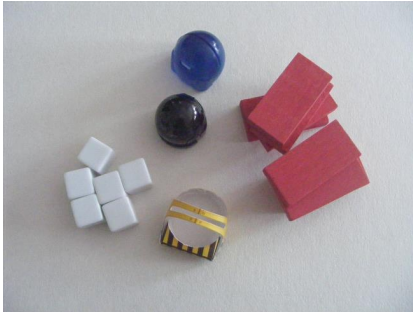


OzoBuldozer

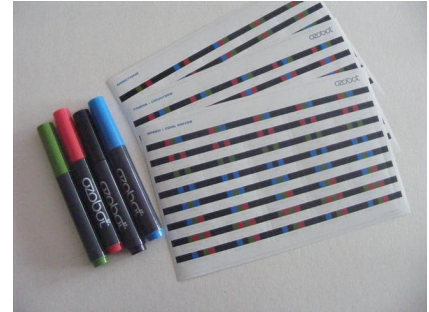
You will need:



per one group – lesson 1



per two groups – lesson 2



for both lessons

... and the printed boards.

Lesson 1

Exercise One

Use the Construction Kit to dress Ozobot with the bulldozer.

Use the cubes from the kit to realize its task.

Ozobot starts and follows the top line. No codes this time.

The **question**: Will it move the cube into the drop area?

The answer: NO.

The **question**: Why?

Collect the students answers. Choose the proper one and tell the students to write it down on the worksheet.

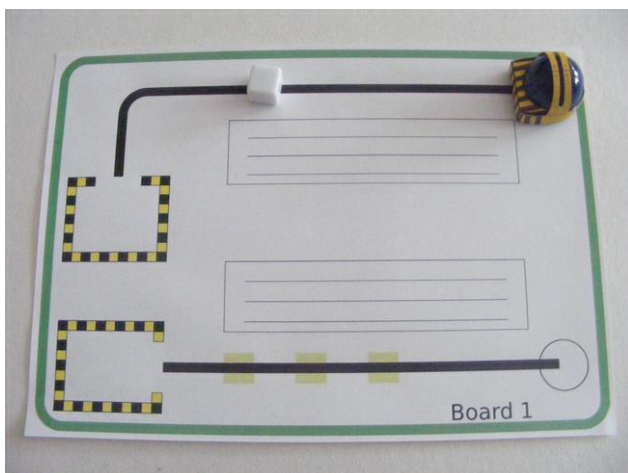


Fig.1

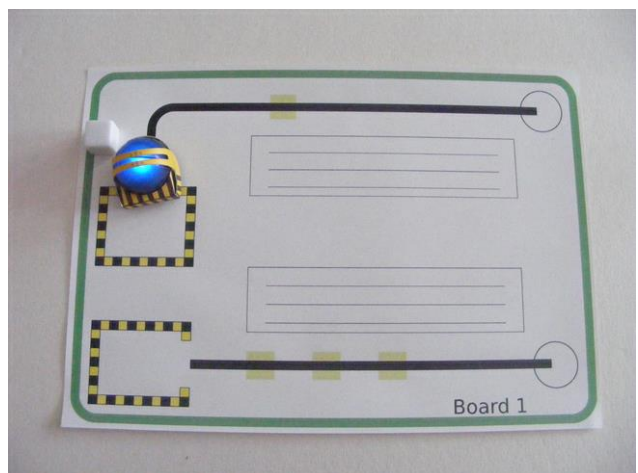


Fig.2

Exercise Two

Code the bottom road the way, that Ozobot will start, will drive to the end of the line, then return and drive back onto „Start” area, then end its work.

Place the cubes on the road (1, 2, 3 or even more).

The **question**: How many cubes Ozobot can move into the drop area depending on its speed?

Tell the students to change the speed of Ozobot and to note the results.

Realization:

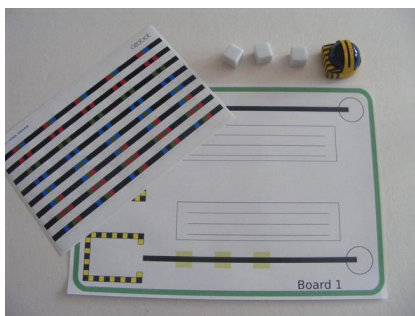


Fig.3
What we need

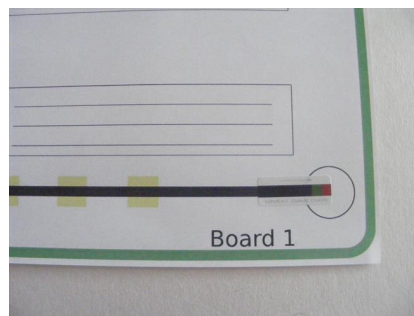


Fig.4
End code

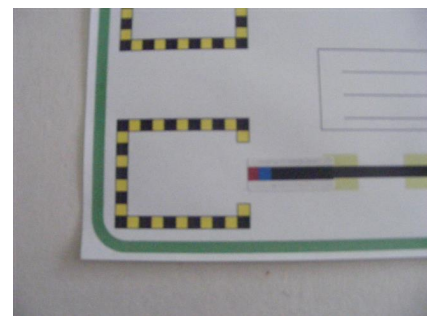


Fig. 5
Turn code

Examples

Speed = standard

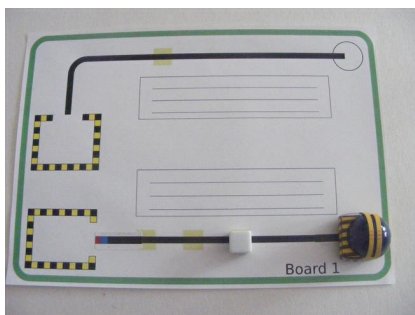


Fig. 6

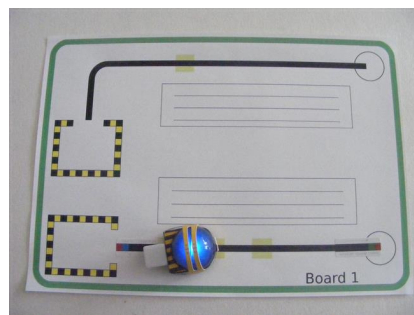


Fig. 7

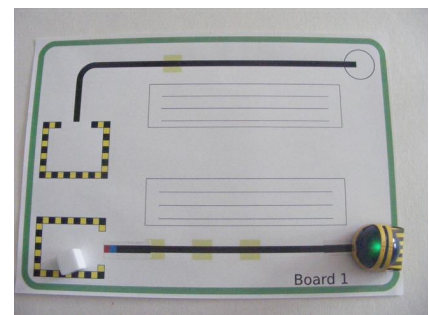


Fig. 8

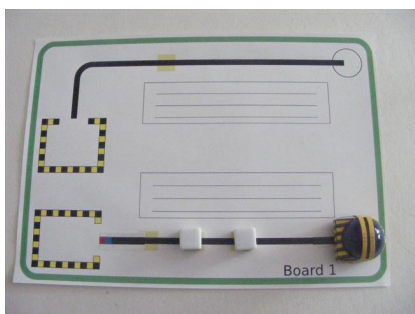


Fig 9

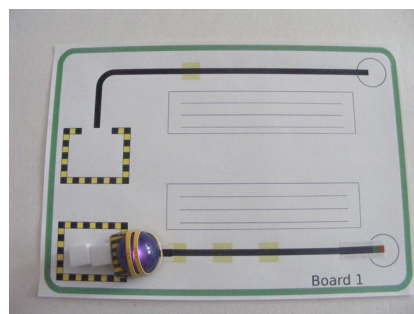


Fig. 10

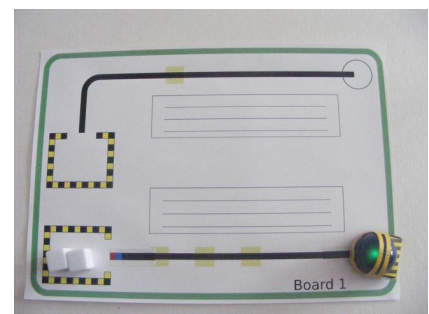


Fig. 11

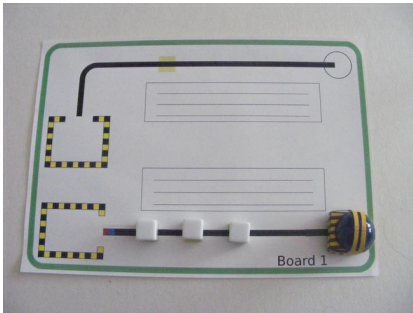


Fig. 12

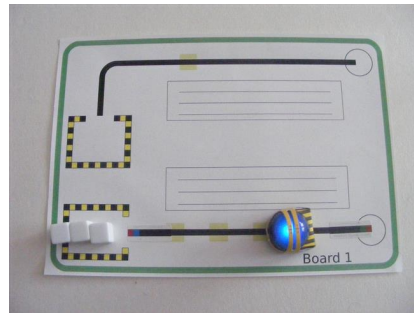


Fig. 13

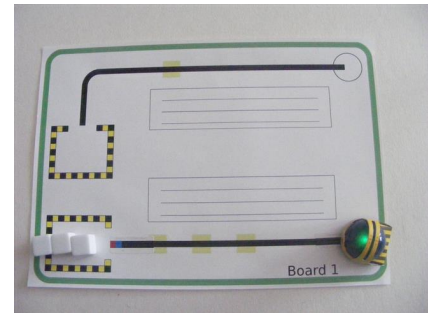


Fig. 14

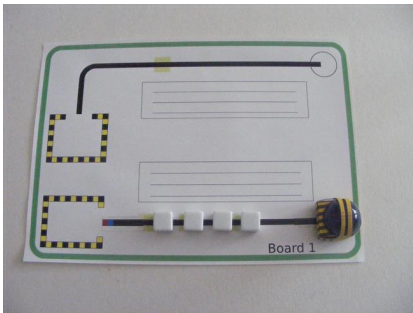


Fig. 15

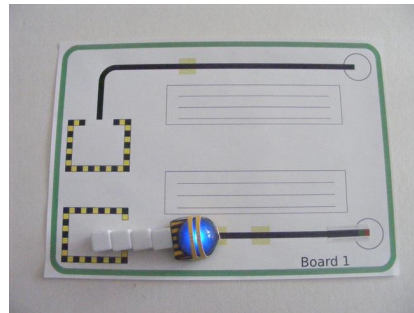


Fig. 16

FAILED!

