Week 3 –Software Development – Obstacle Avoidance V1.2

Software Version: 1.2

Contents

[Navigation Class 1](#_Toc413513553)

[Hardware involved 1](#_Toc413513554)

[Motors 1](#_Toc413513555)

[Ultrasonic Sensor 1](#_Toc413513556)

[Run 1](#_Toc413513557)

[Major Methods 1](#_Toc413513558)

[Obstacle Avoidance Mode 1](#_Toc413513559)

[Glossary of Terms 2](#_Toc413513560)

# Navigation Class

The navigator class will be responsible for ordering the robot to rotate and drive forward to a desired location while utilizing the odometer class to verify if destination is met.

## Hardware involved

### Motors

The robot’s left and right wheel motor will be used to drive the robot forward.

### Ultrasonic Sensor

There will be 2 ports for the 2 Ultrasonic Sensors: the FrontUS and SideUS

## Run

The robot will drive to the set of path indicated. Upon reaching each sub-destination, it will move onto the next one unless another set of action is given.

### Major Methods

travelTo(double x, double y) – the robot will travel to the destination asked.   
turnTo(double theta) – the robot will orientate itself to the desired angle  
driveTo(double x, double y) – the robot will reorient itself upon exiting obstacle avoidance mode.

## Obstacle Avoidance Mode

While navigating, the frontUS will continue polling data to check for incoming obstacles. When the robot approaches an obstacle, this is when the robot enters Obstacle Avoidance Mode. The robot will rotate 90 degrees to its right to not face the wall. The Obstacle Avoidance Mode will enter a wall follower mode to avoid colliding with the obstacle. The FrontUS will be used to perceive any other incoming obstacle. When the orientation of the robot faces the waypoint, the robot will navigate back to its waypoint. This is when the robot will exit Obstacle Avoidance Mode and the SideUS will be disabled and the FrontUS will be enabled once again for spotting incoming obstacles. In this way, with the use of only 2 ultrasonic sensors and no motor, we can ensure that the robot will not run into obstacles.

# Glossary of Terms

leftMotor – Motor with port ‘A’

rightMotor – Motor with port ‘C’

FrontUS – Front Ultrasonic Sensor

SideUS – Side Ultrasonic Sensor