

Use of Arrays to save multiple values.

Aims of this section:

- To discuss the use of arrays in programming, in particular how they operate.
- To work through some array examples on the whiteboard with a focus on:
 - How to set-up an array
 - Adding values to an array
 - Removing values from an array
 - Totally and averaging the values in an array
- To work through the array examples on the microbit with a focus on:
 - Initialise an array
 - Adding values to an array, that are coming in via radio communication
 - Sending these values over the serial port, Downloading the CSV for them.
 - Demonstrate a simple graph of data in excel.
 - Totally and averaging the values in an array on the micro:bit.



Pre-Coding Considerations for Arrays.

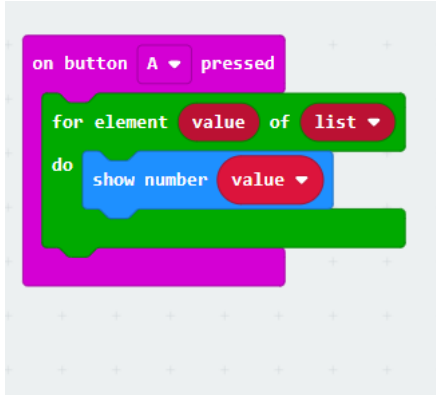
The image shows a screenshot of a Beamer presentation slide. The slide content is centered and reads "Arrays Design" in a large, green, sans-serif font. The presentation interface includes a top menu bar with options: File, Home, Insert, Draw, Design, Transitions, Animations, Slide Show, Review, View, and Help. On the right side of the top bar are "Share" and "Comments" buttons. On the left side, there is a "Thumbnails" panel. The bottom status bar shows "Slide 1 of 1", a language dropdown set to "English (Ireland)", and a navigation toolbar with icons for Notes, Display Settings, and a zoom level of 94%.

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Next Step is to code this on the micro:bit.

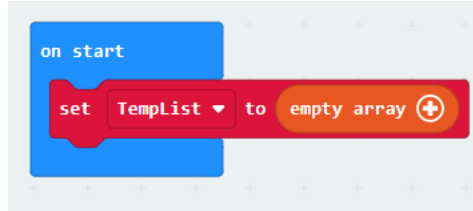
<https://makecode.microbit.org/>

Loop through all values in Array



```
on button A pressed
  for element value of list
    do
      show number value
```

Initialise Array



```
on start
  set TempList to empty array
```

Set values in array



```
forever
  set list to array of 9 11 3 22 4
```

TASK

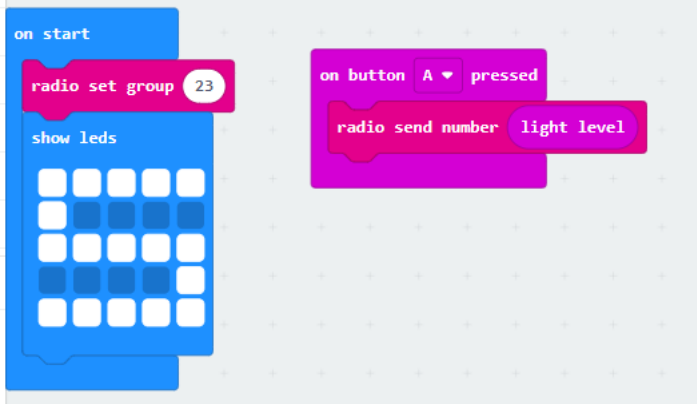
Assume : Light level is being sent via radio signal from one microbit to another.

AIM:

1. Take the light level received and store it in an array.
2. When button A pressed the array data is analysed to do the following:
 - a. Get the total of all the values in the array
 - b. Get the average value for that day (Assume each array represents a day.)
3. When Button B is pressed all data in the array is:
 - a. Displayed
 - b. Send via the serial port.

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Light Sender Code



This code has two parts:

OnStart – Here the radio channel is set and an S is displayed so when powered it is easy to see that this micro:bit is the sender.

OnButtonAPressed – Here the light level from the sender micro:bit is sent to the receiver.

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```
on start
  serial redirect to USB
  radio set group 23
  show leds
  set LightList to empty array

on button A pressed
  set Total to 0
  for index from 0 to length of array LightList - 1
  do
    set Total to Total + LightList get value at index
    show number Total
  change Average by Total ÷ length of array LightList
  show number Average

on radio received receivedNumber
  LightList add value receivedNumber to end

on button B pressed
  for element value of LightList
  do
    serial write line value
    show number value
```

This is the Sender Code.

This is explained on the next slide.

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Receiver Code with Array and Serial Explanation:

OnStart –Ensure data can be sent via the USB, Set radio channel to 23, show the letter R to indicate that this micro:bit is the receiver and finally initialise the array to an empty array.

OnRadioReceived- This receives the light level from the sender and adds the value to the end of the array.

OnButtonAPressed – In this part we are looping through the array and getting the total and the average for the values in the array.

OnButtonBPressed - This part loops through the array and sends all the values along the serial port. This can be used to generate a CSV file or to be picked up by another application like Python or be sent to storage in a database.

We are also showing each value after it is sent but this is not essential it is just a debugging part of the code So we can ensure that the values are processed.



[See Video 5 –Arrays Implementation](#)

Arrays



Any Questions?

Stretch break