Speed = fast

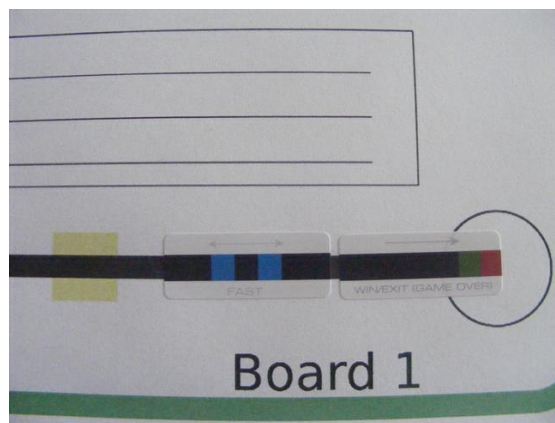


Fig. 17

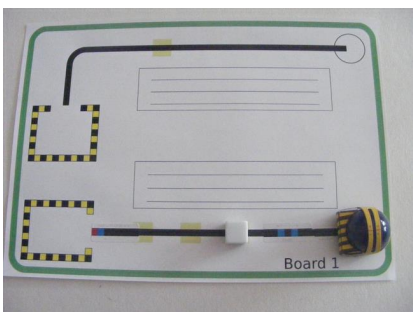


Fig. 18

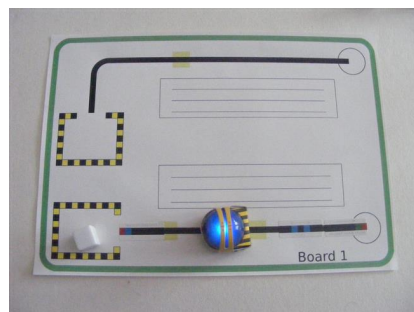


Fig. 19

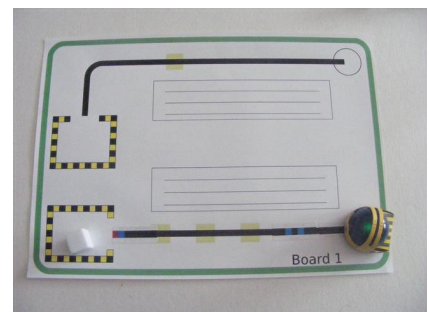


Fig. 20

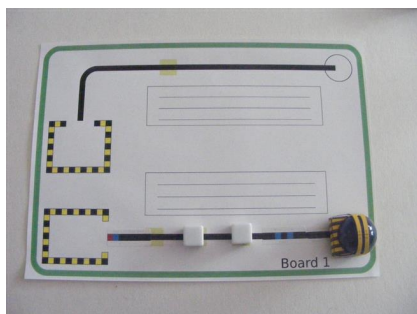


Fig. 21

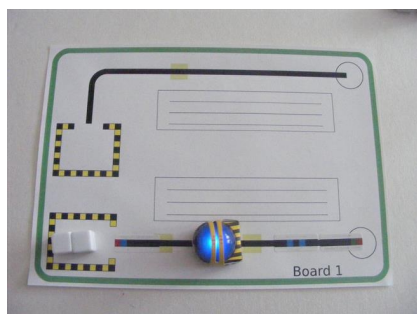


Fig. 22

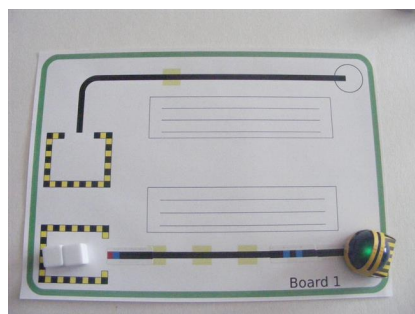


Fig. 23

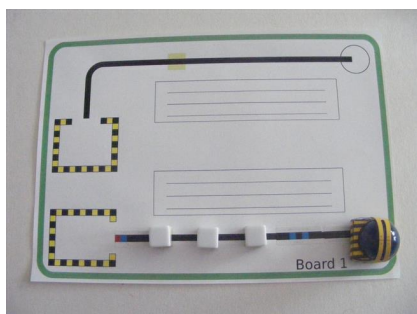


Fig. 24

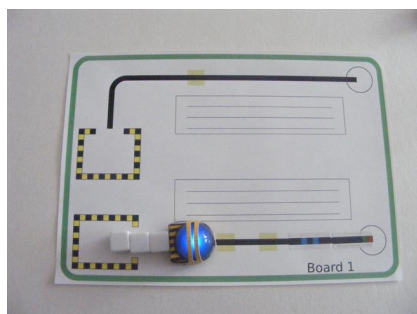


Fig. 25

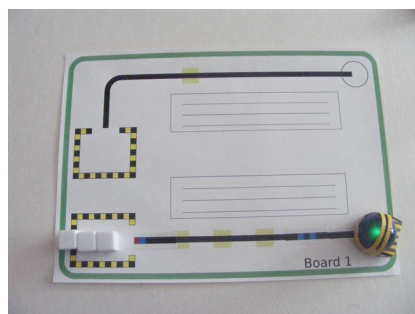


Fig. 26

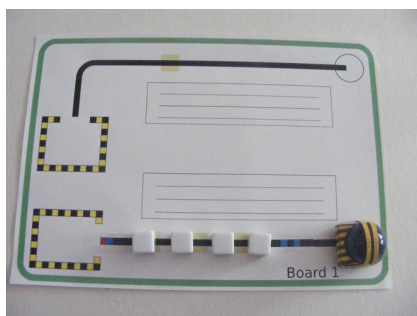


Fig. 27

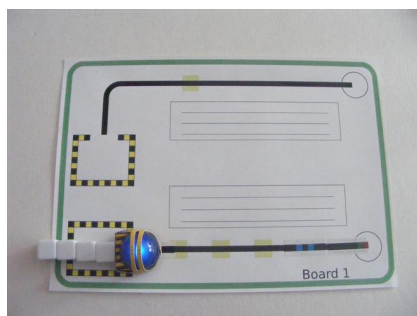


Fig. 28

FAILED!

Exercise Three

Depending on the students you teach – choose the variant – easier (Board 2) or harder (Board 3).

Code the road the way that Ozobot starts, follows the line (and realizes the codes) to move the cubes into the drop area, to topple the domino blocks, to return to the „Start” areas, then end the work.

Tell the students to plan the algorithm, code the road and test.

Collect the students observations.

The **question**: Did Ozobot properly moved the cubes?

The answer: (probably) YES.

The **question**: Did Ozobot properly toppled the domino blocks?

The answer: (probably) NO.

The **question**: Why? What to change in order to do this?

Tell the students to fix this problem. Compare the different solutions (if exist).

Test again to check if each group well done this exercise.

Realization

I have chosen the easier variant to show you how to realize this exercise.

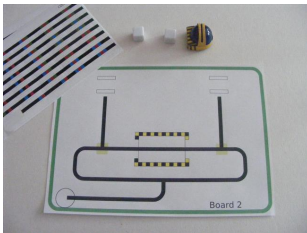


Fig. 29
What we need

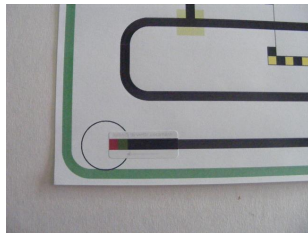


Fig. 30
Initial code „End”

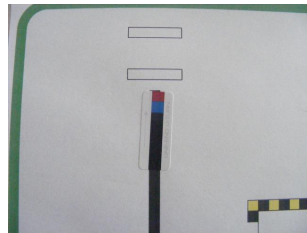


Fig. 31
Initial code „U-turn line end” 1

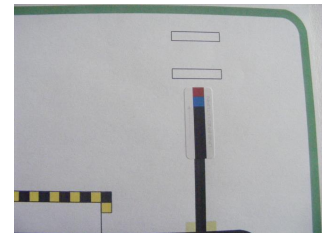


Fig. 32
Initial code „U-turn line end” 2

Coding the road

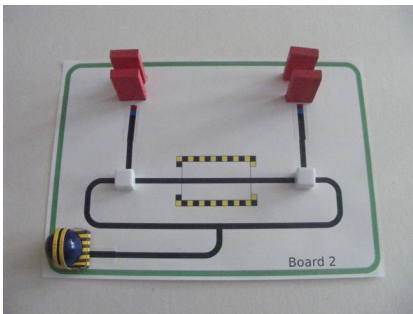


Fig. 33
Initial look

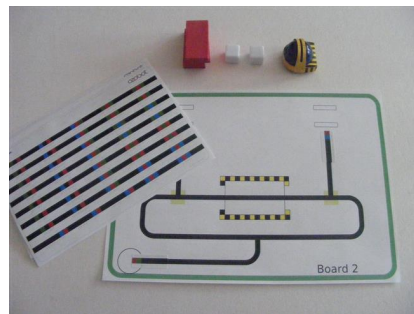


Fig. 34
What we need

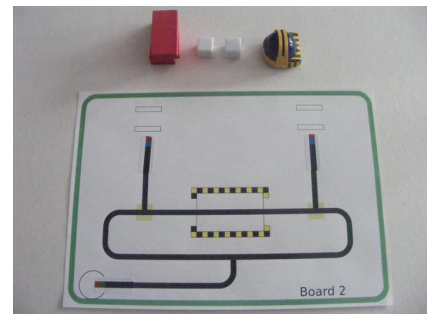


Fig. 35
Start coding...

