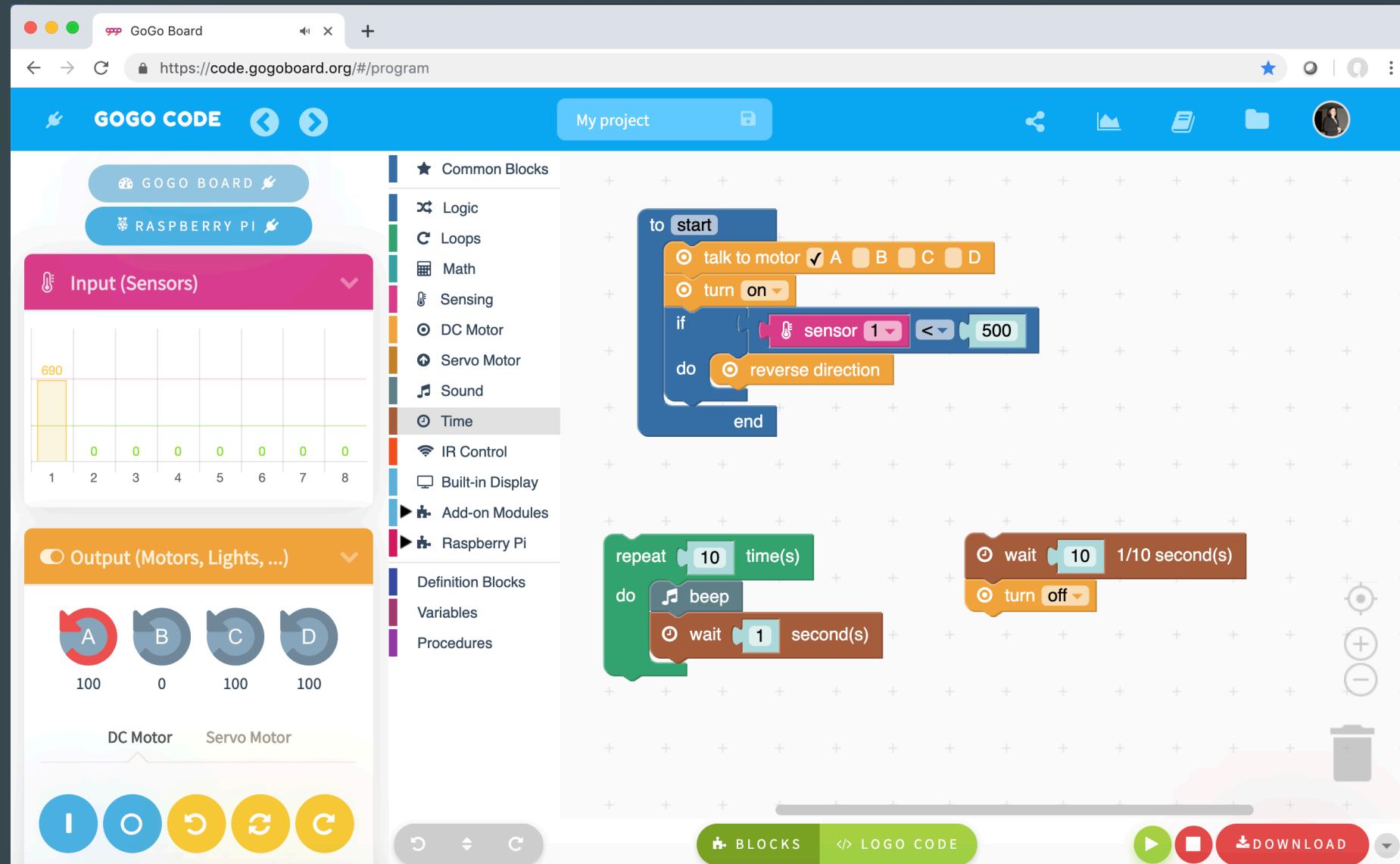


"Download" the program to the GoGo Board!

Challenges (15 min):

- Combine movement and sound
- Build a moving artifact and program it to move back and forth
 - Others?

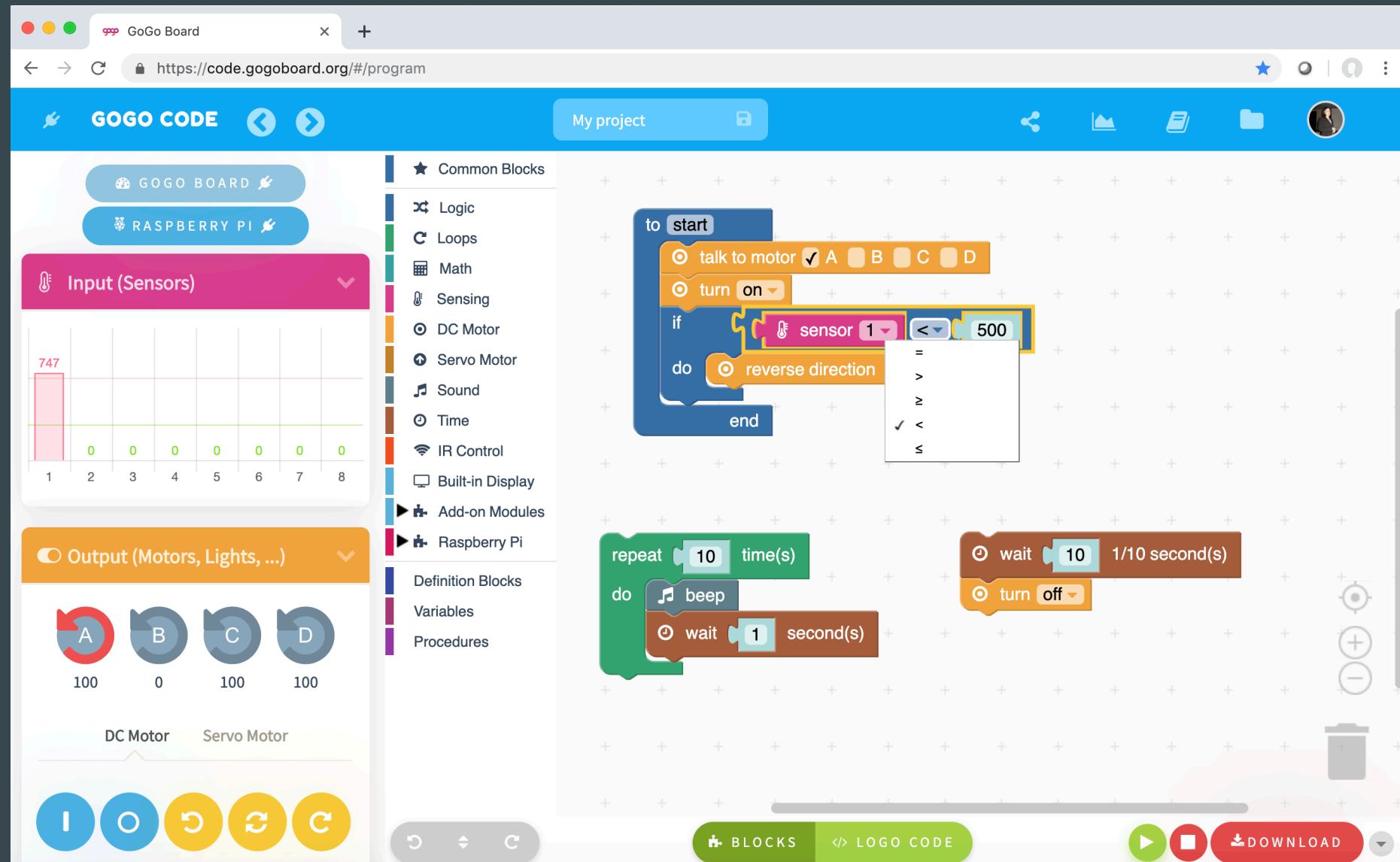
Control Motors



What if we can control the movement with a sensor?

Select a sensor and connect it to a sensor port!

