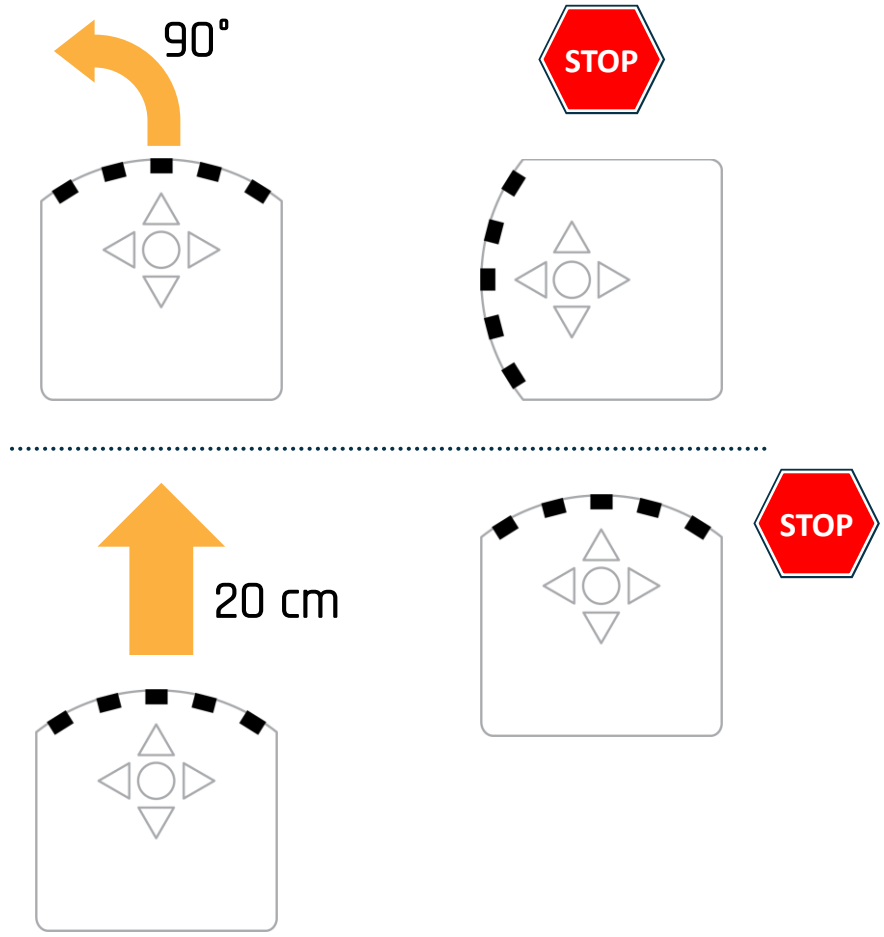
How to program Thymio to move forward with a given distance or turn a given angle

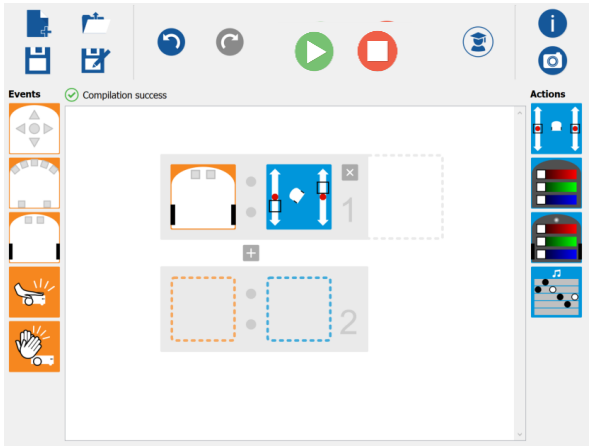
Move forward with a given distance or turn a given angle

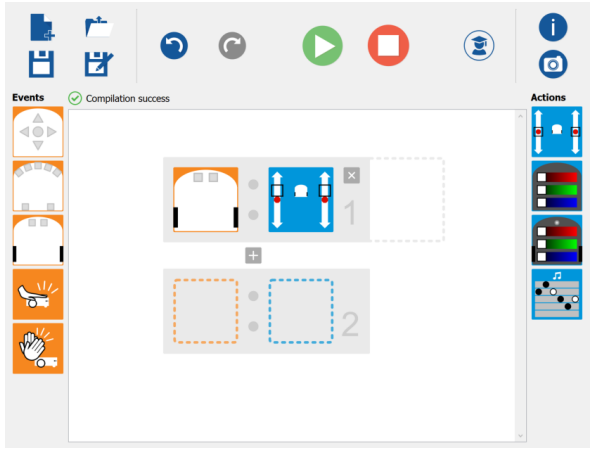
VPL does not contain a "turn 90 degrees" or “move forward 20 cm" action icon.

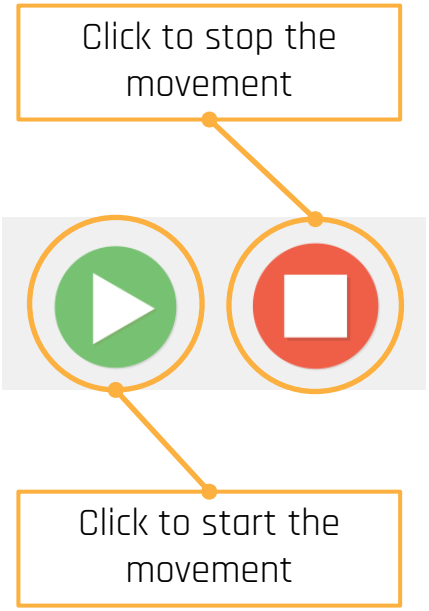
How can we program the robot to do this?

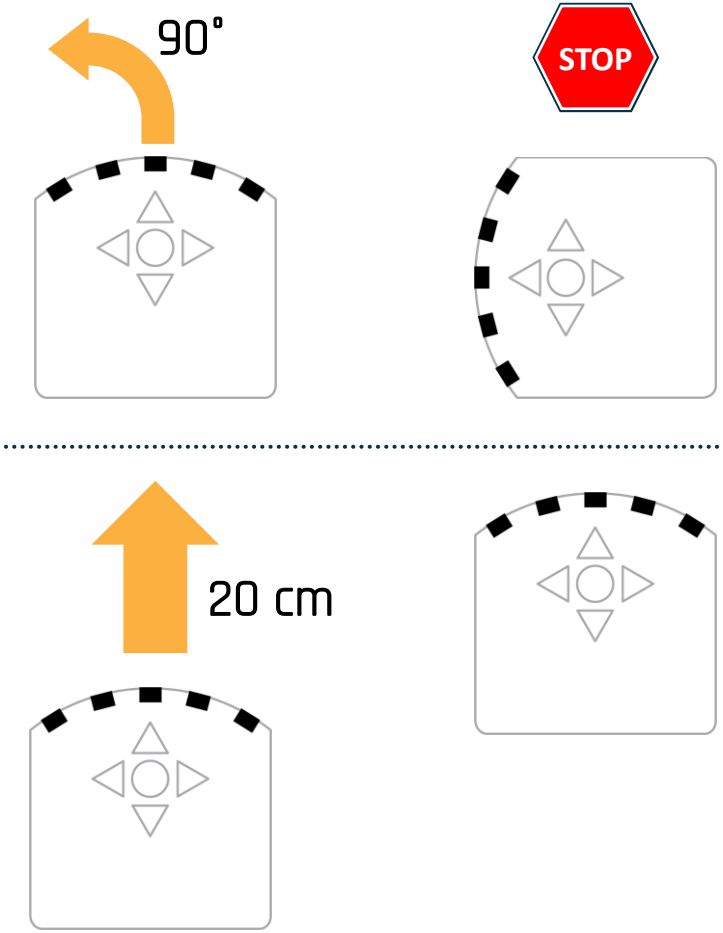


Move forward a given distance or turn a given angle manually





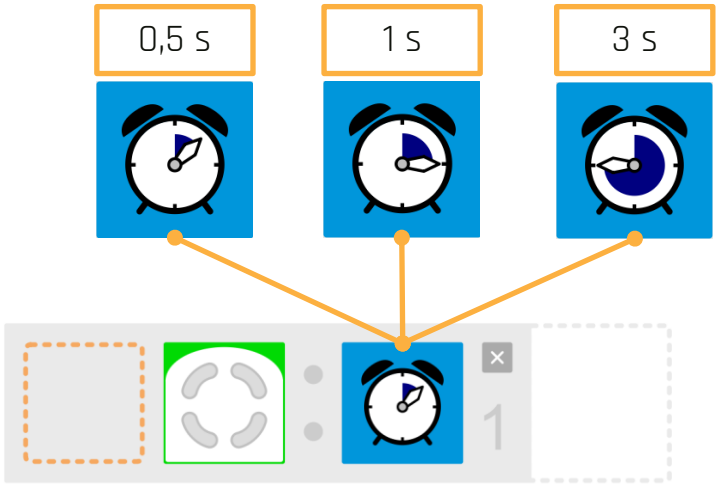




Timer

Thymio has a timer that can be programmed from VPL and it's the one that can help us to move the robot a desired distance and stop it automatically.

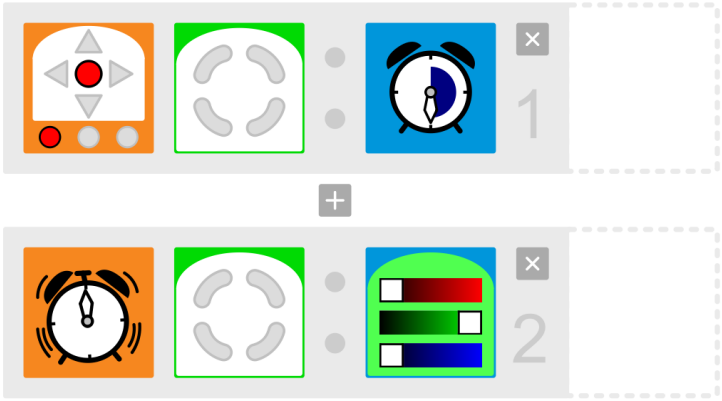
First of all, you have to set up the timer with an event of your choice.



What do you want the robot to do when the timer runs out?

Green squares will appear automatically in the advanced mode and means four variables. They are not used if all arc stay grey.

First program with the timer



1. Implement the program shown in the picture :

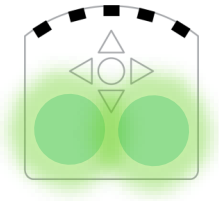
   Line 1 :
   When the button in the middle is pressed, Thymio triggers a timer for 2 seconds.

   Line 2 :
   When the timer has elapsed, Thymio lights the top LEDs in green.

2. Load the program into the robot.
3. Test the program! Thymio awaits your actions:

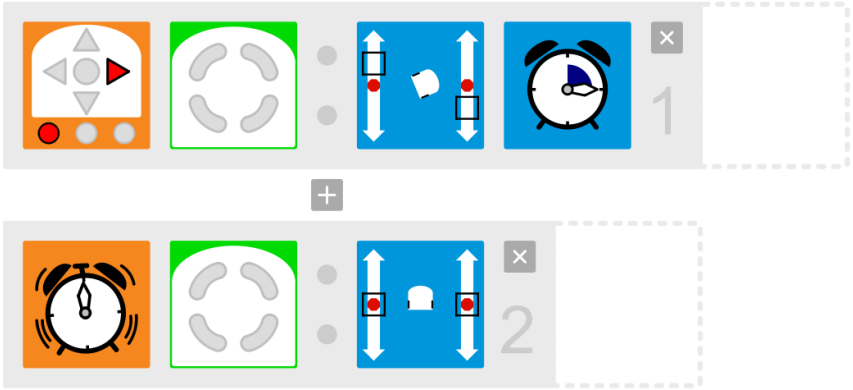
Press the button

After 2 seconds

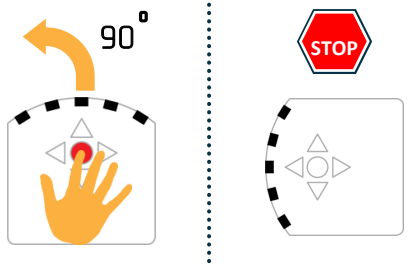


Rotate the robot 90 degrees

For the robot to turn on the spot, the same speeds must be chosen for both motors, but in opposite direction.



