

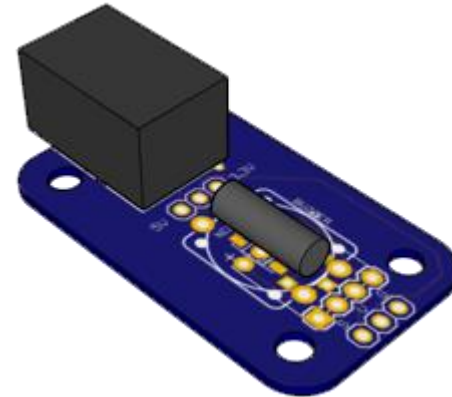
TScratch Basics

Coding with mBlock (Software)

Learning Objective

In this lesson you will learn:

TScratch (Vibration)



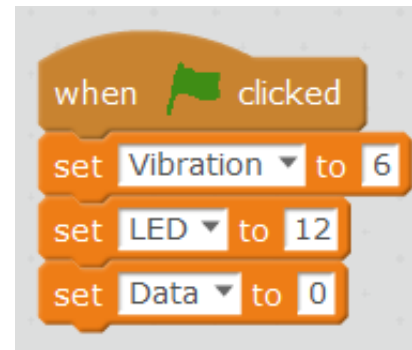
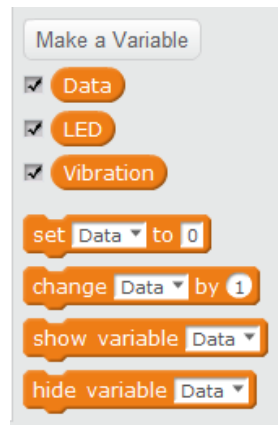
- Include a vibration-sensitive sensor to your project!
- Coding another digital input with mBlock

What is Vibration?

- Vibration is also known as **periodic oscillation**.
- The vibration sensor is a “**switch**” that works on a vibrating input.
- Not Vibrating → Low Resistance (not working)
- Vibrating → High Resistance (working)
- They are used commonly in the medical and automobile industries.

Write your vibration control program

- In this program, we will have a vibration **digital input (port 6)** and LED **digital output (port 12)**. We will also be creating a variable Data to help us track if a vibration is being sensed.
- Create the respective variables in the Data&Blocks tab, then define them in the scripting area:



Write your vibration control program

- Within a forever loop, set your conditions. In this case, we want the LED to be switched ON when the vibration sensor detects a movement (eg. hitting the sensor).
- If vibration input is HIGH → LED output is HIGH (switched on)
- If vibration input is LOW → LED output is LOW (switched off)
- Vibration input is HIGH when sensor is hit, meaning $\text{Vibration} = 1$
- Vibration input is LOW when no movement is detected, meaning $\text{Vibration} = 0$

Write your vibration control program

- To track whether a vibration is detected, we will use Data to display the updated value.
- Write a simple program to display the value:

```
when clicked
  set Vibration to 6
  set LED to 12
  set Data to 0
  forever
    set Data to read digital pin Vibration
```

Forever loop to continuously check for changes in state

The value of Data will be continuously read and displayed on the stage

Write your vibration control program

- From the Operators tab, drag the  :



Double-click and type the number 0 in the box



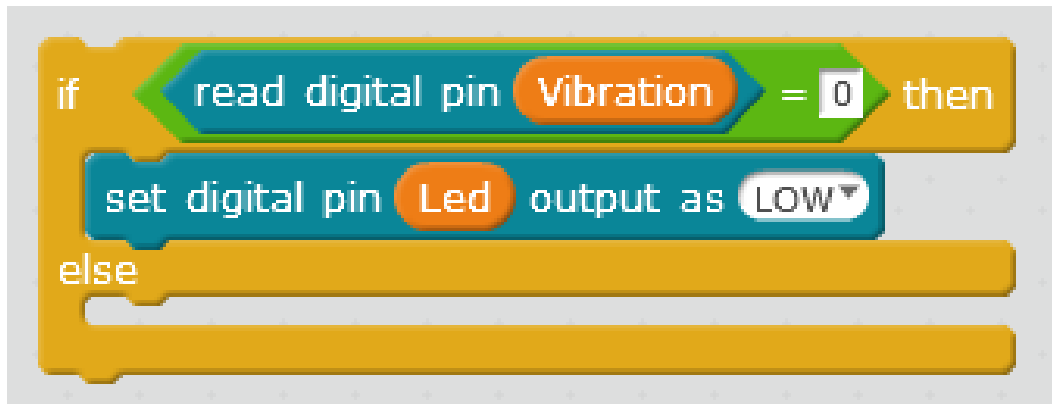
Note: Remember to drag the Button variable inside!

