<u>**Emerging Technologies I**</u>

<u>**Project Milestone I**</u>

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Step 1: Visit MakeCode (https://makecode.microbit.org/). Use the visual editor to write a step counter. For starters, you can assume a "shake" is equivalent to a step. When you update the counter, you should also display the current step count on the microbit's LEDs.

In MakeCode, we used the visual editor in order to create the step counter. The process was very simple and we started with creating a variable called "step". On start, the step variable would be set to 0 and every time the microbit was shaken, the step counter would increase by 1. In this iteration, we decided to always display the number of steps.

Step 2: Download Mu (https://codewith.mu/en/about). Use the Mu editor to re-write your step counter in Python. You might find the python API documentation for the microbit to be useful:

Wrote a MicroPython code using Mu editor to program a BBC micro:bit to count and display steps taken by user using the "shake" gesture. We attached the microbit to one leg for demo purposes. Incremented the step count by 2 for each shake since the step counter was only recording movement of one leg at a time.

Step 3: Test your step counter. Does it reliably count your steps? Identify one limitation that is interfering with its step counting (hint: it has to do with the display). Fix the python implementation. Your fix should include (at a minimum) the use of a button.

For step count larger than 10, we added the scroll option to display module for better display. Also, we bound the display feature to Button A press functionality i.e. only display the step count when Button A is pressed.

Step 4: Test the refined step counter. Describe and document your tests, including your results. Identify at least one additional way you might modify your step counter to make it more reliable. For bonus points, attempt to implement your proposed modification(s).

The refined step counter tested well; our improvements to the design were successful. The number of steps now showed up only at when the A button was pressed and held, costing the device less power (because the LED was less used). In addition, the potentially visually annoying constant red text was not displayed all the time.

To trigger the shake gesture and therefore get the step counter to increase, one has to walk in very deliberate manner making it impractical for general use. A possible way we could modify the step counter to work better is to calibrate it to **respond to a less forceful shake.**

We attempted our proposed modification. When the fully refined step counter was attached to a leg and tested, we found it to be almost completely accurate.

Limitations of the complete model include the fact that the step counter is not very "wearable". It lacks straps and aesthetically looks like a processor. In addition, there is an error range of +-1.