

June 2020



Programming 2.0

Micro:bit Sensors – Week 3

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Agenda – Week 2

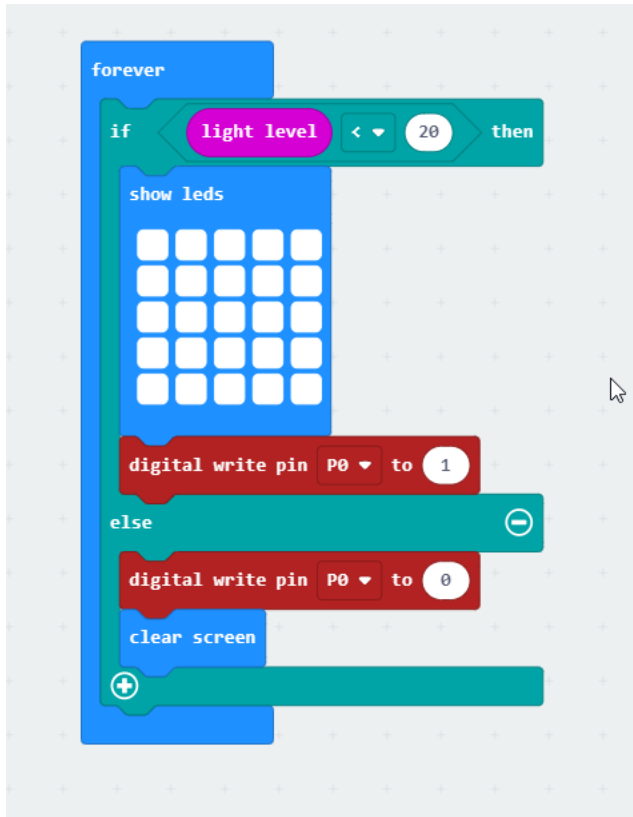
- + Review
- + Home work discussion
- + Arrays example
- + Variable example
- + Sensors – Light
- + Sensors – Temperature
- + Sensors – Compass
- + Review
- + Homework – 2



Homework

+ Light sensor

+ Father's day – Night light for your dad



Home work 1 – Night light

+ How light sensor works?

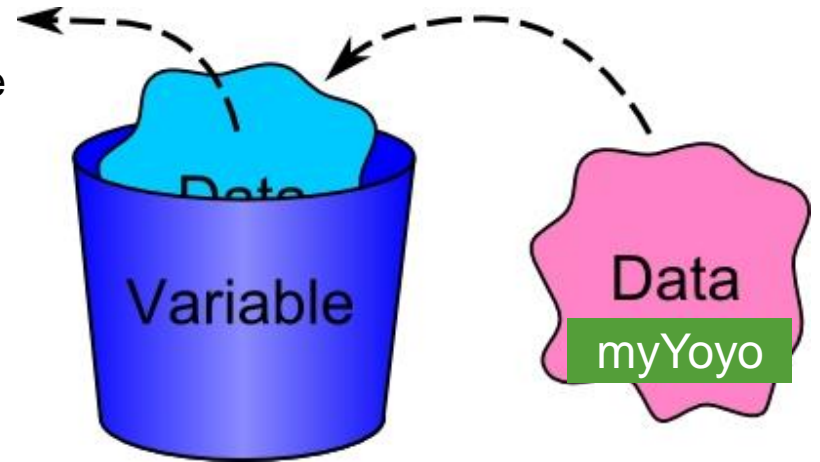
+ Watch video

+ <https://www.youtube.com/watch?v=TKhCr-dQMBY&t=125s>

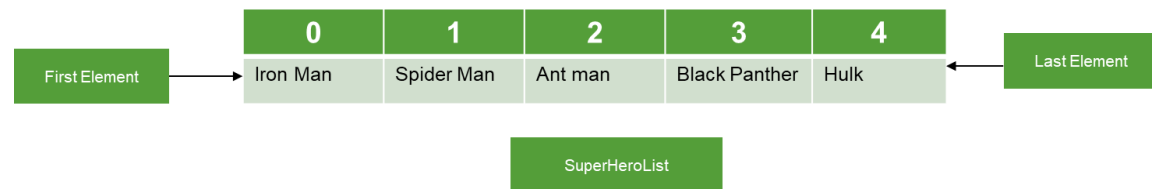


Review – Week 2 - Data

- + Data is stored in computers.
- + Data can be split into two parts: the name and the value
- + Data types - The kind of value that a variable can hold
 - + Numbers
 - + Strings
 - + Booleans – true/false