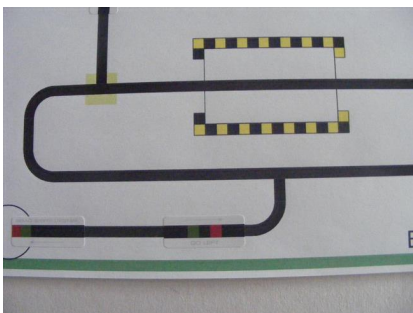


Fig. 36
Step 1

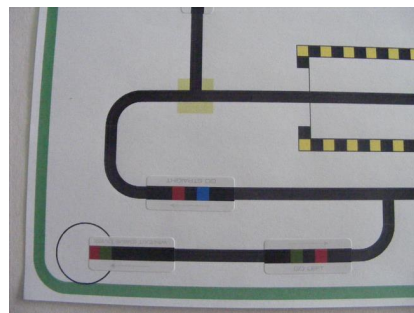


Fig. 37
Step 2

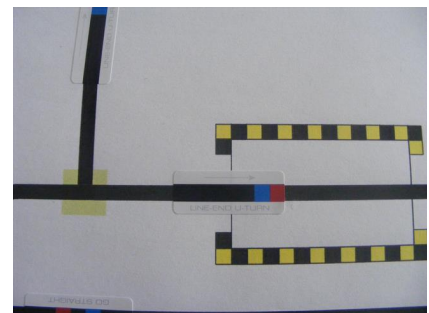


Fig. 38
Step 3

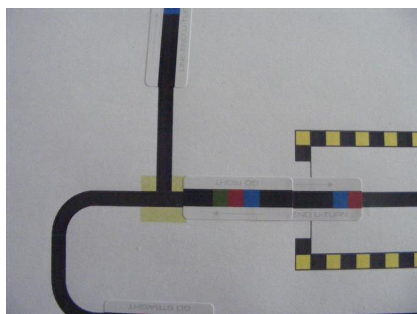


Fig. 39
Step 4

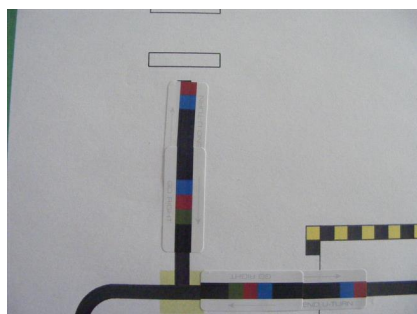


Fig. 40
Step 5

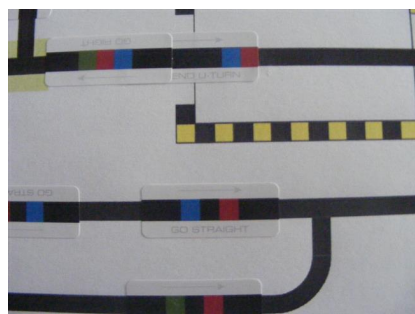


Fig. 41
Step 6

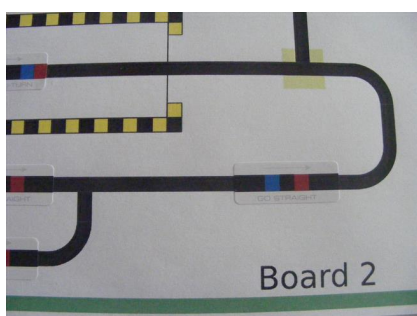


Fig. 42
Step 7

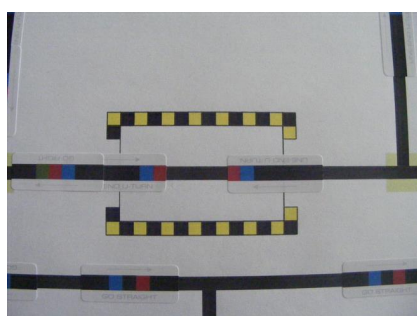


Fig. 43
Step 8

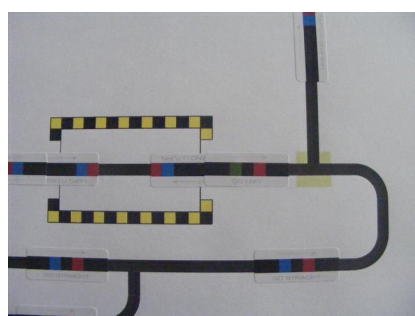


Fig. 44
Step 9

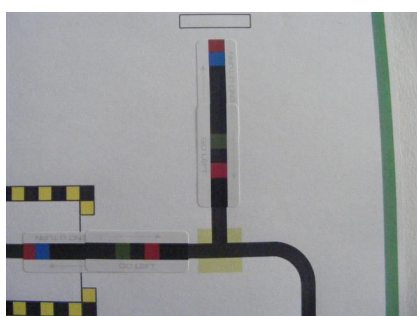


Fig. 45
Step 10

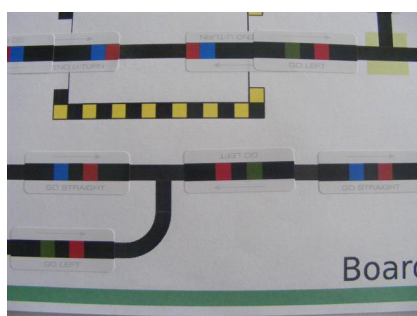


Fig. 46
Step 11

Addition

If you want to tell the students, that they can make a „programm”, in the form of the listing – you can propose them (if you'll find the time) to prepare at the same time such a worksheet (but you'll need more stickers), counting the initial codes we already have on the board.

STEP

CODE

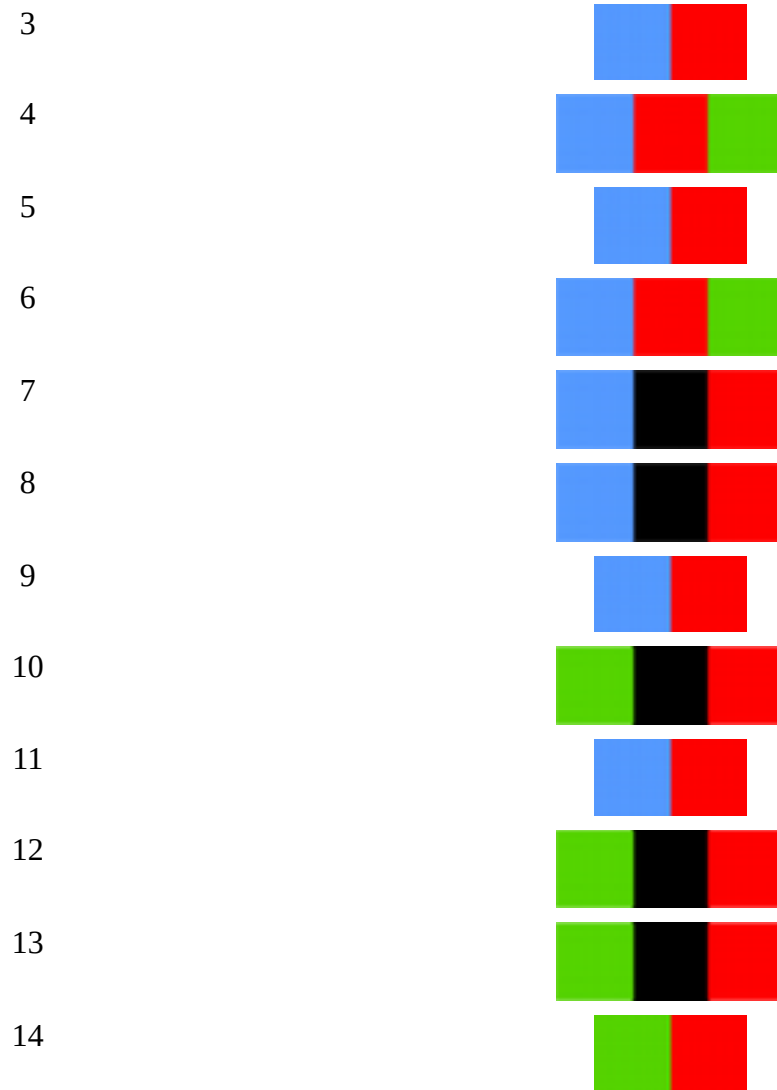
BEGIN

1



2





END

Test no. 1

We are testing first the coded road with the robot **WITHOUT** the bulldozer.

