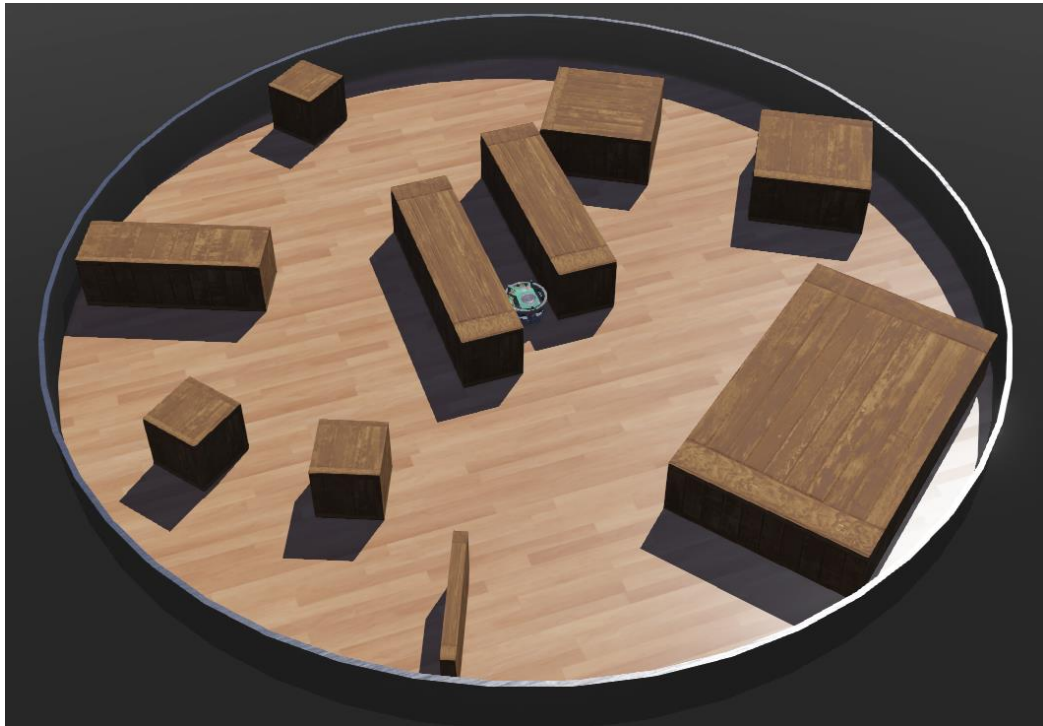
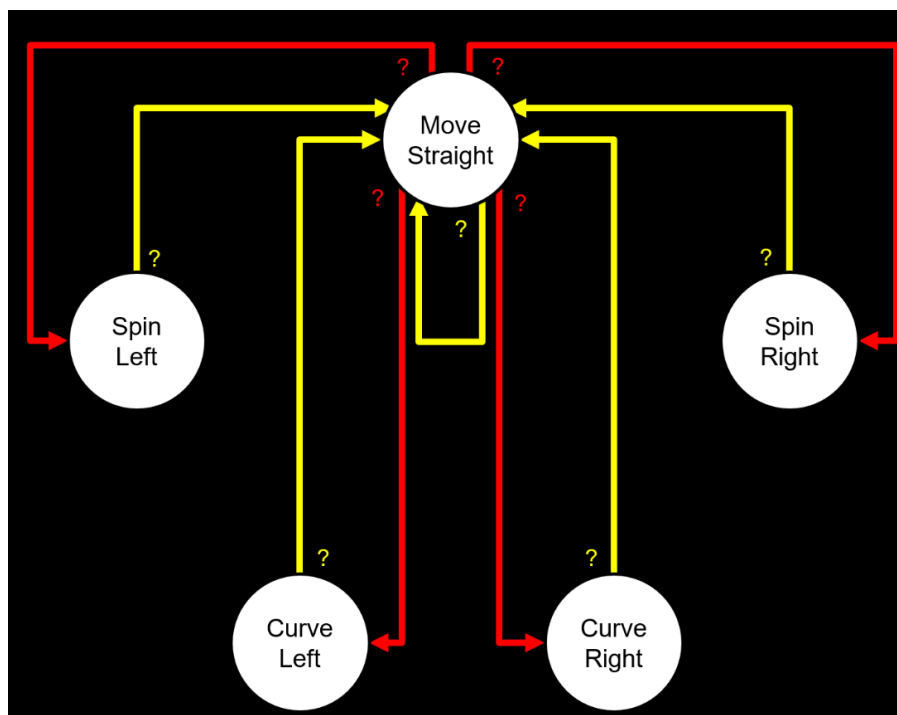


