

Micro:bit: Data, Sensors, Data Collection (Streaming & Logging)

Bill Siever

Intros: Me & You

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- Questions at any time!
- Me: Bill Siever / bsiever@gmail.com
 - Background: Computer Science & Computer Engineering
 - Teaching: Computer Science & Engineering
@ Washington University in St. Louis
- Micro:bit: Summer camps & Microbit “Champion”

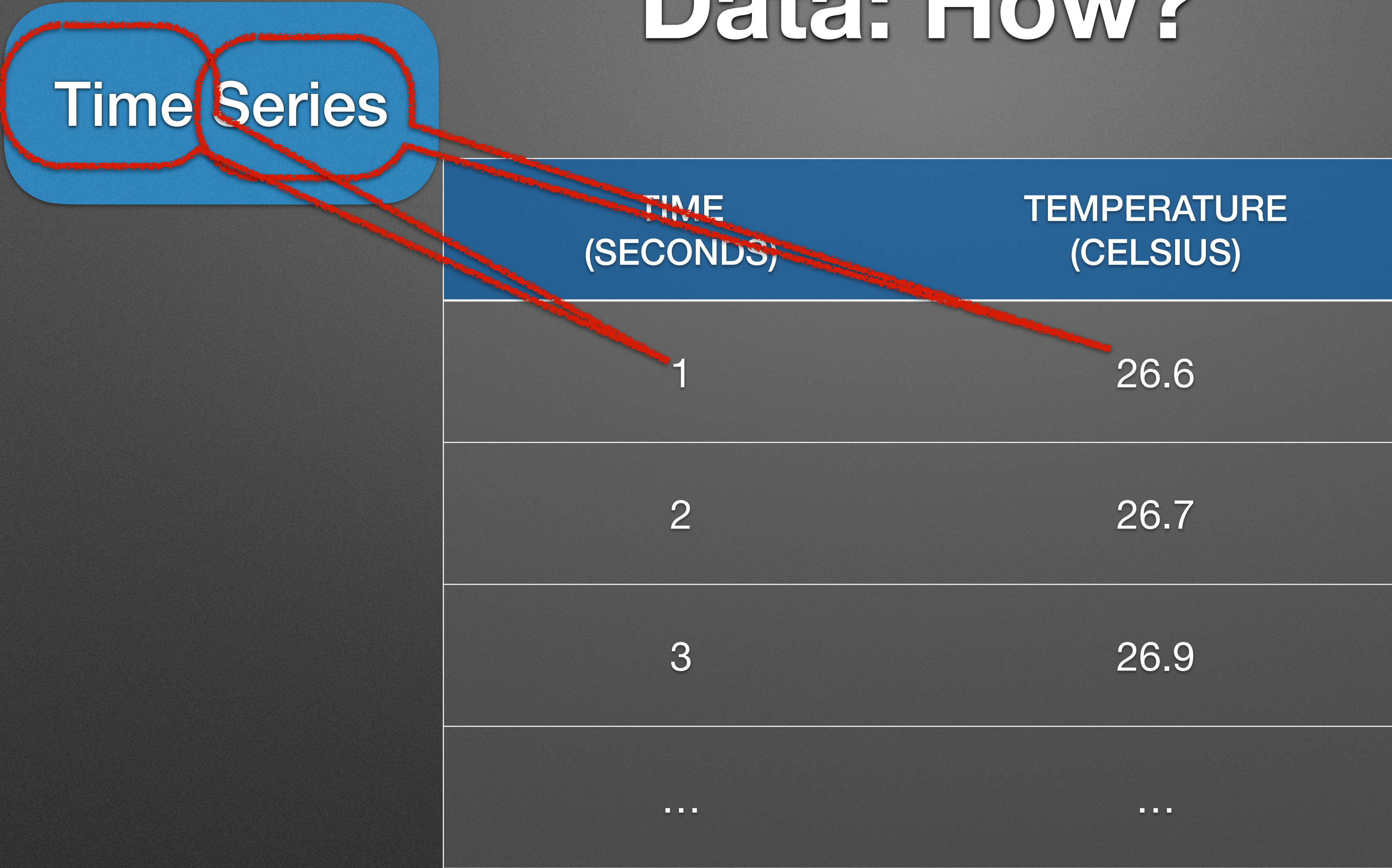


Data: Why?