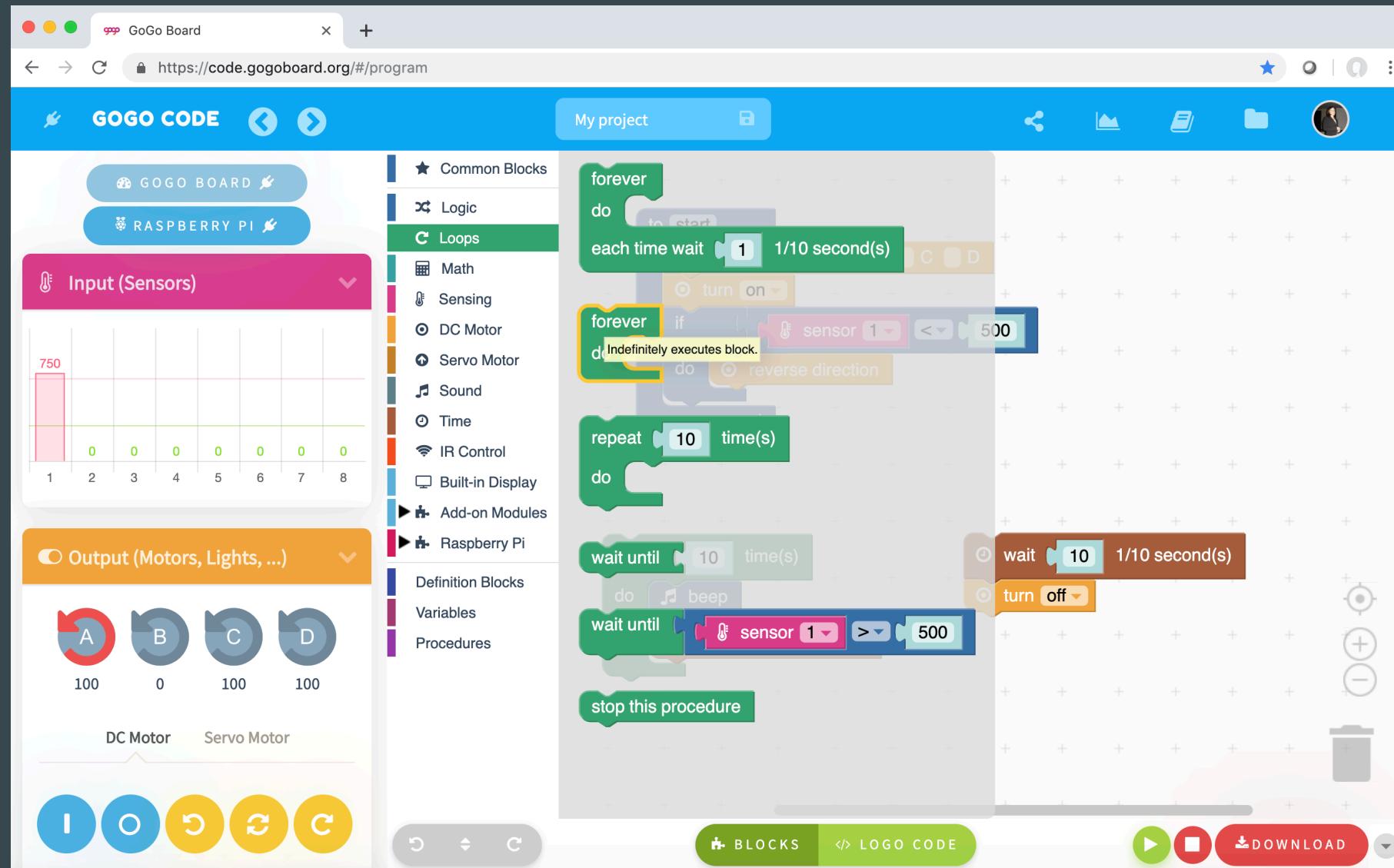
Control Motors



A light sensor reading is smaller than 500 when is dark!

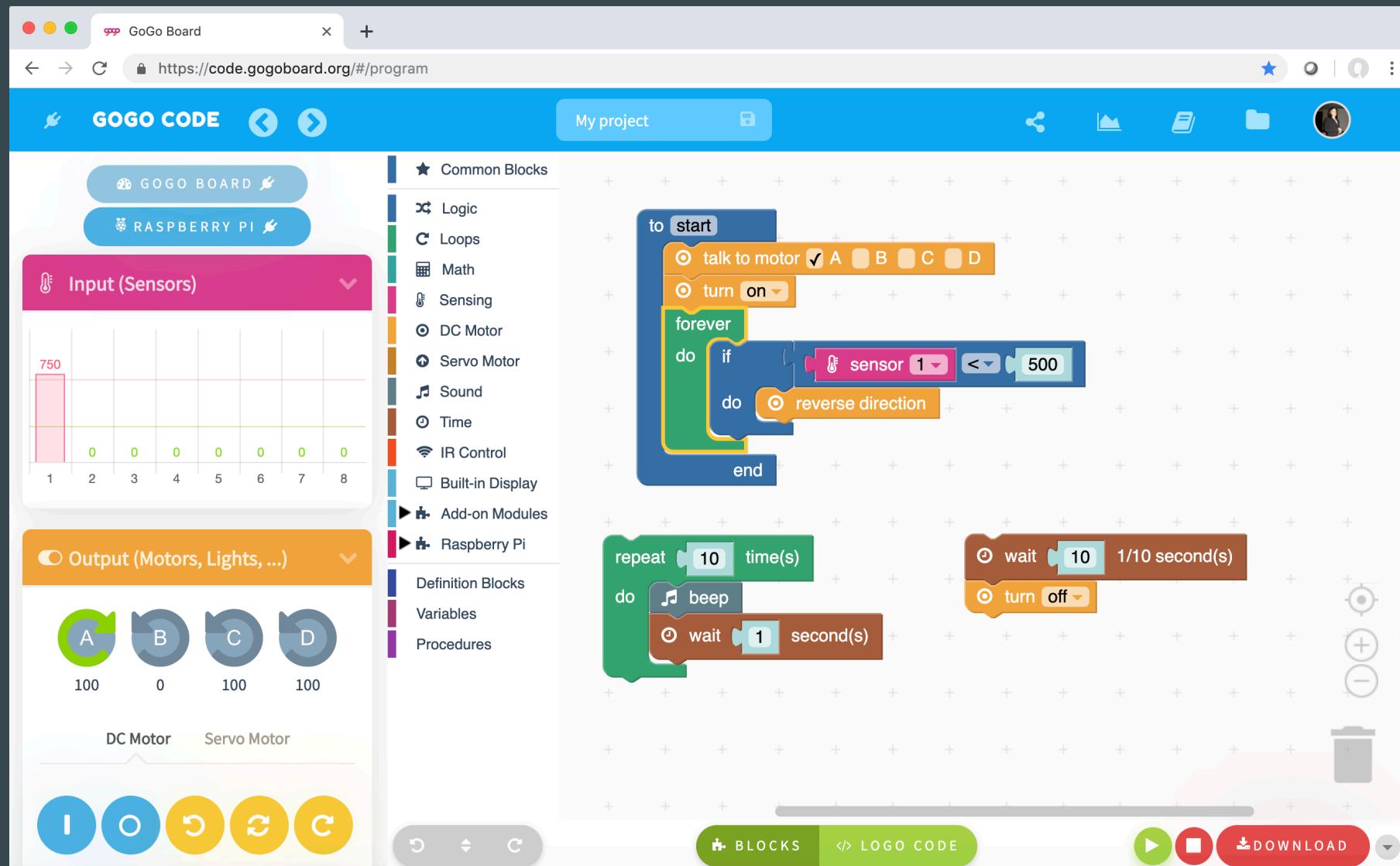
Calibrate your sensor!

Control Motors



What happens without a "Repeat" block?

Control Motors



Explore and
build your
own
artifact!

Challenges (30 min):

- Build a house alarm
- Turn a light on when it is dark
- Start a motor when soil is too dry
- Build a small car that avoids obstacles
 - Other ideas?

