# Exercises

## General

Hints for each exercise are available in the Hints.doc and full example code is available in Full solutions.doc. However these only covers the basic exercises, for the rest you need to write code your own code (with our support of course!).

In addition, we have tape and paper, so make your own track or labyrinth if you want to!

## Basis exercises

1. Run the robot forward 50 cm, stop, turn 180 degrees, run forward 50 cm, go backwards 50 cm, stop
2. Add a sound before turning
3. Play the sound every 5th second instead
4. Print the text “Hello!” on first row, and “I am 3Pi” on the second row
5. Wait until someone presses the middle button, then run in a circle of 50 cm diameter
6. If someone instead presses the right button, run like a snake (run in a half circle to the right, then left, right again and so on, ca 20 cm diameter of the half circles).
7. Print the value of the line sensors (returned value, i.e. the estimated angle) on the first line. On the second line, print *right* if the value is greater than 2000 and *left* otherwise.

When finished, test to put the robot on the line on the track. See how the value changes depending on how you turn the robot.

Note: Now the robot needs to be calibrated properly, according to what is written in “The Sample Code“ chapter.

Now you know all of the basic functionality of the robot!

Go ahead with any of the actions mentioned below (further exercises, line following or Robocop mission), depending on which one seems interesting.

## Further exercises

1. Go forward until the robot finds a line, beep, then turn 180 degrees and continue
2. Try to stay inside a square of black tape by “bouncing” when finding the line
3. Find your way into the end of the labyrinth (dead reckoning), without touching the “walls”. Play a sound of triumph when reaching there. If the robot detects a line with one of the sensors on the way, make a different sound, stop, and consider the mission as failed (revise your code and try again! ☺ )
4. While the robot is driving in the labyrinth, print the number of turns encountered so far on the display.

## Line following on the track

1. Make the robot follow the black line on the track
2. Try to go round the track as fast as possible (for example speed up on the straights and slowdown in the tight corners)

## Robocop mission

1. Find a marker on the track (you can optionally get ready made code for this step)
2. Pop a balloon (high speed is important!)
3. Detect the colour of a balloon, and pop it only if it is red.
4. Try out the full Robocop mission (go around the track, find marker, pop balloon if red).