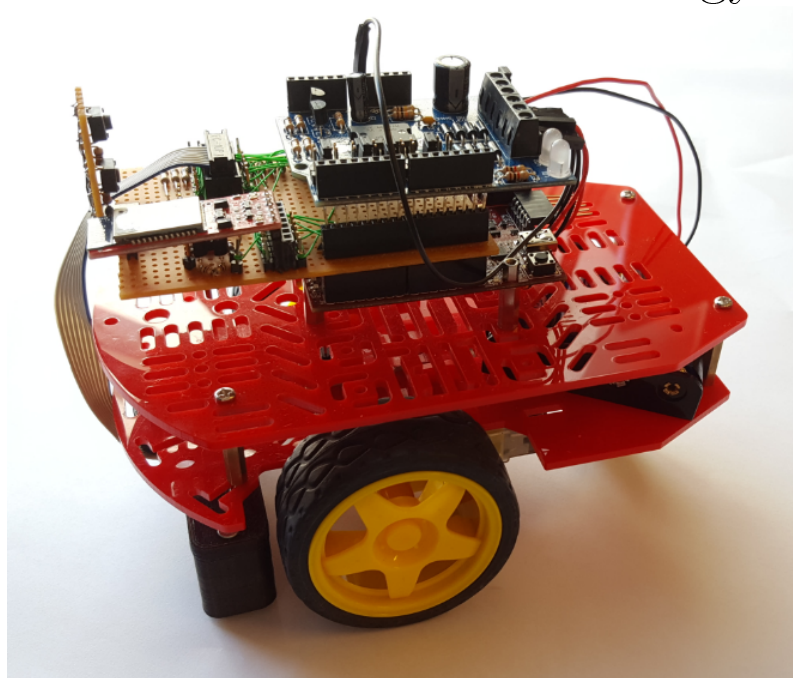


Fall Semester 2015

**Line following robot**

Group 2

2. Semester IT-Technology



Group members: Benjamin Nielsen - Henrik Jensen - Martin Nonboe - Nikolaj Bilgrau

Supervisor: Jesper Kristensen - Steffen Vutborg

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Title:

SICK PEW PEW robot

Project Period:

3. Semester | Spring semester 2016

Projectgroup:

Group 2

Group participants:

Benjamin Nielsen

Henrik Jensen

Martin Nonboe

Nikolaj Bilgrau

Supervisors:

Jesper Kristensen

Steffen Vutborg

Pages:

Appendices:

Completed:

# Preamble

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This project was written by group 2, for the second semester on the IT-electronics education at university college Nordjylland, Sofiendalsvej 60. The project goal is to make a line following robot.

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Benjamin Nielsen

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Henrik Jensen

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Martin Nonboe

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Nikolaj Bilgrau

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3D print 3-Dimensional printing

# Introduction 1

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Indledning til afsnittet af analyse

## 2.1 Problem statement

The problem presented to the group is how to make a robot move from point A to point B, with the help of different sensors, including ultrasound and infrared, and to make use of autonomous algorithms to avoid obstacles.

Problem statement:

- Bot should be able to move from A to B
- Should be able to stop at a predetermined point
- Manoeuvre around obstacles

## 2.2 Problem analysis

### 2.2.1 Mobility from A to B

Motorer, som bliver styret af H-bro vha. PWM Line-following-principper.

### 2.2.2 Predetermined end point

### 2.2.3 Obstacles avoidance



# Requirements specification 3

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Beskriv section [1]

# Hardware section 4

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Beskrivelse af afsnit

## 4.1 Hardware diagram

Beskrivelse af hardware diagram

### 4.1.1 Sensor choice

### 4.1.2 Another sensor choice?

## 4.2 Analog-to-digital converter

ADC diagram

This products usage of ADC

## 4.3 The chipKIT Uno32 board

## 4.4 The motor shield - PKA03

### 4.4.1 The H bridge

## 4.5 The Bluetooth transceiver

# Software section 5

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Beskriv Software section

## 5.0.1 Software diagram

## 5.1 Analog to digital conversion

## 5.2 PID controller

### 5.2.1 Proportional control(P)

### 5.2.2 Integral control(I)

### 5.2.3 Derivative control(D)

### 5.2.4 Loop tuning

### 5.2.5 Steady-state error

### 5.2.6 Stability

Table manual explained

### 5.2.7 PID Implementation

## 5.3 Pulse-width modulation

### 5.3.1 Duty cycles

## 5.4 The interface

# Test 6

---

Beskriv test section



## 6.1 Unit Testing

### 6.1.1 Sensor

Setup

Results

### 6.1.2 DC Motors

Setup

Results

### 6.1.3 H-Bridge

Equipment

Setup

Results

### 6.1.4 PWM

Equipment

Setup

Results

### 6.1.5 ADC

Equipment

Setup

Results

## 6.2 Integration Testing

### 6.2.1 PWM motor control

Equipment

Setup

Results

### 6.2.2 Robot to Interface communication

Equipment

Setup

Results

## 6.3 System Testing

Equipment

Setup

Results

# Conclusion 7

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Skriv en fucking Conclusion!!

# Appendices 8

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## 8.1 Group collaboration agreement

### 8.1.1 Contact Information

Table 8.1: Contacts

Benjamin Nielsen	Tlf: 30427645	@: yipiyuk5@gmail.com
Henrik Jensen	Tlf: 28568934	@: henrik_kort@hotmail.com
Martin Nonboe	Tlf: 23827566	@: nonsens_4@hotmail.com
Nikolaj Bilgrau	Tlf: 29802715	@: nikolajbilgrau@gmail.com

### 8.1.2 Workflow

### 8.1.3 Deadline

### 8.1.4 Milestones and goals

Gerne en kalender der viser dage arbejdet!



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## 10.1 C code

main.c:

ADC.c:

## 10.2 C# code - interface

# Bibliography

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- [1] placeholderAuthor. *placeholderTitle*. 2016. URL: <http://www.ucn.dk>.