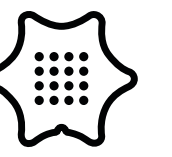
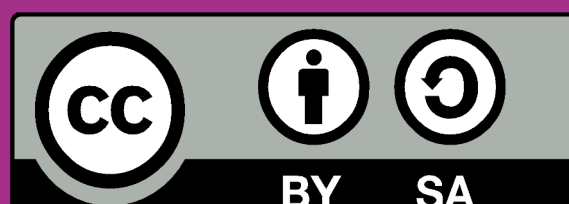
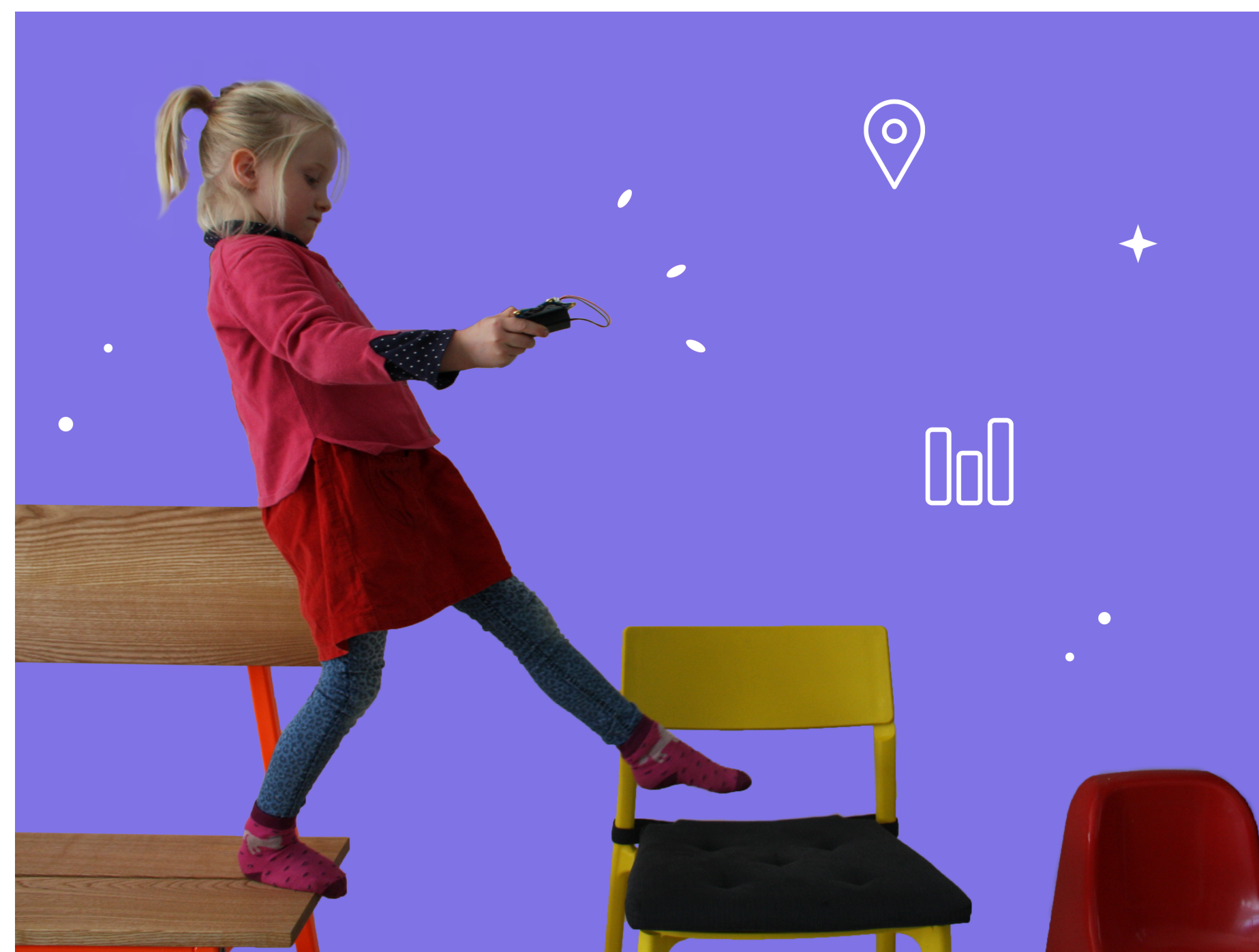


OBSTACLE COURSE



Set up an obstacle course in your home for you and your family and carry your Calliope mini through the obstacles. You have to keep the Calliope mini as straight as possible, otherwise the Calliope mini will give a warning signal and you will have to start all over again. Who in your family is the most skilled?

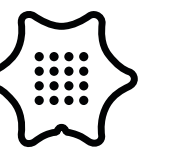


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<https://creativecommons.org/licenses/by-sa/4.0/deed.en>
Idea: „Spiele mit dem Calliope mini“ by Andreas Huppert
<https://open.sap.com/courses/calli2>
Project „Obstacle course“ Calliope gGmbH, August 2020

CALLIOPE.CC



OBSTACLE COURSE



You need the following blocks and categories for this program:

Basic

on start

On start

Execute the program when it starts

Input

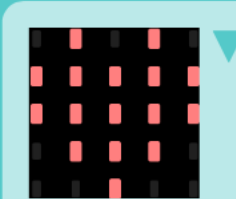
forever

Forever

Repeats the code permanently in the background.

Music

show icon



Show icon

Draws the selected symbol on the LED display.

Logic

set led to

red

Set led to

Specifies the color of the built-in LED-RGB.

pause (ms)

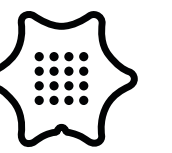
100

Pause

Pauses for the specified time in milliseconds.



OBSTACLE COURSE



You need the following blocks and categories for this program:

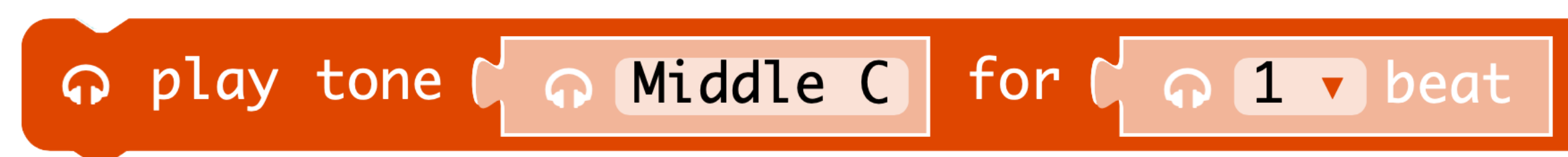
Basic



Acceleration sensor

Outputs the acceleration value in milli-earth gravity.

Input

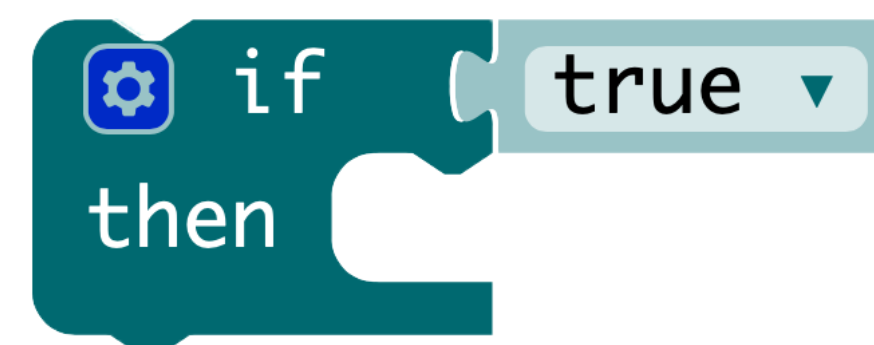


Play tone

Plays a sound for the specified period.

Music

Logic



If/then condition

If a condition is true, then execute specific commands.

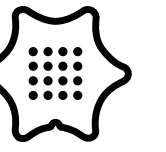


Comparison of values

If the first value is smaller than the second, the condition is true.



OBSTACLE COURSE



1

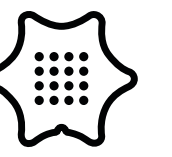
Select the block **on start** from the basics category.

Basic

on start



OBSTACLE COURSE



2

In the next step you need the **set led to** block from the basics category. This serves as start signal. When the RGB-LED lights up, the Calliope mini is ready for the obstacle course.

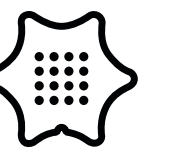
Basic

on start

set led to red



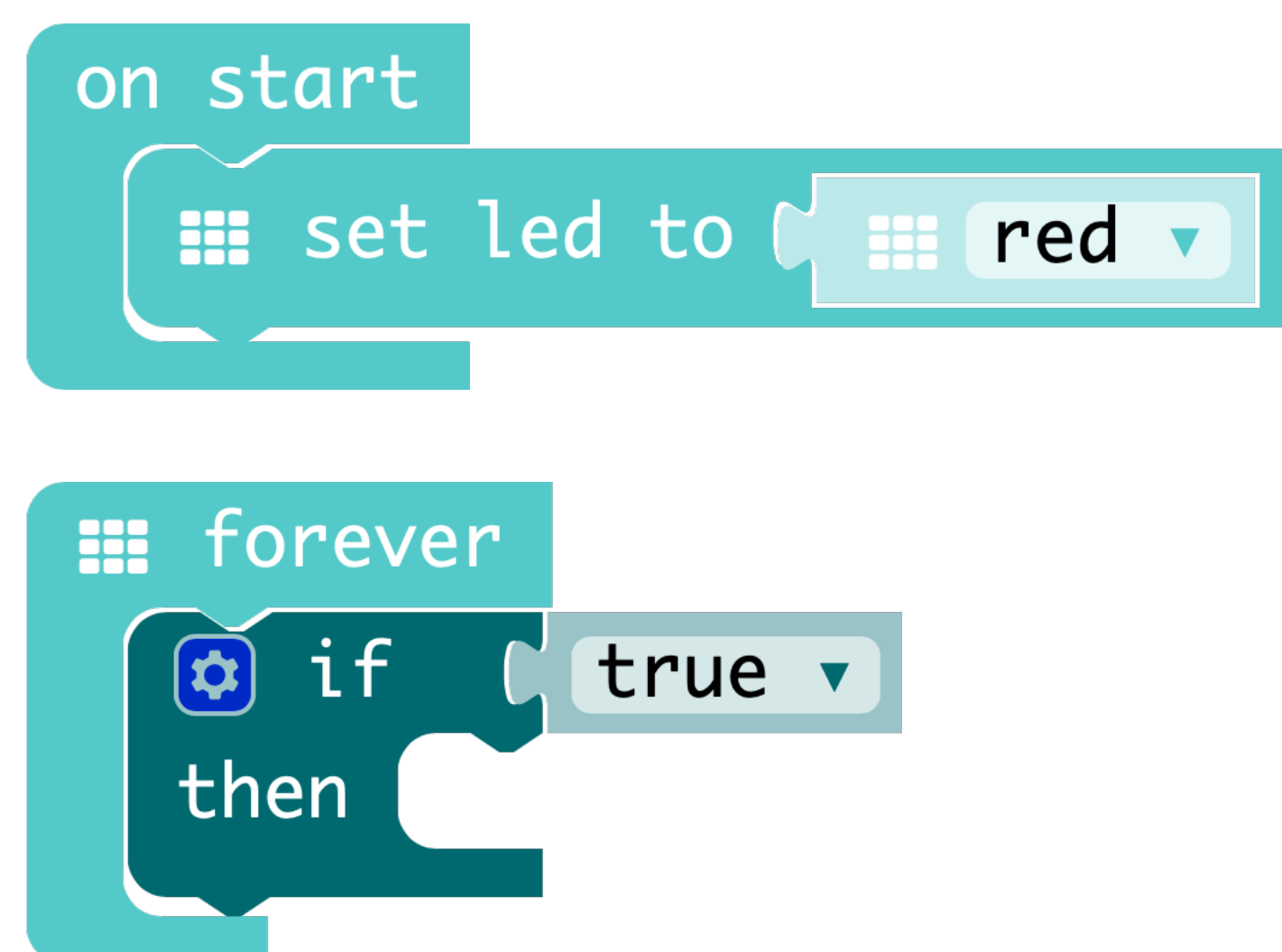
OBSTACLE COURSE



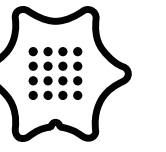
3

The position sensor of the Calliope mini is designed to continuously read the acceleration values and thus determine whether you are holding it in a horizontal position (i.e. still) or not. Imagine that you have to carry a full plate of soup and you must not spill anything. To do this, use a **forever**-loop and an **if/then** condition.

Logic



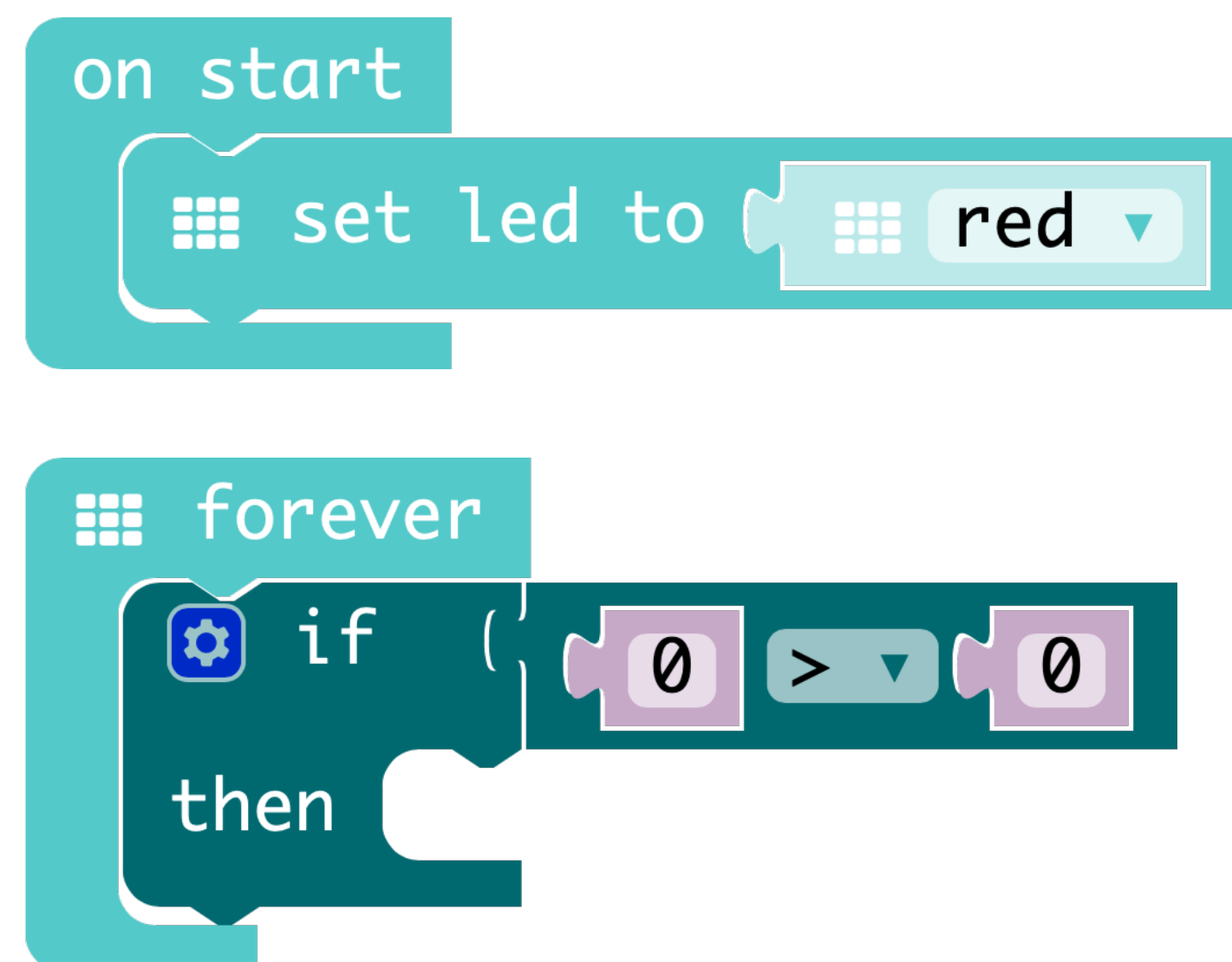
OBSTACLE COURSE



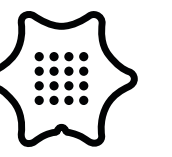
4

The [comparison block >](#) from the logic category allows you to define the if/then condition and specifies when the Calliope mini should give an alarm.

Logic



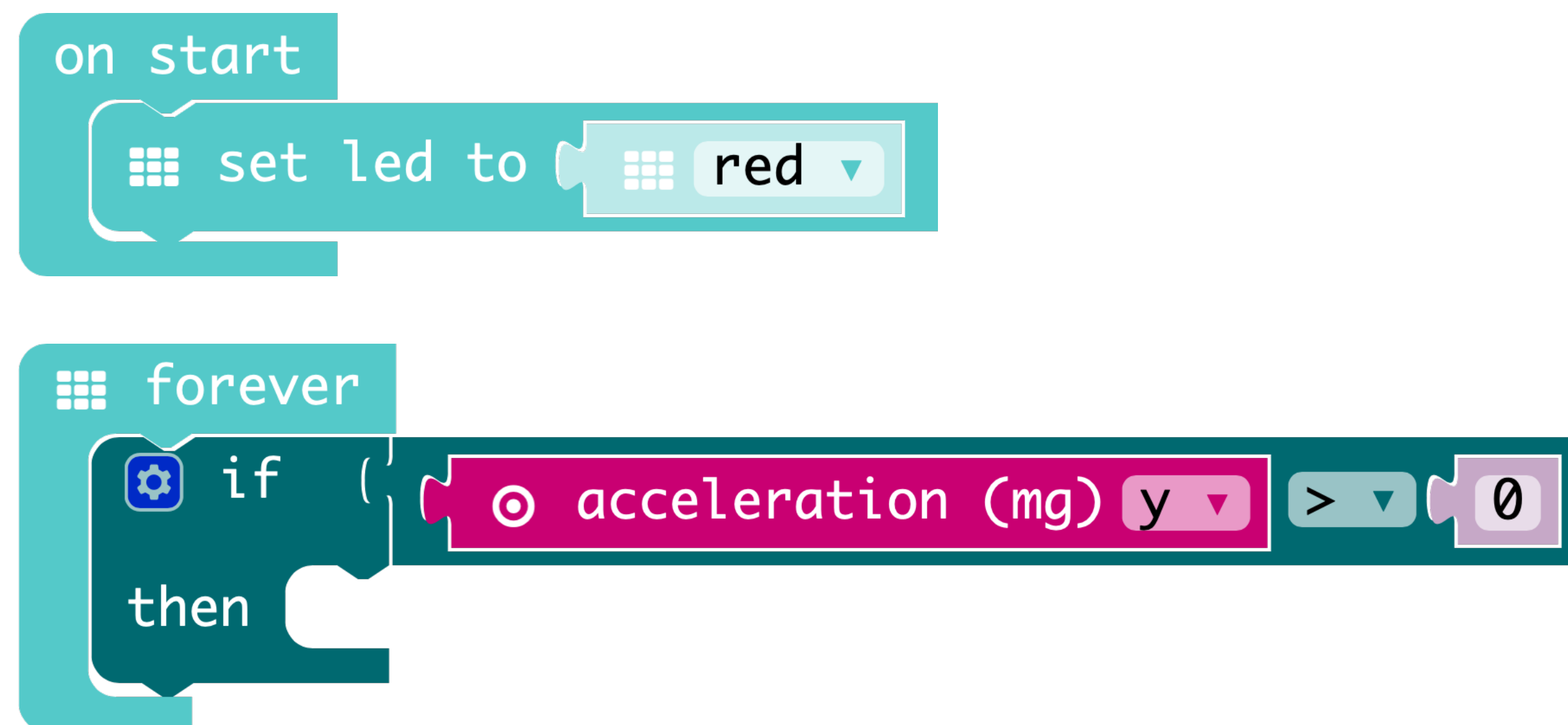
OBSTACLE COURSE



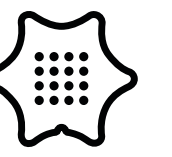
5

You will find the **acceleration block** in the input category. The Calliope mini measures the strength of the acceleration in milli-earth gravity and outputs this value as a number. You can also set the direction of the acceleration. Select the y-axis here. Drag the block to the first position of the comparison block.

Input



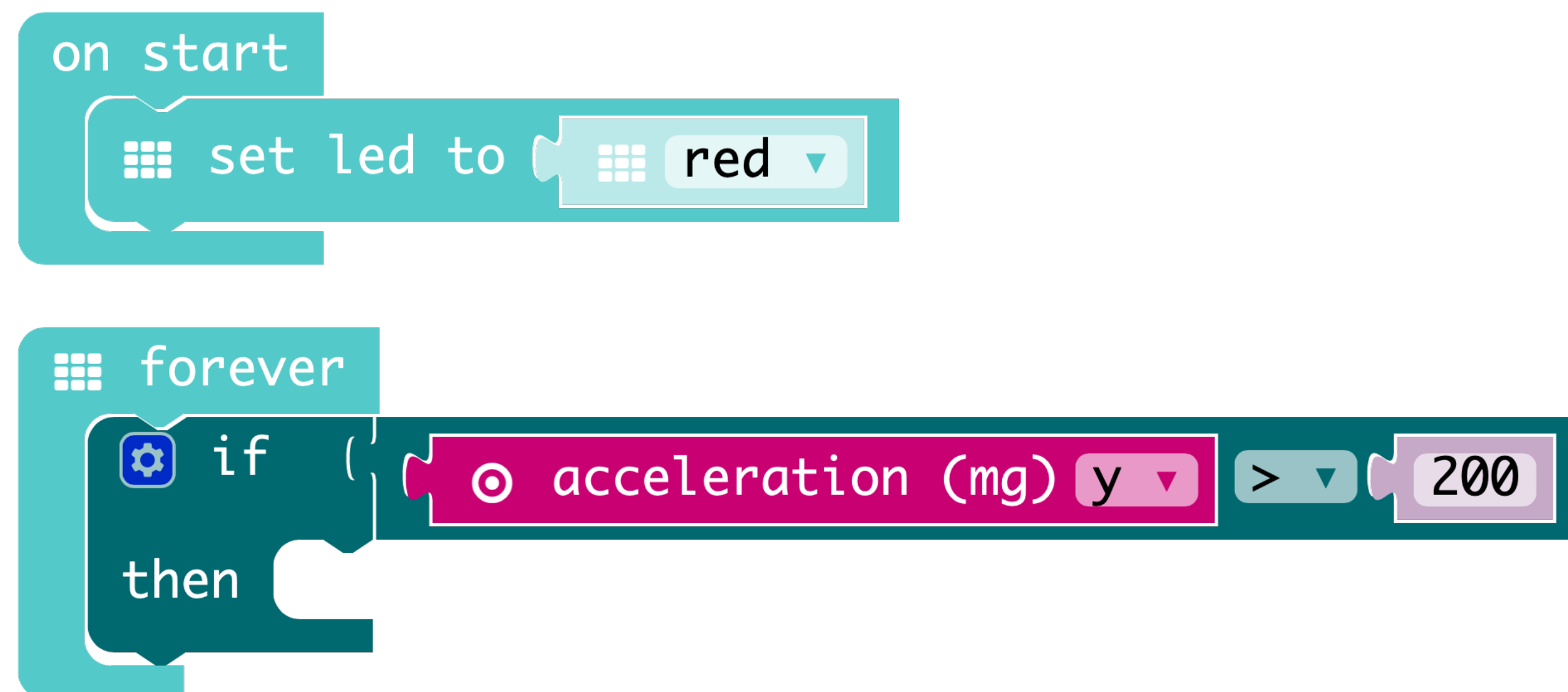
OBSTACLE COURSE



6

To set the alarm correctly, the next step is to define a so-called threshold value. This value indicates how much you can move the Calliope mini without triggering the alarm. This value must be placed in the second place on the comparison block. The smaller the value, the more difficult the exercise. Try the value "200".

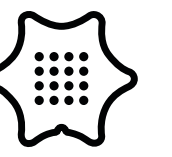
Logic



Tip: When the Calliope mini is lying flat on the table, the value for acceleration (mg) is approximately "0". If the Calliope is tilted backwards, the values become negative, if the Calliope mini is tilted forward, the values become positive. If the alarm goes off too quickly, you must increase the threshold.



OBSTACLE COURSE



7

In the next step the alarm signal is programmed. If the acceleration exceeds the threshold value, an "X" should appear on the LED display and a sound will be played. Use the blocks **show icon** and **play tone**.

Basic

Music

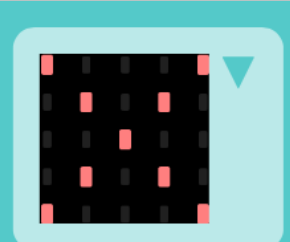
on start

set led to red

forever

if (acceleration (mg) y > 200

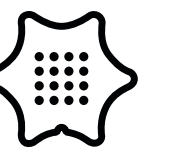
then show icon



play tone Middle C for 1 beat



OBSTACLE COURSE



8

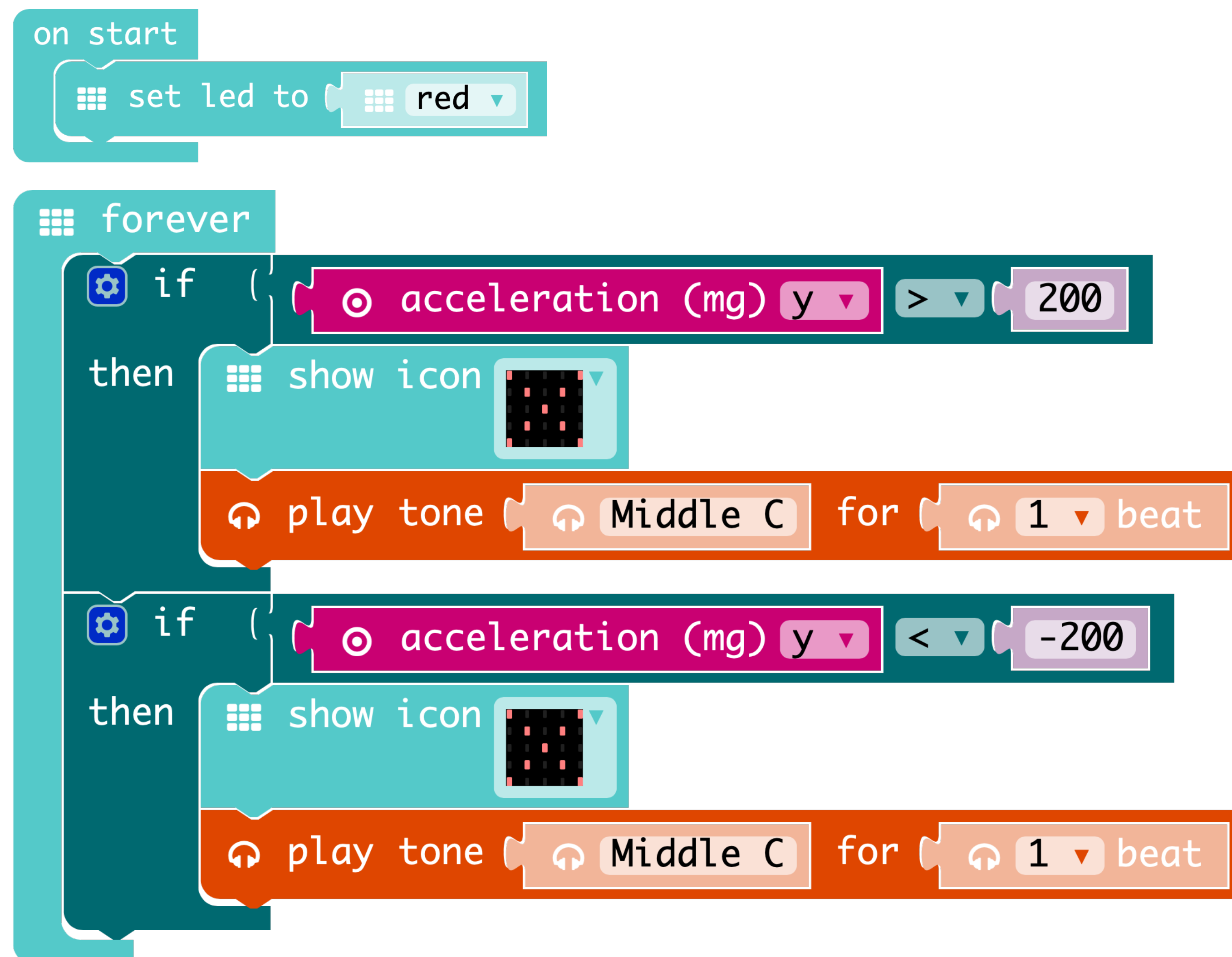
Since the accelerometer also outputs negative values, we must also take these into account in our program. Copy the entire if/then condition (right-click and duplicate) and paste it below the first condition. Now you only have to set the threshold to "-200" and change the direction in the comparison block to **less than** <.

Basic

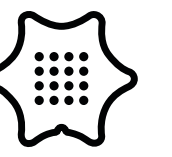
Input

Music

Logic



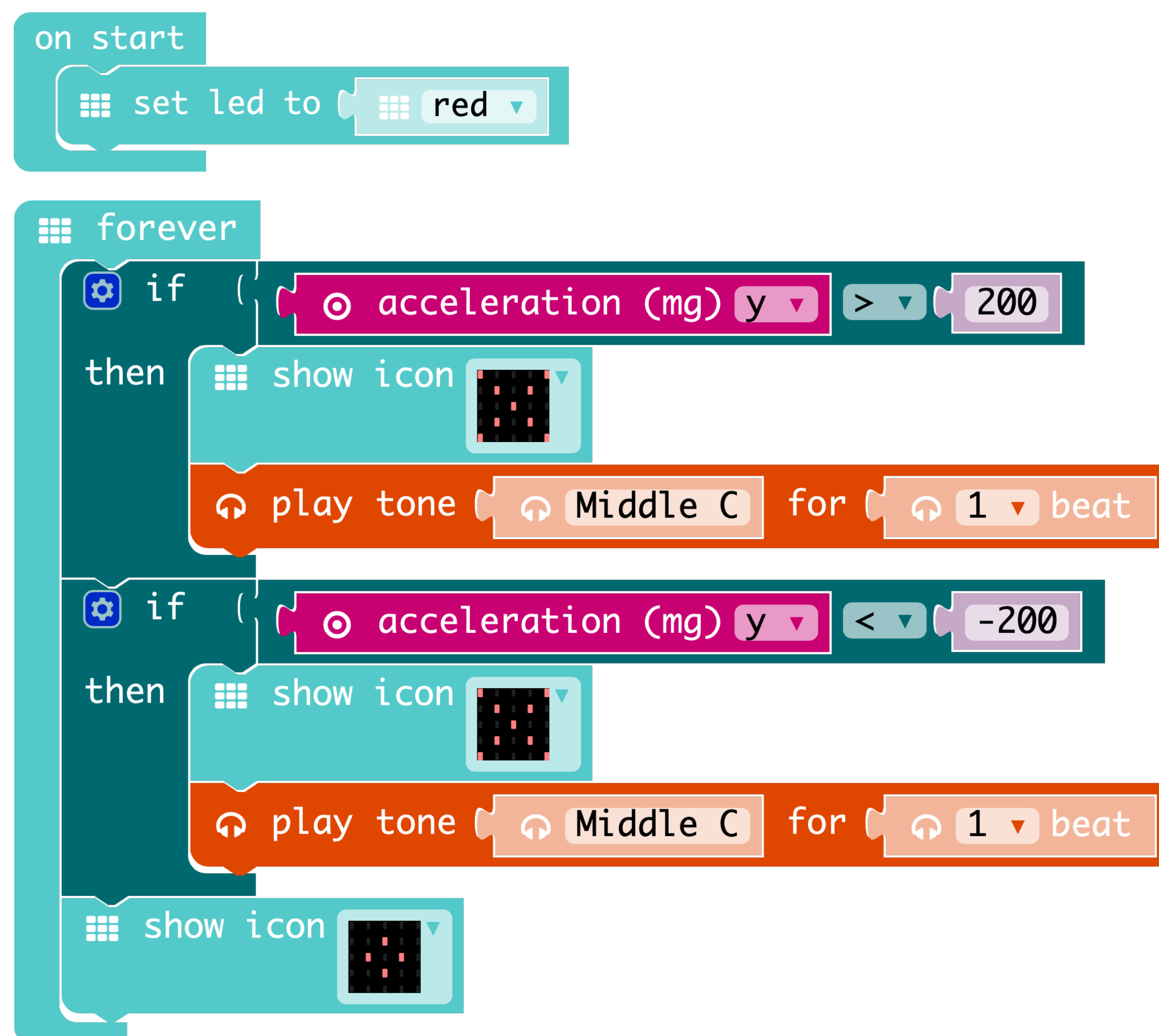
OBSTACLE COURSE



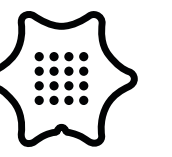
9

To make sure the Calliope mini shows something during the obstacle course, we use another [show icon](#) block. Insert it into the forever-loop. Done.

