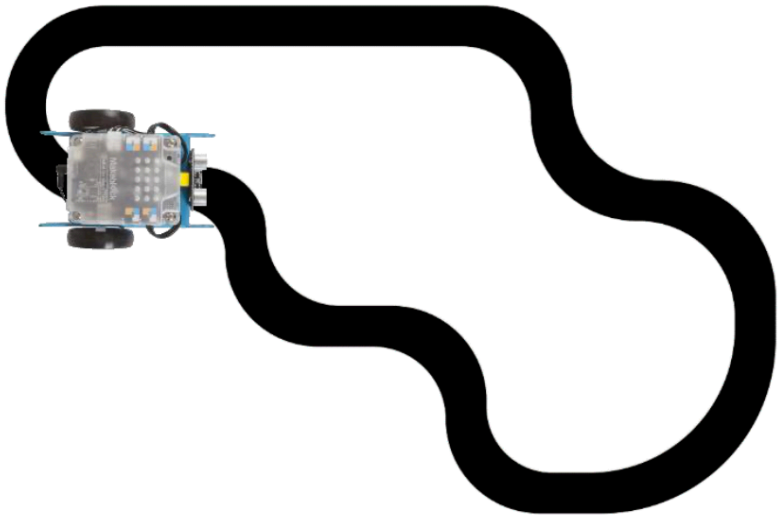
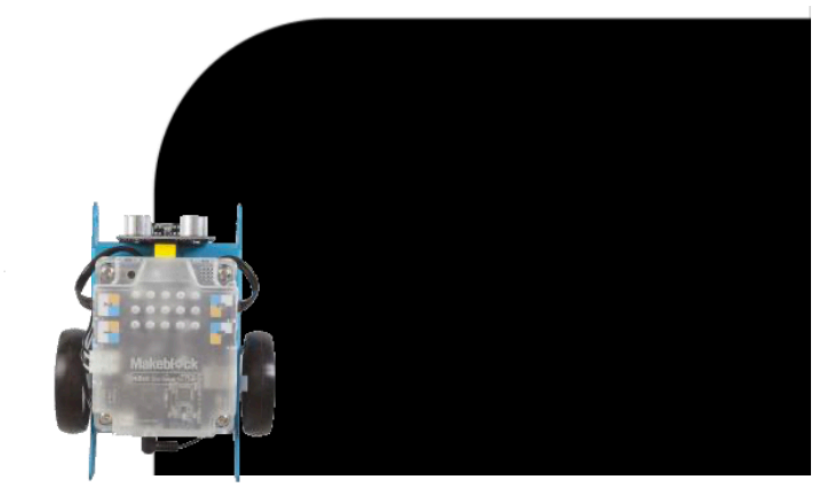
Autonomous Formula 1 racing car!

Solve Problem	Problem: How do you programme a Formula 1 racing car that is as fast as possible and drives independently?
1. Understand the problem a) Describe the problem b) Abstract the problem c) Disassemble the problem **2. Solve the problem** a) How can (partial) problems be solved? b) Implementation in Scratch **3. Analyze the problem** a) Test the program b) Debug the program c) Transferred to other problems	Program the mBot so that it drives along the entire Formula 1 track on its own and as quickly as possible - that's the only way to win Formula 1! 

Problem 1: Training along the edge!

Program the mBot so that it moves independently along the black edge.



1. Understand problem

a) **Describe** the problem briefly, in general terms, in your own words - without thinking about the specific mBlock programme.
b+c) Abstract and decompose the problem by considering what information you need during the journey so that the robot can move along the edge.

2. Solve problem

a) **Describe** how to solve the problem (e.g. required sensor, required programme components...).

b) Implement your solution in mBlock.

