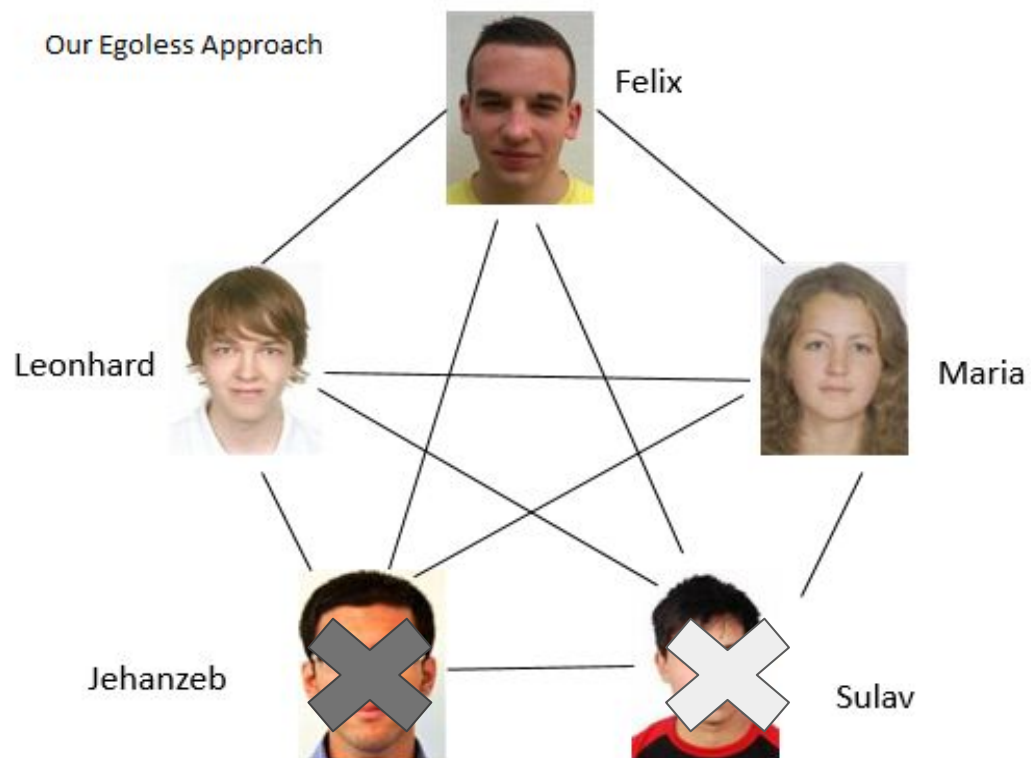


Team III

Felix Schmoll, Mariia Gladkova, Leonhard Kuboschek

The Te



The Beginning

What we set out to do

- Weekly meetings
- Egoless approach
- Sprint 1: Random walk
- Sprint 2: Wall following
- Sprint 3: Improvements / possibly SLAM

Sprint 1

Random Walk

Communication is key

Sprint 2

Wall following

Work consistently

Sprint 3

Improvements

“A bad hire costs more than passing on a good one.”