Basic



OBSTACLE COURSE



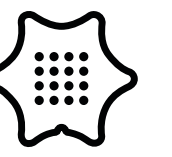
10

Upgrade: Up until now, the program has only considered the position in one direction (y-axis). Can you extend the program so that the acceleration is also measured on the x-axis? Try it out.

If you want to know what this extension can look like, download the .hex file from the Calliope website. Then you can open and view the code in the MakeCode Editor.



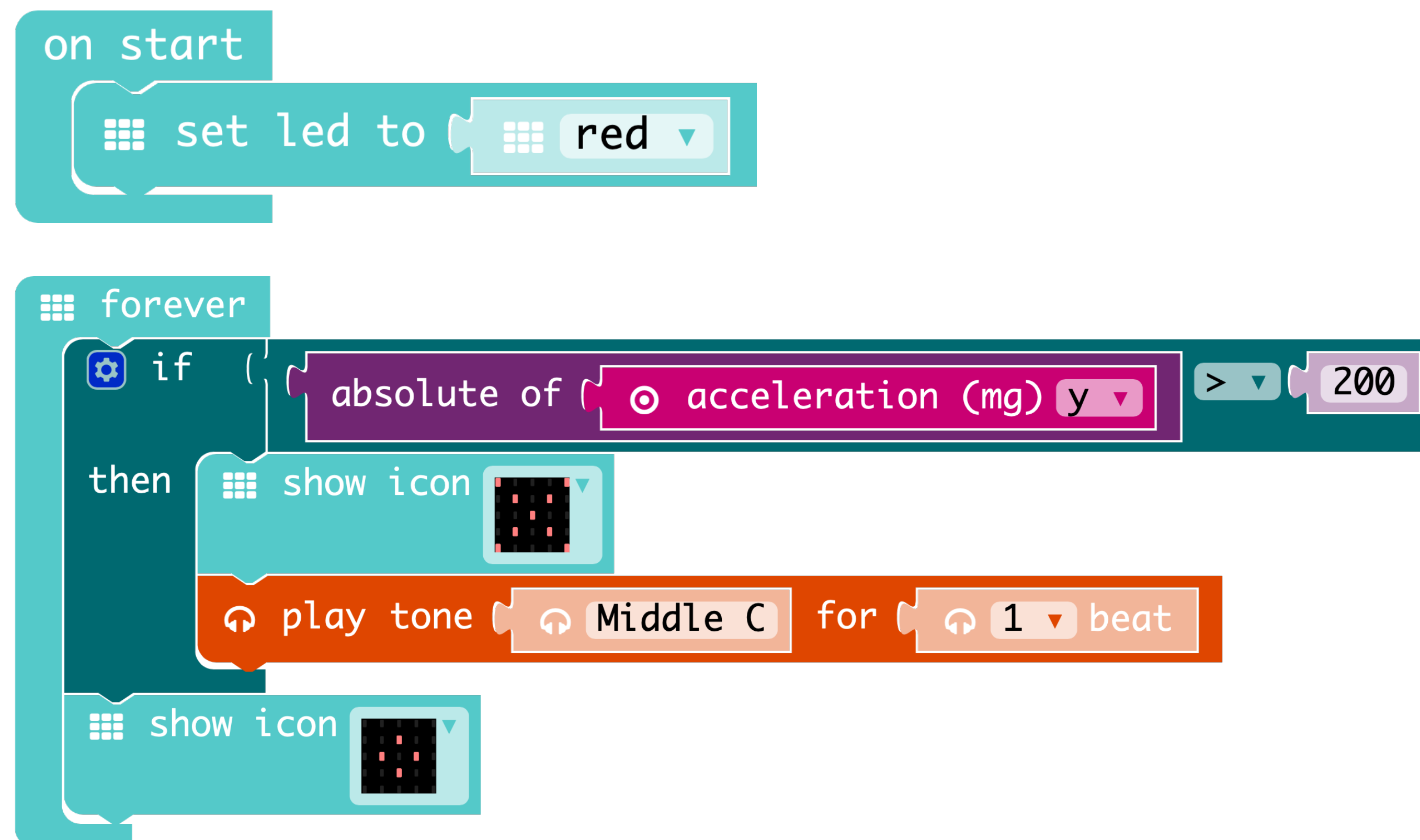
OBSTACLE COURSE



Option

Finally there is a little trick to simplify the program considerably. There is the block **absolute of** in the math category. This allows both positive and negative values of the position sensor to be evaluated in a single condition. Simplify your program.

Math



Explanation: The absolute value of a number is its distance to zero and is therefore always a non-negative number.

