Line-Following NXT Robot

Content

Building and programming a robot, which is able to follow a black line

Required knowledge

NXT-G basics

Time consumption

- Preparation by instructor: 1 hour
- Theory lesson: 30 minutes
- Practical session: 2 units 50 minutes each
- Postprocessing: 30 minutes

Enviroment

Classroom with enough space to layout the line follower course

Equipment

- 1pcs LEGO Mindstorms NXT per student
- bright plane with a closed black line (e.g LEGO test pad 8547)
- sheet of paper with a black line (2-3cm) - stopwatch to compare the individual performance
- 1 PC with NXT-G Software 2.0 per student
- 3 light sensors per NXT Alternatively, the lesson can be hold with groups of 2 students per robot

Presentation

presentation.txt -

Papers

papers.txt -

Teacher description

The instructor may start with a brief introduction to the theory of line following and eventually a review of NXT-G programming. The students shall build their line following robot themselves. In case they start from scratch the manual for building the basic NXT model is helpful. Students shall be encouraged to think about different ways to mount the sensors and to build their individual model. Discuss mechanical parameters for mounting the sensors: - distance between the sensors - clearance from the floor - distance from drive wheels, etc. Before starting to program the robot, the students shall provide a flow diagram, which may be reviewed by the instructor. Start programming the robots and test using the test pad. Good practice is testing the correct function of the robot by placing it on top of a support box, the wheels can move freely without floor contact, and a piece of black and white paper. Record the time the robot needs to complete a given number of laps.

Encourage the students to modify and improve the algorithm.

Student description

todo

Sample solution

3D model of the robot, example of code: linefoloower.rbt, pictures: myrobot.jpg

smaple_solution.txt - riešenie20.zip - riesenie

Multimedia

multimedia files

media.txt -

Construction manual

main function: Simple robot with 2 degrees of freedom, special requirements: 3 light sensors

Components description

Easy start model, Line sensors LEGO Mindstorms user manual

FAQ

Question When I program the motors to move with unlimited duration they stop after a few seconds. What shall I do? Answer The program will set the motor operation to unlimited, the motors will speed up, and then the program will carry out the next command. If this is the end of the program the motors will stop. The simplest way to is to put the MOVE block within a LOOP block set to control=forever. See also the presentation material.

Robtivity resources

TODO

General resources

TODO