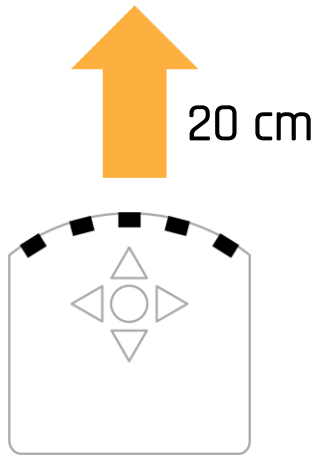
1. Implement the program shown in the picture.
2. Load the program into the robot.
3. Test the program! Thymio is waiting for your actions:

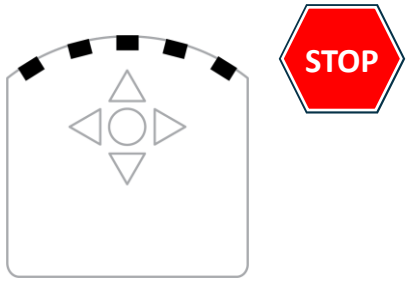


If the robot does not rotate 90 degrees, adjust the motor speeds and time, and test your program again!

Challenge 1

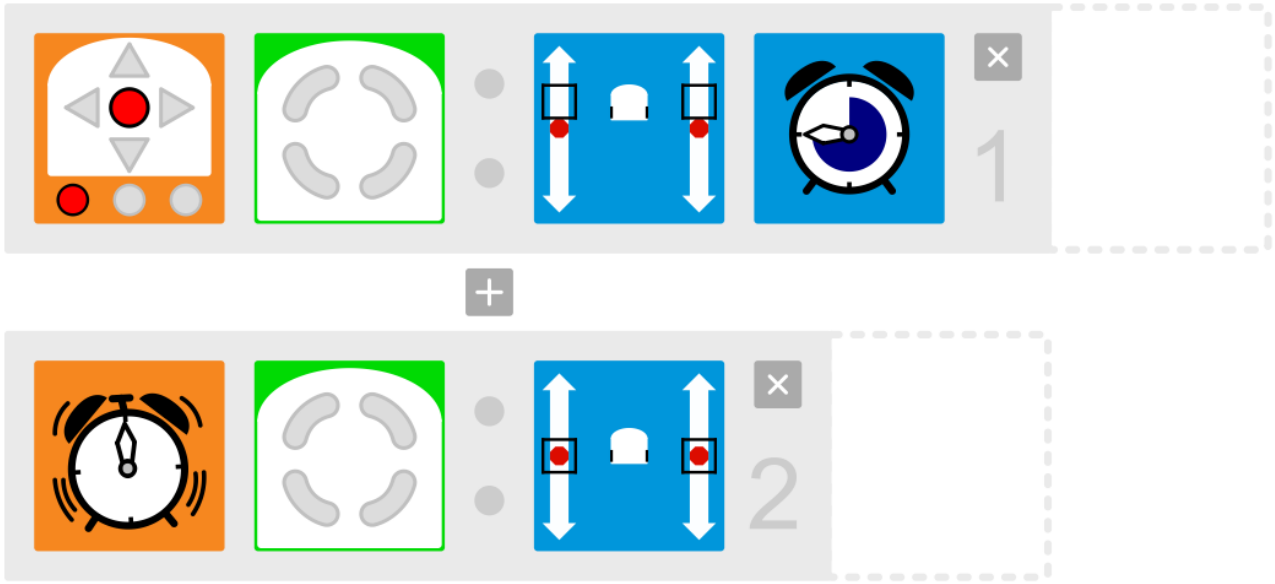
Program your robot to move 20 cm forward.





You can find an answer to the challenge on the next page

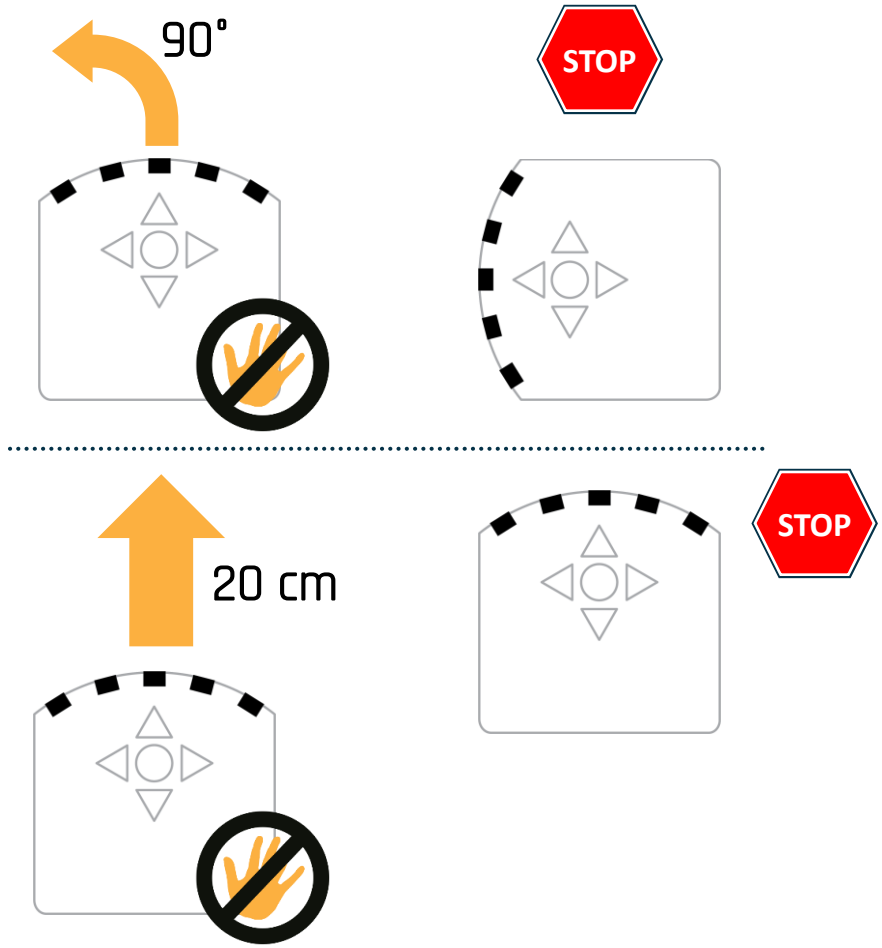
Answer to Challenge 1



Move forward a given distance or turn a given angle automatically

As we know, during the mission we can't touch the robot to operate it.

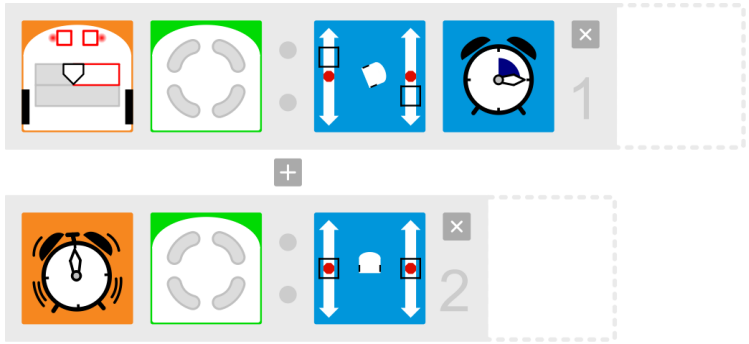
How can we move or rotate Thymio without touching it?



