

makeblock

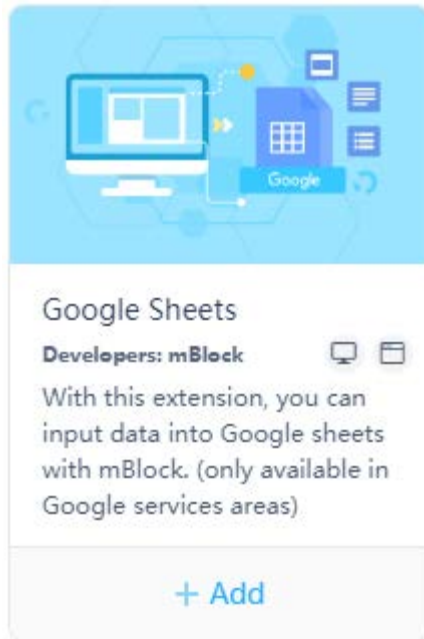
Lesson plan

Cross curricular links: - IoT application for industry (google sheet) - automation in agriculture - coding, logic - mathematics, statistics - basic data analytics -History -Economy	Age group: 14 years old	Duration: 2 hours
--	--------------------------------	--------------------------

Objectives: <hr/> Understand how to link a Google sheet to record data acquired by the program
Resources: <hr/> <ul style="list-style-type: none">• Desktop or laptop computers• Tomato Detection robot• mBlock (browser based version or downloaded version)• Google Account• Extension Google Sheets

Duration 30 min	Mini lesson (introduction): More and more often the IoT (Internet of Thinking) is entering into everyday life, the IoT is the technology that allows us to connect everyday objects to the internet so as to receive and send information and data collected remotely to be saved or processed. There are several IoT applications ranging from mobility (such as intelligent cars), health (systems that monitor patients' vital parameters in real time) or industry (systems that can give us information about means, production and consumption in a way that is optimal). After briefly introducing the topic to your students, watch the video (https://www.youtube.com/watch?v=QSIPNhOiMoE&t=68s) in order to better understand the topic and prepare a brainstorming with them by noting the answers on the blackboard. You can take your cue from this article (https://www.arcweb.com/blog/brainstorming-iot-imperative-world-economic-
--------------------------------------	---

	<p>forum-2018).</p> <p>Guide a short discussion on the topic through pilot questions that stimulate reflection</p> <p>This activity is based on industry 4.0, a trend in industrial automation that integrates some new production technologies to improve working conditions, create new business models and increase productivity and production quality of plants.</p> <p>After watching these videos discuss with your students the advantages and disadvantages of the 4.0 industry through brainstorming and annotate them.</p> <p>What is the Fourth Industrial Revolution? https://www.youtube.com/watch?v=O77r_vJ4Tb4</p> <p>INDUSTRIAL REVOLUTION 4.0 https://www.youtube.com/watch?v=v9rZOa3CUC8</p> <p>After the discussion with the students introduce the project, we have to simulate a device able to recognize when the tomatoes are ripe (red) and when not (green) and store the harvest data on a spreadsheet to then produce graphs with google sheets showing the trend of the harvest in a year.</p>
<p>Duration</p> <p>1 hour</p>	<p>Main activity:</p> <p>As a first step we must activate the extension of mBlock 5 useful to register and read data from a Google Sheets external to the application:</p>



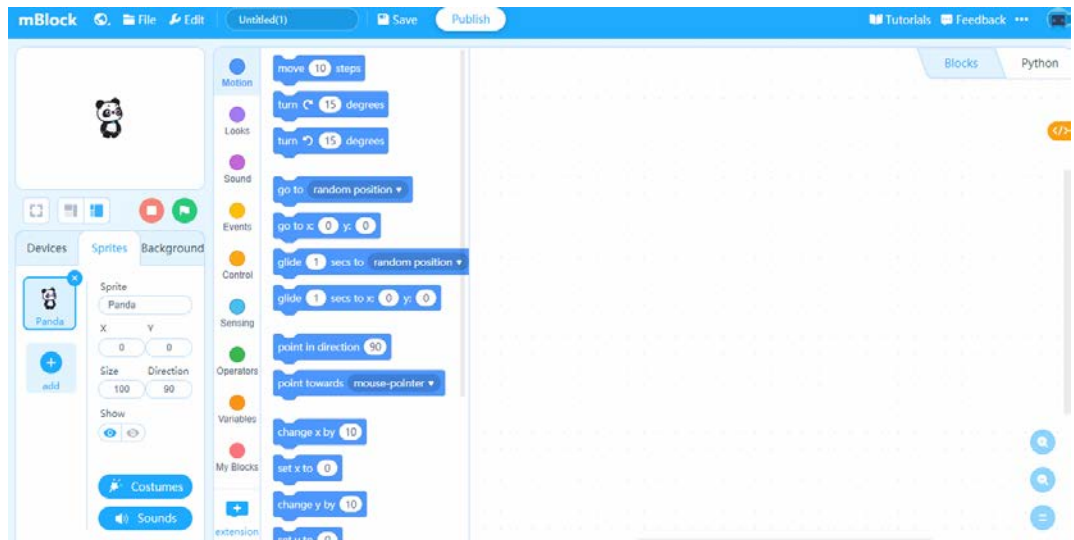
Google Sheets

Developers: **mBlock**

With this extension, you can input data into Google sheets with mBlock. (only available in Google services areas)

[+ Add](#)

You can find more information on how to use this extension here:
<https://www.mblock.cc/doc/en/use-extensions/google-sheets.html>



The screenshot shows the mBlock 5 interface with a script containing three blocks from the Google Sheets extension:

- connect to shared sheet
- get data from sheet
- set data to sheet

The extension activates 3 blocks:

 <p>connect to shared sheet https://docs.google.com/spreadsheets</p>	<p>mBlock 5 connects to the spreadsheet indicated by the link</p>
--	---



Records the value **50** (in the example) in column **1** row **1**



reads the value of column **1** row **1**

Now let's create our own spreadsheet where we can save the data

Use Google Sheets Extension to get access to your Google sheets. You can input data to your sheets, or read data of the sheets.

