The robot shall follow a black line on a one-way track.

The robot starts at the red T-junction.

The track has three zones, where the following rules apply:

1. In a white zone, the robot drives with NORMAL speed.

2. In a gray zone (rainy weather), the robot drives with a LOW speed.

3. In a green zone (highway), the robot drives with HIGH

speed.

At the end of the track, the robot ends its journey in a free parking lane.

Collisions should be avoided at all times.

A journey from start to the end, with no obstacles on the way, should not take more than five minutes.

Functional requirements:

1. *Starting the ride:* When the user turns on the robot or when the user replaces the robot, it uses its optosensors (light sensors and ultrasound (front) sensors to define which action to start with. There are multiple start actions:
   1. Ultrasound sensor senses a block in front of the robot: the robot does not move.
   2. Optosensors both see white: the robot drives straight.
   3. One optosensor sees white and one optosensor sees black: the wheels on the black side drive backwards until both optosensors see white.
   4. Both optosensors see red: the robot starts driving with FAST speed.
   5. One optosensor sees red and one sees black: the wheels on the black side drive backwards until both optosensors see red. From then both sides drive with FAST speed.
   6. Both optosensors see gray: the robot starts driving with SLOW speed.
   7. One optosensor sees gray and one sees black: the wheels on the black side drive backwards until both optosensors see gray. From then both sides drive with SLOW speed.
   8. Both optosensors see purple: the robot [checks if there is a vehicle on the left, if not it makes a turn to the left (crosses black with right) otherwise it looks if there is a vehicle on the right, if not it makes a turn to the right (crosses black with left). If there is a vehicle on the right it doesn’t move].
2. *During the ride:* when the first action was performed, it will continuously do one of the following:
   1. Ultrasound sensor senses a block in front of the robot: the robot stops.
   2. Optosensors both see white: the robot drives straight at NORMAL speed.
   3. One optosensor sees white and one optosensor sees black: the wheels on the black side drive backwards with NORMAL? Speed until both optosensors see white.
   4. Both optosensors see red: the robot drives with FAST speed.
   5. One optosensor sees red and one sees black: the wheels on the black side drive backwards with NORMAL? Speed until both optosensors see red.
   6. Both optosensors see gray: the robot drives with SLOW speed.
   7. One optosensor sees gray and one sees black: the wheels on the black side drive backwards with NORMAL? Speed until both optosensors see gray.
   8. Both optosensors see purple: [the robot checks if there is a vehicle on the left, if not it makes a turn to the left (crosses black with right) otherwise it looks if there is a vehicle on the right, if not it makes a turn to the right (crosses black with left). If there is a vehicle on the right it doesn’t move]. [kunnen ze hierna zien of er nog een zwarte lijn aan komt? Aangezien er 2 paarse vakken zijn.]
3. *Ending the ride:* when the robot is parked in one of the parking spots, the robot should not move anymore until it is replaced by the user or if it is turned of by the user.
4. *Driving time:* when the robot starts at the beginning of the track and there are no obstacles on the way, it has to take less than 5 minutes for the robot to drive the whole journey and to park in one of the parking lanes.

Non-functional requirements:

1. Modifiablity: the source code will be developed in MATLAB 2017B and has to be easily understandable for MATLAB developers while also easy to modify.
2. Security:
3. Usability:
4. Portability: