

STEM 08 2020-09 P1-Coding

Functions & Truth Tables & Arrays, oh my!

Building a 'Smart' RPS

- [microbit-RPS-v3.hex](<https://vsbworld.sharepoint.com/sites/STEM820-21-/Shared Documents/Project 1/microbit-RPS-v3.hex>)
- [microbit-RPS-v4_75.hex](https://vsbworld.sharepoint.com/sites/STEM820-21-/Shared Documents/Project 1/microbit-RPS-v4_75.hex)

Project: Musical instrument

- musical notes hex
- <https://makecode.microbit.org/courses/csintro/arrays/project>
- This is a project in which students are challenged to create a musical instrument that uses arrays to store sequences of notes. The array of notes can be played when an input occurs, such as one of...

<<https://teams.microsoft.com/l/message/19:0ae7acc45b1849158cec43065b60f7d7@thread.tacv2/1601567840610?tenantId=0b8a2e58-7b30-4a08-bab7-d75559e0e3a5&groupId=690cf2eb-06ce-4eaf-9114-e33bdd0a91c2&parentMessageId=1601567840610&teamName=STEM 8 Templeton 2021&channelName=Q1-Coding&createdTime=1601567840610>>

How to make a Magic 8 Ball

Microbit Magic 8 Base Activity

- <https://makecode.microbit.org/lessons/magic-8/activity>
- *What is the "Magic 8-Ball"?, you may ask: https://en.wikipedia.org/wiki/Magic_8-Ball
- <https://www.indra.com/8ball/front.html> (online version)

magic 8 activity

- Welcome! This activity will help you create a magic 8 ball on the micro:bit. Let's get started!
- https://makecode.microbit.org/_00uMD0CT37ea
- magic-8-functions
- Made with ❤️ in Microsoft MakeCode for micro:bit.

<<https://teams.microsoft.com/l/message/19:0ae7acc45b1849158cec43065b60f7d7@thread.tacv2/1601497279126?tenantId=0b8a2e58-7b30-4a08-bab7-d75559e0e3a5&groupId=690cf2eb-06ce-4eaf-9114-e33bdd0a91c2&parentMessageId=1601497279126&teamName=STEM 8 Templeton 2021&channelName=Q1-Coding&createdTime=1601497279126>>

Microbit App

Buy your own Micro:bit in Vancouver

In response to a question in class about if you where to buy your own micro:bit, I offer the following:

- <https://leeselectronic.com/en/product/16336.html> | MICRO:BIT BOARD (Fraser and King Ed, Vancouver)
- <https://www.rpelectronics.com/arduino-pi-microcontrollers-3d-printing-and-kits/arduino-raspberry-pi-and-microcontrollers/micro-bit> | micro:bit (Dawson Street, Burnaby; by Gilmore Skytrain)

Order online

- <https://microbit.org/buy/?location=CA> | micro:bit resellers in Canada
- <https://bc-robotics.com/product-category/bbc-microbit/> | BBC micro:bit - BC Robotics (Nanaimo, Vancouver Island)
- <https://www.digikey.ca/en/maker/platforms/m/micro-bit> | micro:bit @ Digi-key
- <https://www.bestbuy.ca/en-ca/product/micro-bit-micro-computer-with-motion-detector-compass-led-display-and-bluetooth/12348807> | micro:bit @ Best Buy Canada (but not necessarily in store)
- https://www.amazon.ca/s?k=microbit&ref=choice_dp_b | Amazon.ca : microbit

The Windows 10 MakeCode app can be downloaded from the following link.

