

# The AntibacBuggy

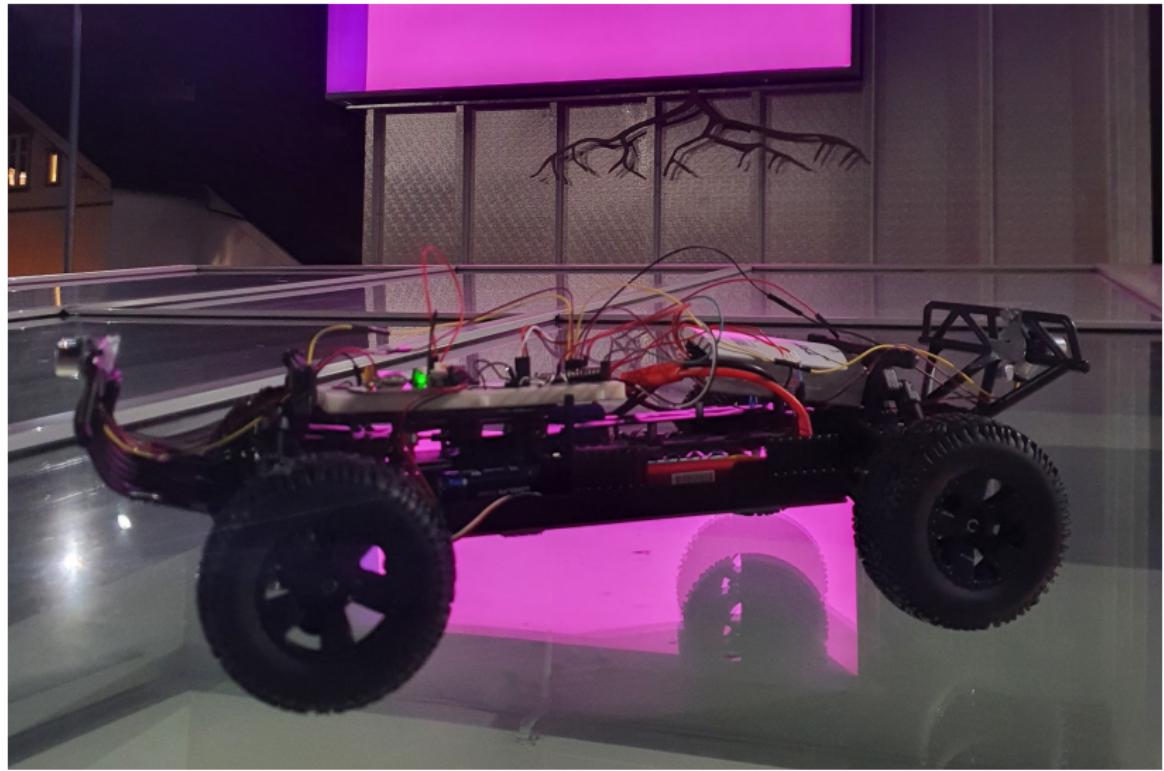
Kent Odde, Stian Onarheim, Tarald Vestbøstad

USN

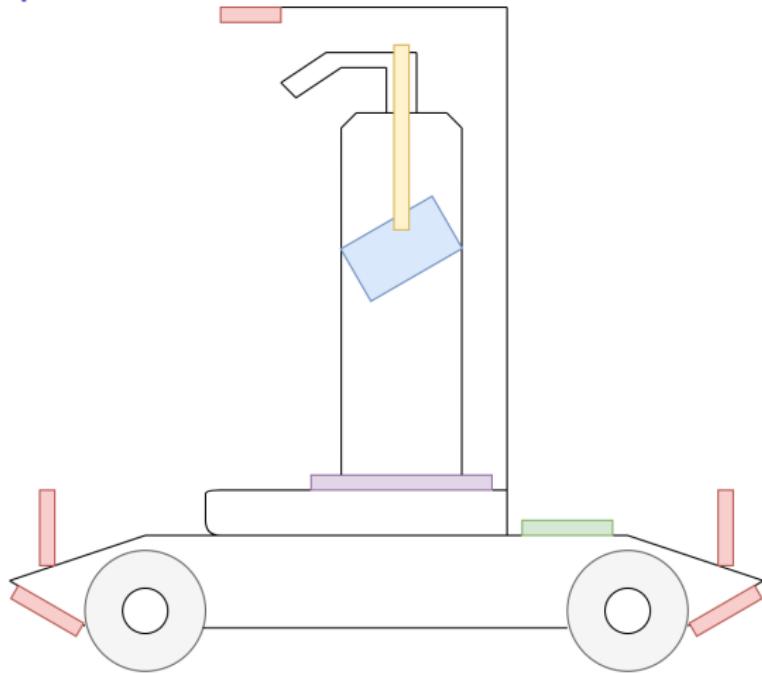
Autumn 2020

# Showcase

• S  
• G



# Initial Concept



Arduino NANO 33  
BLE SENSE



Pressure  
Plate



Rubber Band

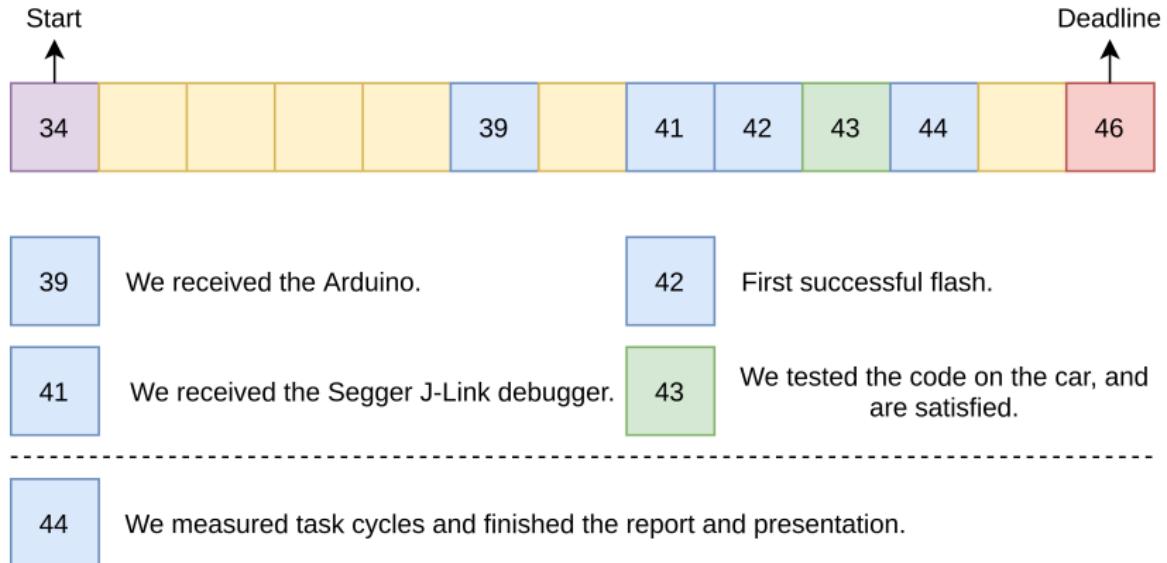


Proximity  
Sensor

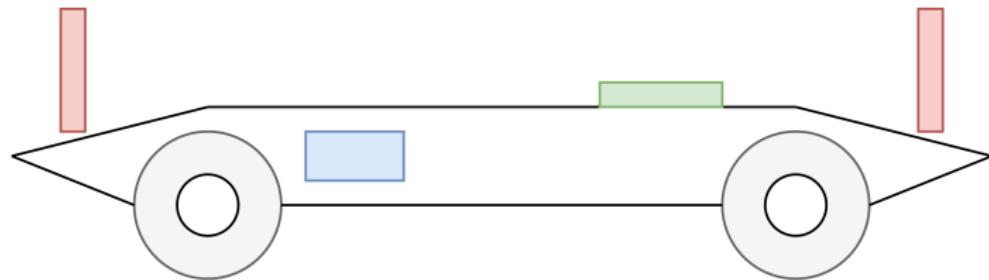


Servo Motor