Note:

Only available in Google service areas.

Sign in to Google

Visit Google Sheets: <https://docs.google.com/spreadsheets>, and sign in with your Google account.



Sign in

to continue to Google Drive

Email or phone

[Forgot email?](#)

Not your computer? Use Guest mode to sign in privately.

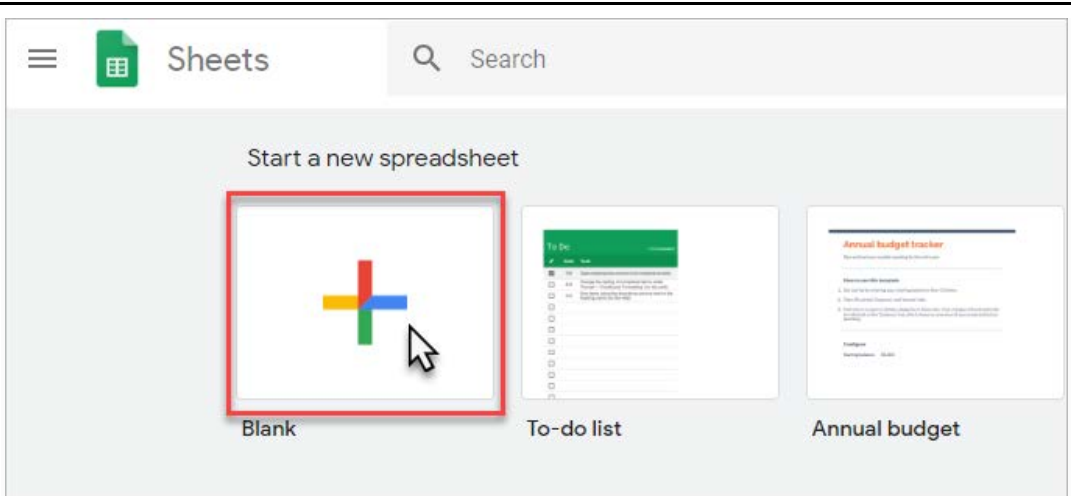
[Learn more](#)

[Create account](#)

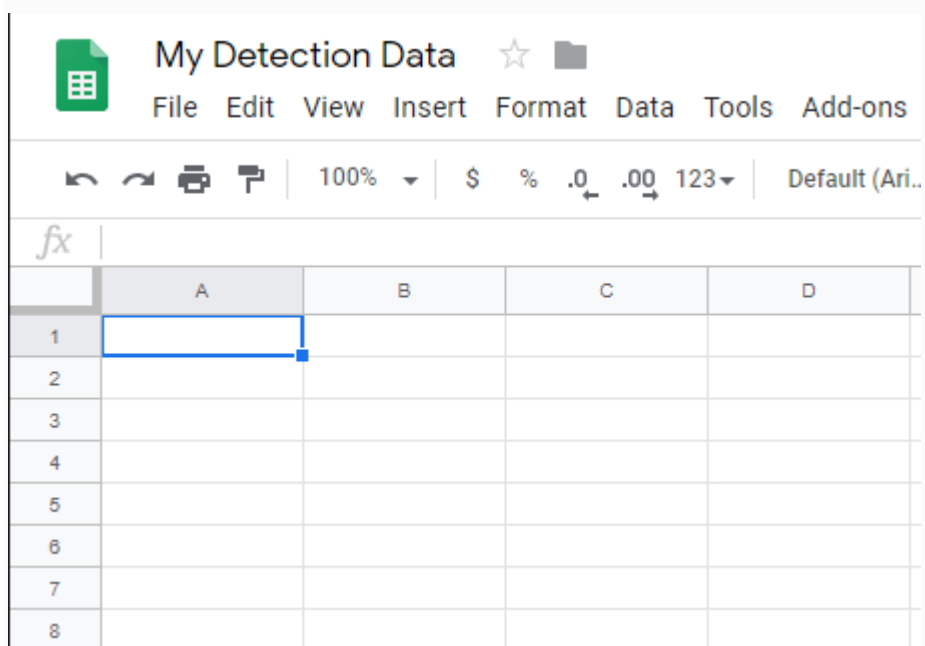
Next

Create a new Sheet

1. Click "+" to start a new spreadsheet.



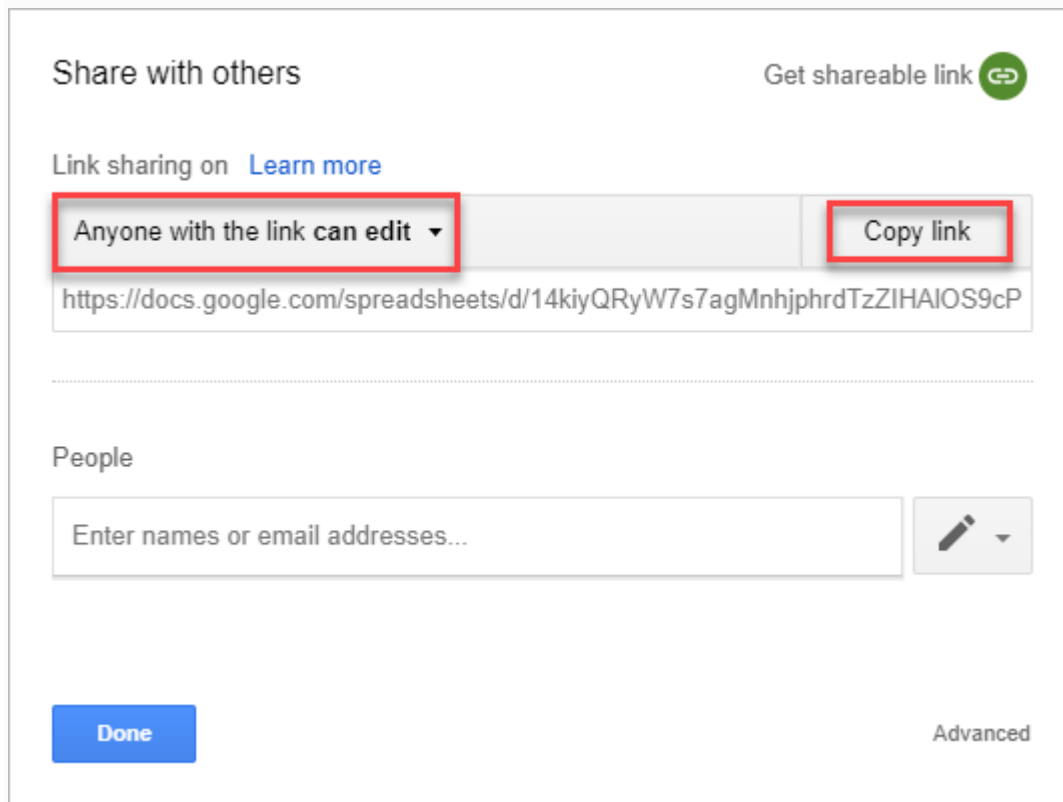
2. Name the spreadsheet "**My Detection Data**".