- Understand behavior:
 - History / ranges of values
 - Cause-and-effect / prediction

Data: How?

Time Series



TIME (SECONDS)	TEMPERATURE (CELSIUS)
1	26.6
2	26.7
3	26.9
...	...

Data: Visualization

- Graphs can help us understand patterns.
- For example: Temperature Over Time

Micro:bit & Data Collection

- Two major options:
 - Streaming: Data flows in continuously to some “reciever” (that may store it)
 - I.e. a flow/stream of data comes in
 - Logging: Data is stored on the micro:bit for future retrieval

Streaming & MakeCode:

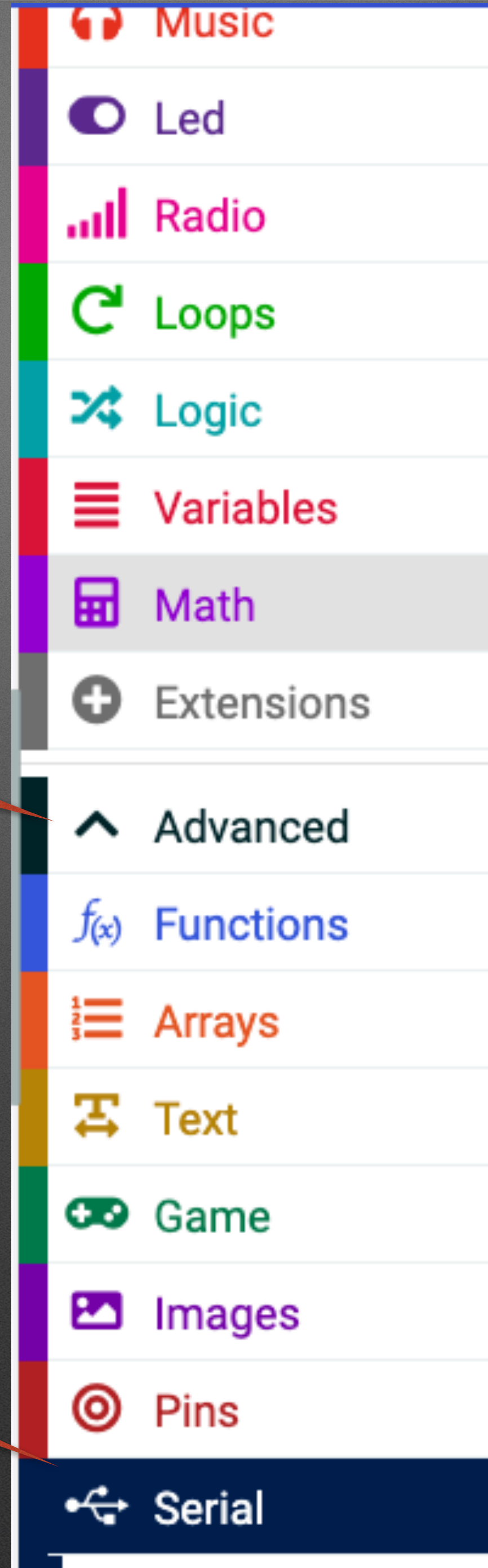
A “light” example

(Pun intended)