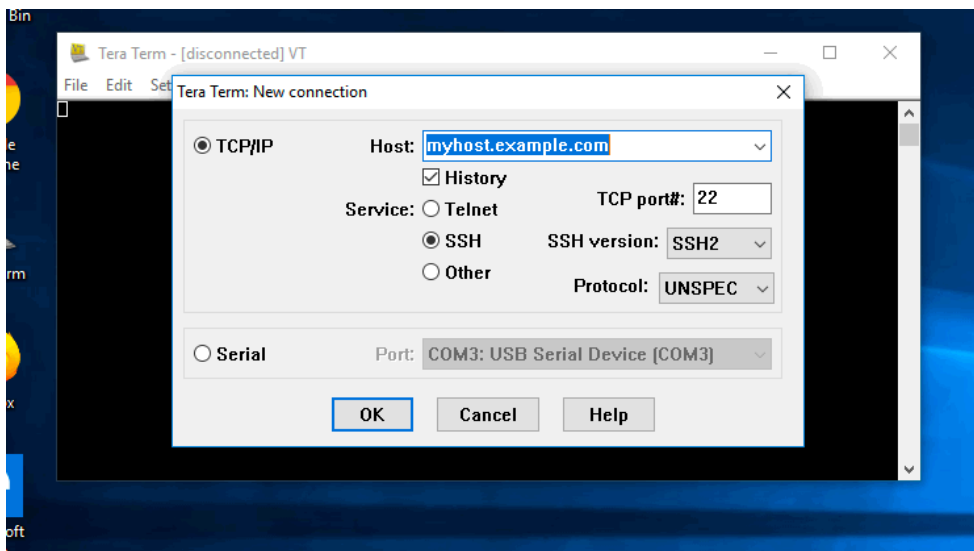
<https://www.microsoft.com/en-ca/p/makecode-for-micro-bit/9pjc7sv48lcx?rtc=1&activetab=pivot:overviewtab>

Link to the offline installer: <https://makecode.microbit.org/offline-app>

Try TeraTerm

1. Download the attached file and unzip it.
2. Plug in micro:bit
3. Go into the folder and click ttermpro.exe
4. Select Serial as the port
5. Choose Setup > Serial port from the setting menu and configure these settings:
 - a. Baud rate = 115200
 - b. Data = 8 bits
 - c. Parity = none
 - d. Stop = 1 bit

You should now see serial data output in the console.



- [teraterm-4.105.zip](<https://vsbworld.sharepoint.com/sites/STEM820-21-/Shared Documents/Project 1/teraterm-4.105.zip>)

<<https://teams.microsoft.com/l/message/19:0ae7acc45b1849158cec43065b60f7d7@thread.tacv2/1602052414228?tenantId=0b8a2e58-7b30-4a08-bab7-d75559e0e3a5&groupId=690cf2eb-06ce-4eaf-9114-e33bdd0a91c2&parentMessageId=1602052414228&teamName=STEM 8 Templeton 2021&channelName=Q1-Coding&createdTime=1602052414228>>