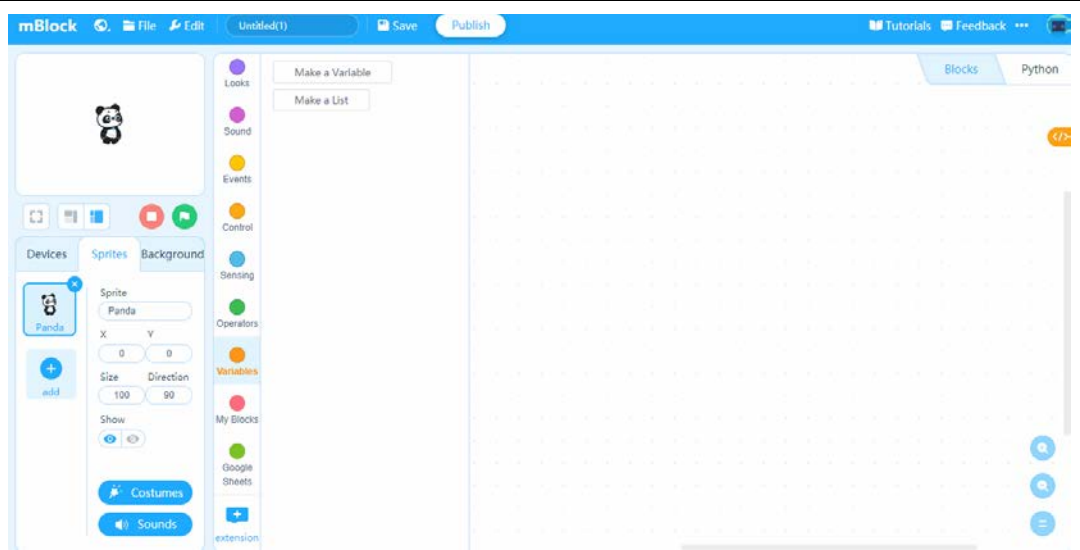
3. Click "**Share**" to edit share settings.



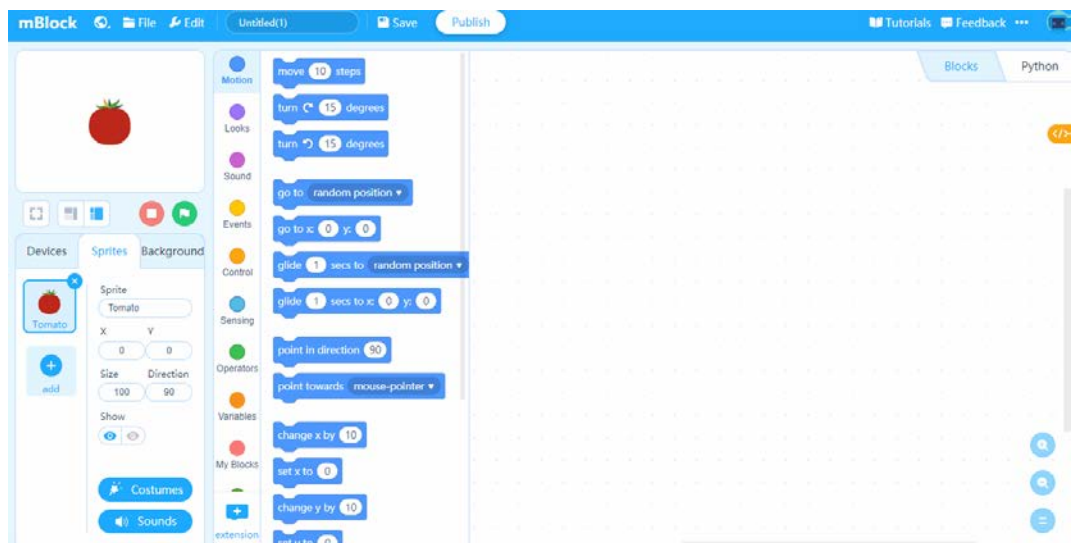
4. Set "Anyone with the link **can edit**", and click "Copy link". Then click "Done" to save the settings.