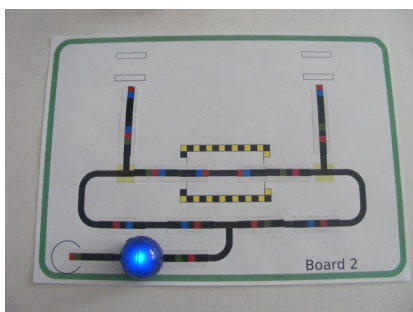


Fig. 47
Step one

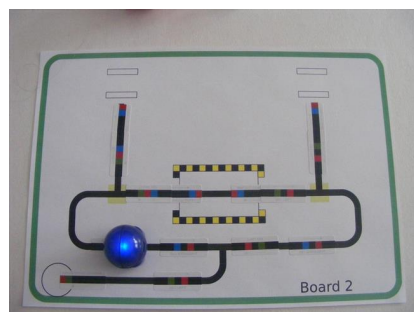


Fig. 48
Step two

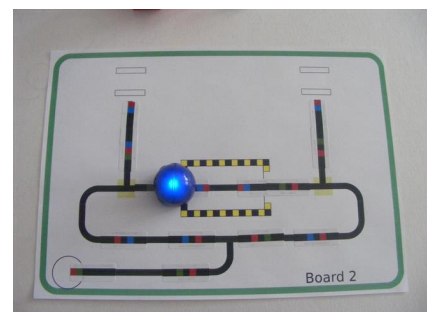


Fig. 49
Step three

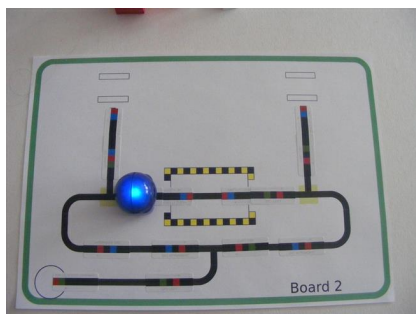


Fig. 50
Step four

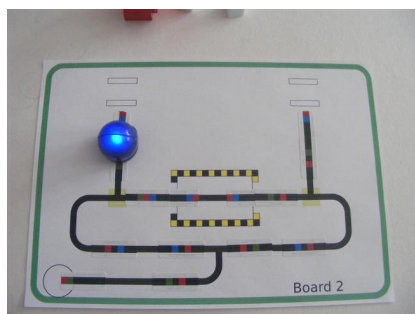


Fig. 51
Step five

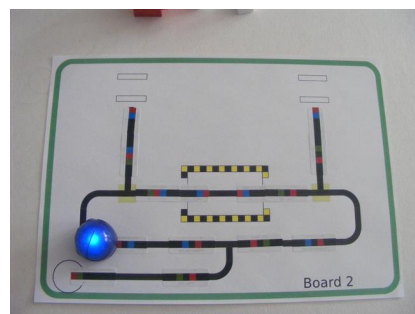


Fig. 52
Step six

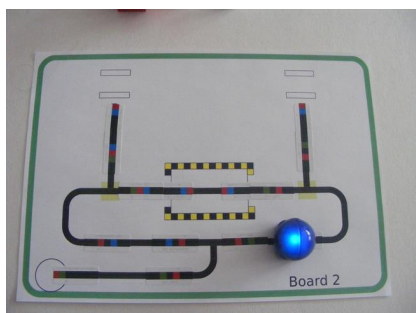


Fig. 53
Step seven

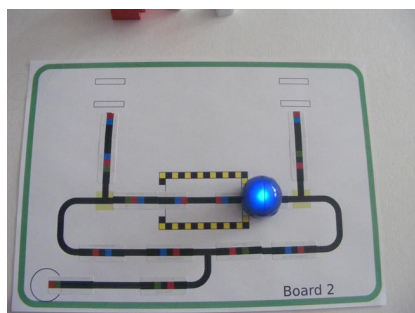


Fig. 54
Step eight

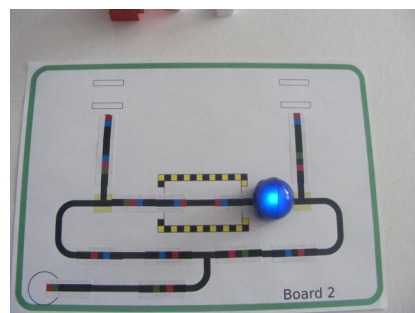


Fig. 55
Step nine

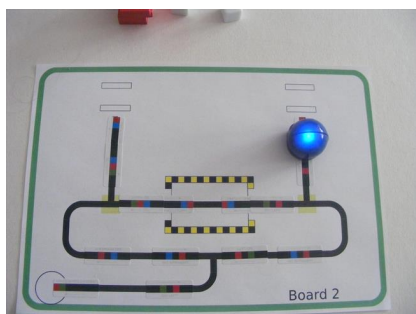


Fig. 56
Step ten

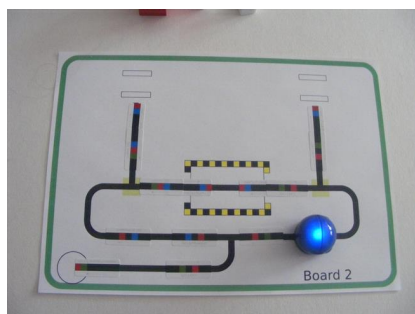


Fig. 57
Step eleven

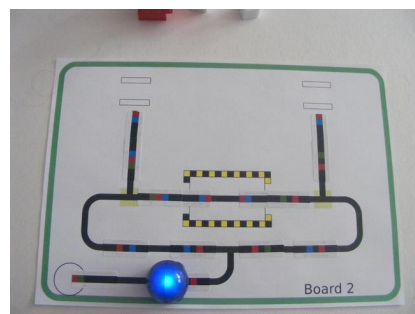


Fig. 58
Step twelve

Well done

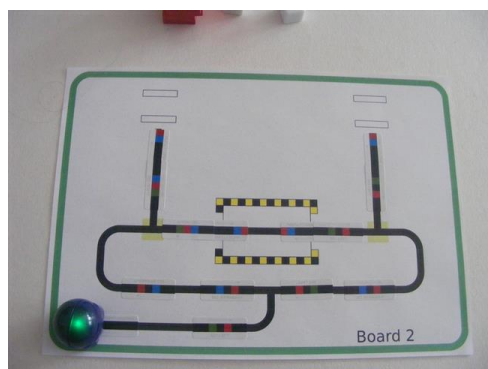


Fig. 59

Test no. 2

We are testing the coded road with the robot, with the bulldozer and all of the rest of the accessories.