Blocks Used

1. Advanced

2. Serial
(Serial as in “in-order”; Note “USB” cable symbol. In-order over cable)



Serial

serial write line

serial write number

serial write value "x" = 0

serial write string

serial write

serial read

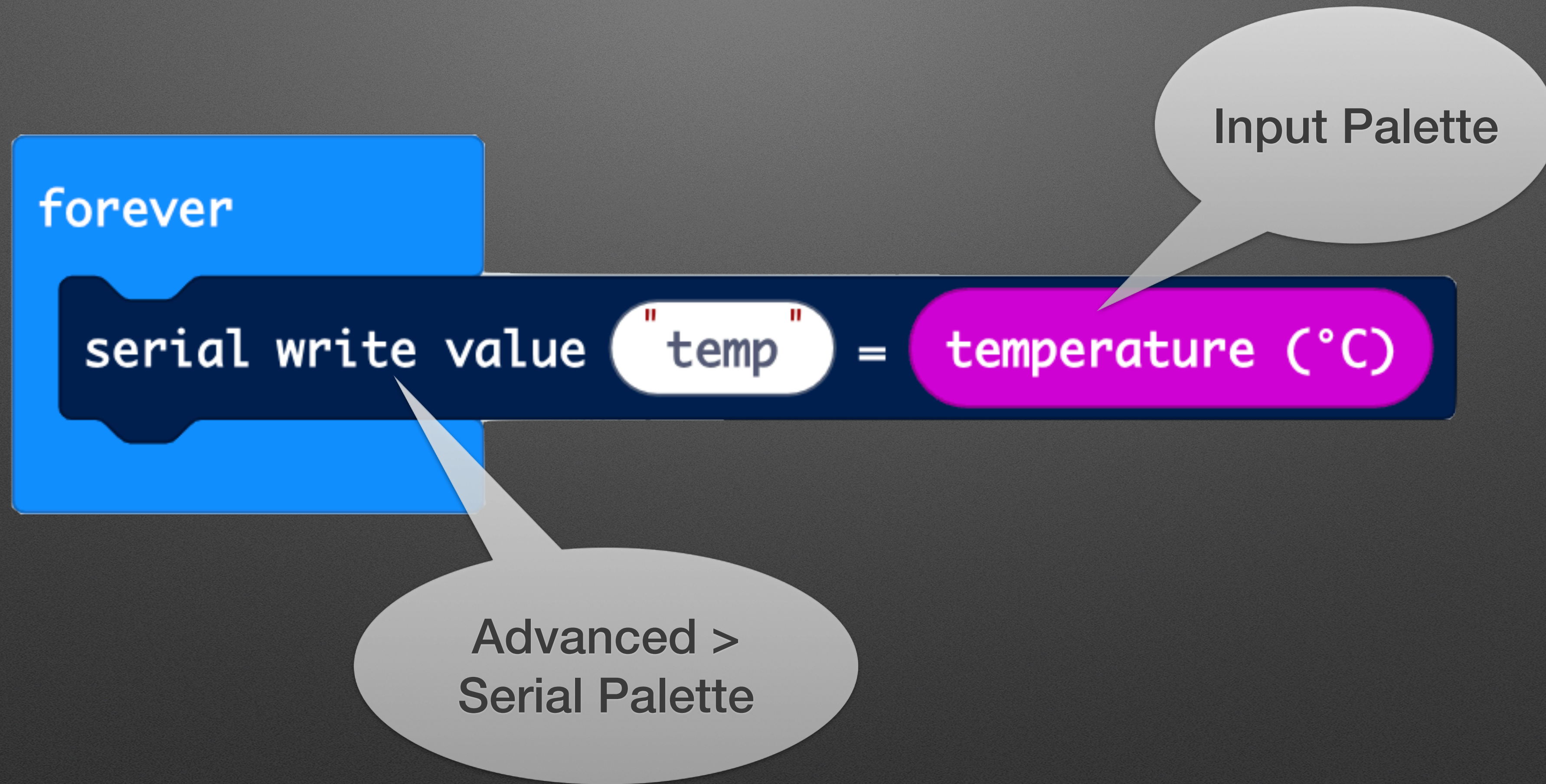
serial read

serial on data received new line ()