Microbit Review

Crashy Bird

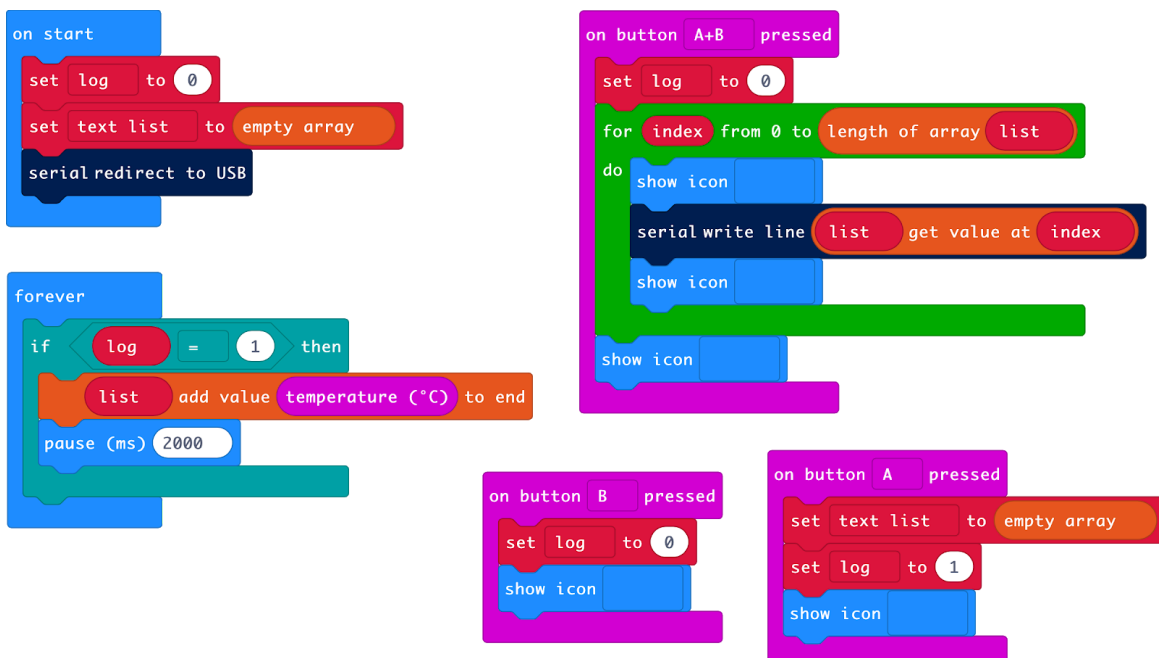
- <https://makecode.microbit.org/projects/crashy-bird>
- Crashy Bird
- All the fun from the Flappy Bird game is coming to the micro:bit as Crashy Bird!

<<https://teams.microsoft.com/l/message/19:0ae7acc45b1849158cec43065b60f7d7@thread.tacv2/1603123085653?tenantId=0b8a2e58-7b30-4a08-bab7-d75559e0e3a5&groupId=690cf2eb-06ce-4eaf-9114-e33bdd0a91c2&parentMessageId=1603123085653&teamName=STEM 8 Templeton 2021&channelName=Q1-Coding&createdTime=1603123085653>>

Collecting Data

Collect and Display Real World Data

- Create the "Temperature Data Logger" code from the link below.
- <http://blog.sparkfuneducation.com/how-to-datalog-using-only-the-microbit>
- <https://lh4.googleusercontent.com/c80F-K7Kd7odvTbrvfSzyF963ljZKeWrNYk0xWtsS1QmPAsxhKWk4cxdQGykysOMoCjIw-fd3zHYiyOBD0vi1dnjjNu14d6d3ixTeiamhZSK3qxpNt1EcOIC3PaDQR0YSx95IIBCdsolIYeJRA>
- dataloggerLightLevel: https://makecode.microbit.org/_3R25PLDqwWUU
- [Beagle Term](#)



How To Datalog Using Only the micro:bit

- Typically, logging data using the micro:bit requires additional electronics components, or at least a microSD card. This MakeCode program makes it simple to log data using only the micro:bit.
- <http://blog.sparkfuneducation.com/how-to-datalog-using-only-the-microbit>

Javascript Code (copy, paste, change to blocks)

```
input.onButtonPressed(Button.A, function () {
  log = 1
  text_list = []
  basic.showIcon(IconNames.Yes)
})
input.onButtonPressed(Button.AB, function () {
  log = 0
  for (let index = 0; index <= list.length; index++) {
    basic.showIcon(IconNames.Diamond)
    serial.writeLine("" + (list[index]))
    basic.showIcon(IconNames.SmallDiamond)
    basic.pause(500)
  }
  basic.showIcon(IconNames.Happy)
})
input.onButtonPressed(Button.B, function () {
  log = 0
  basic.showIcon(IconNames.No)
})
let list: number[] = []
let text_list: number[] = []
let log = 0
log = 0
text_list = []
serial.redirectToUSB()
basic.forever(function () {
  if (log == 1) {
    list.push(input.compassHeading())
  }
  basic.pause(1000)
})
```