# Timeline



# Final Design



Arduino NANO 33 BLE SENSE



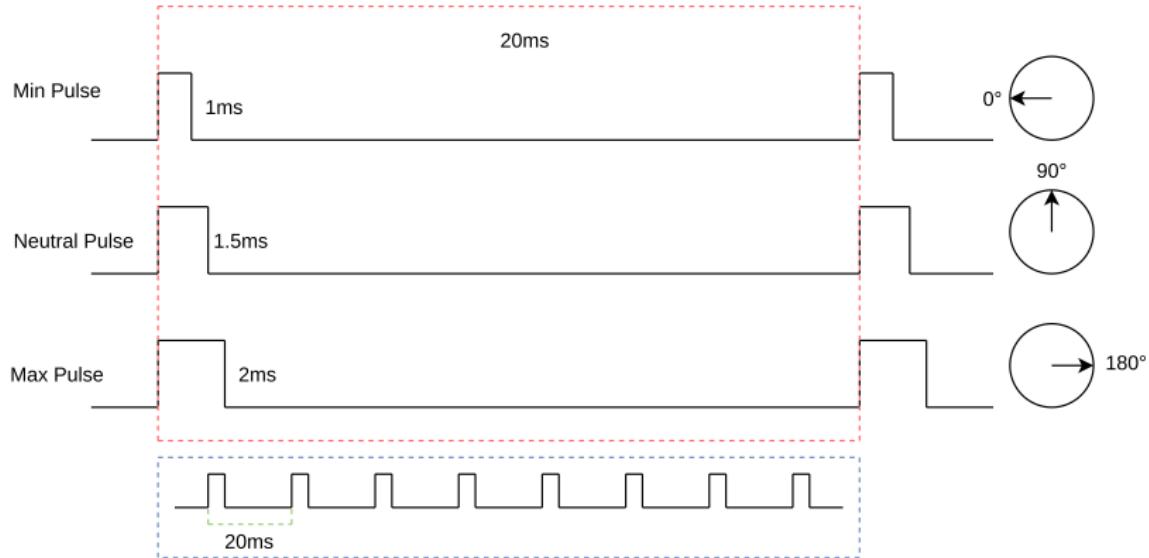
Proximity Sensor



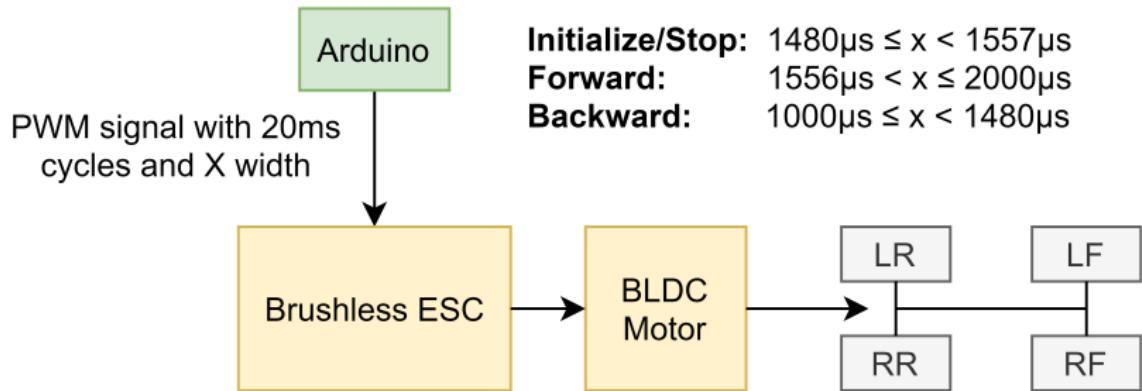
Brushless Motor ESC

# Servo

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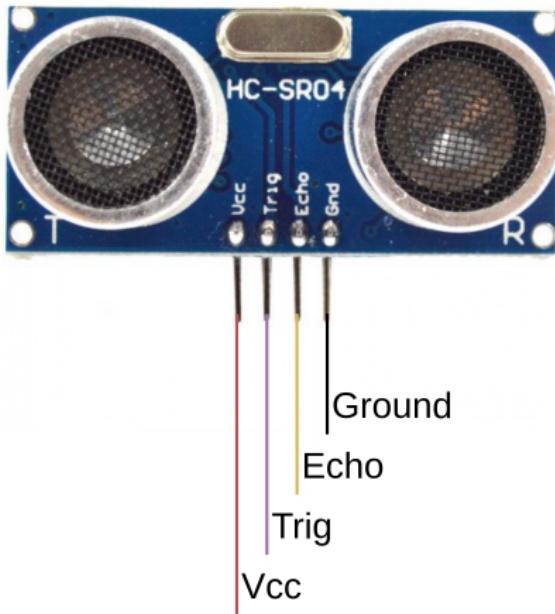