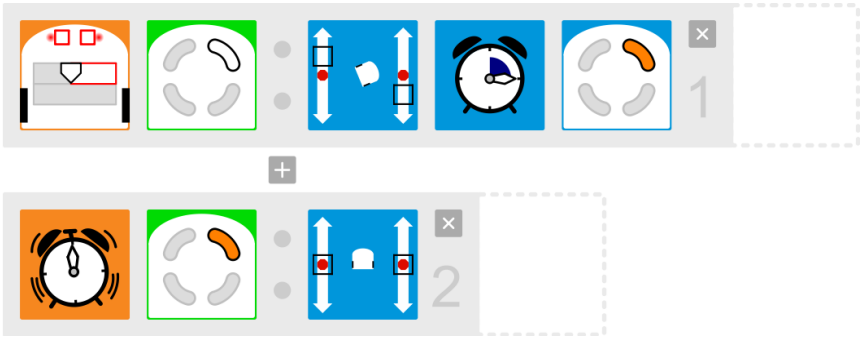
Move forward with a given distance or turn a given angle automatically

Test these two programs with the robot.
What do you observe?

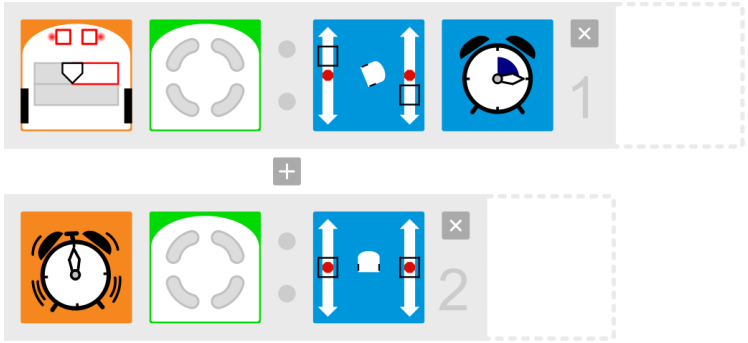
Experiment 1



Experiment 2

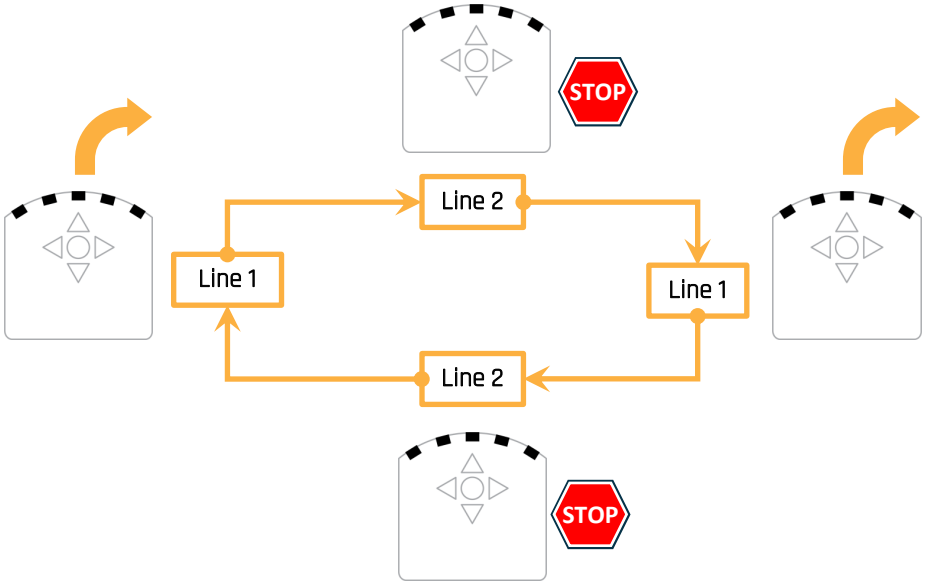


Observation of the program Test 1



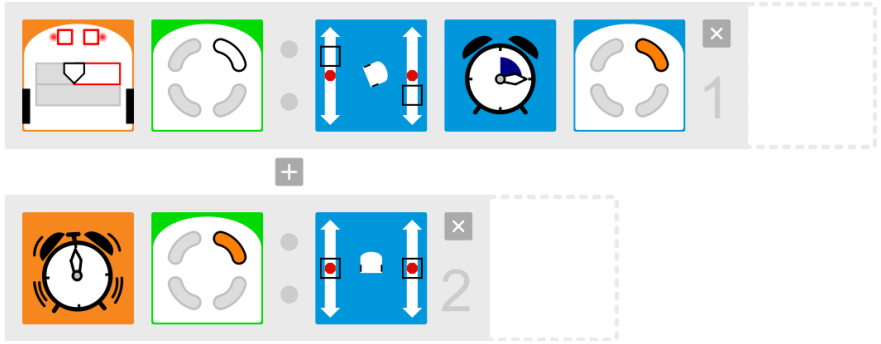
Line 1 :
When the sensors on the ground detect a surface, Thymio turns and triggers the timer for one second.

Line 2 :
When the timer runs out, Thymio stops its motors.



What's really going on is that Thymio is always running. This is because if Thymio is always on a clear surface, it detects it. So when the timer runs out, Thymio stops and immediately starts turning again by triggering the timer, because it has detected the surface again. Thymio is in a loop.

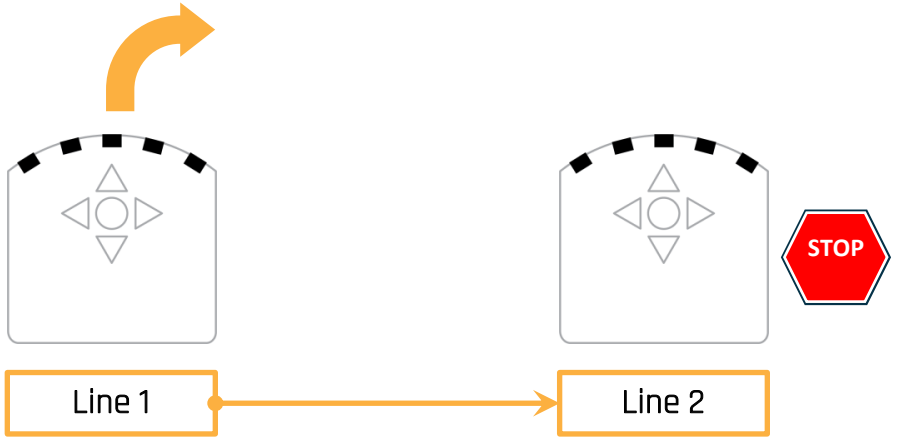
Observation of the program Test 2



We've added one more condition to avoid the loop.

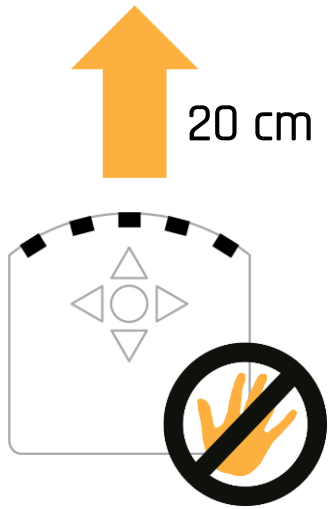
Line 1 :
When the ground sensors detect a surface and the state is 0, Thymio turns, triggers the timer for one second and sets the state to 1.

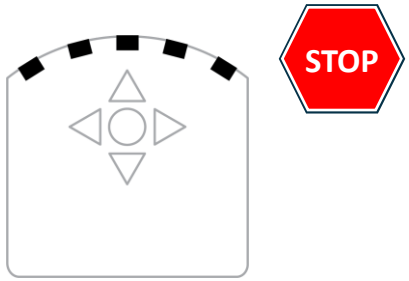
Line 2 :
When the timer runs out and the status is 1, Thymio stops its motors.



Challenge 2

Program your robot to move 20 cm forward without touching it.





You can find an answer to the challenge on the next page

Answer to Challenge 2