delete the panda and insert the Tomato

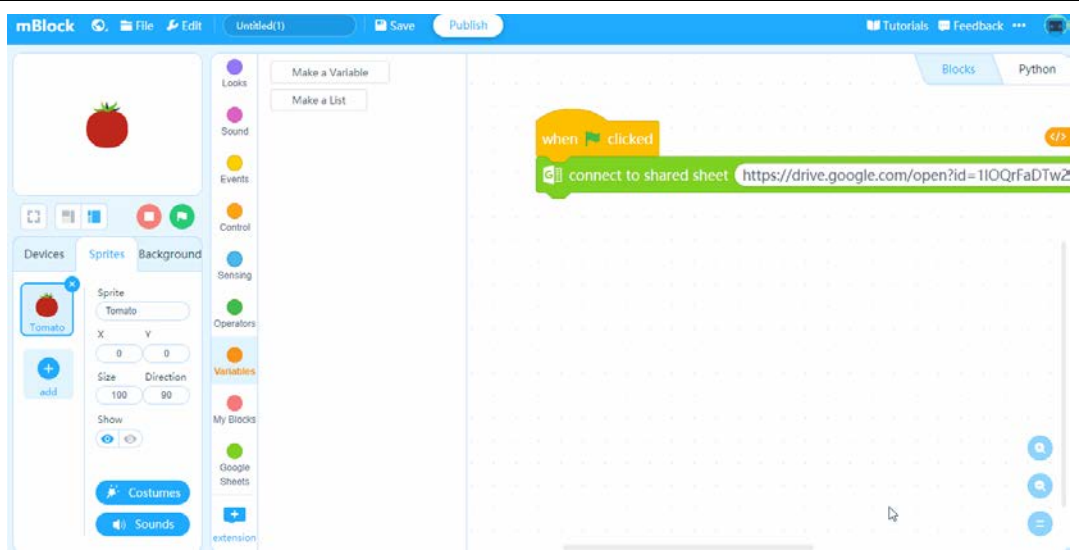


Google Sheets block [connect to shared sheet \(\)](#). Paste the link of sheet.



Now let's create the variables that will be used to manage the data recording:

Time
TomatoNumber
dayNumbers
nbDay



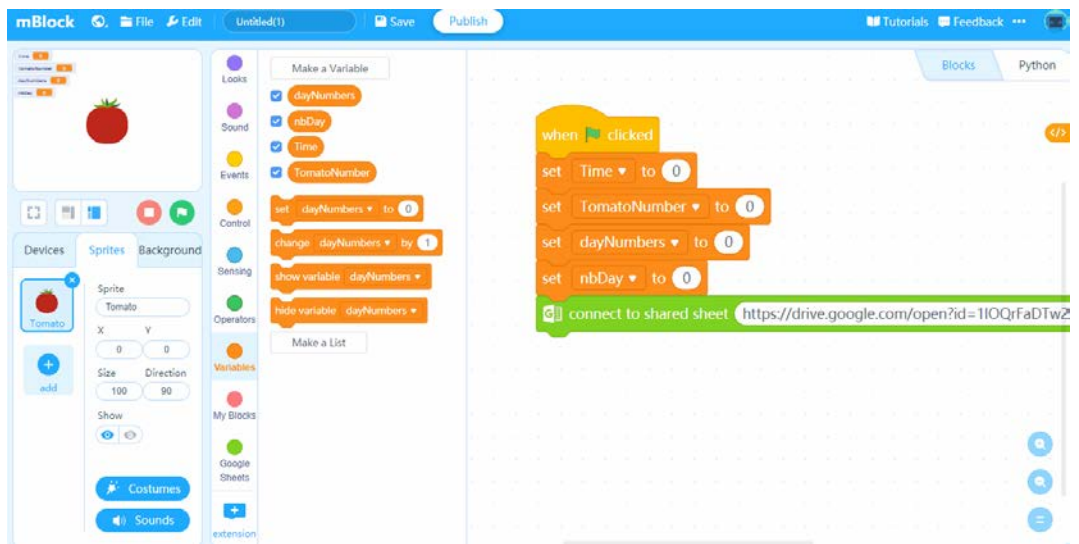
Let's start with the values

Time = 0.5

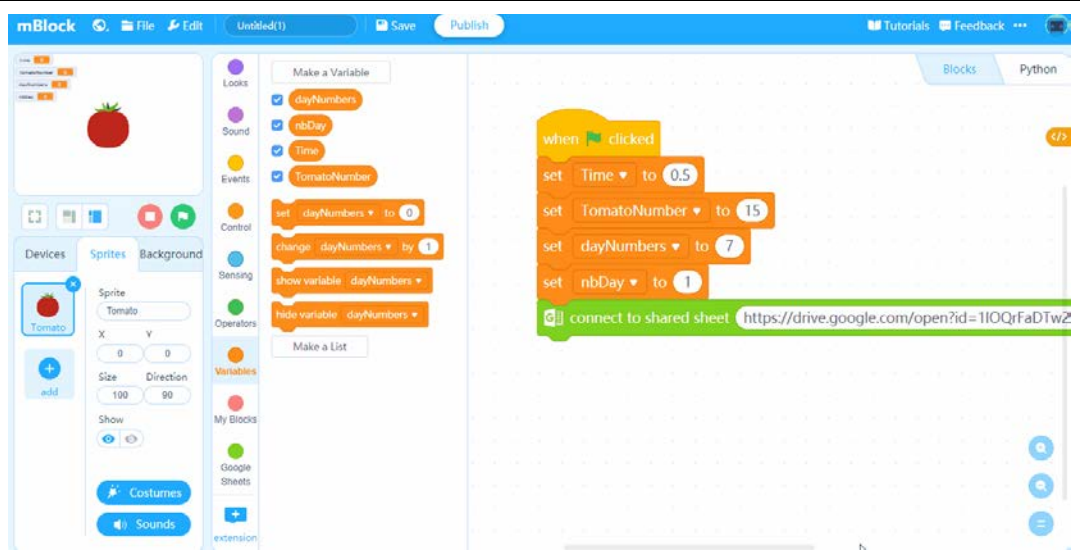
TomatoNumber = 15

dayNumbers = 7

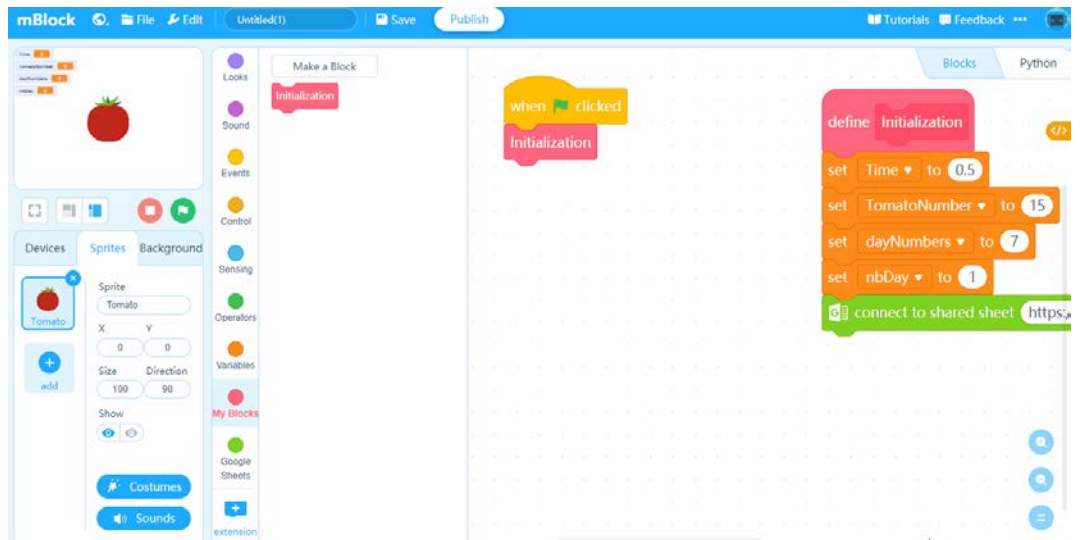
nbDay = 1



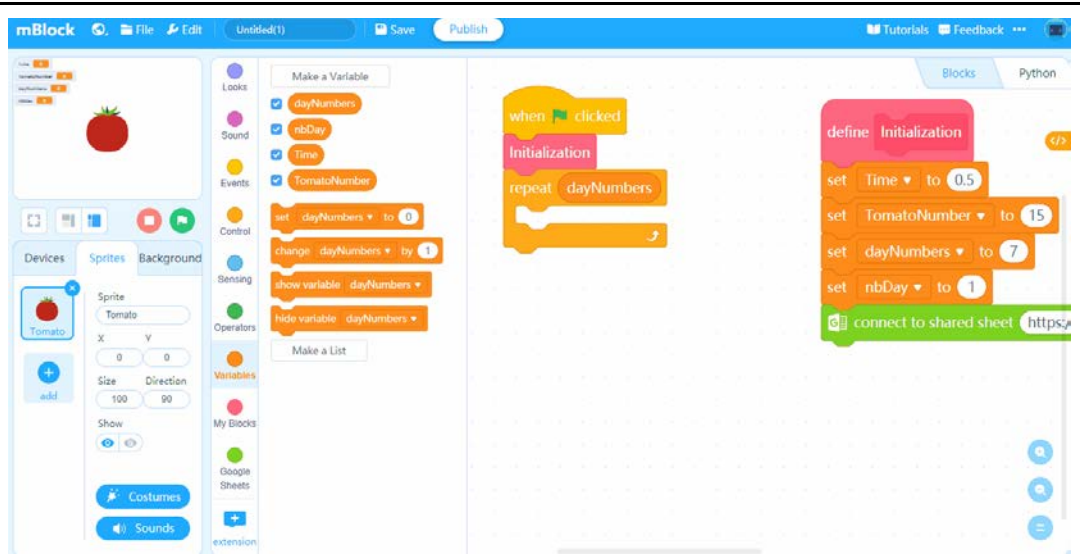
create an "Initialization" function with "My Block".



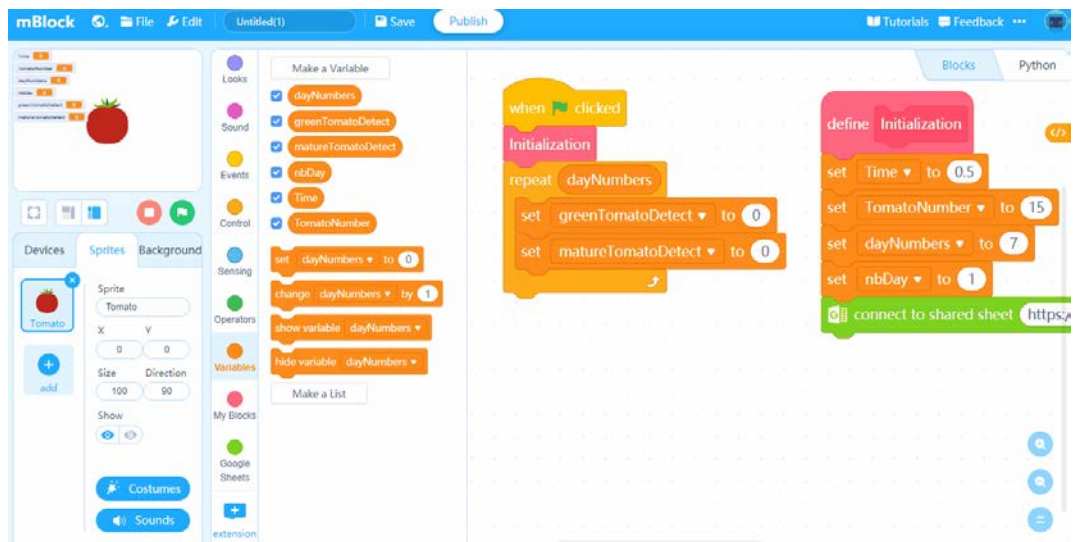
At this point we build the cycle that will give us the duration of our analysis, in our case 7 days (NB if you change the value of the variable **dayNumbers** will change the duration of the simulation)