- + Variables
- + Arrays - collection of items stored at contiguous memory locations
 - + Zero-based indexing
 - + Get items from any position
 - + SuperHeroList[0] → Iron Man
 - + SuperHeroList[4] → Hulk

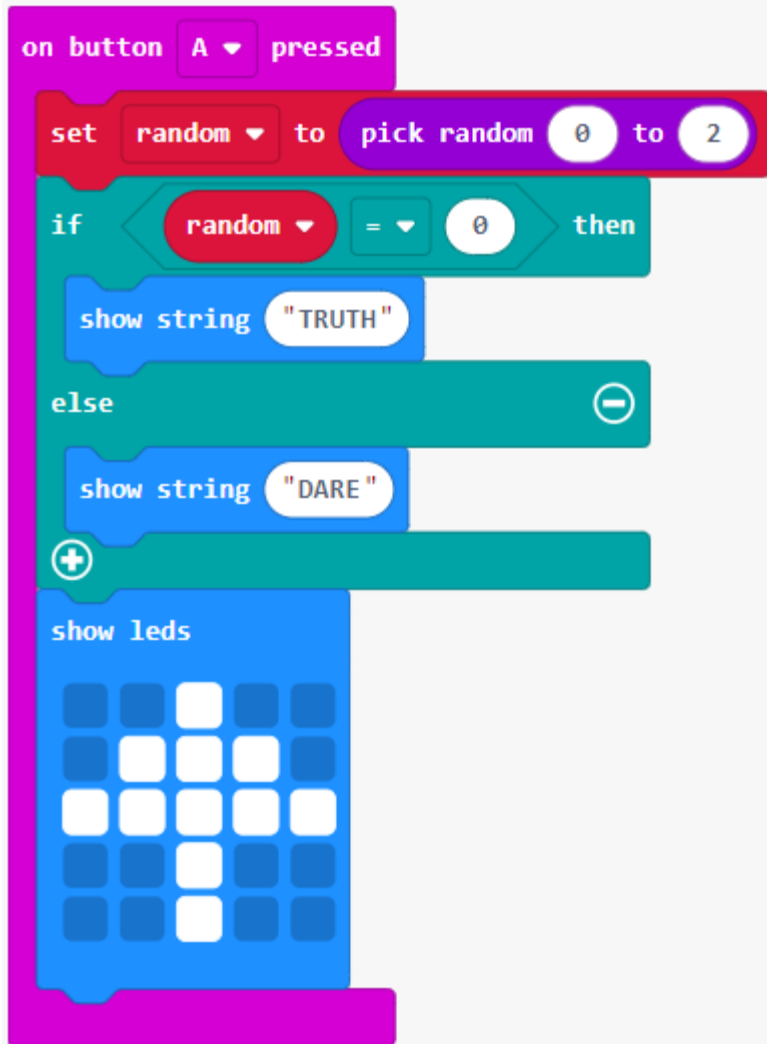


- + How is data is collected?
 - + Light sensor
 - + Temperature sensor

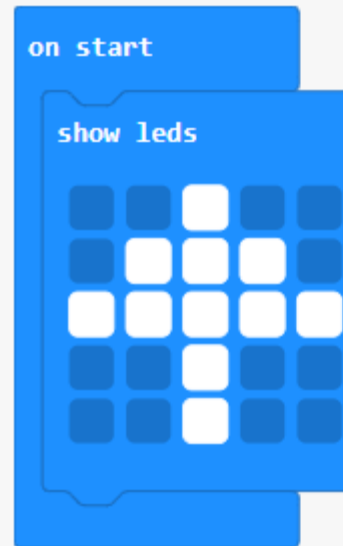


Truth/Dare

```
on button A pressed
  set random to pick random 0 to 2
  if random = 0 then
    show string "TRUTH"
  else
    show string "DARE"
```

A Scratch script for button A pressed. It starts with a 'set random to pick random 0 to 2' block. This is followed by an 'if random = 0 then' block. Inside the 'then' block, there is a 'show string "TRUTH"' block. Below the 'if' block is an 'else' block with a 'show string "DARE"' block. The script ends with a 'show leds' block that displays a 4x4 grid of LEDs with the top-middle and bottom-middle LEDs lit.

```
on start
  show leds
```

A Scratch script for the 'on start' event. It contains a single 'show leds' block that displays a 4x4 grid of LEDs with the top-middle and bottom-middle LEDs lit.

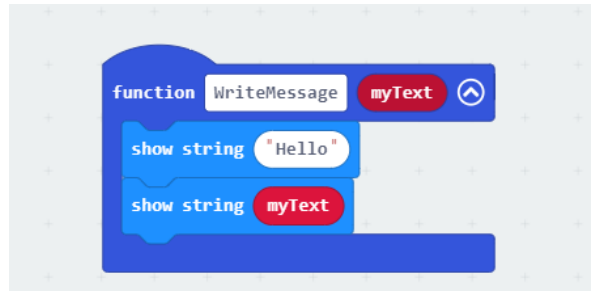
Array – Activity Selector

- + Activity List
 - + Watch Movie
 - + Read book
 - + Jogging
- + Length of an array
- + First index
- + Last index
- + Activity chooser



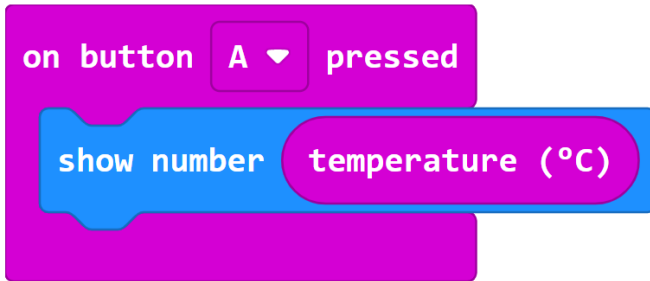
Functions

- + Every programming language allows us to write some functions
- + Modules of code that accomplish a specific task
- + Design program as a bunch of sub-steps
- + Allow us to reuse code instead of rewriting it
- + All programming functions have input and output
- + The function contains instructions used to create the output from its input.
- + Example

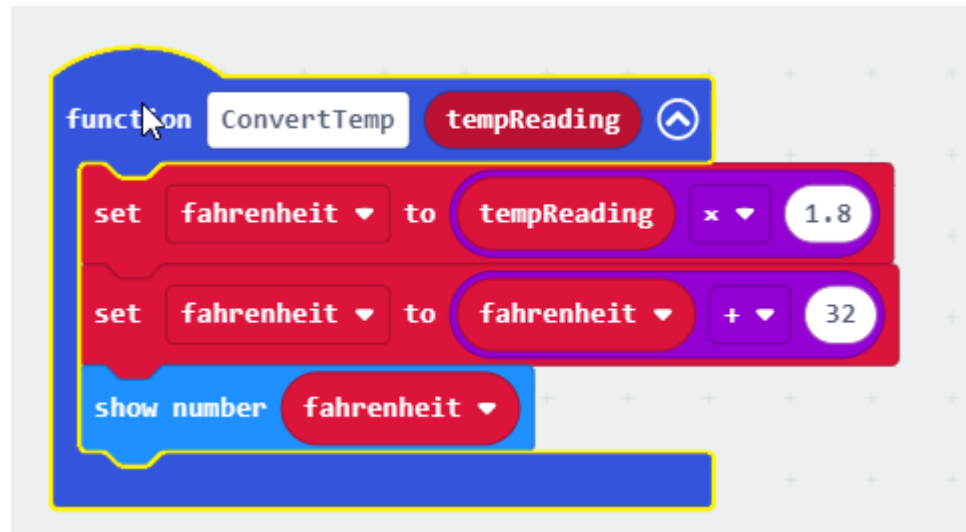


Sensors

+ Temperature sensor



```
on button A pressed
  show number temperature (°C)
```