Super Basic first code from tutorial above

- [microbit-Data-Logger-V1_0.hex](https://vsbworld.sharepoint.com/sites/STEM820-21-/Shared Documents/Project 1/microbit-Data-Logger-V1_0.hex)

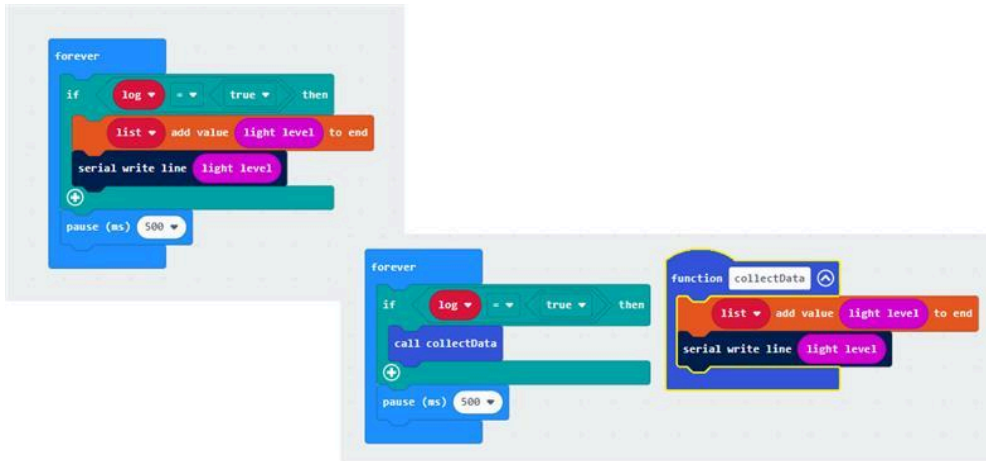
<<https://teams.microsoft.com/l/message/19:0ae7acc45b1849158cec43065b60f7d7@thread.tacv2/1602607835197?tenantId=0b8a2e58-7b30-4a08-bab7-d75559e0e3a5&groupId=690cf2eb-06ce-4eaf-9114-e33bdd0a91c2&parentMessageId=1602607835197&teamName=STEM 8 Templeton 2021&channelName=Q1-Coding&createdTime=1602607835197>>

Function explanation

what is the code doing; i.e. how does a particular block of code demonstrate an element of code.

See this post for how I changed a block of code to demonstrate the "Function" element of code. Your next step would be to describe what the code block is doing and how it is a demonstration of a "Function".

if you didn't ever make a function before; try creating a function in the program you are using for the Assignment 4 and moving code into it. If it still works the same way; Congratulations, you did it.



Coding 1: Exploring Micro:bit

Due October 5, 2020 11:59 PM

Instructions

1. Open and complete the "Flashing Heart Tutorial" (if you don't have a Micro:bit yet, that is okay - you can still run the simulated parts)
2. Open the "Personal Flash.mkcd" and code your own flashing pixel graphic.

Reference materials

Flashing Heart Tutorial <https://www.youtube.com/watch?v=NvEOKZ8wh9s>

Student work

Personal Flash.mkcd

Coding 2: Rock, Paper, Scissors

Due October 6, 2020 11:59 PM

Instructions

1. Follow the link below to the Microbit Coding Dashboard and complete the "Rock Paper Scissors" tutorial.
2. Open the "RPS Player.mkcd" and code/import an RPS game that lets you (the player) select using the "A" button, and randomly generates with the "B" button.

Reference materials

Microbit Coding Dashboard

makecode.microbit.org

Student work

test.mkcd

RPS Player.mkcd

Coding 3: Choice Projects

Due October 8, 2020 11:59 PM

Instructions

1. Open the link to the micro:bit Coding Dashboard
2. Complete at least 3 tutorials (at least one "Game" and one "Radio")
3. Mashup / personalize the code from the tutorials to make 3 different coding projects
4. use the "Add work" link below to upload your hex codes or build them in the attached .mkcd files

Reference materials

Microbit Coding Dashboard

makecode.microbit.org

Student work

Coding Project 2.mkcd

Coding Project 1.mkcd

Coding Project 3.mkcd

Coding 4: Final Coding Assignment

Due November 2, 2020 11:59 PM

Instructions

Applying Elements of Code and Computational thinking to coding artifacts.

