"Projet Long" Report - Version 1

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Signatures

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Customers - David Doose - Julien Brunel :

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Acknowledgments

Apart from our personal efforts, the success of any project depends largely on the encouragement and guidelines of many other persons either from the clients or our school professors. We would like to express the deepest appreciation to all our professors at ENSEEIHT who introduced us to Computer Science Engineering and helped us to acquire solid technical skills and widen our knowledge by attending very interesting courses and working on many exciting projects during this three years.

We take this opportunity to express our gratitude to the people who have been instrumental in the successful completion of this project. I would like to gratefully acknowledge the enthusiastic supervision of Mr. David Doose and Mr. Julien Brunel, both engineering researchers at ONERA, who had been a source of inspiration and were always guiding us and giving us useful suggestions which helped us in completing the project work. They always did there best to respond promptly and enthusiastically to all our requests, despite their congested daily schedule. I would also like to thank Mr. Jean francois Coiffin, our industrial partner, who helped us to manage the project, raise awareness with problems and methods for this activity and also ensure quality control.

Finally, the reception of ENSEEIHT, which provided us every day with a room to work in all day long.

Introduction

This report deals with the work we did from the end of January, in the context of the "projet long". It is proposed by Mr. David Doose and Mr. Julien Brunel from ONERA, the French Aerospace Lab, and deals with pattern recognition in C++ code. We will describe the project management methods that we used and then we will present the technical aspects of our project.

Our team consists of five ENSEEIHT students (Zohour Abouakil, Fabien Sauce) from the computer science course and (Sofia Boutahar, David Courtinot, Xiaowen Ji) from the imagery and multimedia course, two clients (Mr. David Doose and Mr. Julien Brunel) and an industrial partner from Astrium (Mr. Jean Francois Coiffin)

As third year engineering students in Computer science and applied mathematics, we are interested in groundbreaking technologies. Part of our degree, our final year project has been the right place to get in touch with a lot of new technologies and get in touch with very skilled and professional persons by working on an innovant and ambitious project.

It was the opportunity to discover and set up project management systems that are necessary to respect all the deadlines.

Part I

Project presentation

I.1 Overview

To get our ENSEEIHT engineering diploma, we are required to take part in a project called "Projet long" in teams of five students to work on a common project.The project started on January 19, and will last eight weeks. It ends up with a defense in which we promote our work in front of a jury which evaluates us against different aspects :

- Project management and organization
- Technical accomplishment
- Report and defense presentation
- English evaluation

All over the project, we have to work side by side with the client for whom we have to deliver, at the end of the project, a product that suits their expectations. Furthermore, we are also supervised by Mr. Jean-Francois COIFFIN. He is in charge of helping us through his experience in the project management and organization.

We chose to work on that project because of the originality of the subject, since it is mixing theoretic computer science and technical advanced principles. Moreover, studying model checking and temporal logic to assert properties on a source code was a topic that we studied in ENSEEIHT courses. This project is an opportunity to apply this theory and dive deeper into it.

I.2 Subject

I.2.1 Main idea

The client is waiting for a prototype that allows a search of patterns on a C++ code. The patterns will be expressed in terms of temporal logic properties.

I.2.2 Project description

Embedded systems and robotics are designed to interact with humans. Therefore, a single failure or a malfunction can really be catastrophic. This is why various analyses are undertaken to limit and prevent such problems. Theses analysis aim to study the embedded code and prove that it does what it is supposed to do. The goal of our project is to find out whether the embedded code meets a number of programming rules by

defining authorized and prohibited patterns. Our clients have an existing tool named Coccinelle that is developed at INRIA. This tool detects patterns and also offers the possibility to modify the code. However, this tool only works on C code. The objective of the project is to design a prototype for pattern matching in a C++ code.

I.3 Objectives

From a pedagogical point of view, this project was the opportunity to apply a lot of techniques that we saw in our three years of courses in ENSEEIHT and new techniques that we learned while working on it. We took our project management courses as a reference to organize our time and to catch up with the deadlines.

To deliver a good product at the end, we realized that the good coordination in the team, the regular exchange of ideas during meetings and code/design reviews and production of relevant documents are main keys of success.

I.4 Constraints

Part II

Project management

II.1 Team organization

II.2 Delivered documents

II.3 Development plan

II.4 Risk management

II.5 Resource management system

II.6 Quality checking and validation