Race Day

Ownership

The only team that
mastered the task properly

- Denis Rochau

35%

more effective than competitors

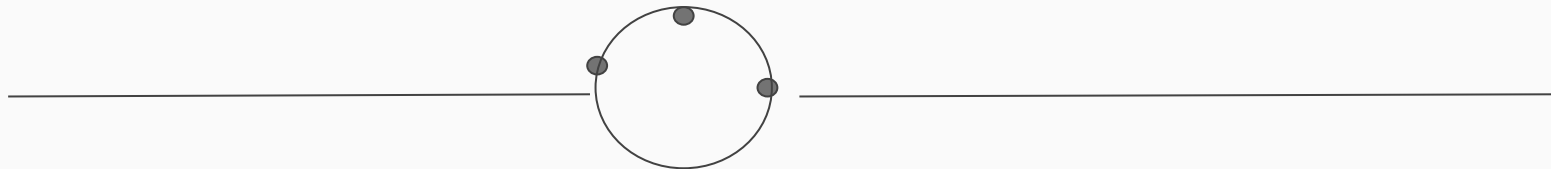
The Software

- Wall Following Strategy
- Half Circle Detection
- Crash Recovery

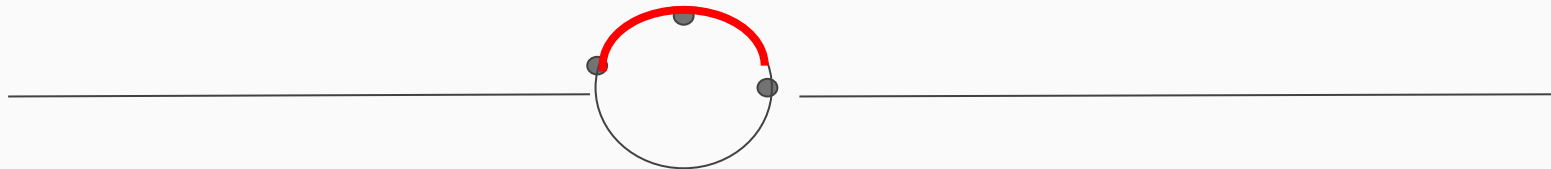
Half Circle Detection



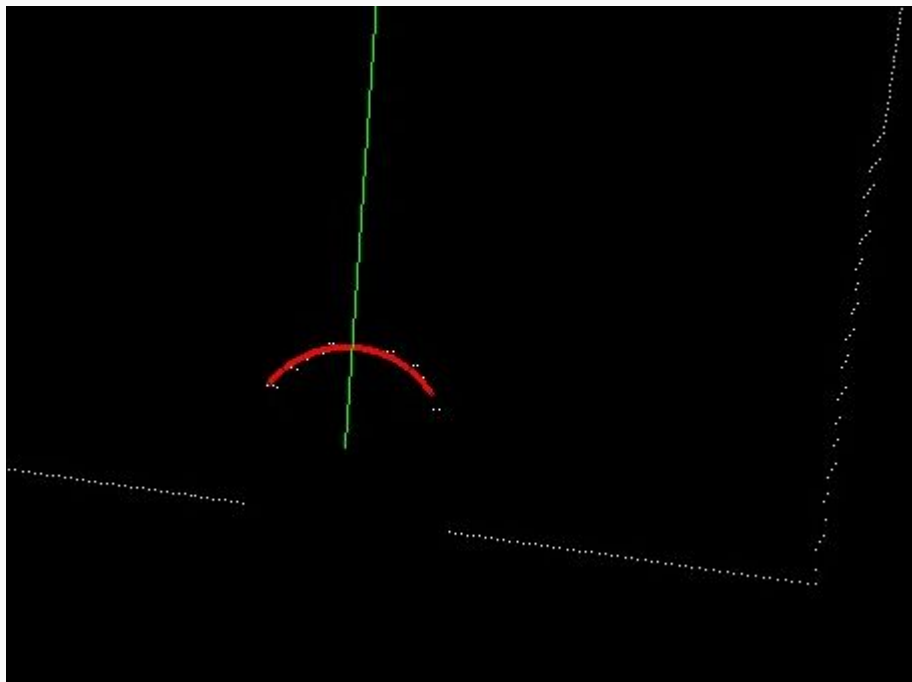
Half Circle Detection



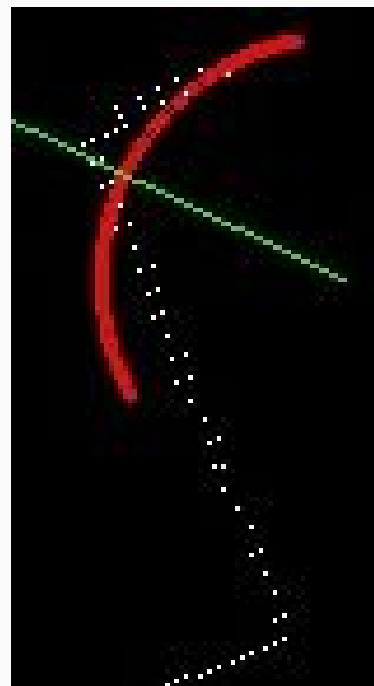
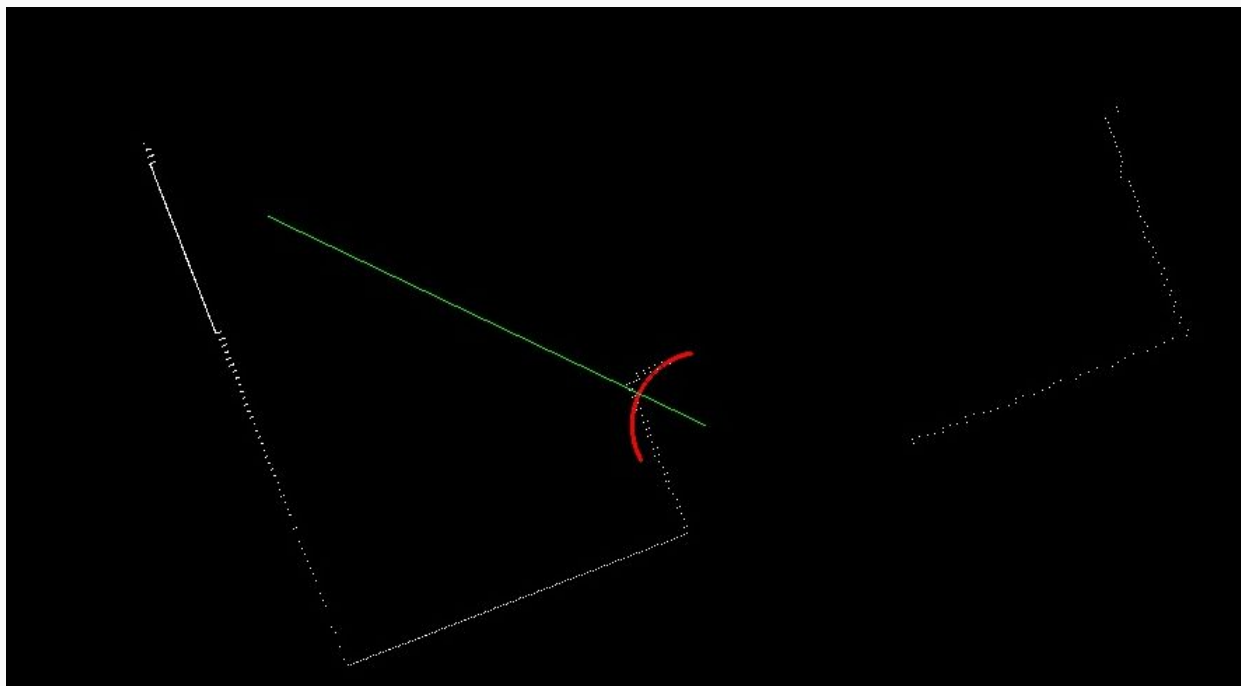
Half Circle Detection



