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# **RCAT Documentation**

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RCAT - Raspberry Pi circuit analysis tool Your best friend when learning electronics!



# CHAPTER 1

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## Contents:

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### 1.1 Thesis:

As part of our education in industrial automation at the academy (HoGent) in Gent, we have to write a thesis. We chose to develop this project for our thesis. If you would like to know more about us, please refer to the team page: [\[insert link here\]](#).

#### 1.1.1 Origin:

It is hard to pinpoint the actual origin for this project. Before we even thought about our thesis, we were designing a shield for Arduino, aimed at absolute beginners. When our initial concept was finished we went to our teacher of microcontrollers, to get some feedback.

This meeting went quite well, we got a lot of feedback. There was another teacher present that said that there was a possibility of doing something similar as our thesis. Back then it was also briefly mentioned to implement some sort of automatic evaluation for the students.

This possibility of designing a system like this, kept lingering in the back of our heads. As time went on this thought kept coming back and getting stronger. After quite a few mails back and forth, it was final; we would be doing this project for our thesis. The actual subject of our thesis had also changed a bit already.

We would be making a system to simulate and emulate peripherals for microcontrollers. So that teachers can introduce more diversity into their practicals. There would also be an automatic evaluation module implemented.

#### 1.1.2 Vision:

There is a lot that we hope to achieve with this project.

### **Help the students:**

The main thing we hope to achieve is to improve the education. Quite often the practicals are quite monotonous and not really representative of real world cases. This is because actual industrial hardware for students to practice on is rather expensive. It is also really hard to stay up to date with the newest developments as this often requires getting new installations.

There is also a significant risk involved with letting unexperienced students practice on actual installations. The risk is both for equipment and for personal injuries. Most of this problem could be solved by replacing the installation with a small and cheap computer that has the same interaction as the real thing, but keeps all the dangers and costs virtual.

### **Help the teachers:**

We also hope to streamline the practicals. Students that have no problems with the subject can solve the exercises and have them automatically evaluated. This way the teacher has more time to help the students that do have problems with the subject. By not having to spend time evaluating exercises that will be correct a lot of time is saved. If an exercise is judged as incorrect by the automatic evaluation the teacher can still come and help in.

It is not our goal to eliminate the teacher. It is our goal to allow the teacher to focus more students that have troubles with the subject and better help them.

### **Help other areas:**

Although this system is developed, to help teach microcontrollers, industrial process control and other relevant subjects such as PLC, we also hope that it might be useful in other areas as well.

The fact that the system can simulate processes makes it quite useful in many areas. We would really like to see this project become a universal tool for education.

### **1.1.3 Goal:**

This section will be added as soon as we have the actual outline of our thesis. But for now the goal is to make the project work.