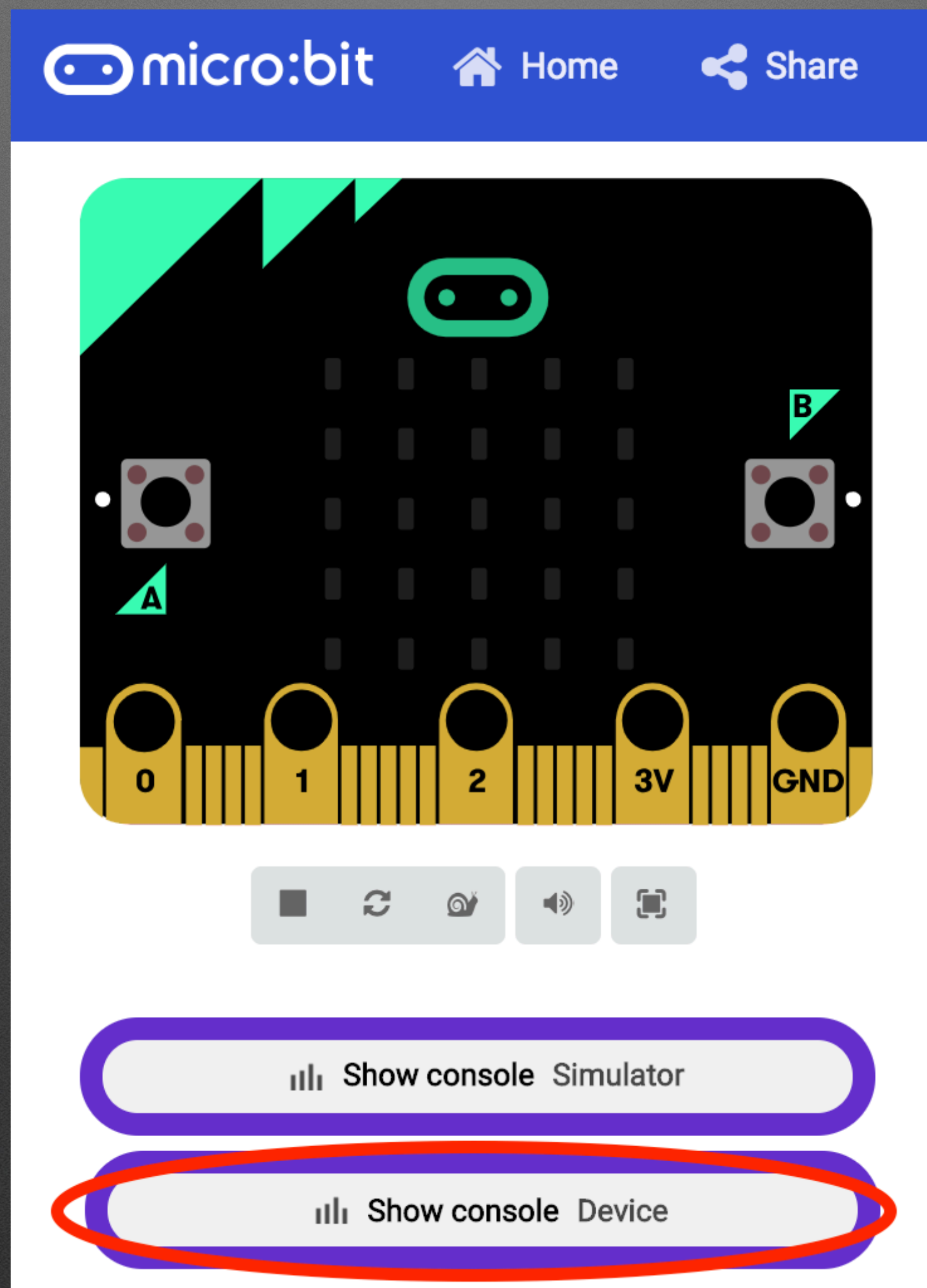
serial read string

3. Serial Write Value
("x" part is the