

Labyrinth

Deadline: 16.5.2021

Points: 15

Material requirements: PC or Laptop (no Tablet) with Browser (no Safari)



Topic description

Our robot got lost in a maze. Help him to get out of the maze, write a program that will guide him out of the maze as fast as possible. Our robot got lost in a maze. Help him to get out of the maze, write a program that will guide him out of the maze as fast as possible. However, the maze does not open the way to the exit until the program is started. Furthermore, the path can change every time the program is started. The program must therefore find the way to the exit independently of the labyrinth.

There are different ways (algorithms) to get out of a maze. A relatively simple way is the so called "right hand rule", search the internet to find out how it works. You are welcome to try other algorithms and see how they differ from each other.

We wish you a lot of fun with this and the following tasks!

ATTENTION: Some browsers seem to have problems with this task. If your browser loads this task very slowly or the handling is very slow, please switch to Firefox. We will try to solve the problem.

Task description

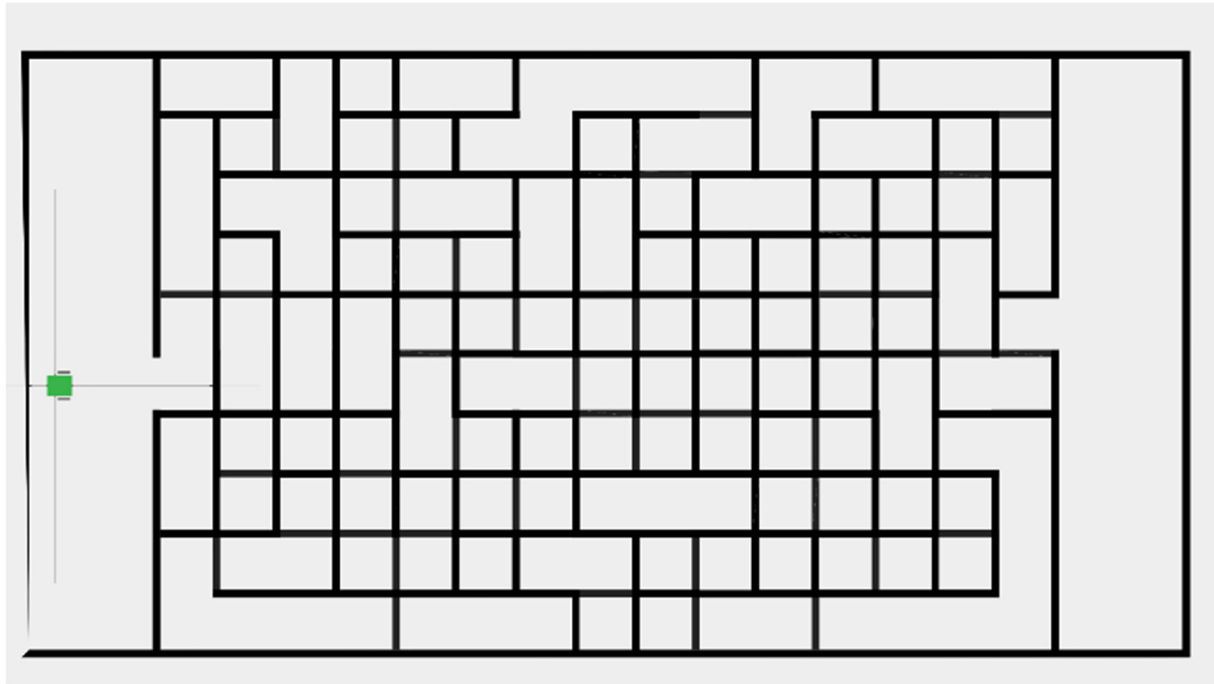
Visit our online simulation environment again (ide.pria.at) and create a new project with the "Labyrinth HighSchool" task as a base. Open your project and the simulation task should look like this.

Labyrinth

Deadline: 16.5.2021

Points: 15

Material requirements: PC or Laptop (no Tablet) with Browser (no Safari)



Your task is to move the robot from the left side through the maze to the right side. For this purpose your robot has 4 sensors at its disposal, which can measure the distance in all 4 compass directions to the next obstacle.

The block with which you can read the values of the sensors can be found in the category "Sensors" -> "value of analog sensor". The sensors are numbered as follows:

value of analog sensor 0

0 - Sensor front

1 - Sensor left

2 - Sensor back

3 - Sensor right

The value of the sensor gets smaller and smaller the closer you move to a wall. With the block "Text" -> "print text ...", you can print the current sensor value into the console.

print text value of analog sensor 0

Labyrinth

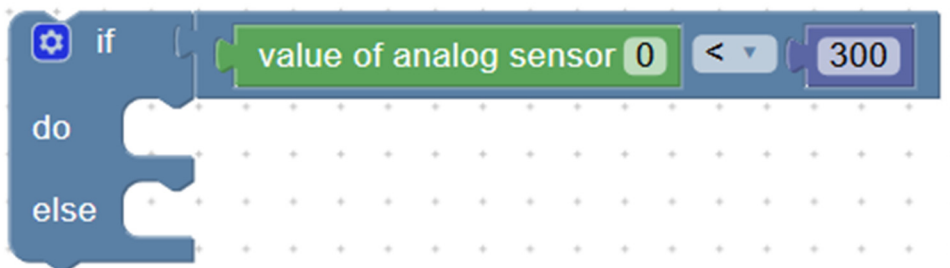
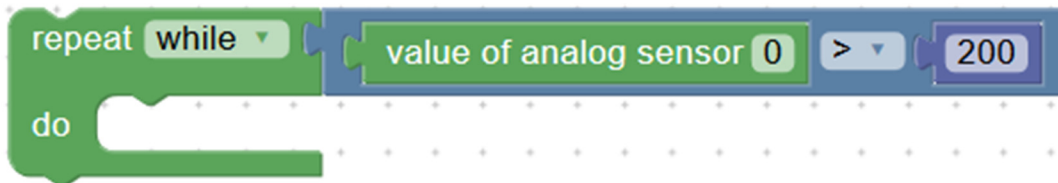
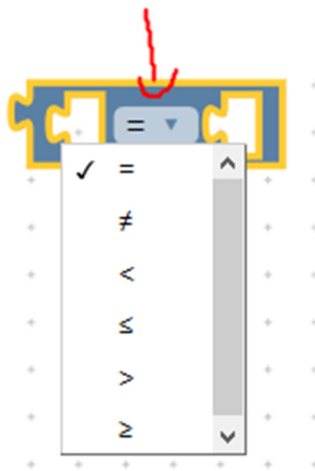
Deadline: 16.5.2021