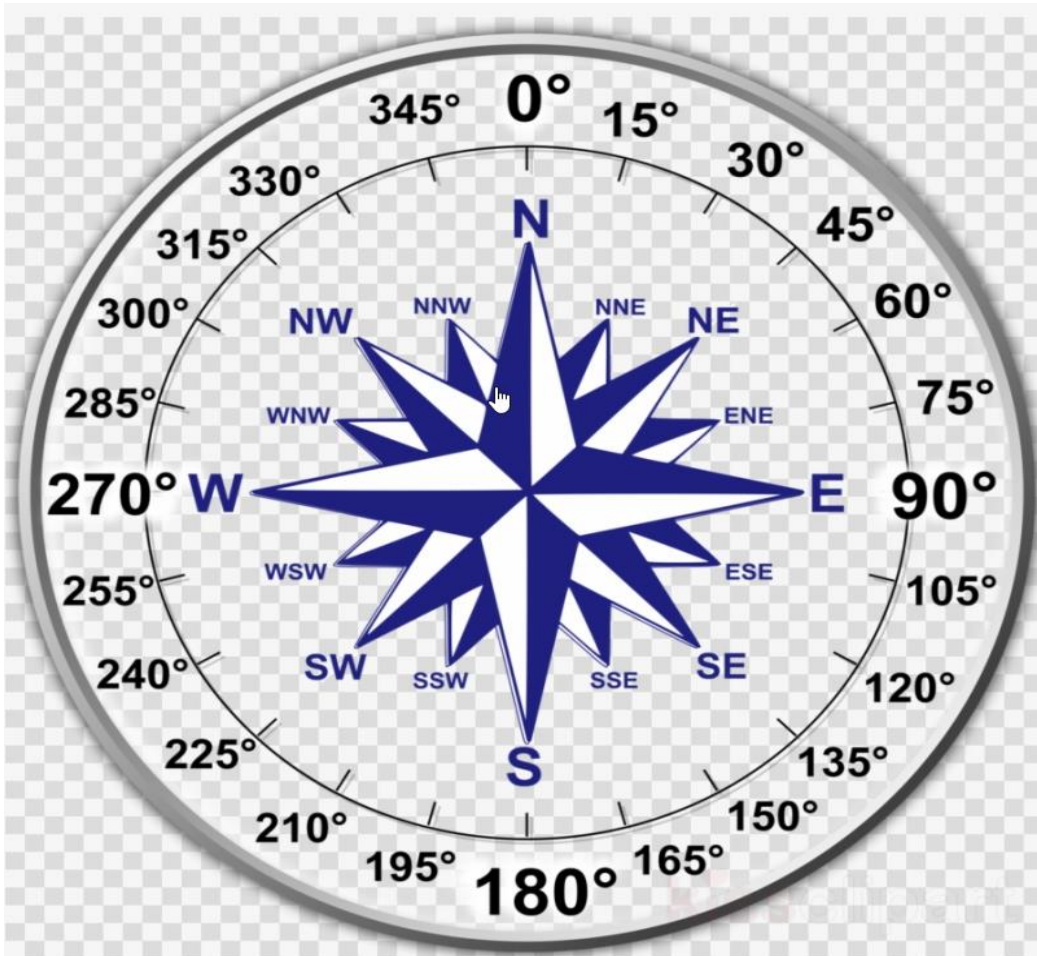


```
function ConvertTemp tempReading
  set fahrenheit to tempReading * 1.8
  set fahrenheit to fahrenheit + 32
  show number fahrenheit
```



Sensors

+ Compass sensor



```
on button A pressed
  show number compass heading (°)
```



Sensors

- + Compass sensor
 - + If Reading $< 45 \rightarrow N$
 - + If Reading between 45 & 135 $\rightarrow E$
 - + If Reading between 135 & 225 $\rightarrow S$
 - + If Reading $<$ between 225 & 315 $\rightarrow W$