Recording data

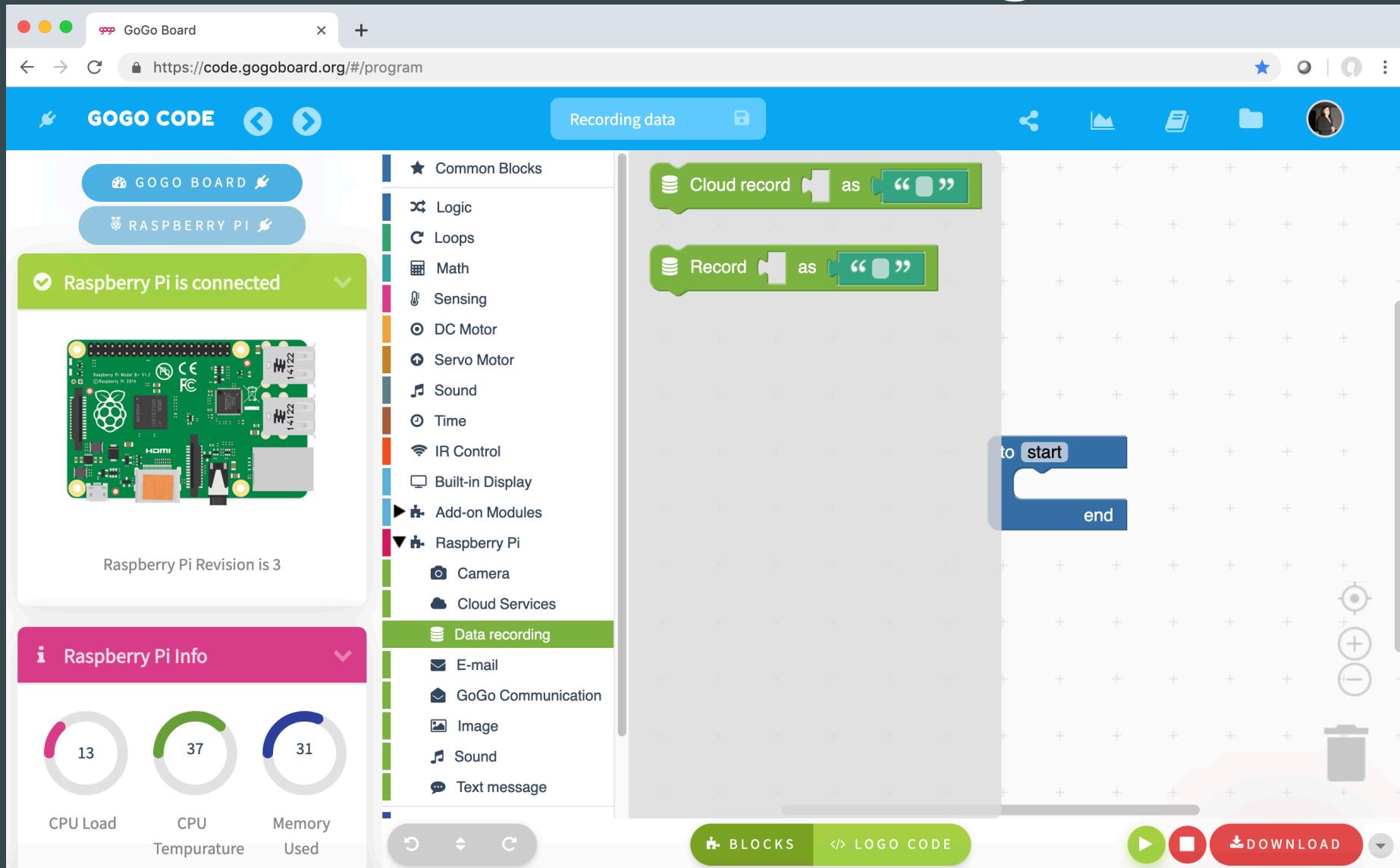
The screenshot shows the GoGo Board web interface at <https://code.gogoboard.org/#/program>. The interface includes a sidebar with "GOGO CODE" and "LOGO CODE" tabs, and sections for "Raspberry Pi" and "Raspberry Pi Info". The main area displays a Scratch-like programming environment with a "Recording data" tab selected. A logic block labeled "to start [] end" is visible on the stage. The sidebar also lists categories like Common Blocks, Logic, Loops, Math, Sensing, DC Motor, Servo Motor, Sound, Time, IR Control, Built-in Display, Add-on Modules, Raspberry Pi, Definition Blocks, Variables, and Procedures.

Connect Raspberry Pi!

Network Configuration

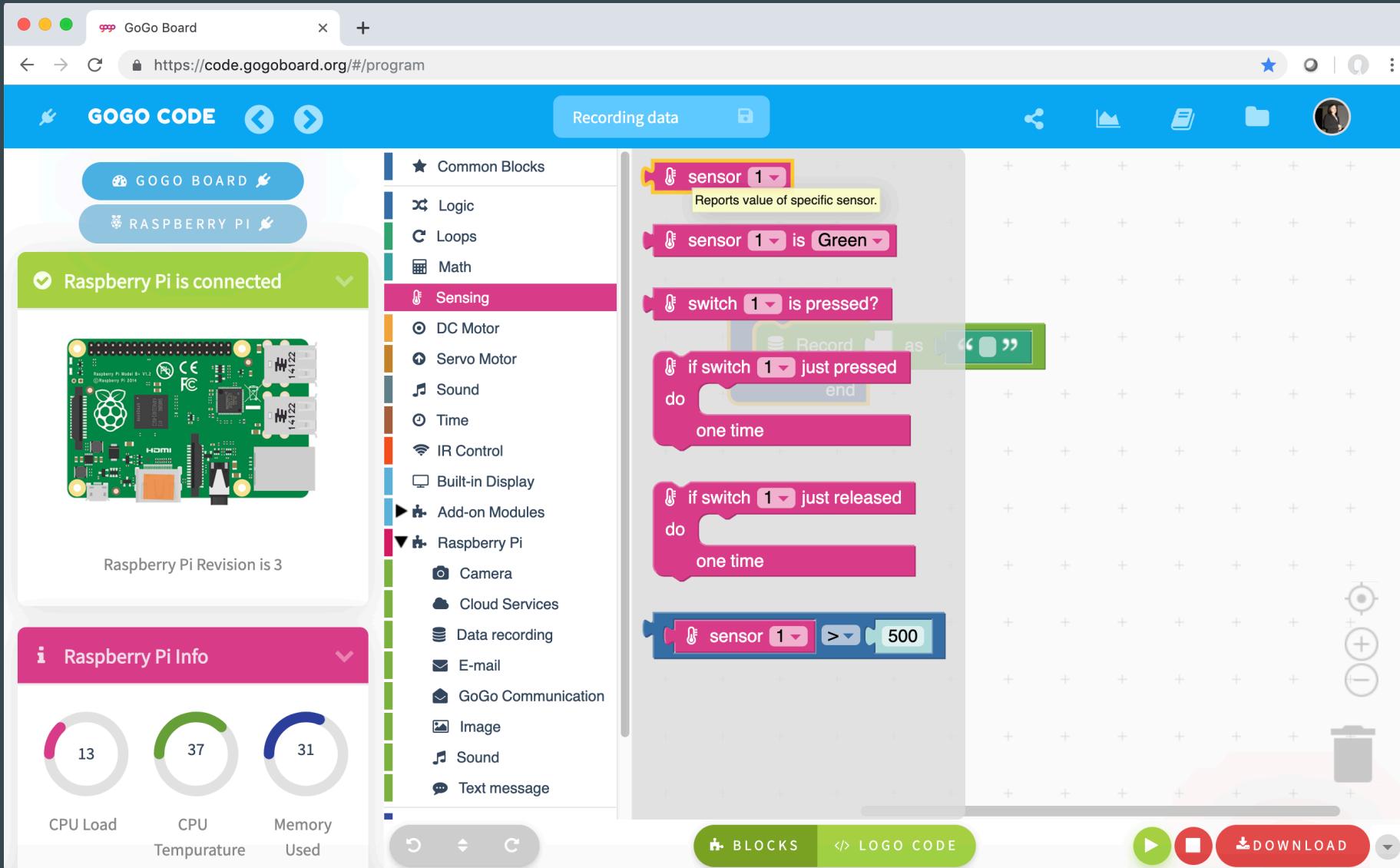
Wireless IP Address	IP Address
0.0.0.0	0.0.0.0
10.0.0.242	
SSID	<input type="text"/>
PASSWORD	<input type="password"/> <input checked="" type="checkbox"/> Show Password
<input type="button" value="Connect"/>	

Recording data



Use
“Record”
block
(from
Raspberry
Pi menu
option)

