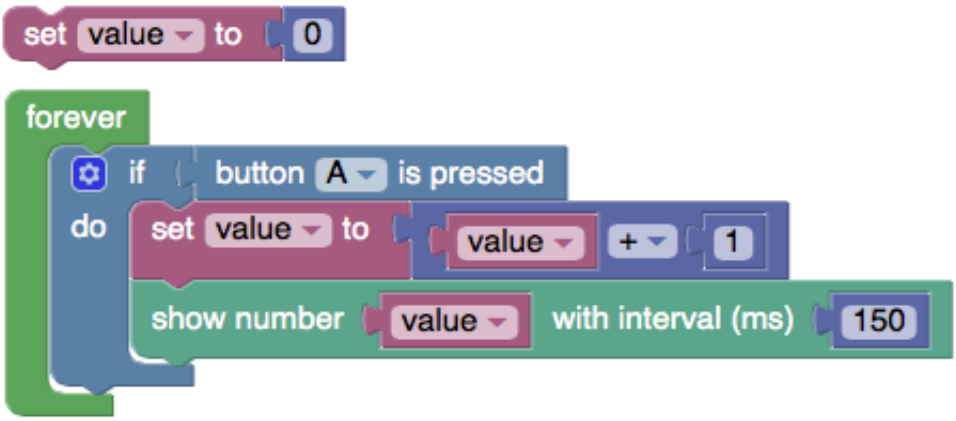
Section 4 Loops

We may want to handle the user's input multiple times or remain waiting for their input for a long time. We use loops to make sure that our code runs multiple times. These can be found in the *Loops* drawer.

Forever loops

In the **Variables (https://www.microbit.co.uk/blocks/book/variables)** tutorial, we utilised a **forever (https://www.microbit.co.uk/functions/forever)** loop to create a counter:



This allows our **BBC micro:bit (https://www.microbit.co.uk/device)** to wait for the user to do something forever, for example wait for the user to press the correct button as the example above shows. If you were creating a quiz, you may want to loop forever until the user presses the correct button or answers the question.

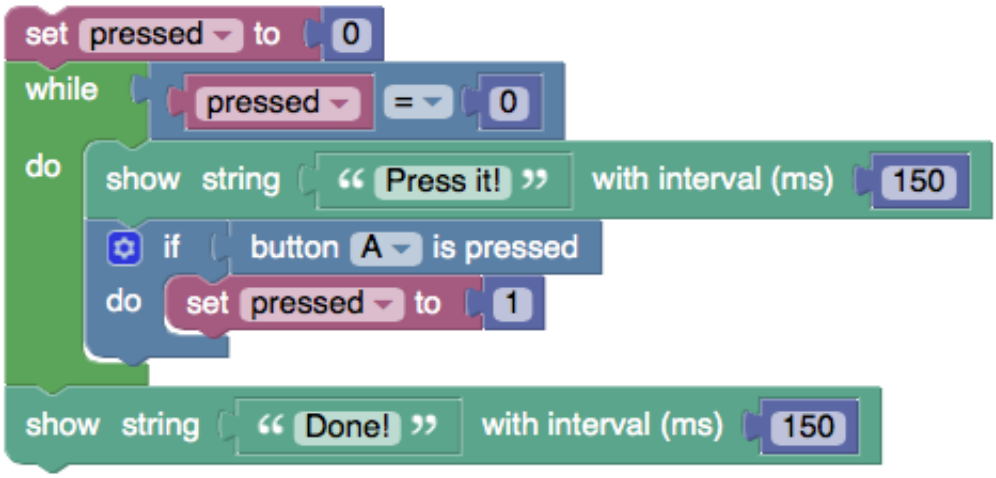
Repeat Loops

Repeat loops allow code to happen a certain amount of times. You may want to create a quiz that only gives the user a few tries to get the correct answer, for example. The number can be changed to facilitate your code.

The code above will scroll the message, "Hello world" three times.

While & Until loops

The repeat **while (https://www.microbit.co.uk/td/while)** loop allows you to continue looping some code until a condition is met. The empty socket next to the while loop allows you to connect some Logic and construct a statement.



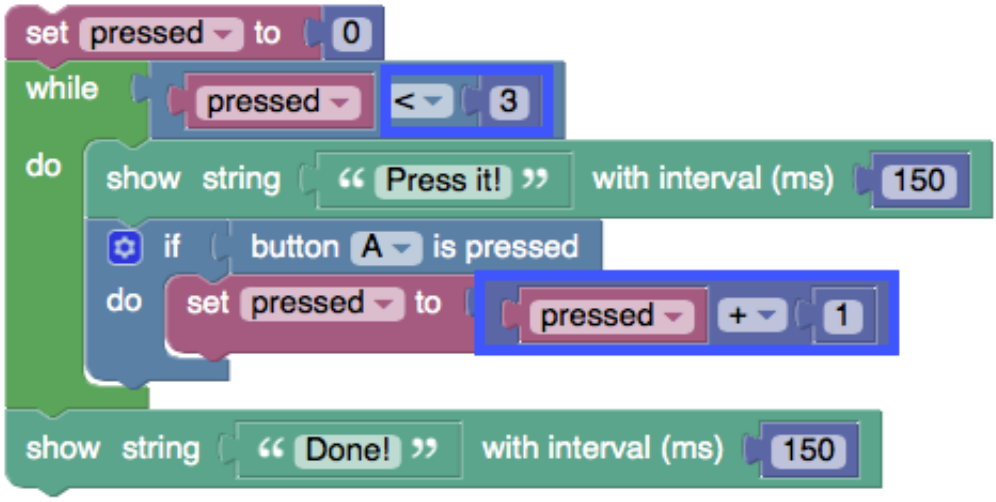
The code above will scroll the message, “Press it!”, while the user hasn’t pressed the button.

- Drag a **set item (https://www.microbit.co.uk/td/assign)** block from the *Variables* drawer. Click the *down arrow* and click *New Variable*, and type "pressed". Drag a **0 (https://www.microbit.co.uk/td/number)** block from *Maths* drawer to set the variable *pressed* to 0.
- Drag a repeat **while (https://www.microbit.co.uk/td/while)** block from the *Loops* drawer and attach a **comparison operator (https://www.microbit.co.uk/td/boolean)** = block from the *Logic* drawer. Drag **item (https://www.microbit.co.uk/td/assign)** from the *Variables* drawer and click the *down arrow*, select ‘pressed’. Drag a **0 (https://www.microbit.co.uk/td/number)** block from the *Maths* drawer and connect it to the other side of the equals. This will carry out the code until the variable ‘pressed’ does not equal 0.
- Add a **show string (https://www.microbit.co.uk/functions/show-string)** block from the *Basic* drawer and change the message to "Press it!"

- Add an **if (https://www.microbit.co.uk/td/if)** block from the *Logic* drawer, connect a **button is pressed (https://www.microbit.co.uk/functions/button-is-pressed)** block from the *Input* drawer. You select button A is pressed to show we are waiting for button A. Finally, add text "Done" with the **show string (https://www.microbit.co.uk/functions/show-string)** block from the *Basic* drawer.
- Inside the 'do' part of the **if (https://www.microbit.co.uk/td/if)** statement, add a **set item (https://www.microbit.co.uk/td/assign)** block from the *Variables* drawer, click the *down arrow* to change it to *pressed* and drag a **1 (https://www.microbit.co.uk/td/number)** from the *Maths* drawer
- Lastly underneath the **while (https://www.microbit.co.uk/td/while)** loop, add another **show string (https://www.microbit.co.uk/functions/show-string)** block and fill in the gaps.

Test the code above on actual **hardware (https://www.microbit.co.uk/device/usb)** or on the **simulator (https://www.microbit.co.uk/td/simulator)** window.

We can also change the code in subtle ways to have a completely different effect:



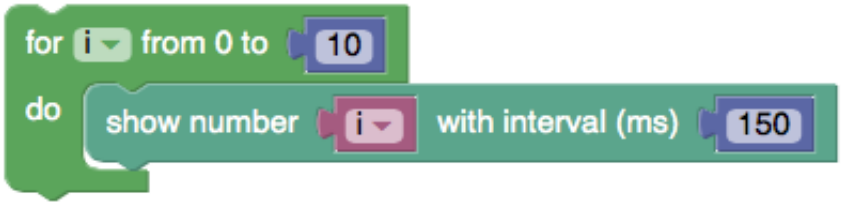
This time we have to press the button three times to leave the while loop.

> **Tip**
>
> You can press the *down arrow* next to a word in a block to change it. For example, you can change *Math* functions or change a *Logic* statement.

Count or for loops

A count **loop (https://www.microbit.co.uk/td/for)** allows you to loop a certain amount of times and to change a variable as you do so. For example, we can

create a simple counting program:



The count **loop (https://www.microbit.co.uk/td/for)** will repeat a certain amount of times whilst changing a **variable (https://www.microbit.co.uk/td/var)** . You can click the *down arrow* next to i to replace it with any of your own **variable (https://www.microbit.co.uk/td/var)** . So this program will display numbers 1 to 10.

This **loop (https://www.microbit.co.uk/td/for)** allows you to repeat code for the amount of times you want to without worrying about manually changing variables. You could use this for a counting program or a timer.

Where next?

Section 3 Variables (https://www.microbit.co.uk/blocks/book/variables)

Section 4 Loops (https://www.microbit.co.uk/blocks/book/loops)

Section 5 Rendering Graphics (https://www.microbit.co.uk/blocks/book/graphics)

Table of Contents (https://www.microbit.co.uk/blocks/book)