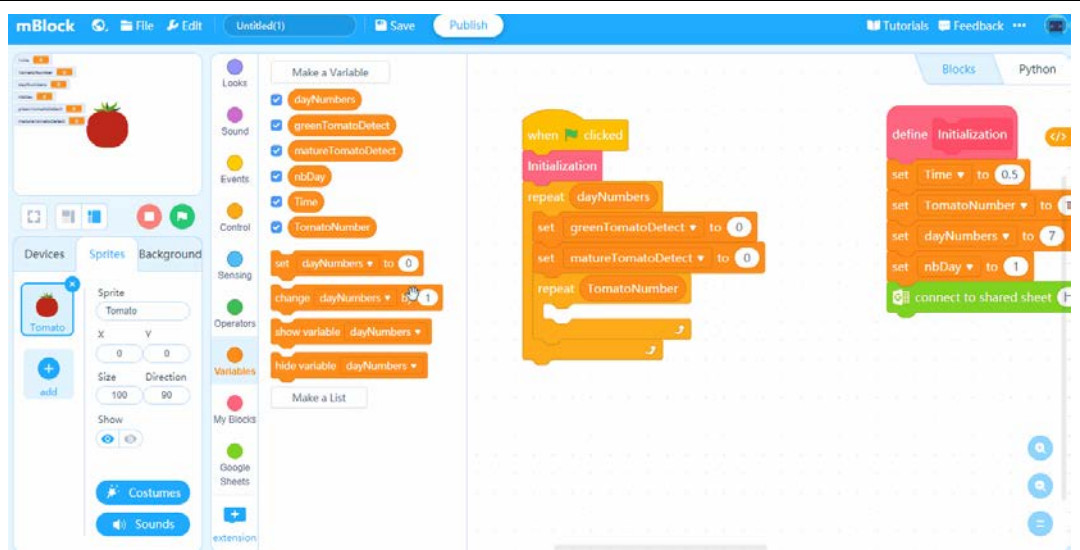
Create two variables that store the data about our tomatoes: **greenTomatoDetect** and **matureTomatoDetect** and initialize them to 0



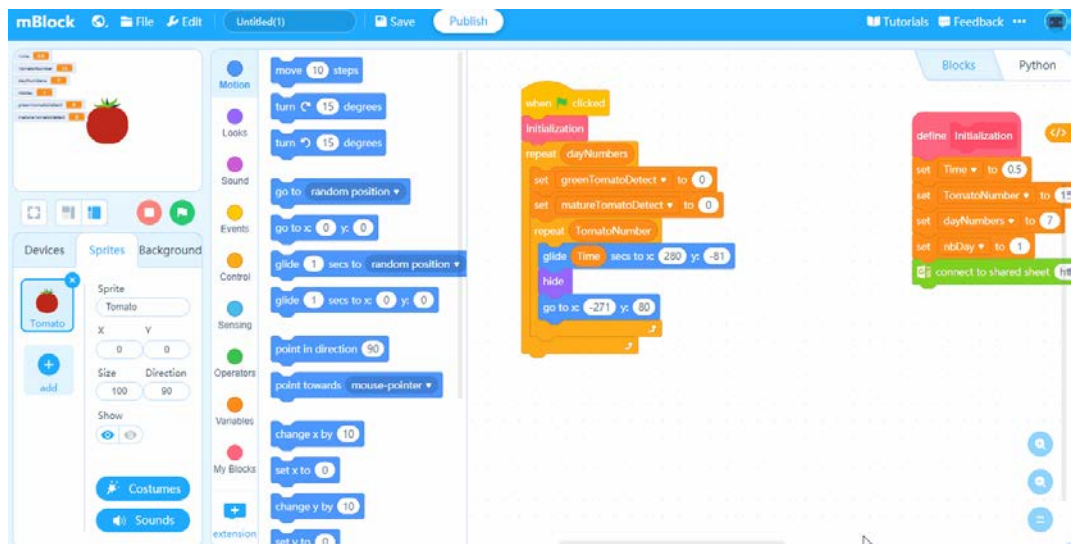
these variables will record values based on the virtual harvest.
we insert a cycle for the numbers of tomatoes harvested



We program the animation of slipping out of our tomato



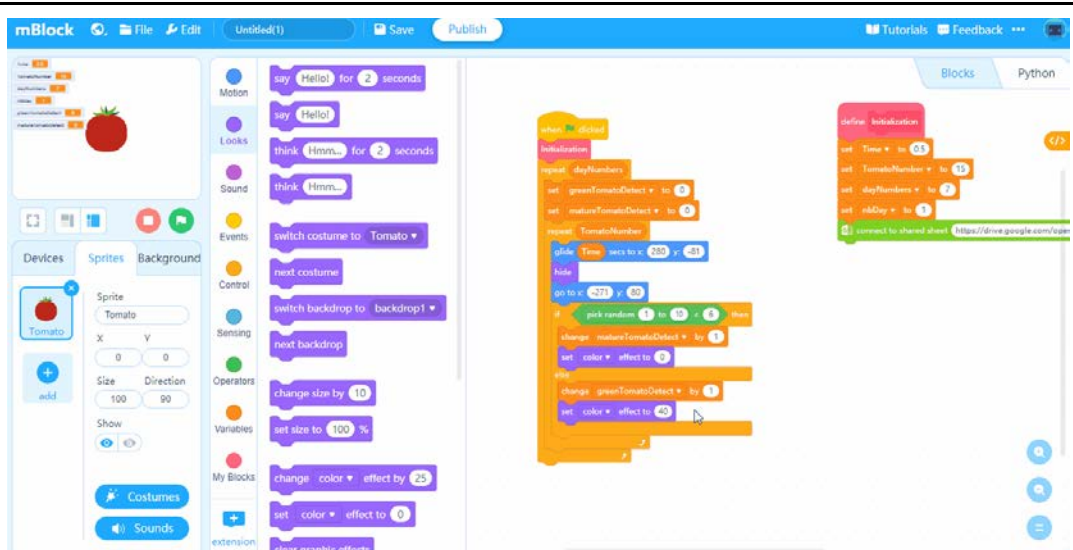
Let's insert the "If... Then... Else..." which automatically generates a simulated tomato harvest