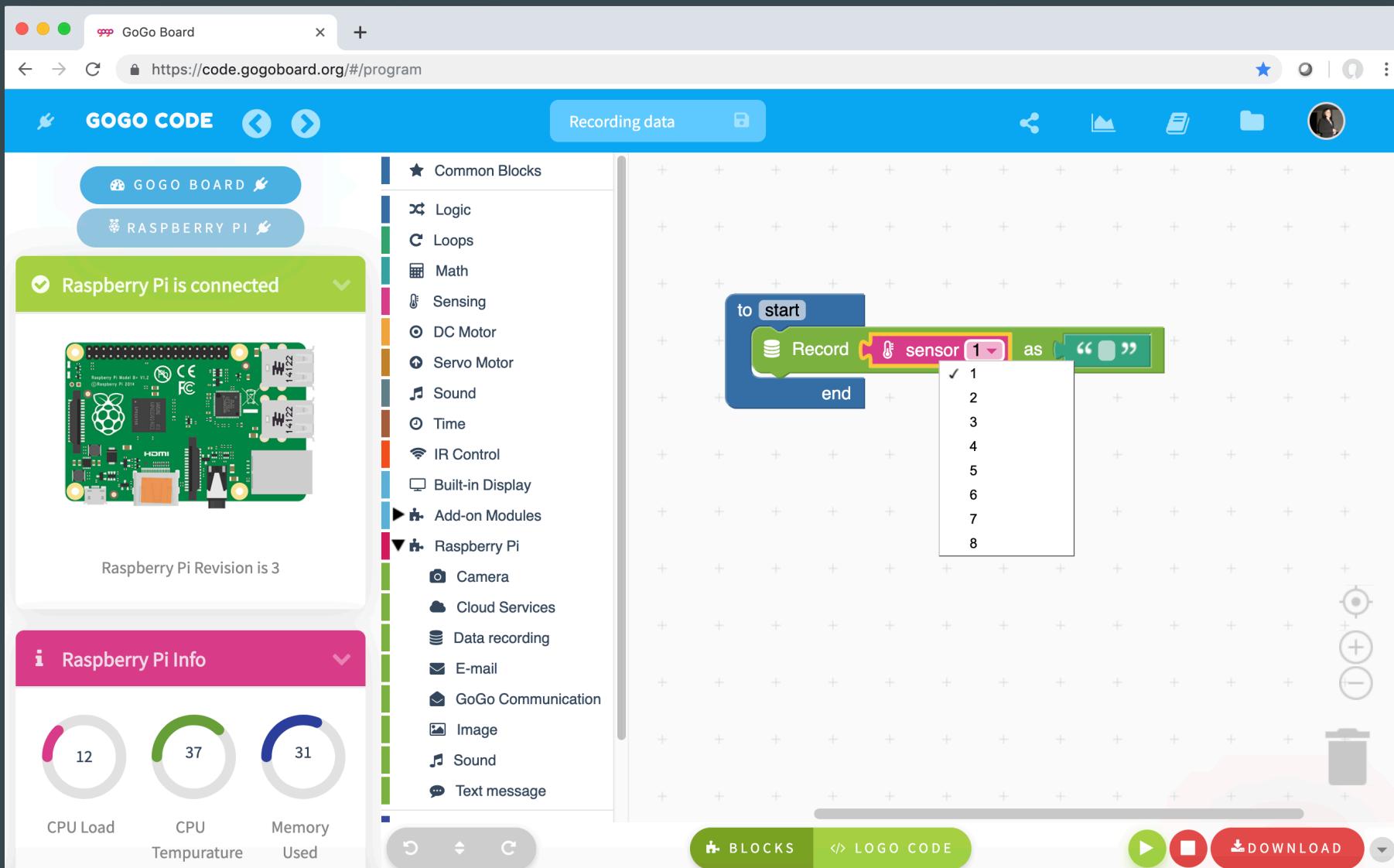
Recording data



Use “Record” block (from Raspberry Pi menu option)

Add a
“sensor”
block.

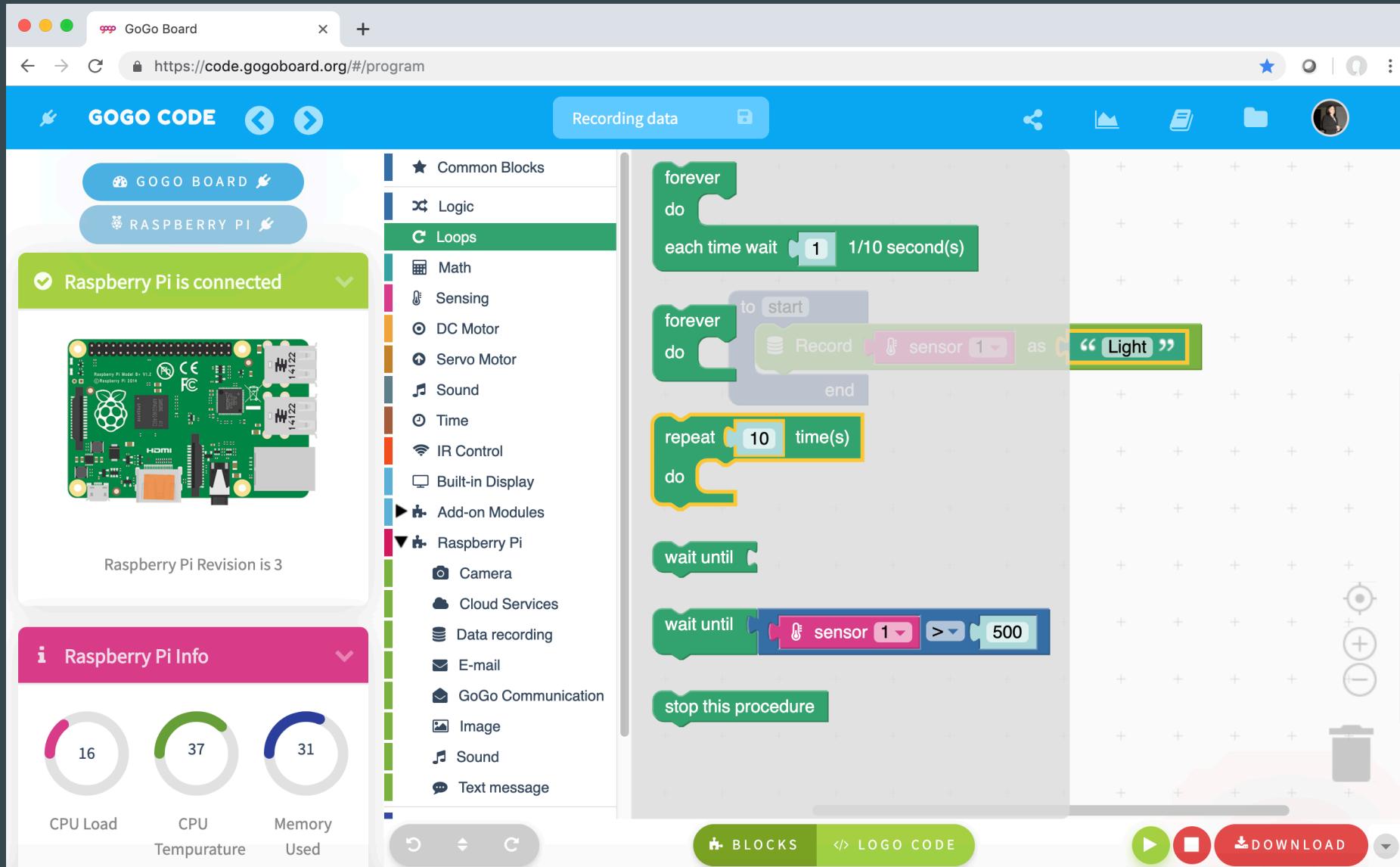
Recording data



Use “Record” block (from Raspberry Pi menu option)

Add a “sensor” block. Make sure to select the correct port!

Recording data



Do we need
a “Repeat”
block?

Recording data

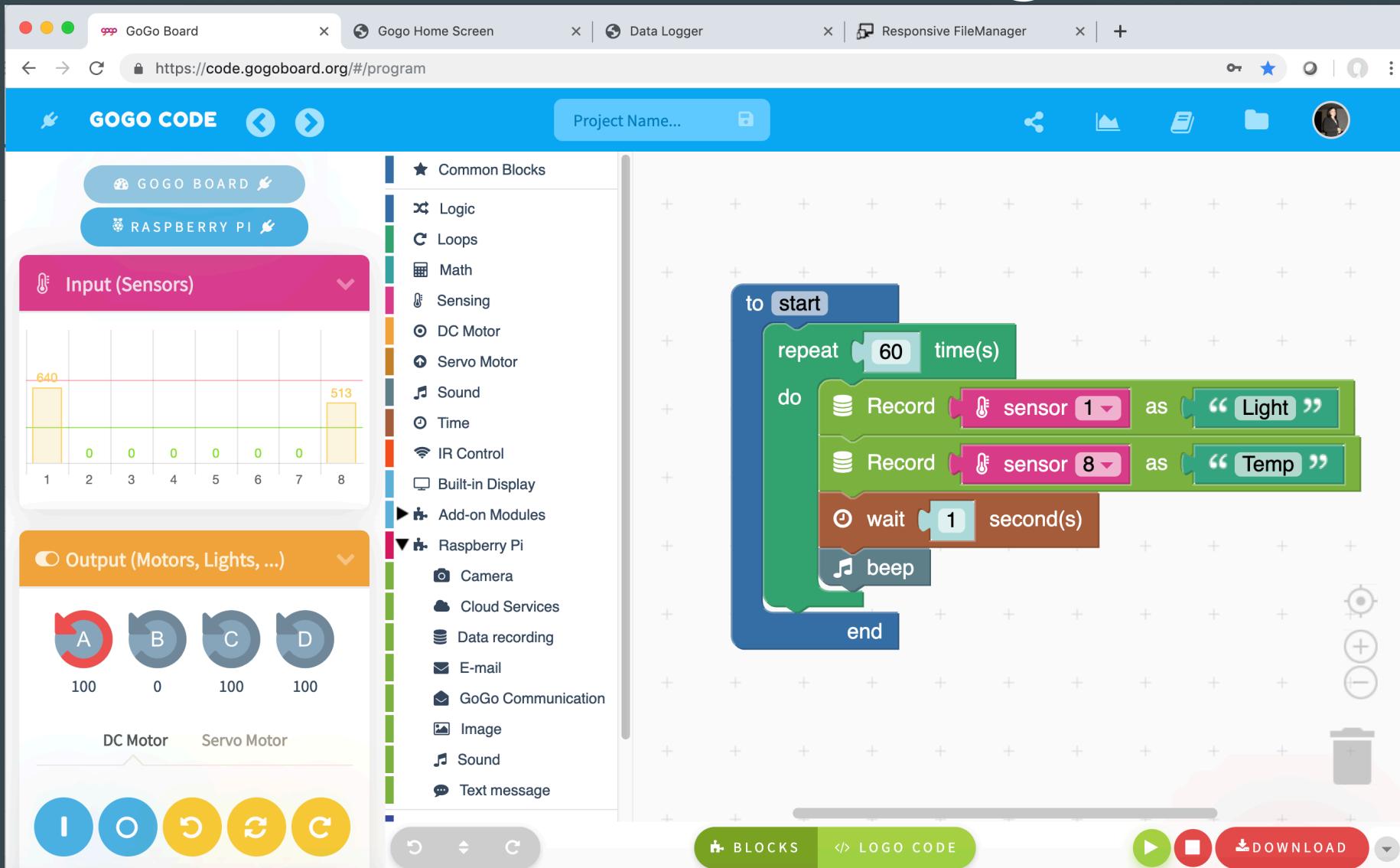
The screenshot shows a web-based Scratch-like programming environment for the GoGo Board. The interface includes:

- Top Bar:** Shows tabs for "GoGo Board", "Gogo Home Screen", "Data Logger", and "Responsive FileManager".
- Project Name:** A field to enter the project name.
- Toolbox:** A vertical sidebar with categories: Common Blocks, Logic, Loops, Math, Sensing, DC Motor, Servo Motor, Sound, Time, IR Control, Built-in Display, Add-on Modules, Raspberry Pi, Definition Blocks, Variables, and Procedures.
- Script Area:** Displays a script starting with a "repeat (60 [time(s)])" loop. Inside the loop, there is a "do" block containing:
 - A "Record" block with "sensor 1" as "Light".
 - A "wait (1 [second(s)])" block.
 - A "beep" block.
- Sensor Data:** A graph titled "Input (Sensors)" showing values for sensor 1 (626) and sensor 8 (512) over time.
- Output Controls:** Sliders for DC Motor (A: 100, B: 0), Servo Motor (C: 100, D: 100), and buttons for I/O, C, and C.

Do we need
a “Repeat”
block?

How many
times? How
often we
record?

Recording data

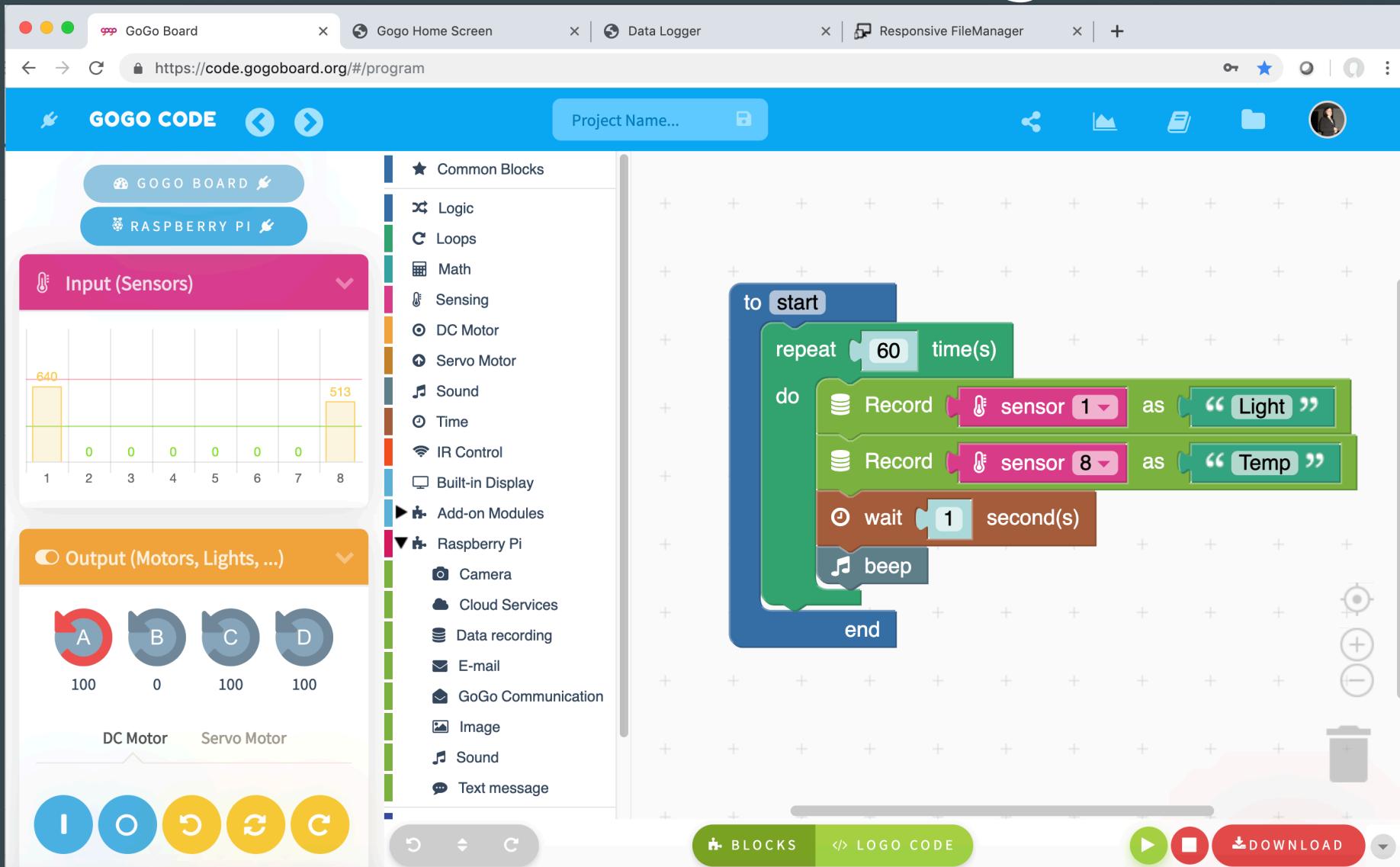


Do we need
a “Repeat”
block?

How many
times? How
often we
record?

What about
2 sensors?

Recording data



You can see data recording in real time!

See recording in real time!

The screenshot shows the GoGo Board web interface with several tabs at the top: GoGo Board, Gogo Home Screen, Data Logger, Responsive FileManager, and a new tab. The main area is titled "GOGO CODE".

Network Configuration: Wireless IP Address is set to 10.0.0.242, which is circled in red. The IP Address field is 0.0.0.0. Other fields include SSID, PASSWORD, and a Show Password checkbox.

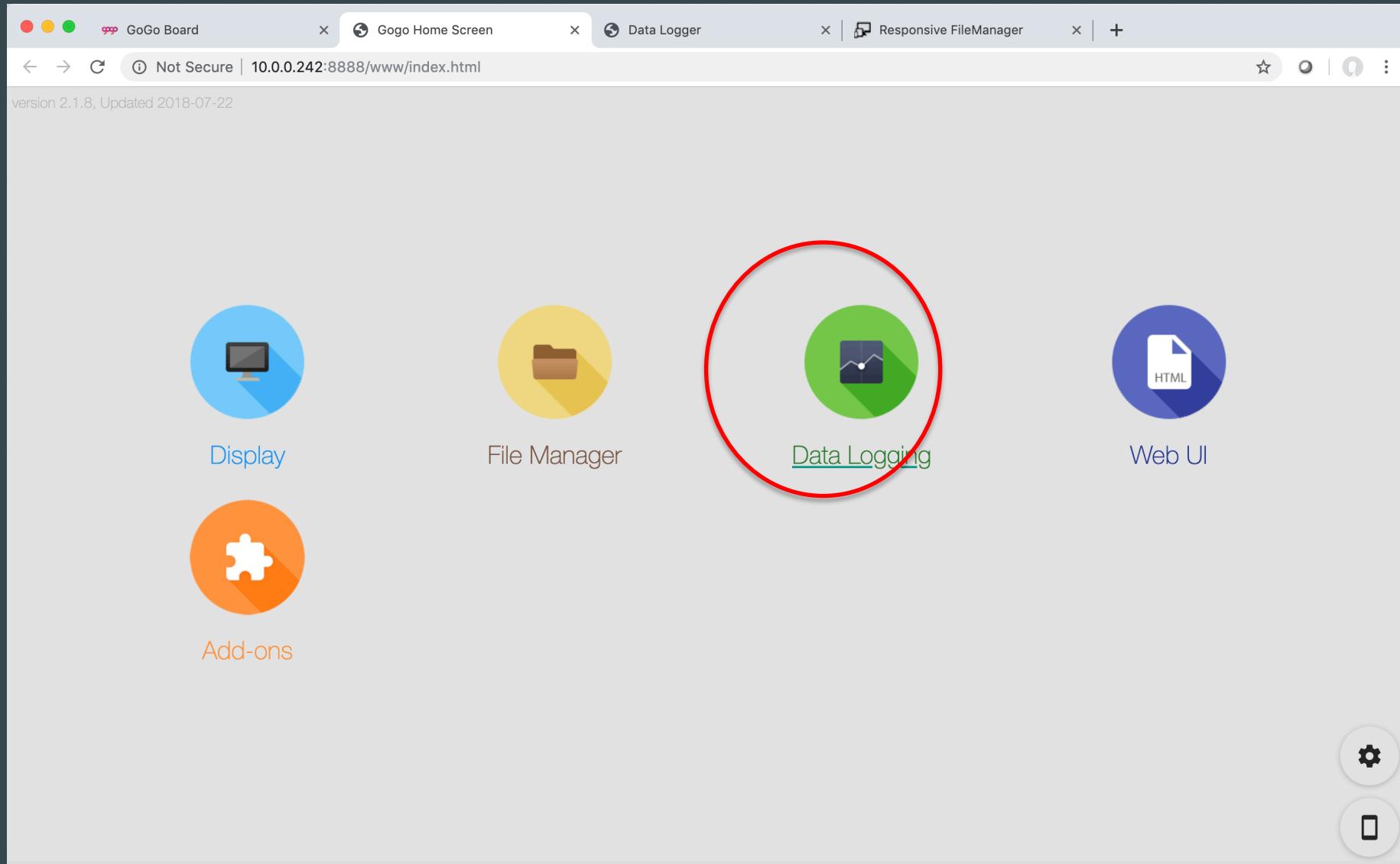
Code Editor: A Scratch-like code editor displays the following script:

```
to start
repeat (60) [time(s)]
  do
    Record sensor 1 as "Light"
    Record sensor 8 as "Temp"
    wait (1) second(s)
    beep
end
```