LAB 1 – Basic Movement and Sensing

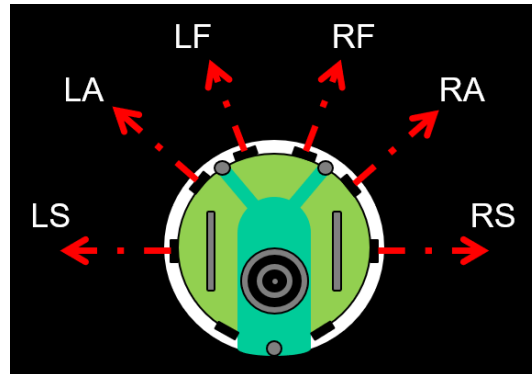
- (1) Download the **Lab1_BasicMovementAndSensing.zip** file and unzip it. Load up the **Lab1_World** world. The goal of this lab is to have the robot move around the environment without hitting anything, without getting stuck in any corners and keeping obstacles away from its sides.



- (2) The **Lab3Controller** code has been started for you. You can open it in the editor to start making changes to it. You should set up a state machine with 5 states as follows:



Make sure to check conditions that cause movement from one state to the next. There should be code for each arrow in the above diagram. The idea is to have the robot move around the environment smoothly without hitting anything. The robot being used is the e-puck robot. You will make use of the motors and the following 6 proximity sensors:



Here is how each of the states behave ...

- **MOVE STRAIGHT** – the robot should move forward with the motors at the maximum speed. If **LF** or **RF** detect something, it should go into either **SPIN_LEFT** or **SPIN_RIGHT** mode randomly with equal probability. Otherwise, if **RA/LA** detects something, it should go into **SPIN_LEFT/SPIN_RIGHT** mode, respectively. If **LS/RS** is detected, it should go into **CURVE_RIGHT/CURVE_LEFT** mode. You will want to handle a special case that will allow the robot to pass STRAIGHT through a “tunnel” with objects on both sides.
- **SPIN LEFT** – the robot should enter this mode if the robot detects something on sensor **RA** or if **LF** or **RF** detected something and the **MOVE STRAIGHT** behavior decided to randomly turn left. It should stay in this mode until all of the **LA, LF, RF** and **RA** sensors detect no reading. The robot should spin at half the maximum speed.
- **SPIN RIGHT** – the robot should enter this mode if the robot detects something on sensor **LA** or if **LF** or **RF** detected something and the **MOVE STRAIGHT** behavior decided to randomly turn right. It should stay in this mode until all of the **LA, LF, RF** and **RA** sensors detect no reading. The robot should spin at half the maximum speed.
- **CURVE LEFT** – the robot should enter this mode if the robot detects something on sensor **RS** and nothing on sensor **LS**. It should stay in this mode until **RS** detects nothing or until one of **LA, LF, RF** or **RA** detects something. The left wheel should move at **75%** of the maximum speed.
- **CURVE RIGHT** – the robot should enter this mode if the robot detects something on sensor **LS** and nothing on sensor **RS**. It should stay in this mode until **LS** detects nothing or until one of **LA, LF, RF** or **RA** detects something. The right wheel should move at **75%** of the maximum speed.

Submit your **Lab1Controller.java** code when you are done. Make sure that your name and student number is in the first comment line.

Tips:

- Build your code up slowly. Add one behavior at a time until it seems to work.
- It is helpful to print out the state that you are in at any time.