Points: 15

Material requirements: PC or Laptop (no Tablet) with Browser (no Safari)



With the comparison block under "Logic" you can define threshold values for the sensors. The result of the comparison block is a so-called truth value (true or false), which can be used as input for loop conditions. The type of comparison can be set in the comparison block, e.g. equal (=), greater than (>), less than (<), greater than or equal to (>=), less than or equal to (<=), unequal (!=)



In addition, there is a special block for this task, to be found in "Custom" -> "Finished labyrinth?".

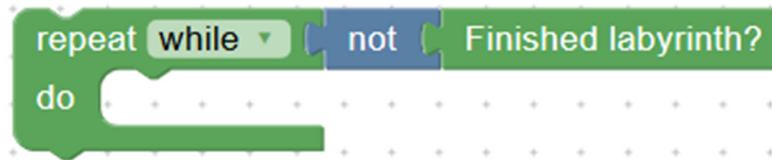
This also returns a truth value as a result, true if the maze was successfully exited on the right side, otherwise false. With this block you can e.g. create a loop, which is repeated until you have exited the maze.


Labyrinth

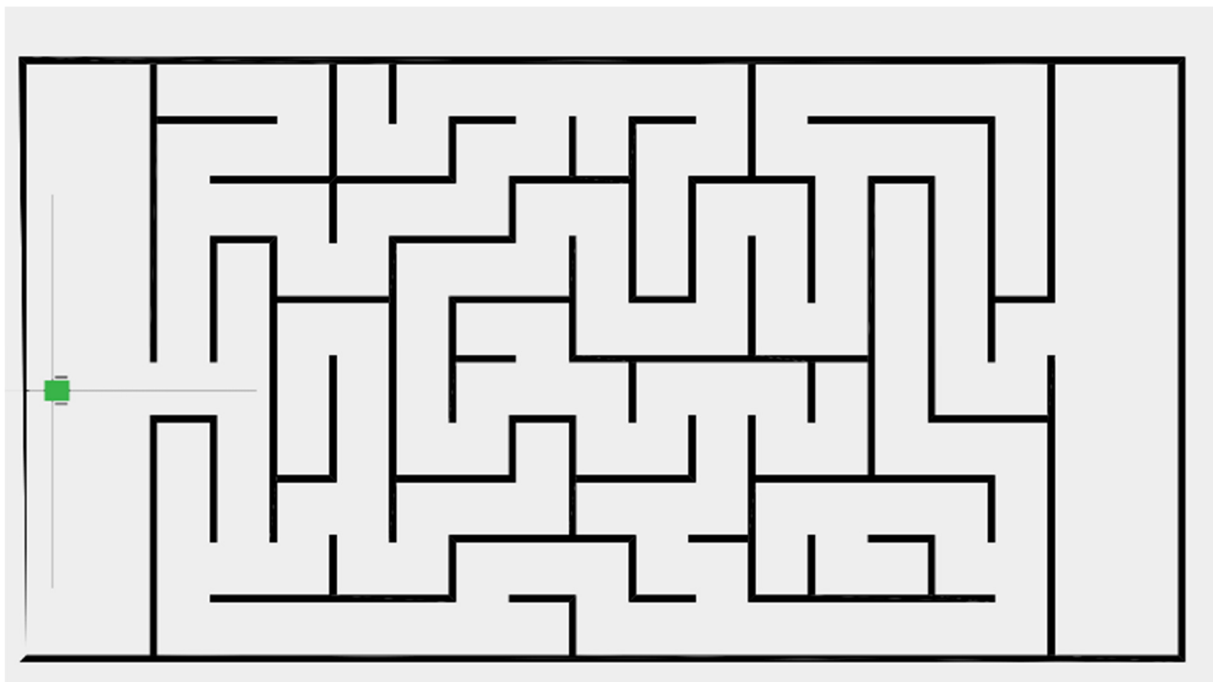
Deadline: 16.5.2021

Points: 15

Material requirements: PC or Laptop (no Tablet) with Browser (no Safari)



Only when you start your program with the play button (), a way through the labyrinth opens. The program must therefore find the way to the exit independently of the labyrinth.



When you have successfully completed the task, please submit a screen video of a successful attempt and your Blockly program file.

Tips:

- If your robot does not go straight after turns, align yourself with the walls of the maze every now and then by driving the robot against a wall, after that the robot should be straight again.
- Use functions and variables to keep the program organized. Useful functions can be e.g.: 90° rotation, driving straight, driving to an opening etc.

Labyrinth

Deadline: 16.5.2021

Points: 15

Material requirements: PC or Laptop (no Tablet) with Browser (no Safari)



Evaluation criteria

- Robot successfully navigates through the maze
- Program quality
- Screen video and Blockly program file submitted
- Jury evaluation: The jury evaluates the quality and creativity of the submission.