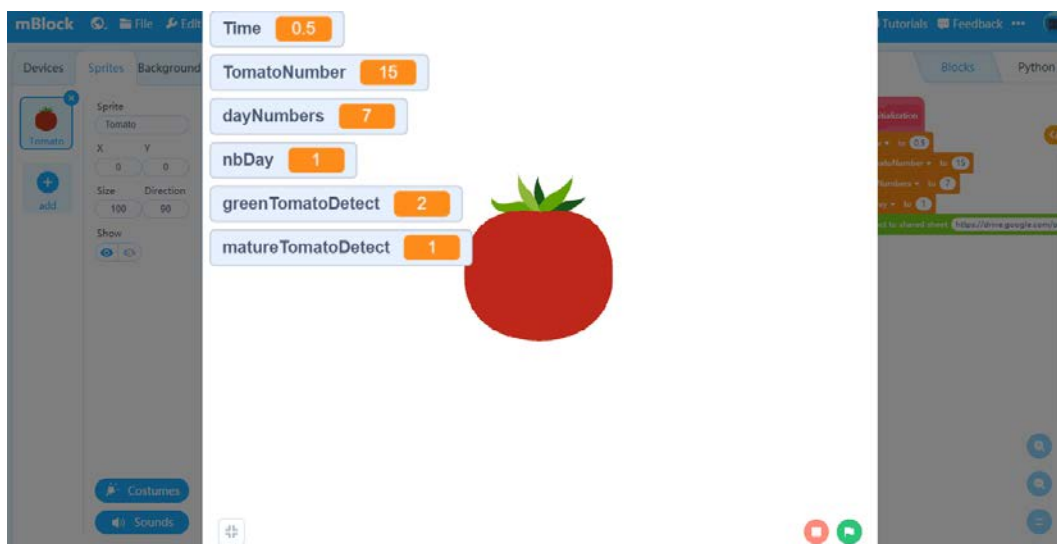
the randomness between 10 numbers dividing them into 2 groups greater and less than 6 is equal to the randomness between 2 numbers such as head or cross

$$5 / 10 = 1 / 2$$

Now let's insert the animation of the entrance of our tomato



this should be the effect obtained



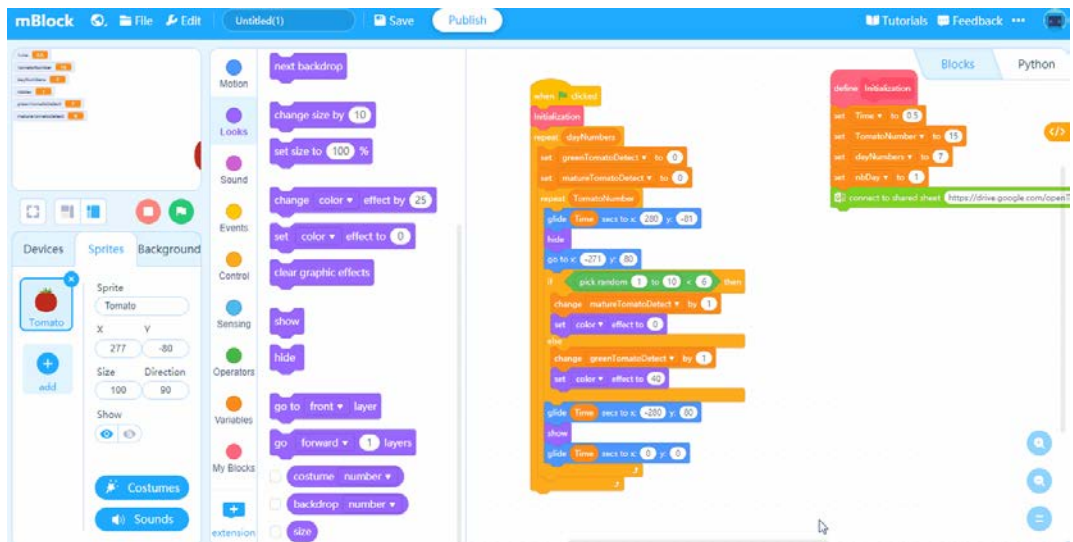
Now after programming the simulation we have to develop and implement the writing part on our **google sheets** these are the blocks that manage the writing on our document google sheets


```

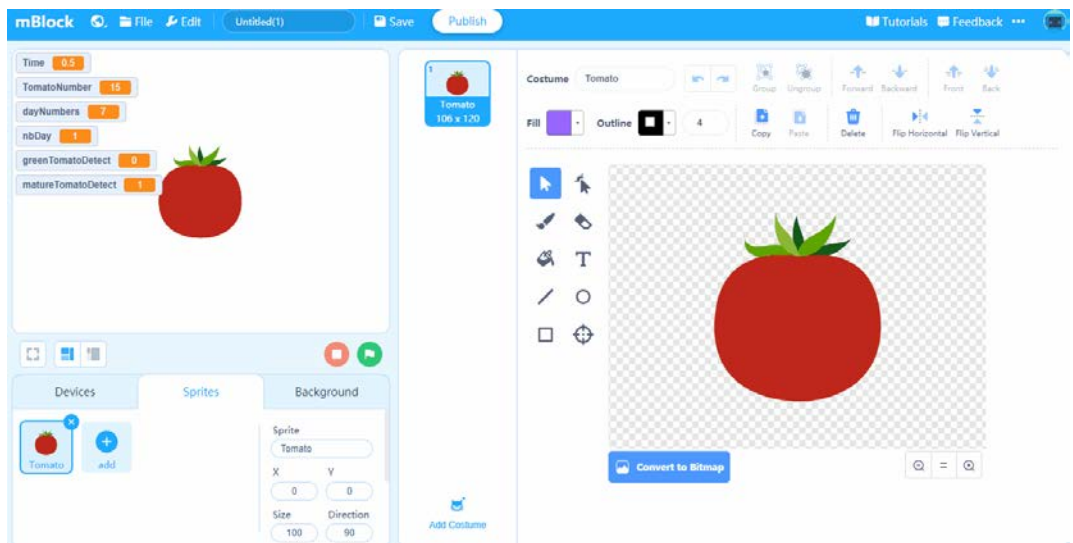
change nbDay by 1
input nbDay to column 1 row nbDay
input matureTomatoDetect to column 2 row nbDay
input greenTomatoDetect to column 3 row nbDay
input matureTomatoDetect / greenTomatoDetect * tomatoNumber to column 4 row nbDay