Toolbars and Buttons: Includes CPU Load, Temperature, and Memory Used monitors, a "Shutdown" button, a "Reboot" button, and a "Connect" button. Bottom buttons include "BLOCKS", "LOGO CODE", "DOWNLOAD", and a play/pause icon.

Click on
the IP
Address.

See recording in real time!



Select Data
Logging!

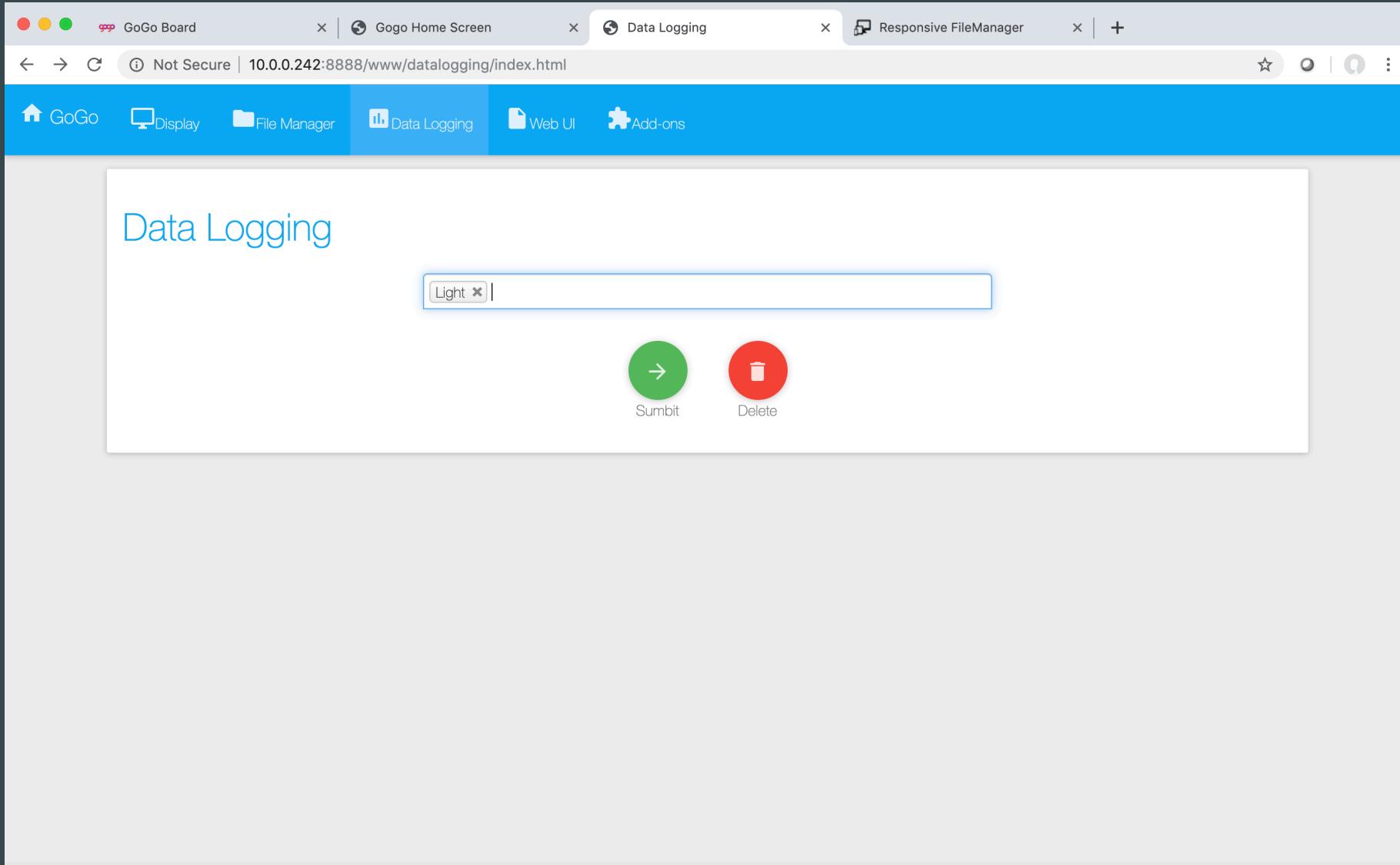
See recording in real time!

The screenshot shows a web browser window with the following details:

- Address Bar:** Not Secure | 10.0.0.242:8888/www/datalogging/index.html
- Tab Bar:** GoGo Board, Gogo Home Screen, Data Logging (active), Responsive FileManager
- Header:** GoGo, Display, File Manager, Data Logging (highlighted in blue), Web UI, Add-ons
- Content Area:** A title "Data Logging" is visible above a search input field. Below the search field is a dropdown menu containing the following options:
 - Light
 - new_air
 - air
 - file_demo_light
 - light
 - file
 - demo_temperature
 - demo_light

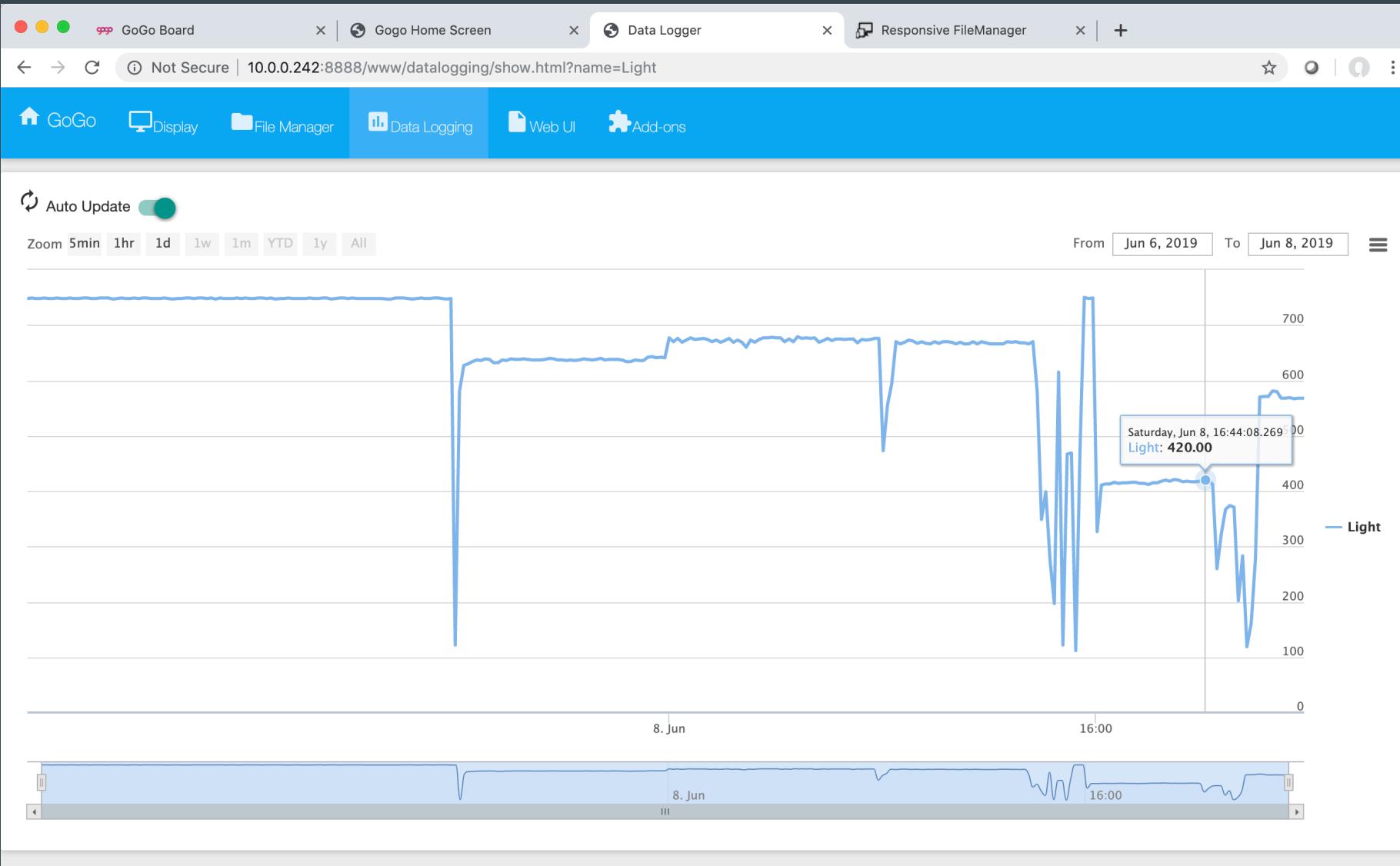
Select the sensor you want to watch!