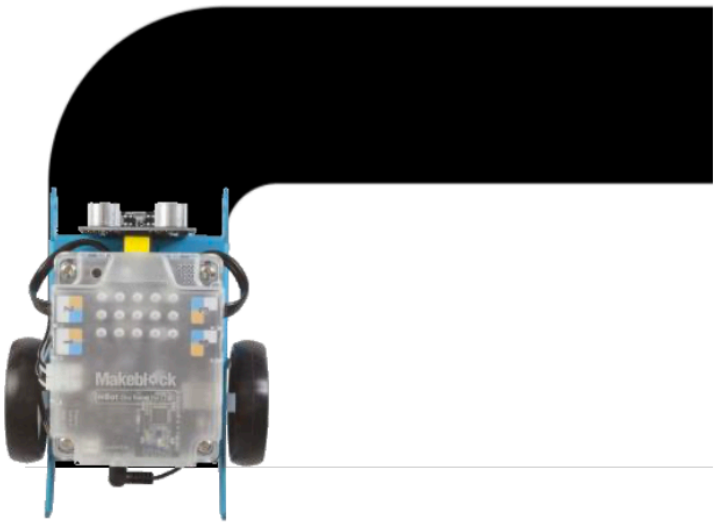
3. Analyse problem

Test your programme using the mBot and improve both the mBlock programme and your solution on the worksheet if necessary.

Problem 2: Always stay on track!

Program the mBot so that it drives independently on the black line. The speed is not important here!

Note: If it should ever completely stray from the line, simply reset it.



1. Understand problem

a) **Describe** the problem briefly, in general terms, in your own words - without thinking about the specific mBlock programme.
b+c) Abstract and decompose the problem by considering what information you need during the journey so that the robot stays on track.

2. Solve problem

a) **Describe** how to solve the problem (e.g. required sensor, required programme components...).

b) Implement your solution in mBlock.

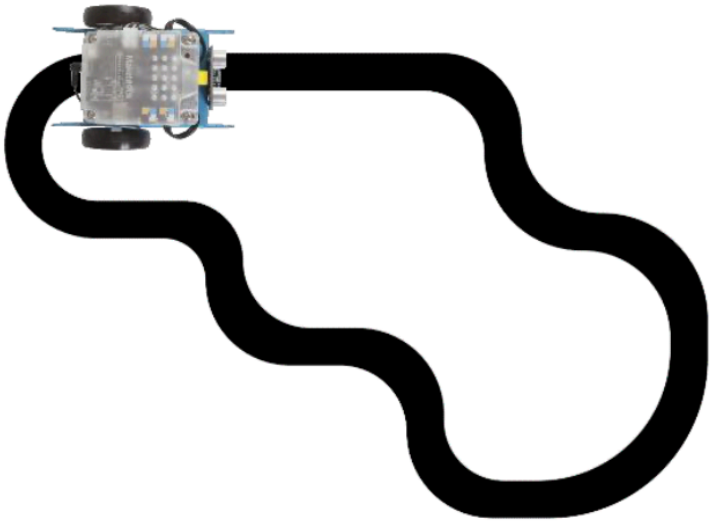
3. Analyse problem

Test your programme using the mBot and improve both the mBlock programme and your solution on the worksheet if necessary.

Problem 3: The Formula 1 race!

Program the mBot so that it drives independently on the black line as quickly as possible. If it strays from the track, it should find its way back independently.

The **Formula 1 competition** is as follows: The fastest robot wins. If the robot has to be put back on the track by hand, 10s are added to the final time!



1. Understand problem

a) **Describe** the problem briefly, in general terms, in your own words - without thinking about the specific mBlock programme.
b+c) Abstract and decompose the problem by considering what information you need during the journey so that the robot drives along the Formula 1 track as quickly and completely independently as possible - especially if it has lost the track!

2. Solve problem

a) **Describe** how to solve the problem (e.g. required sensors, required program modules...).

b) Implement your solution in mBlock.

3. Analyze problem

Test your programme with the mBot and improve both the mBlock programme and your solution on the worksheet if necessary.

If you still have time, improve your programme, e.g. by allowing the mBot to avoid an obstacle (bottle or book) on the route (-60s) or by using the LED display or whatever else you think would be useful! There are no limits to your creativity!