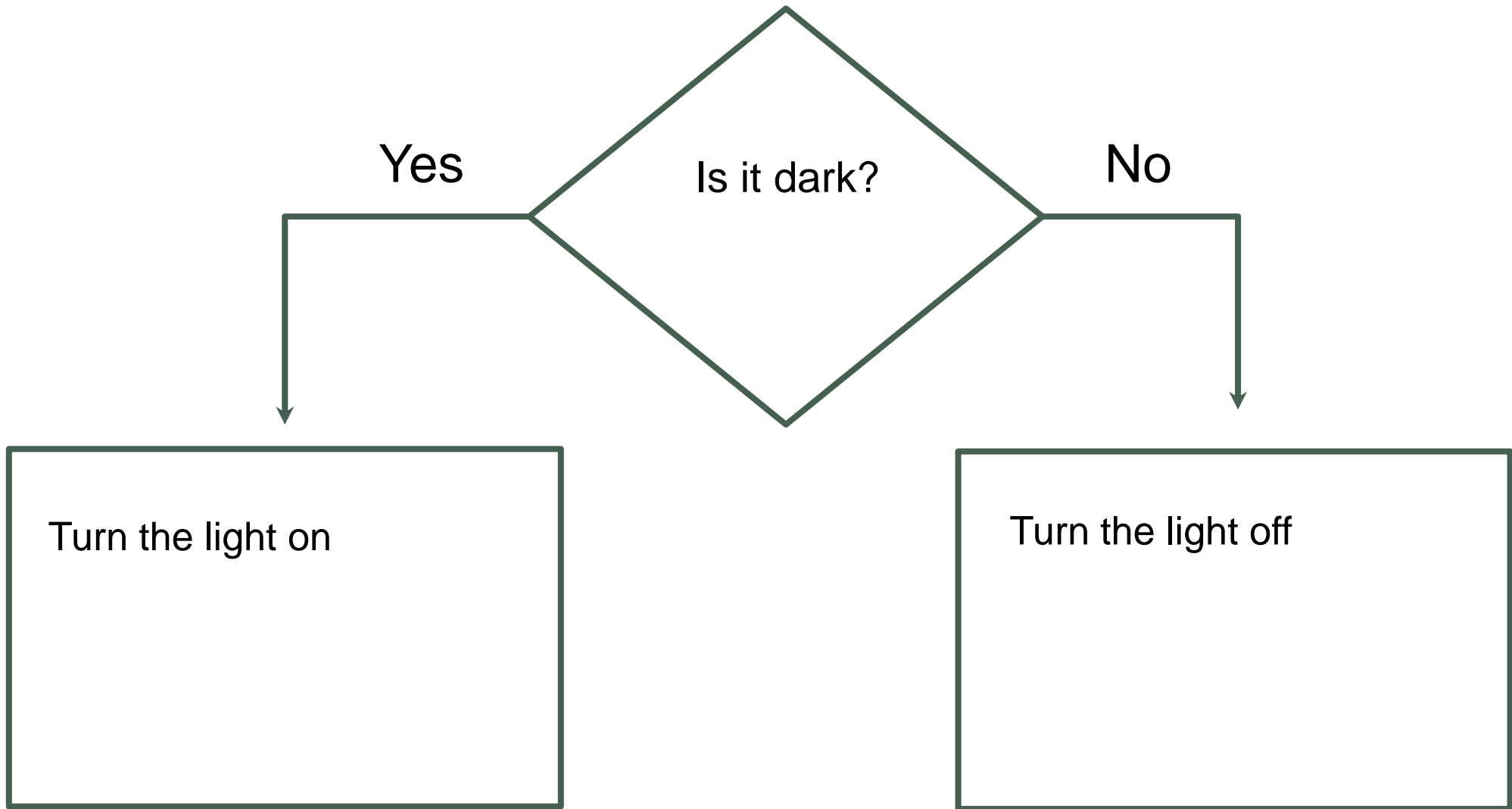


Review

- + Data
- + Data Types
- + How do they collect the data?
- + Sensors



Flowchart



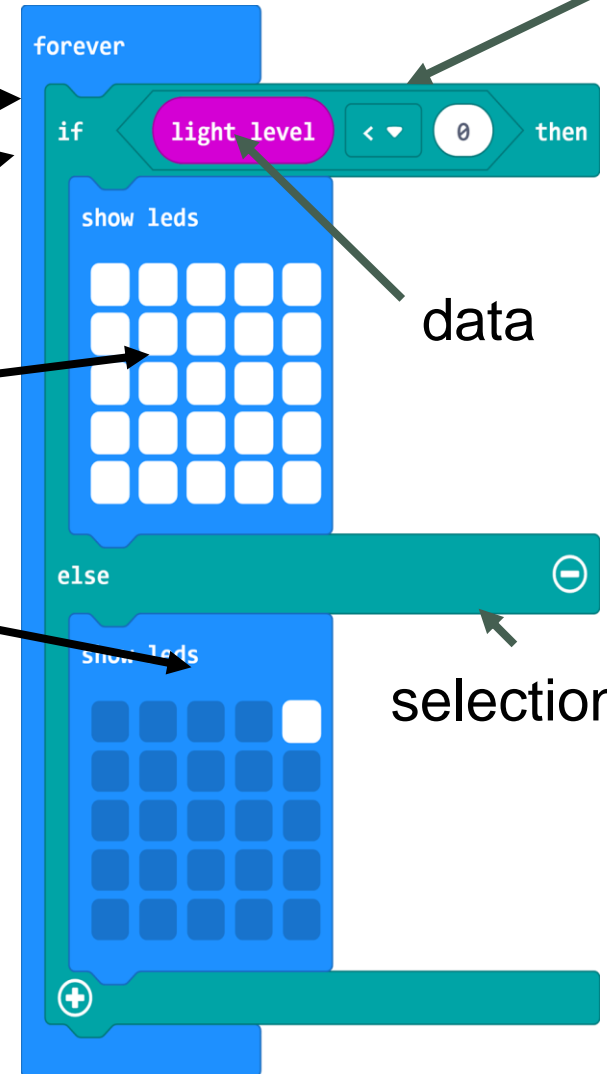
Algorithms and Programs

FOREVER

IF it is dark

THEN turn light on

ELSE turn light off



repetition

data

selection



References

+ Micro:bit Educational Foundation microbit.org