See recording in real time!



Select the
sensor you
want to
watch!

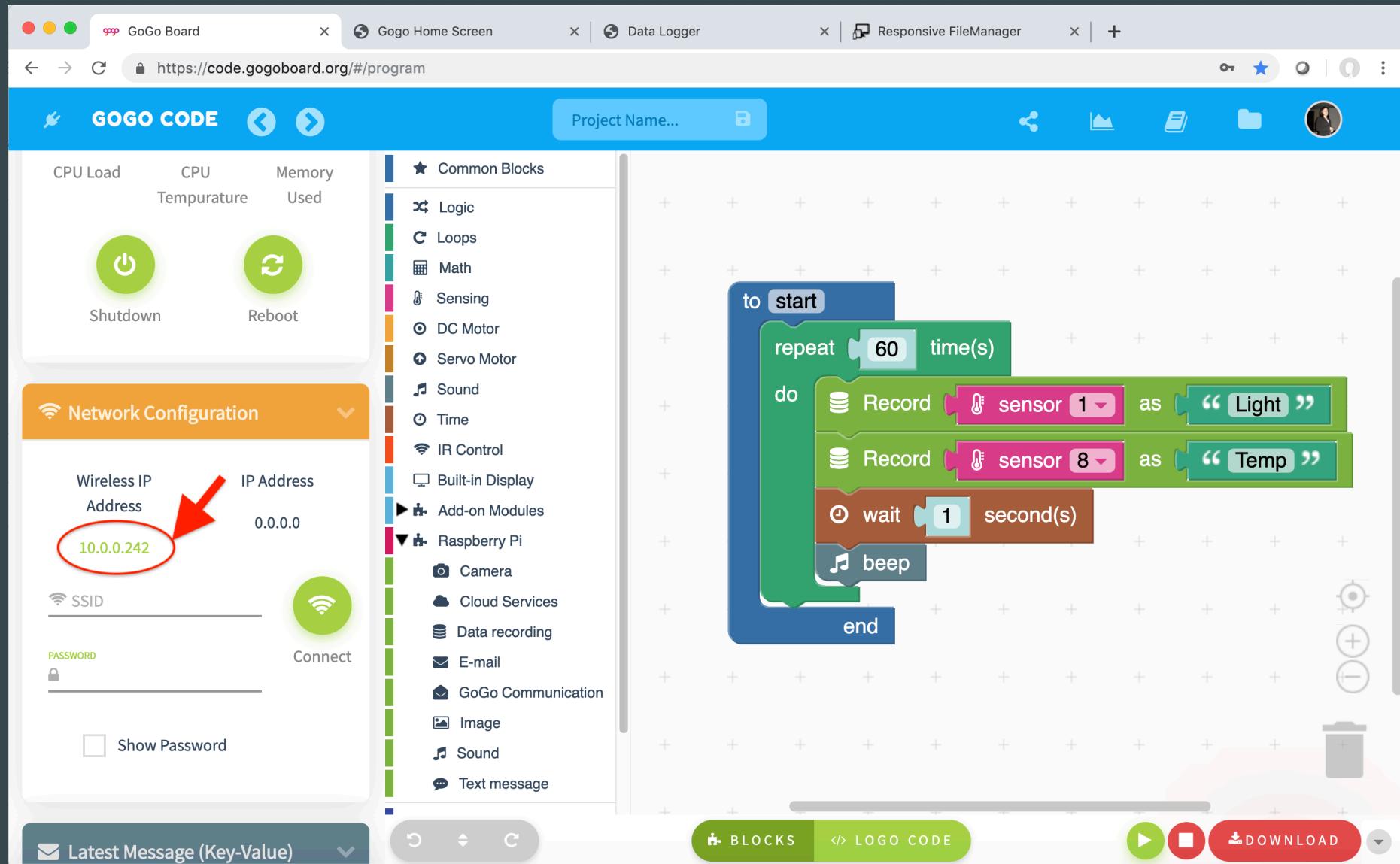
See recording in real time!



Can you
make the
sensor
input
change?

Design your own experiment, go outside and collect some data!!
Tips: Record for 2 min

Retrieve data



Connect the GoGo Board back into your computer.

Make sure the Raspberry Pi is connected.

Click on the IP Address.

Retrieve data

version 2.1.8, Updated 2018-07-22

Not Secure | 10.0.0.242:8888/www/index.html

Display

File Manager

Data Logging

Web UI

Add-ons

Responsive FileManager

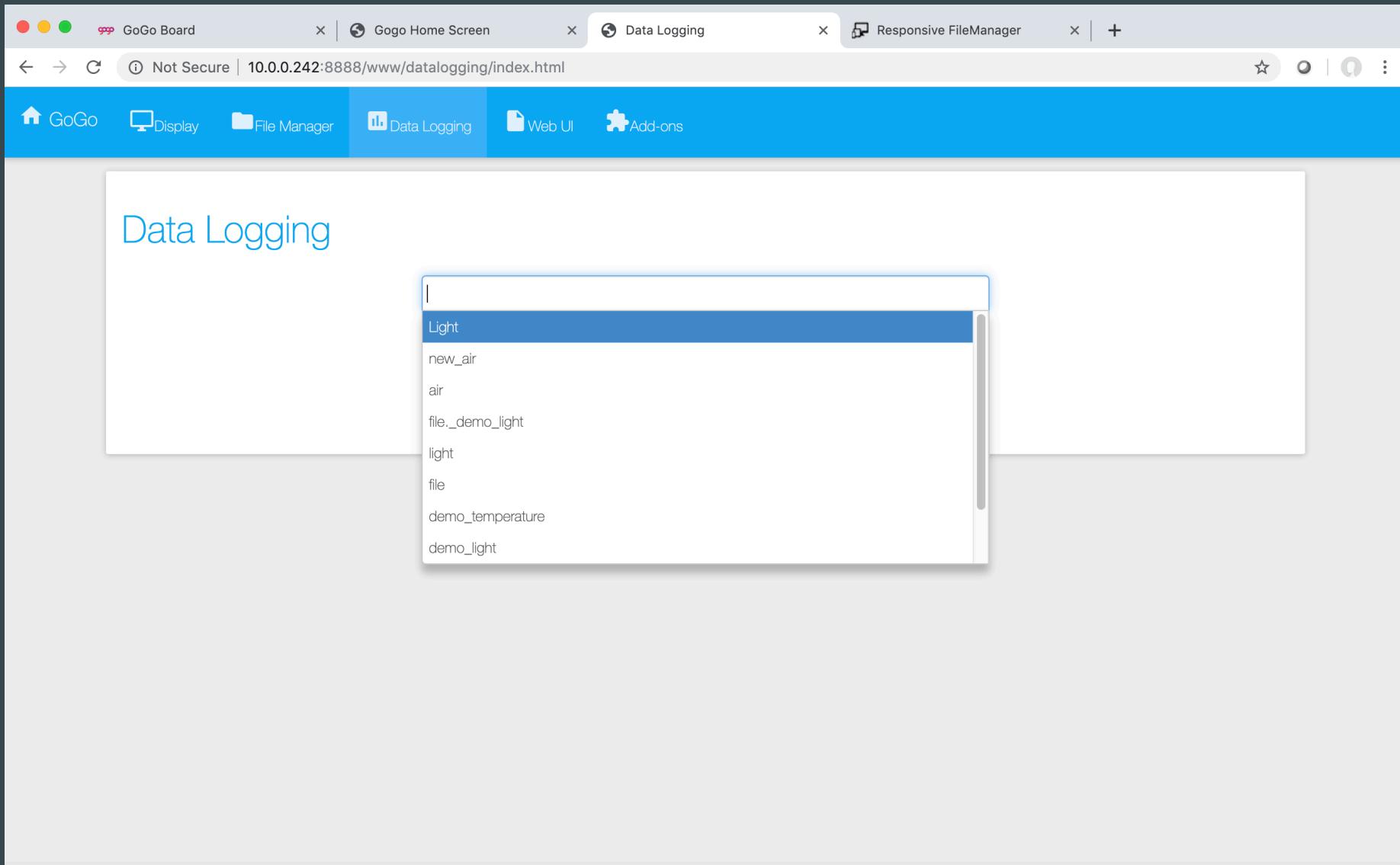
Go Go Board

Gogo Home Screen

Data Logger

Select Data Logging!