column name; = "0" is the data to put in column)

Collecting Data



Graphing

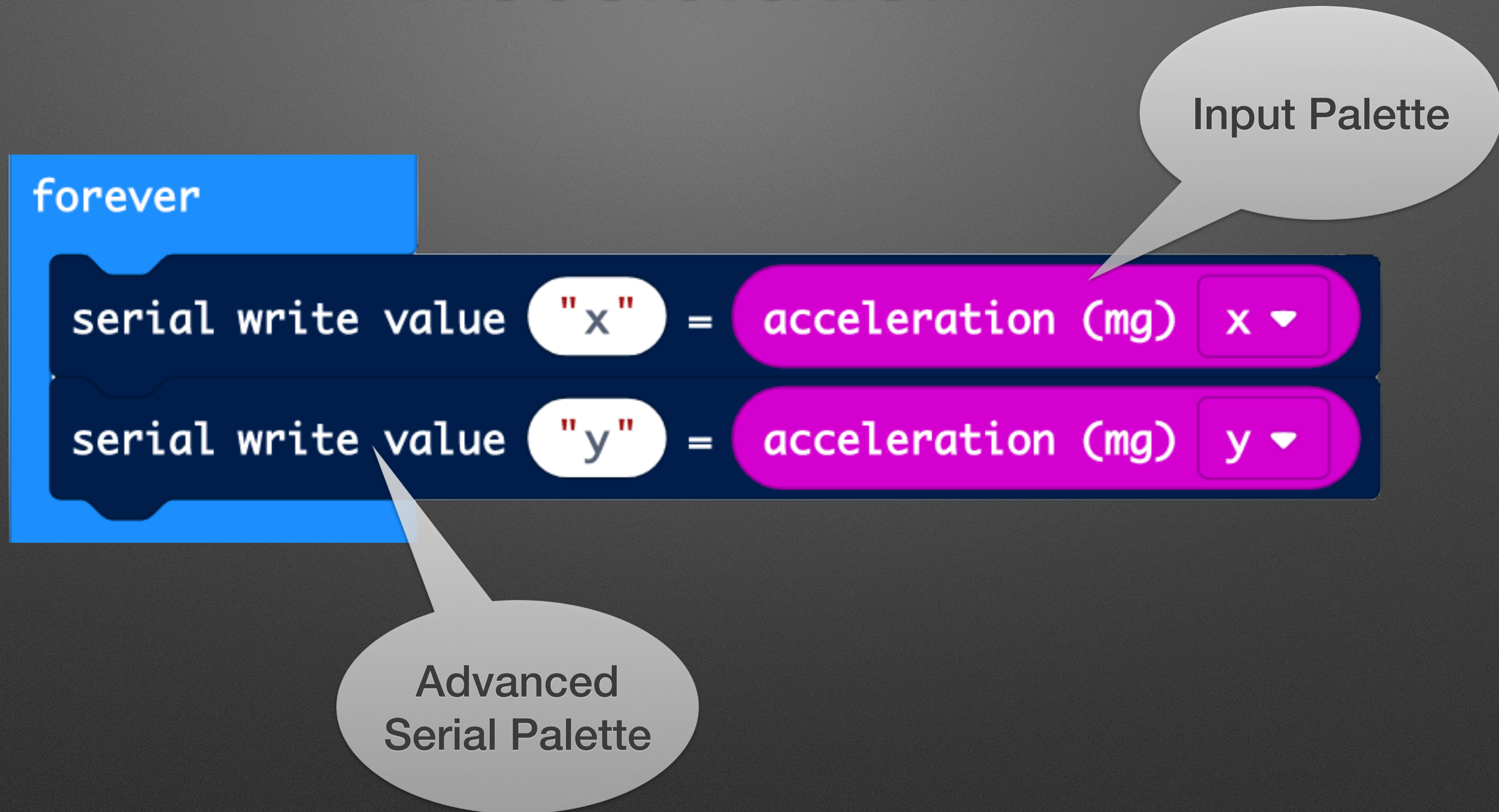


Data Download

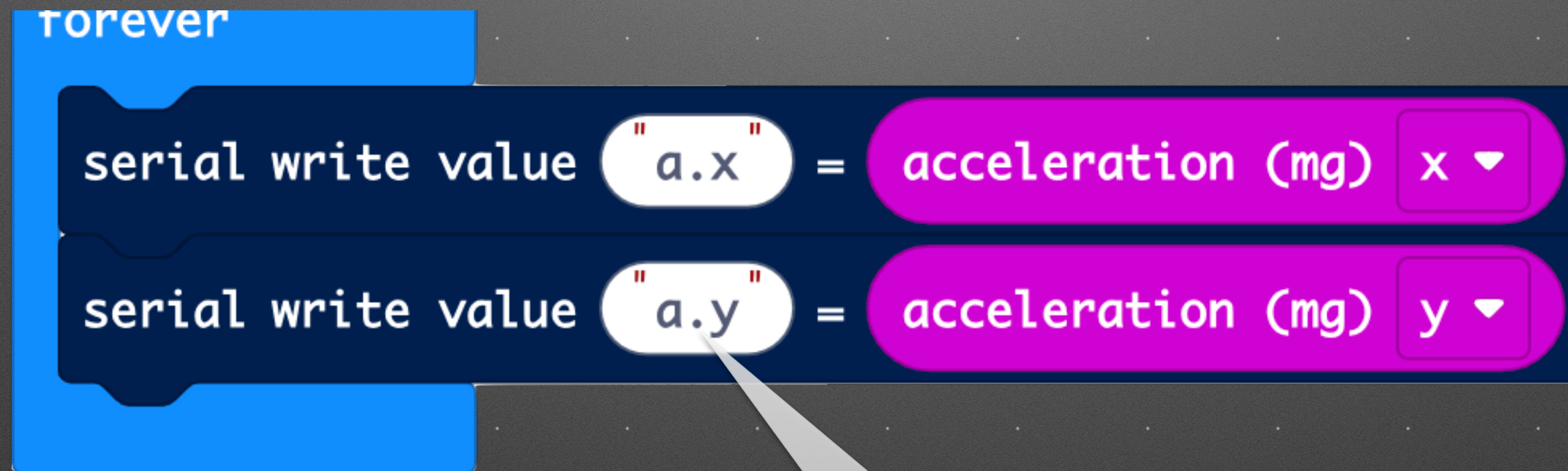


Download a
“CSV”