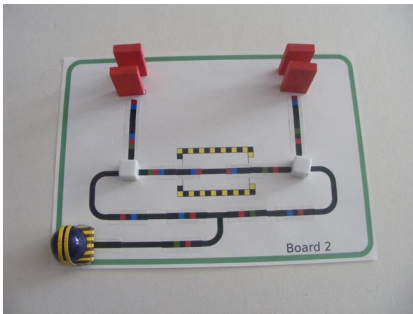


Fig. 60

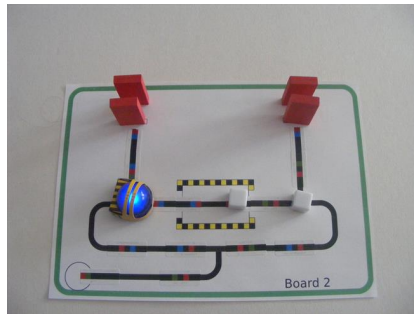


Fig. 61

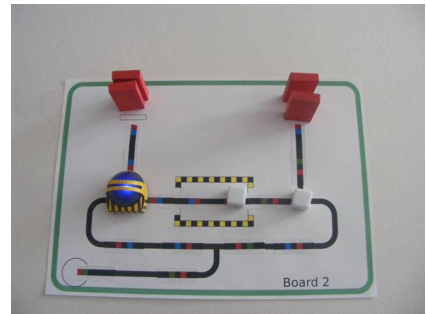


Fig. 62

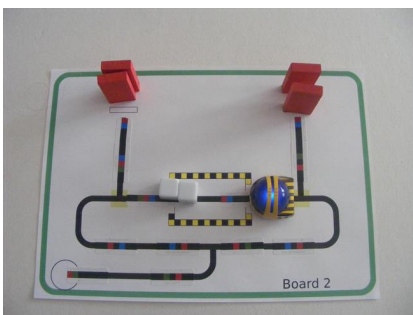


Fig. 63

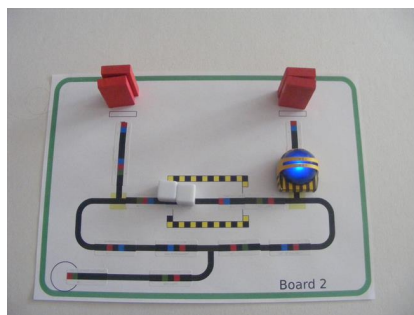


Fig. 64

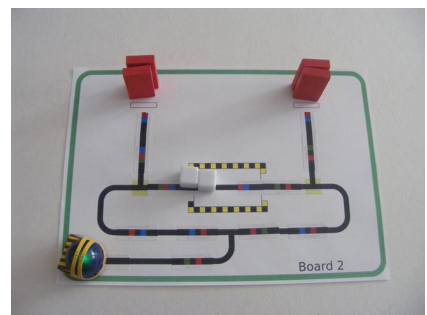


Fig. 65

As far as the cubes were moved properly – the domino blocks were only moved, not tappable.

The **question**: Why?

The answer: we need to change a little the setting of the bulldozer, because it pushes the domino blocks, not tappable.



Fig. 66
How it was



Fig. 67
How it should be

Let's test this solution.

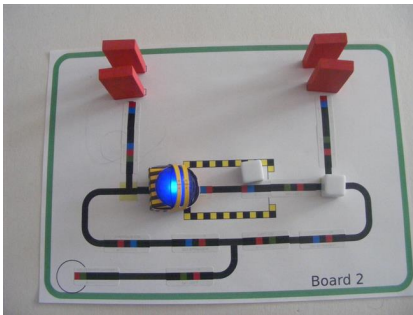


Fig. 68

First cube at place

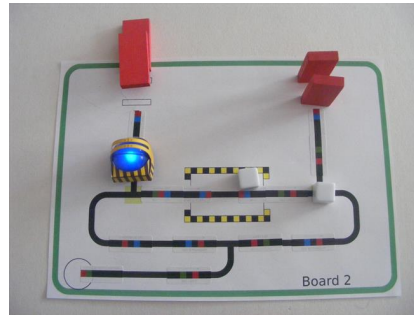


Fig. 69

First domino blocks tapped

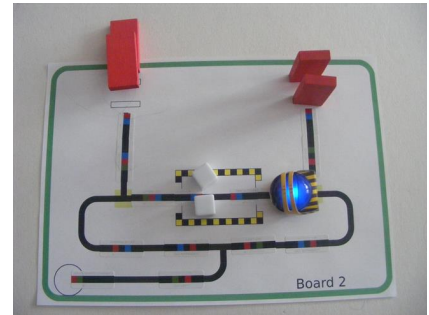


Fig. 70

Second cube at place

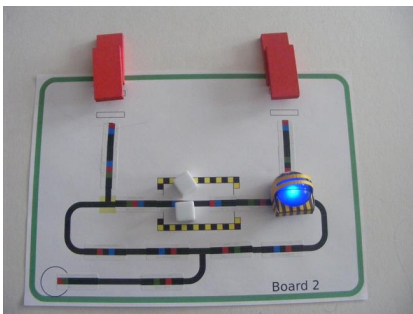


Fig. 71

Second domino blocks tapped

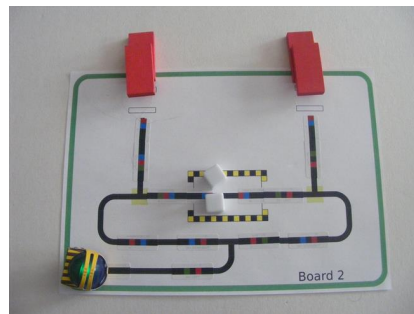


Fig. 72

The end

Aske the students for the alternate proposals :)

Now you can realize the harder variant. The main algorithm is the same, so you can easily do all of these things above with this algorithm.