Pick any previously completed, working coding artifact (anything from the "Coding Overview" page), and, in the attached PowerPoint, use it to demonstrate how you APPLIED the following elements of code:

- Order
- Variables (boxes of memory to hold values)
- Conditionals (questions and choices)
- Iterations (loops)
- Functions (mini-programs)
- Arrays (shelf to hold boxes of values)

From the same artifact, can you EXTEND your previous answer to demonstrate the following Computational Thinking practices:

- Decomposition (how can this be done by breaking into smaller pieces and solving each separately?)
- Pattern Recognition (do parts / actions repeat?)
- Abstraction (can we make one thing that can be used in more than one situation?)
- Algorithms (can we make "recipes" to solve "problems"?)

** Make sure to add the .hex file for the project that you refer to in you slideshow.

P.S. Do you best. This is you first run at reflecting on and connecting these concepts to the real world. We will be applying these same concepts in the Robotics Unit as well.d[o_0]b...

Student work

Coding 4 Final Assignment.pptx

Points

2 points possible

Rubric

Coding Competencies

2 points possible

Computational Thinking: Elements of Code (Sequence, Variables, Conditionals, Iterations, Functions & Arrays)

	NO EVIDENCE	Beginning 1	Developing 1	Applying 1	Extending 1
Computational Thinking: Elements of Code (Sequence, Variables, Conditionals, Iterations, Functions & Arrays)	Not enough evidence	Identify and define blocks of the six elements of code from menus / tutorials	Combine the elements of code in coding tutorials	Demonstrate each of the six elements of code by connecting code blocks from existing programs with short descriptions	Find and solve new problems using the elements of code

Computational Thinking: the Four Practices (Decomposition, Pattern Recognition, Abstraction & Algorithms)

	NO EVIDENCE	Beginning 1	Developing 1	Applying 1	Extending 1
Computational Thinking: the Four Practices (Decomposition, Pattern Recognition, Abstraction & Algorithms)	Not enough evidence	Describe each of the four computational thinking practices	Use computational thinking practices to discuss a program	Use computational thinking practices to analyze and refactor a program	Generalize the six elements of code to the four computational thinking practices

How to collect data with the Microbit

Due November 2, 2020 11:59 PM

Instructions

For those that completed the Data Logger / Streamer and would like to submit it, please attach both the .hex file and the .csv file of captured data.

Student work

None

Points

2 points possible

Rubric

Collecting Data with the Microbit

Computational Thinking: Elements of Code (Sequence, Variables, Conditionals, Iterations, Functions & Arrays)

	NO EVIDENCE	Beginning 1	Developing 1	Applying 1	Extending 1
Computational Thinking: Elements of Code (Sequence, Variables, Conditionals, Iterations, Functions & Arrays)	Not enough evidence	Identify and define blocks of the six elements of code from menus / tutorials	Combine the elements of code in coding tutorials	Demonstrate each of the six elements of code by connecting code blocks from existing programs with short descriptions	Find and solve new problems using the elements of code

Computational Thinking: Elements of Code (Sequence, Variables, Conditionals, Iterations, Functions & Arrays)

	NO EVIDENCE	Beginning 1	Developing 1	Applying 1	Extending 1
Digital Devices and Media Explore the Microbit as a tool for data collection.	Not enough evidence	Complete tutorials and run code in the code editor	Personalize tutorial code and run it in the code editor	Download and run refactored / personalized code on a digital device	Test and run code on a digital device that receives and transmits data to a computer

My cool, coding project

Due November 2, 2020 12:59 AM

Instructions

For those that completed their own version of or extension to a game or application.

Student work

None

Points

1 point possible