```

Let's implement it in our code



Let's put a background in!



This is the final result



define Initialization

set Time to 0.5

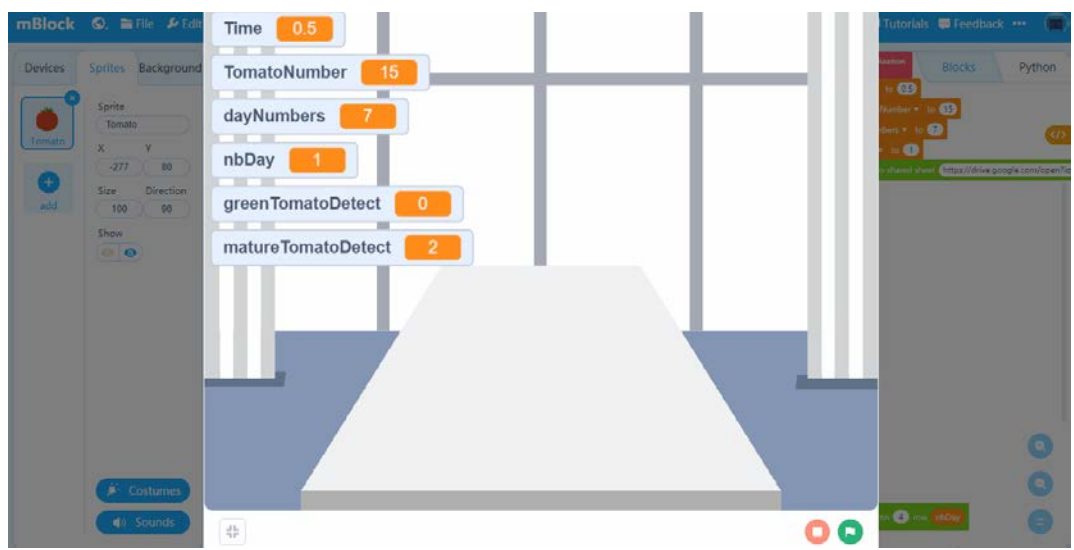
set TomatoNumber to 15

set dayNumbers to 7

set nbDay to 1

connect to shared sheet <https://drive.google.com/open?id=1IOQrFaDTw2NRCKqhk94h3M4PLXvYIhfaIQVjHgbV6do>

```
when clicked
  Initialization
  repeat dayNumbers
    set greenTomatoDetect to 0
    set matureTomatoDetect to 0
    repeat TomatoNumber
      glide Time secs to x: 280 y: -81
      hide
      go to x: -271 y: 80
      if pick random 1 to 10 < 6 then
        change matureTomatoDetect by 1
        set color effect to 0
      else
        change greenTomatoDetect by 1
        set color effect to 40
      glide Time secs to x: -280 y: 80
      show
      glide Time secs to x: 0 y: 0
    change nbDay by 1
    input nbDay to column 1 row nbDay
    input matureTomatoDetect to column 2 row nbDay
    input greenTomatoDetect to column 3 row nbDay
    input matureTomatoDetect / greenTomatoDetect * TomatoNumber to column 4 row nbDay
```

Duration
30 min

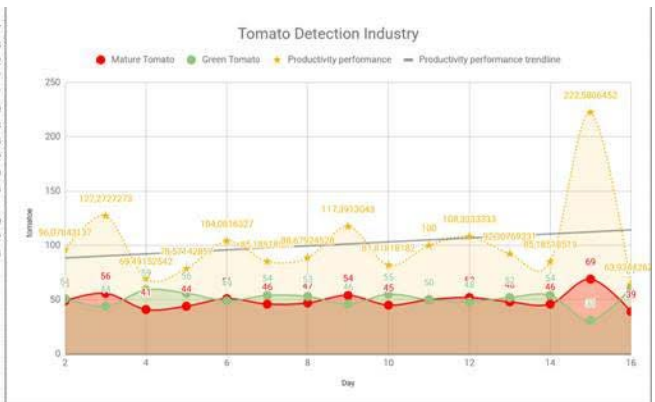
Conclusion:

Allow students to 'test' other edited scripts by running the script and saying the 5 words programmed.

They should search:

- Is the Google Sheets file written?
- Is the file produced always the same?
- Can they create a graph as in the example?

Days	Mature Tomato	Green Tomato	Productivity performance
2	49	51	96.07843137
3	56	44	127.2727273
4	41	59	69.49152542
5	44	56	78.57142857
6	51	49	104.0816327
7	46	54	85.18518519
8	47	53	88.67924528
9	54	46	117.3913043
10	45	55	81.81818182
11	50	50	100
12	52	48	108.3333333
13	48	52	92.30769231
14	46	54	85.18518519
15	69	31	222.5806452
16	39	61	63.93442623



Notes:

Opportunity to reflect:

Discuss with the students what they found challenging with regards to editing the program

- What would they do differently?
- can the students create another similar project that uses google sheets?