# Brushless Motor ESC

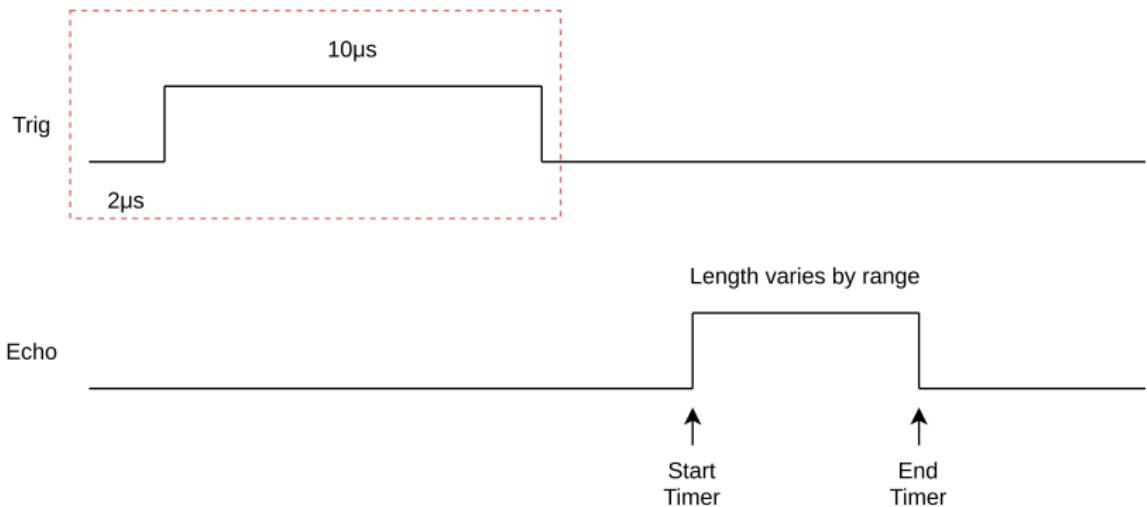


• S  
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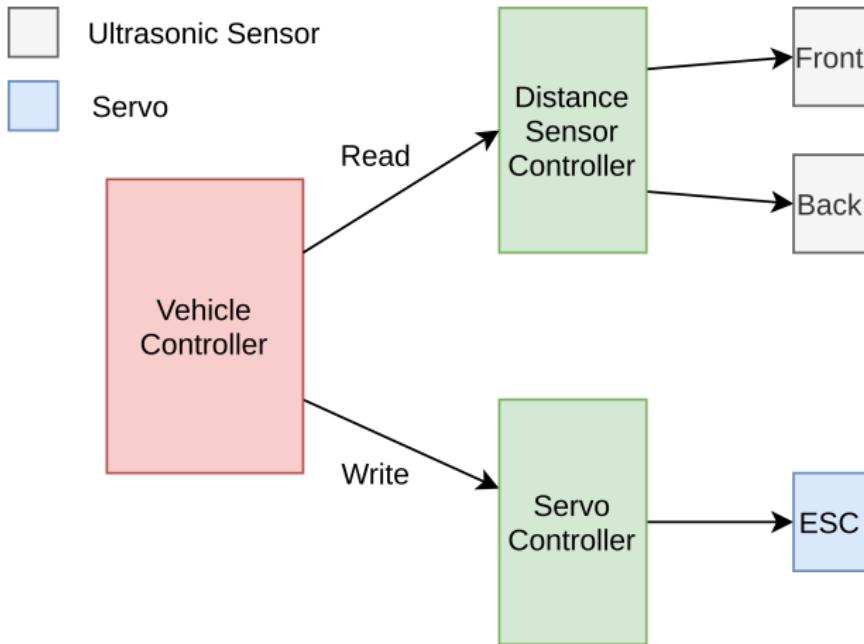
# Distance Sensor