Half Circle Detection



Avoiding Corners

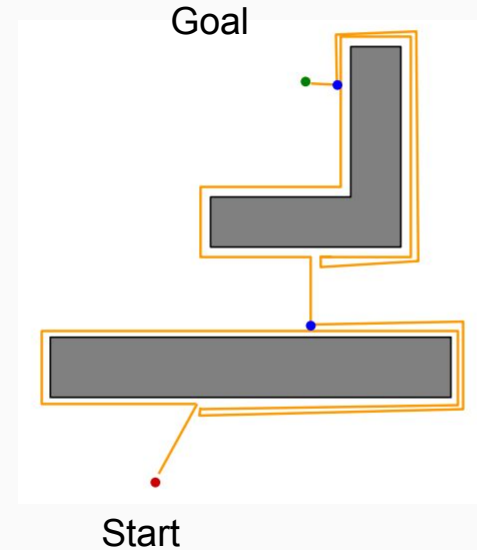


Avoiding Corners

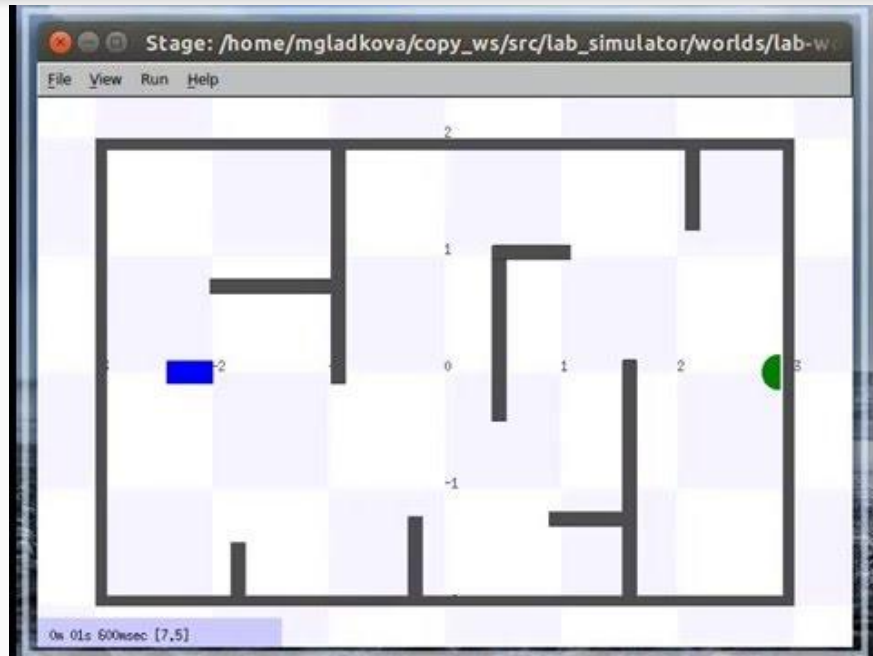


Wall Following Strategy

- “Bug”-approach
 - move forward until the first obstacle is reached and follow it using right-hand rule
- PID-controller to set the angle to the goal and to correct a robot while following the wall
- OpenCV HoughLinesP function to detect the lines and align the robot according to the closest line

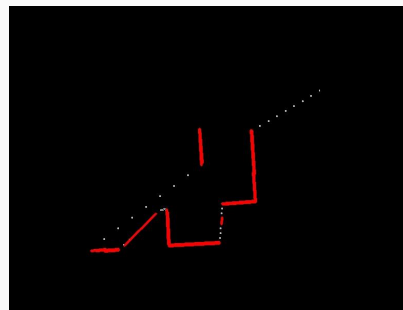


Wall Following Simulator

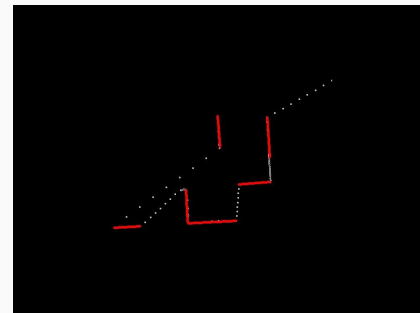


Line Detection and Removal of Duplicates

- Major detection of lines - HoughLinesP from OpenCV
 - Due to noise many duplicate lines are created => not reliable for a robot
- Line Detection package is created
 - Comparing all the lines in OpenCV image according to the slope and x,y-coordinates of end-points



17 lines



6 lines

Crash Recovery

- Use laser data to detect possible crash situation
- When crash is detected, perform recovery maneuver
 - Fixed sequence of velocities
 - Replayed onto the robot
 - To be improved in future versions

Results