Retrieve data



The screenshot shows a web browser window with the following details:

- Address Bar:** Not Secure | 10.0.0.242:8888/www/datalogging/index.html
- Tab Bar:** GoGo Board, Gogo Home Screen, Data Logging (active), Responsive FileManager
- Header:** GoGo, Display, File Manager, Data Logging (highlighted in blue), Web UI, Add-ons
- Content Area:** A title "Data Logging" is visible above a search input field. Below it is a dropdown menu containing the following options:
 - Light (selected)
 - new_air
 - air
 - file_demo_light
 - light
 - file
 - demo_temperature
 - demo_light

Select the
data you
recorded!

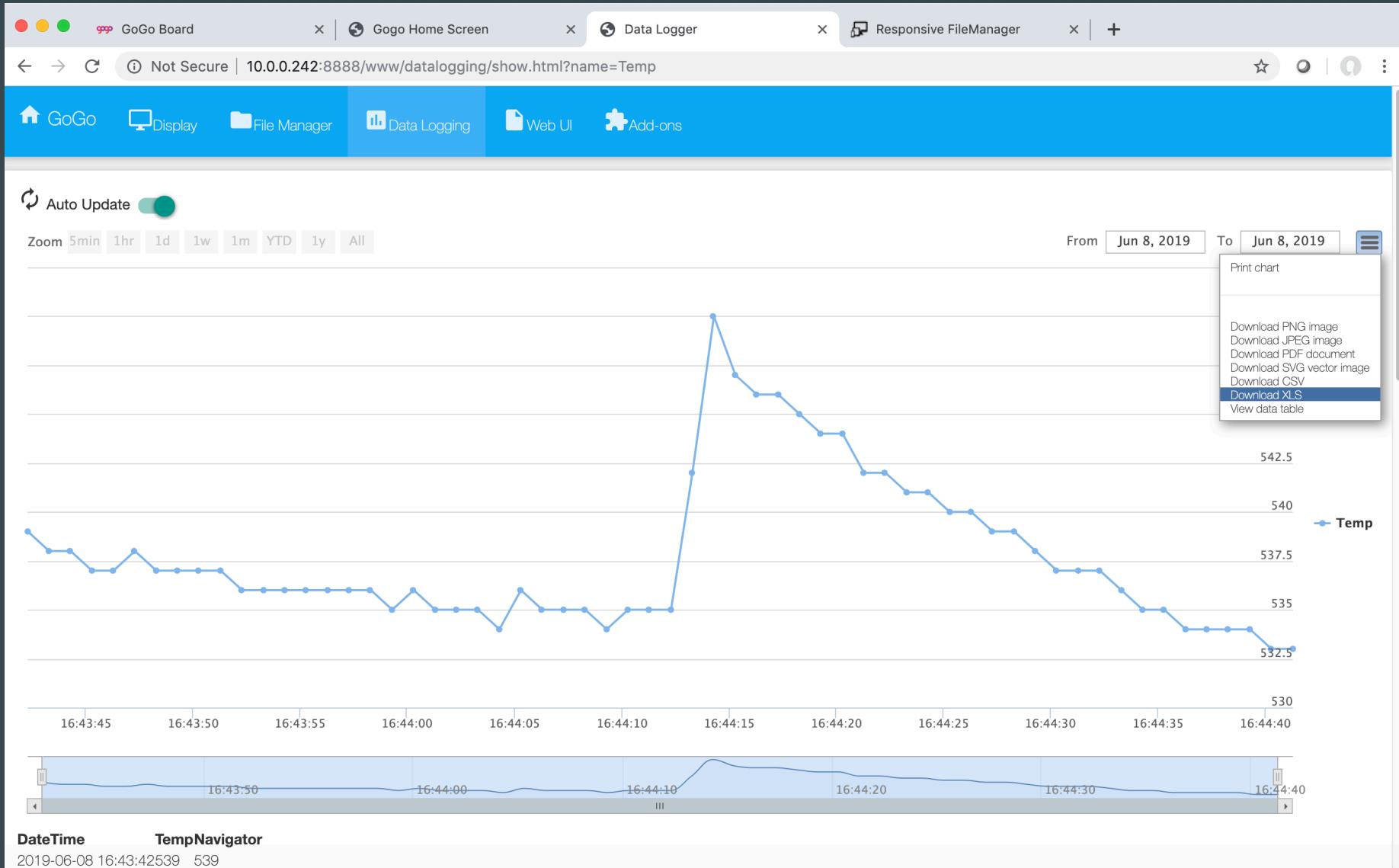
Retrieve data

The screenshot shows a web browser window with the following details:

- Address Bar:** Not Secure | 10.0.0.242:8888/www/datalogging/index.html
- Tab Bar:** GoGo Board, Gogo Home Screen, Data Logging (active), Responsive FileManager
- Header Bar:** GoGo, Display, File Manager, Data Logging (highlighted), Web UI, Add-ons
- Main Content Area:**
 - Data Logging Section:** Contains a text input field with "Light" and an "x" icon, followed by two buttons: "Submit" (green circle with white arrow) and "Delete" (red circle with white trash can).

Select the
data you
recorded!

Retrieve data



What does
your data
says?

You can also
download and
open the
data file
using a
spreadsheet!

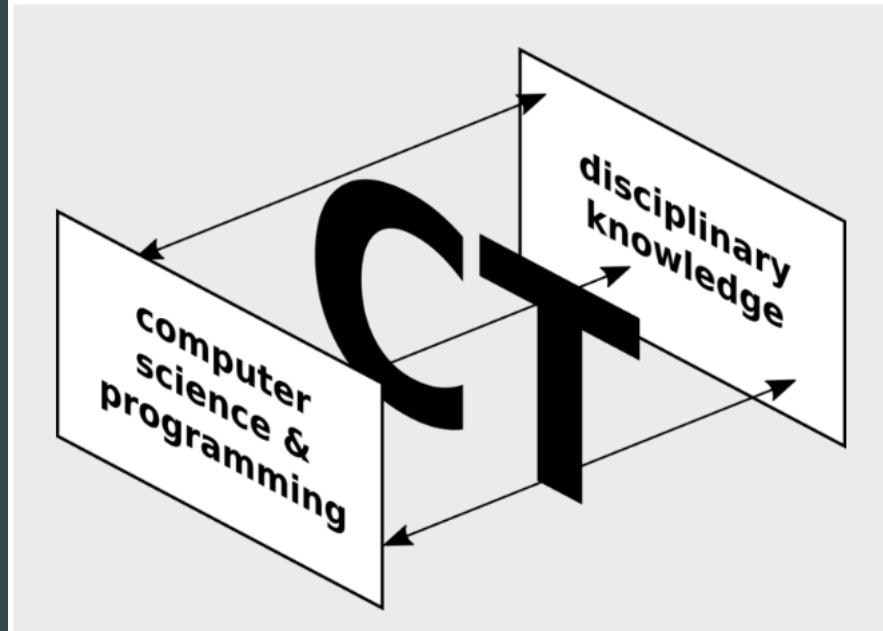
Share ! !

Why are these ideas important?

Papert's Constructionism 1980

- People “build” knowledge
- Impersonal/abstract learning makes us hate education
- Some ideas are more powerful than others (Microworlds)
- Computing is necessary to make powerful representations of ideas personal and concrete (Logo)
- Learning should be facilitated by teachers and mentors. It should not be a memorization/recitation process.

Developing a Framework for Computational Thinking



Computational Thinking is formulating problems and their solutions in a way that a machine (computer) can be used to represent the problem and carry out its solution.

1. Understand (complex) systems.
2. Innovate with computational representations.
3. Design solutions that leverage computational power/resources.
4. Engage in collective sense making around data.
5. Understand potential consequences of actions.