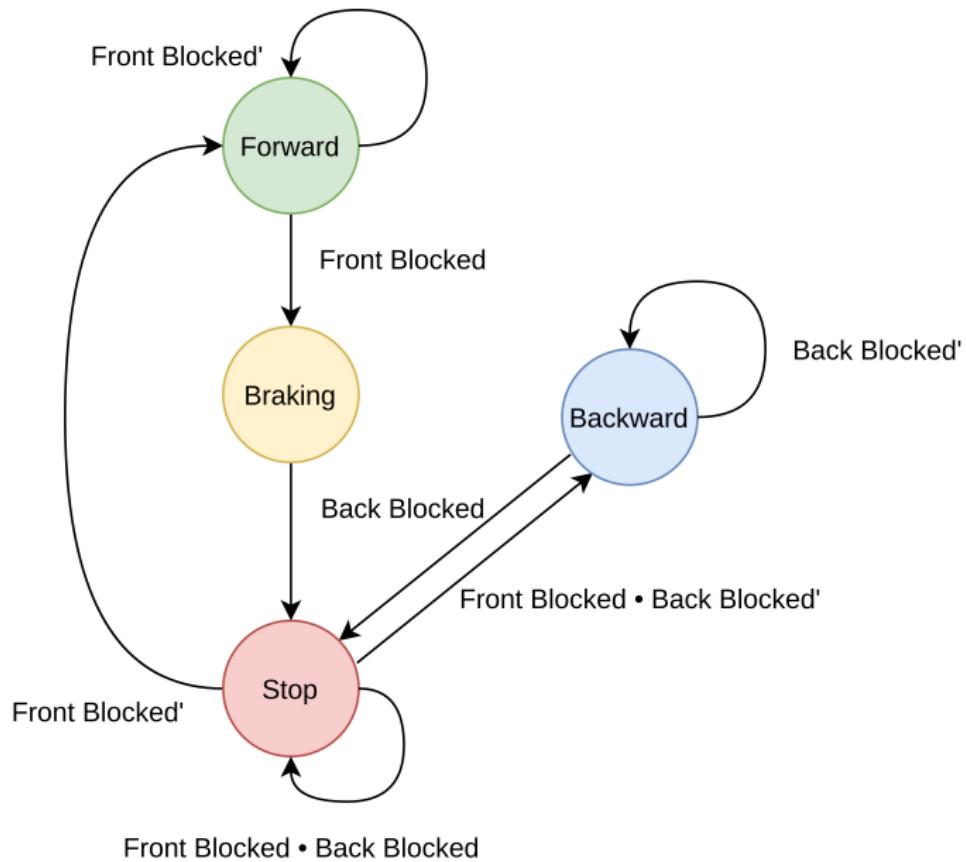
# Distance Sensor



# System Architecture



# Vehicle Controller



## Scheduling with utilization test

Task	Period(T)	Comp. time(C)	Priority(P)	Util(U)
Engine	20ms	4094ns	4	0.0002
Compute	16ms	844ns	3	0.000052
Sensors	16ms	11600190ns	2	0.72
Lights	200ms	13438ns	1	0.000067
Main	N/A	16ns	0	0

The utilization factor for this system is

$$U_{Sum} = 72.0319\%$$

which is lower than the limit of 74.1% for five tasks.

# Scheduling with response time analysis

$$R_i = C_i + \sum_{j \in hp(i)} \left\lceil \frac{R_i}{T_j} \right\rceil C_j$$

Task	Period(T)	Comp. time(C)	Priority(P)	Response Time(R)
Engine	20ms	4094ns	4	4094ns
Compute	16ms	844ns	3	4938ns
Sensors	16ms	11600190ns	2	11605128ns
Lights	200ms	13438ns	1	11618566ns
Main	N/A	16ns	0	N/A

# Demonstration

- S
- G

Live Demo

# Questions

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- G

Any questions?

# The End

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- G

Thank you for your attention. :)

You can find our Ada\_Drivers\_Library fork and the source code over  
at <https://github.com/stykk-gruppen>