- Click and drag the block over the white square you want it to go until it lights up to insert it.



Write your vibration control program

- First condition: if the Vibration input is LOW (0), the LED output is LOW (switched off).
- Drag out an **if... else** control block and insert the condition:



Make sure the correct variables are in the correct places, and you are using **digital** pins with the correct designation (input or output)!

Write your vibration control program

- Second condition: if the Vibration input is HIGH (1), the LED output is HIGH (switched on).
- Insert the condition in a **NEW if** block, then into the **else** part:

```

if (read digital pin Vibration = 0) then
  set digital pin Led output as LOW
else
  if (read digital pin Vibration = 1) then
    set digital pin Led output as HIGH
    wait 3 secs
  
```

Note: There are **TWO** if conditions, but only **ONE** if... else block!
 In the case that the first condition is not fulfilled, **ONLY THEN** will the program check for the second condition!

Add a Wait block to give time for the light to be visible

Write your vibration control program

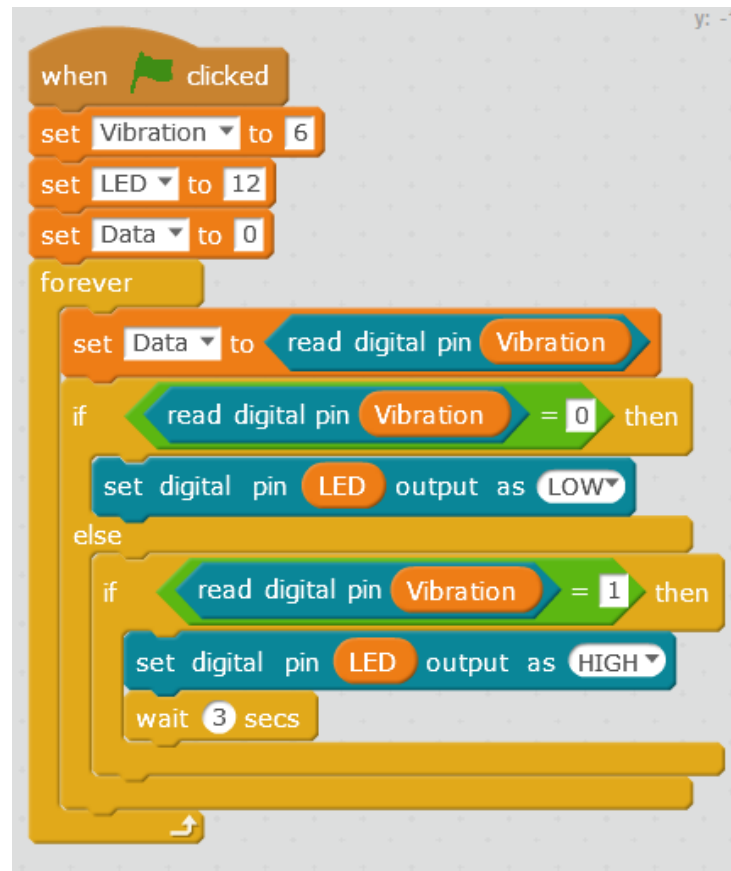
- We want the program to continuously check if the conditions are fulfilled, in case there is a change of state.
- Insert your conditions into a forever loop:

```

forever
  if read digital pin Vibration = 0 then
    set digital pin Led output as LOW
  else
    if read digital pin Vibration = 1 then
      set digital pin Led output as HIGH
      wait 3 secs
  
```

Write your vibration control program

- Complete program:



```
when clicked
  set Vibration to 6
  set LED to 12
  set Data to 0
  forever
    set Data to read digital pin Vibration
    if read digital pin Vibration = 0 then
      set digital pin LED output as LOW
    else
      if read digital pin Vibration = 1 then
        set digital pin LED output as HIGH
        wait 3 secs
```

The image shows a Scratch script for a vibration control program. It starts with a 'when clicked' event block. This is followed by three 'set' blocks: 'set Vibration to 6', 'set LED to 12', and 'set Data to 0'. A 'forever' loop contains the main logic: 'set Data to read digital pin Vibration', an 'if' block checking 'read digital pin Vibration = 0' which sets the LED output to 'LOW', an 'else' block containing another 'if' block checking 'read digital pin Vibration = 1' which sets the LED output to 'HIGH' and includes a 'wait 3 secs' block. The script ends with a return arrow block.