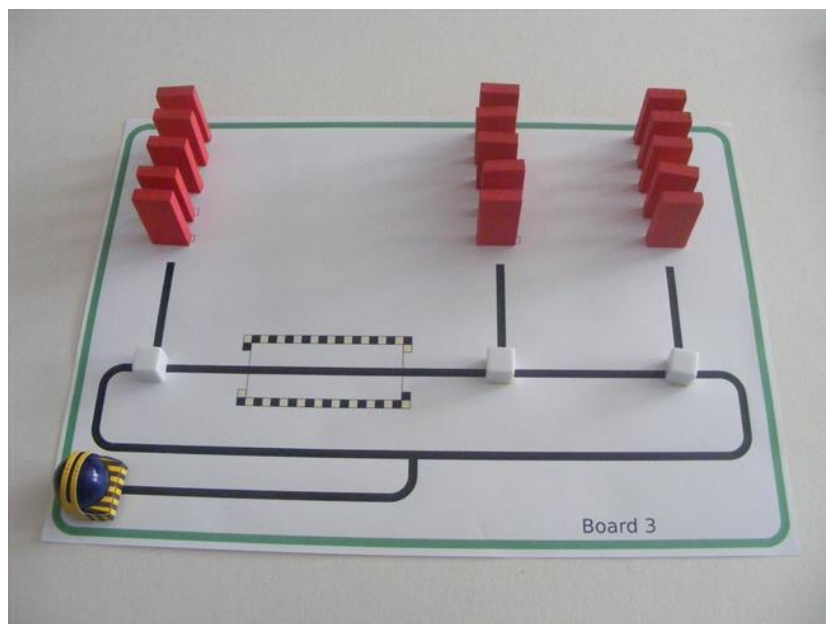


Fig. 73

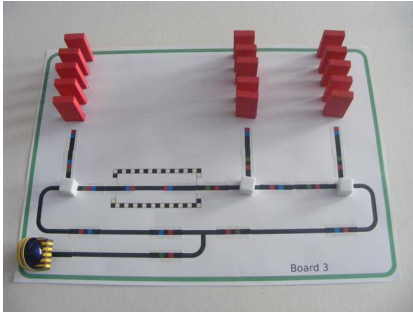


Fig. 74

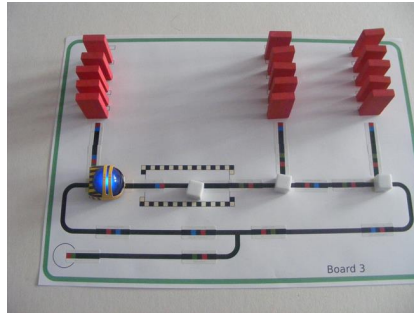


Fig. 75

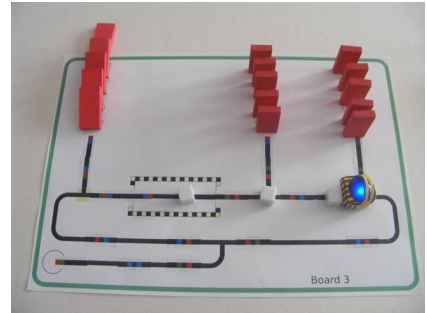


Fig. 76

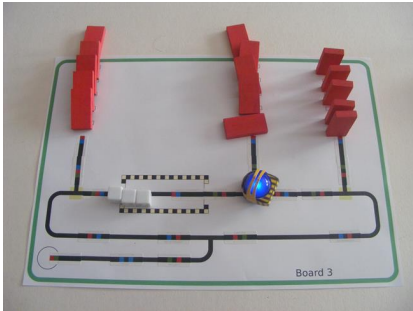


Fig. 77

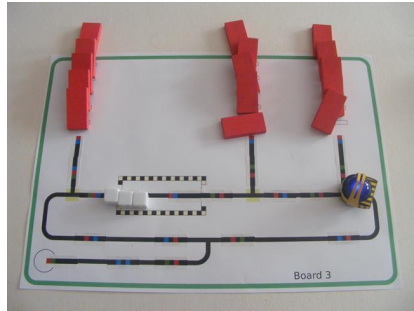


Fig. 78

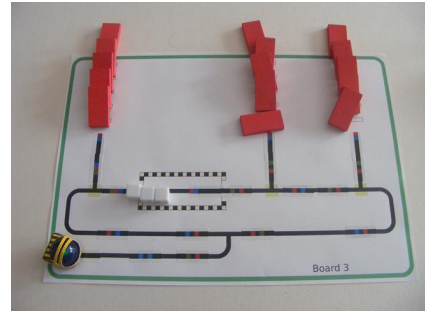


Fig. 79

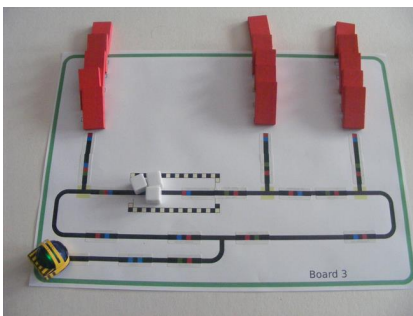


Fig. 80

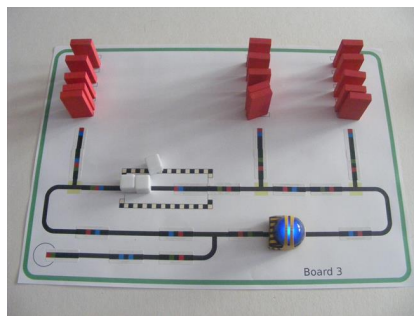


Fig. 81

Ask the students if they've met another problems. If so – try to discuss the potential solutions.

Lesson 2

Organize the groups – one board (game board) and two groups.

Tell the students the rules of the game.

Place the cubes on the horizontal axis.

Place the initial codes (u-turn line ends).

On „3...2...1...GO!” two Ozobots start, follow the lines, drive to the end and move the cube into the opponent area, then return and follow the line to move the next cube. When completed (below) the groups count how many cubes are in their area and write the result in the table (first result).

Round One

Ozobots drive randomly.

The **question**: what if Ozobot will drive back in the direction of the „Start” area?

The answer: We should block such the possibility. Place the proper code in the proper position.

The **question**: Because of Ozobot drives randomly (yet), with this block it will be driving continuously, still and still... We want to stop this round at some moment. What to do?

The answer: To place the timer code and to limit the round to 30 seconds. Place the proper code at the proper position.

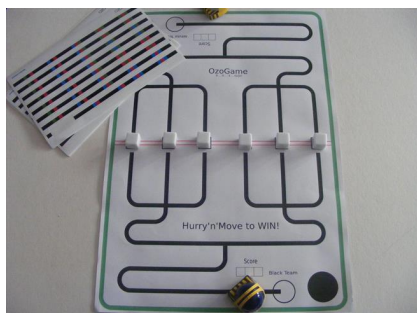


Fig. 82

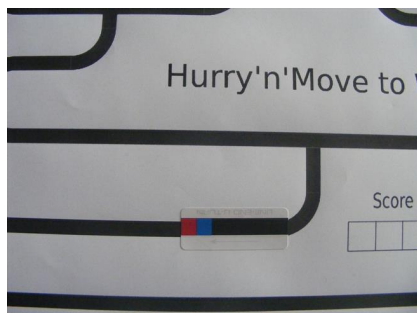


Fig. 83

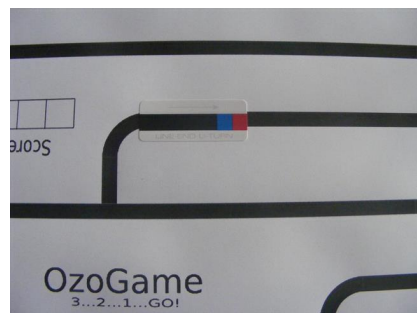


Fig. 84



Fig. 85

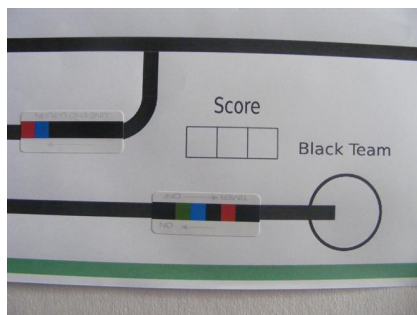


Fig. 86

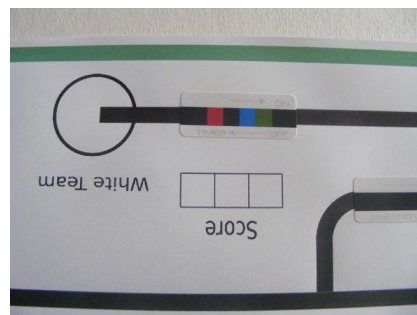


Fig. 87

Let's play. Tell the students to observe the Ozobots and to think what to change in the round two. Maybe to place the codes of the directions? Or maybe to change the speed? Tell the students to change anything they want on their part of the board (give them about 10 -15 mintues to talk to and to place the stickers.