Acceleration

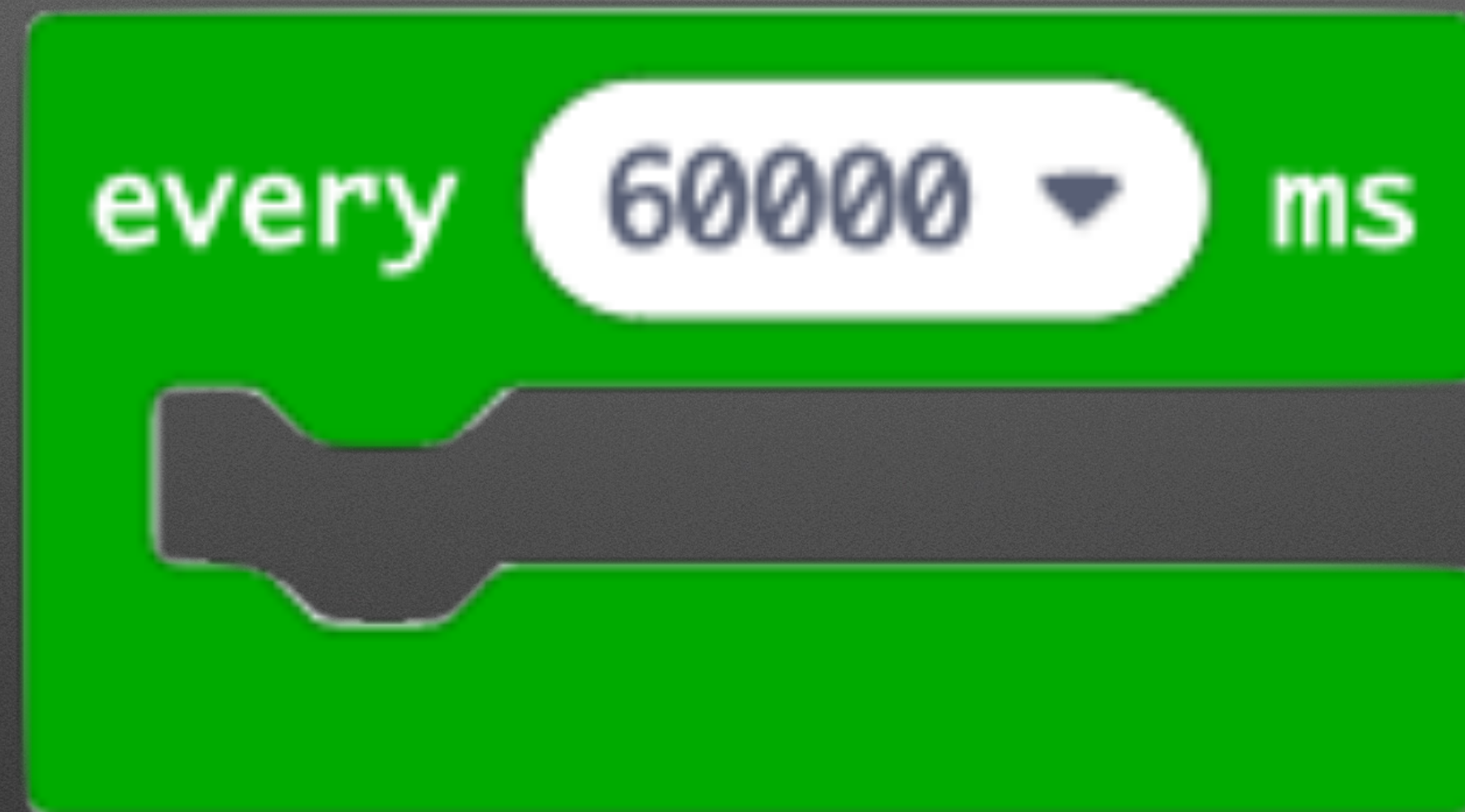


Acceleration 2: Single Graph



Dot notation:
Graph Name . Series name

Pacing Data: Periodic Loop



Cutting the cord: Remote Data Logger

Example

Data Logging

Streaming

- Streaming: Data “streams in” in real-time
 - Wired vs. Wireless Streaming
 - Wireless: Two micro:bits vs. Bluetooth*
- Pros/Cons
 - Pros: responsive; fast / can handle lots of data
 - Cons: requires PC to be on/listening

Logging

- Logging: Saving data on the micro:bit
- A quick tour <https://microbit.org/get-started/user-guide/data-logging/>
 - Demo
- Pros/Cons
 - Pros: Can “deploy” micro:bit for data collection
 - Cons: Micro:bit V2 only; Limited data collection / Space ; Slower

Misc.

- “Data Streamer” Excel Plugin: <https://learn.microsoft.com/en-us/microsoft-365/education/data-streamer/using-microbit-and-makecode>

