

# Design document

**Group Nr. 3**

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# 1 Project description

## 1.1 Problem description

When the CO2 level in a room reaches a certain level, a window should automatically open and a fresh air fan should switch on. After a certain lower CO2 level is reached and a certain run-on time has elapsed, the window is closed again and the fan is switched off again.

## 1.2 Hardware

1. MH-Z19 CO2 Sensor
2. Arduino with bluetooth module
3. Raspberry
4. Electric motor

## 1.3 Hardware

1. Analog input for measuring the CO2 contentr
2. Digital output for controlling a window opener
3. Digital output to control a fan

## 1.4 Schema

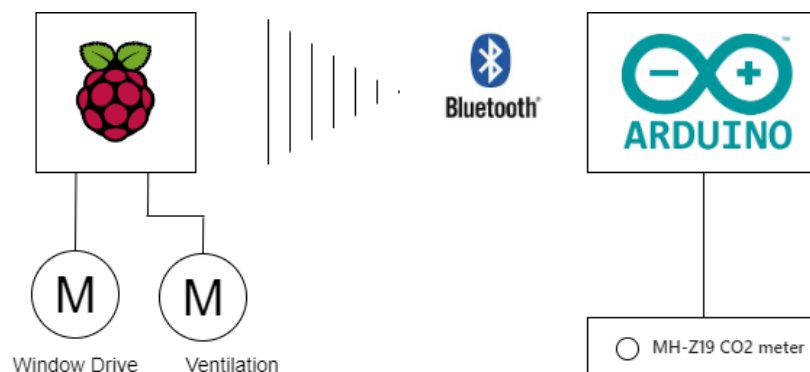


Figure 1: system description

## **2 Software architecture and design**

### **2.1 Software modules**

#### **Safety related modules**

1. Modul x:  
Description:  
Functions:  
Data:  
Requirements see: 1.1., ....

#### **Security related modules**

#### **Modules with no influence on Safety and Security**

### **2.2 Libraries**

Description of used function with parameters.

### **2.3 Interrupts**

Definition of priorities.

### **2.4 Pinout**

### 3 Program flowchart

Hier bitte Sequenzdiagramme, bzw. Programmablaufdiagramme

## **4 Hazard identification**

### **4.1 Identified hazards and countermeasures**

1. Hazard 1:  
Requirement see 1.1.

2. Hazard 2:

3. Hazard 3:

### **4.2 Identified hazards without countermeasures**

1. Hazard 1:

2. Hazard 2:

3. Hazard 3:

## 5 Threat identification

### 5.1 Identified threats and countermeasures

1. Threat 1:
2. Threat 2:
3. Threat 3:

### 5.2 Identified threats without countermeasures

1. Threat 1:
2. Threat 2:
3. Threat 3:

## 6 Requirements

### 6.1 Safety related requirements

1. Requirement:

At program start all safety related functions must be tested.

Folge Requirements: 1.1. , 1.2.

1.1. Requirement

At program start the LED indicating an error must be tested.2.

1.2. Requirement

At program start the USART sending error messages must be tested.

2. Requirement:

3. Requirement:

### 6.2 Security related requirements

### 6.3 Requirements with no influence on Safety and Security