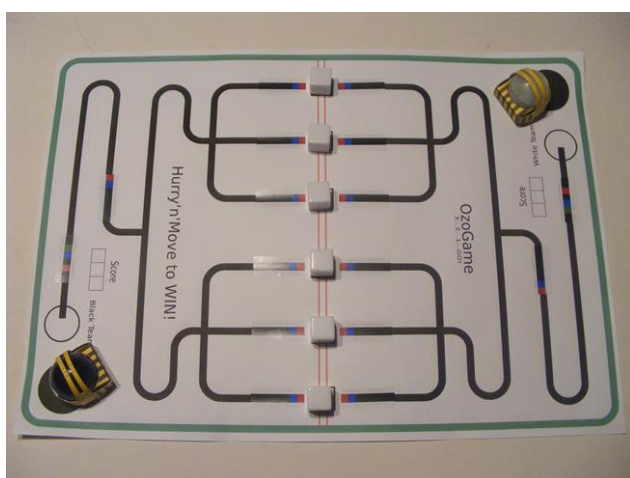


Fig. 88

Start of Round One

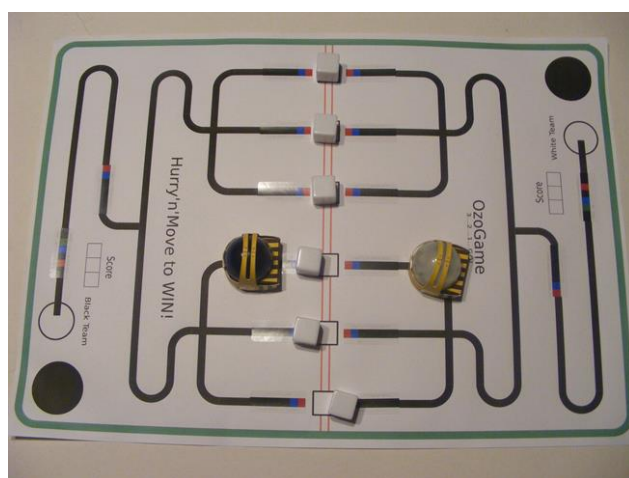


Fig. 89

End of Round One

Round Two

After Round One the players (both) decided to change the speed of the robots into *turbo*.



Fig. 90

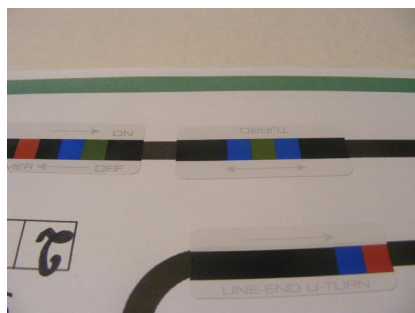


Fig. 91

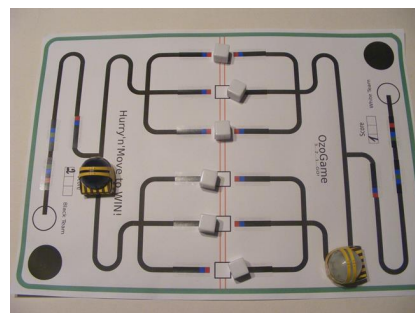


Fig. 92 – end of Round Two

Tell the students to observe the Ozobots again.

Run Ozobots on „3...2...1...GO!” and when the robots end their work – write the results in the table (result two). Now tell the students to make any tiny corrections (if necessary) and realize the last round.

Round Three (final)

After Round Two the „white” player decided to add some directions. The „black” player didn't change anything.

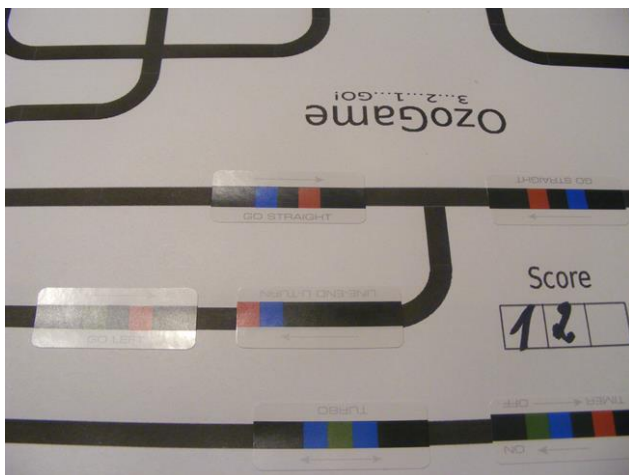


Fig. 93

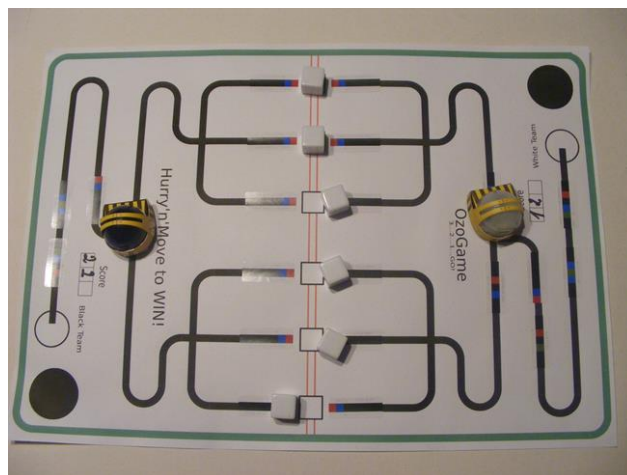
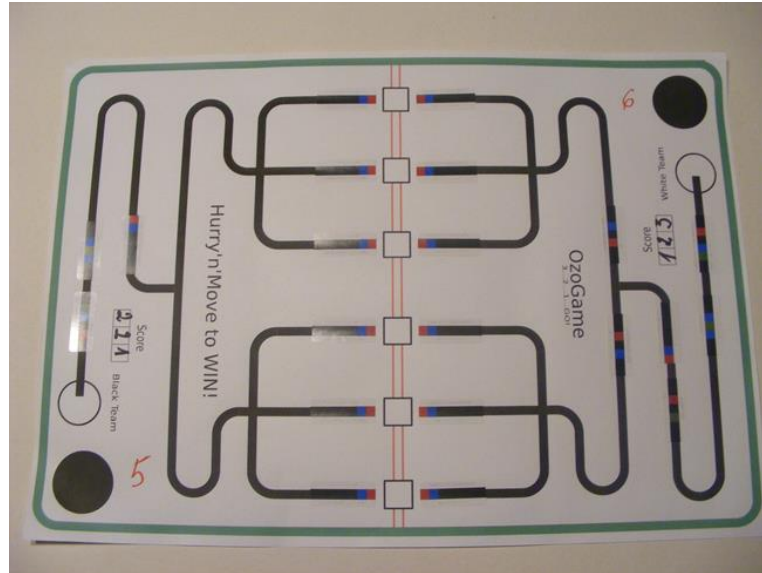


Fig. 94 – end of Round Three

Run Ozobots on „3...2...1...GO!” and when the robots end their work – write the results in the table (result three). Sum the results in the table and write it down. The winner is the group which has the lower score. This case the winner is the „black” player.

Ask the groups how their scores are. Choose the lowest one, show the coded road to the rest and try to discuss WHY.

If you'd have a time you can ask the students if their aprtial scores are comparable. Random to random, changed to changed etc. Ask the students what they would change in the rules of this game, basing on their observations. You can also propose the students to think about their own game with the usage of the bulldozer, and to prepare the schematic rules for the next meeting.



Thank you :)

Dorota

(dorota.maria.kowalczyk@gmail.com – if you'd have any questions)