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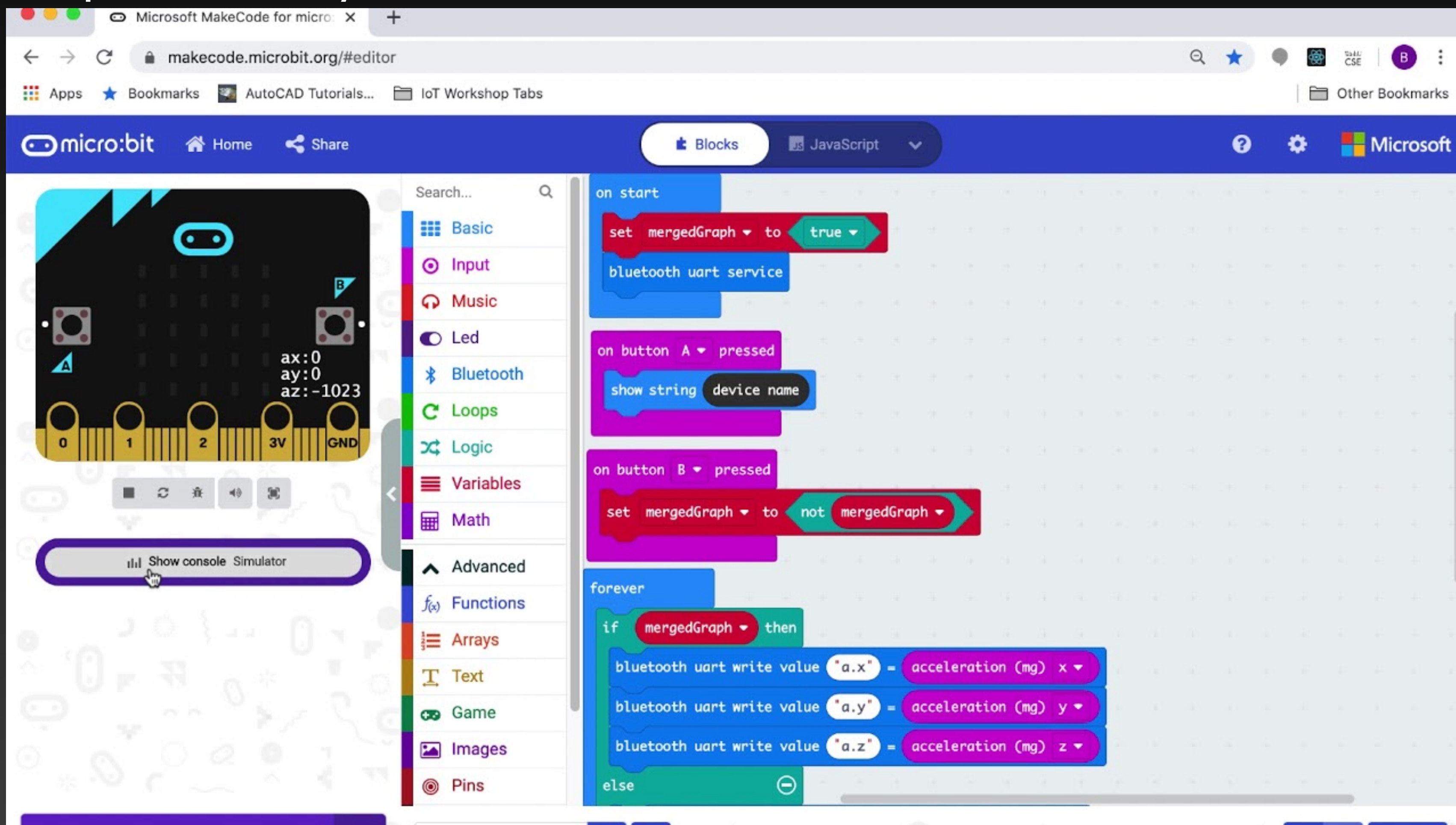
Misc: My Stuff

- USB Library for webpages that “read” data from Micro:bit Serial/USB:
<https://github.com/bsiever/microbit-webusb>
- External websites to plot data (other than MakeCode):
<https://2020-sd.github.io/microbit/> (beta)
- Easier bluetooth remote Log access / webpage / app (in progress):
Extension / Blocks: <https://github.com/bsiever/pxt-blelog>
Web Page that will download the Logged Data:
<https://bsiever.github.io/microbit-webblelog/> (Chrome only)
<https://github.com/bsiever/microbit-webblelog>

Resources

Wirelessly Stream Data

<https://www.youtube.com/watch?v=eJiddQwKPck&t=108s>



<https://vimeo.com/445128371>



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[illegible]

mySci Do: Instructions

<http://bit.ly/MicroBitTempGraph>

Questions???

Demo

<https://2020-sd.github.io/microbit/>