primatec
engineering

PRIMATEC GRADUATION PROJECTS

2020- 2021

ABOUT US

Primatec Engineering, as a prominent offshore outsourcing company specialized in the test and development of electronic controllers, delivers solutions that help clients achieve their goals quickly and without any hassle. Unlike other companies, we don't just promise excellence, but take effective measures to ensure best results. Reliability, efficiency, and expertise are our core principles.

"We don't just promise, we succeed!"

Primatec at a Glance

- More than 200 employees work for Primatec.
- More than 80% of our employees are young graduates.

Hired Trainees

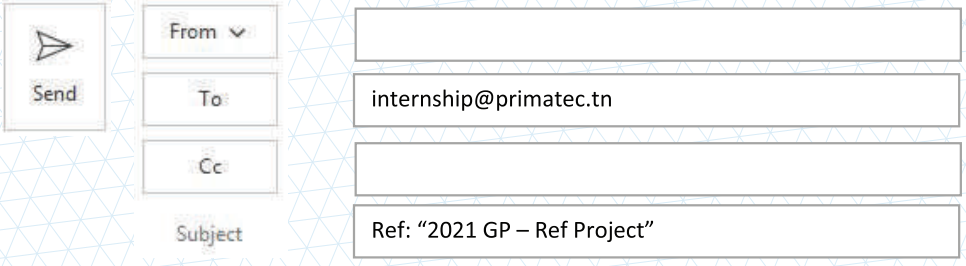
2017	2018	2019	2020
we hired 07.	we hired 08.	we hired 17.	we hired 12.

Our team continues to expand, our expertise continues to grow, but our goal of providing clients with the most thorough software testing and QA services remains unchanged.

Trusted by

Make the most of your internship period with Primatec Engineering! Find your dream job! Build your Future career with us!
There are still places available for all students and graduates from universities.
You can gain professional experience in your chosen project while discovering our culture and learning skills.

How to apply?



Send an up to date CV to internship@primatec.tn mentioning the project you wish to work on.
If you are interested in more than 1 project, you can cite all those for which you apply in order of decreasing preference in the body of the email.

Project 01: Installation and integration of Docker

Ref: 2021 GP-01

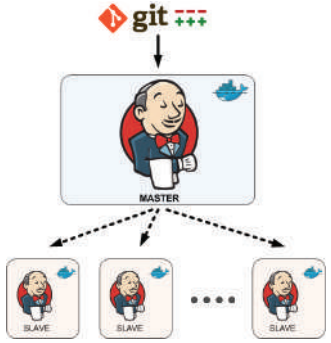
Project detailed description

- Objectives:

The purpose of this project is to install Docker on Linux.
This server will deploy custom image of Jenkins with the desired plugins, nodes, jobs, etc....
Managing the volumes is also needed, like archiving them and put them in a remote location.

- Keywords:

Jenkins, Linux, Docker, Scripting, Git, CI, Python.



- Required tasks:

- Install Docker and manage the containers and volumes.
- Prepare Jenkins container image with automatic job configuration, plugin installation and Node connection.
- Solution to archive/unarchive each docker Jenkins image. Develop a script to clean the volume before archiving (deleting aborted, failed builds, etc....)
- Search for a solution to have one Jenkins master to manage the slave Jenkins.
- Develop script or a job to clone full validation git repository while changing the needed variables automatically.

Technologies:
Python, Linux, Git, Jenkins

Required Educational background
Computer Science Engineer

Highly required

Language:
English

1 Trainee

From 5 to 6 months

Project 02: Diagnostic Tool

Ref: 2021 GP-02

Project detailed description

- Objectives:

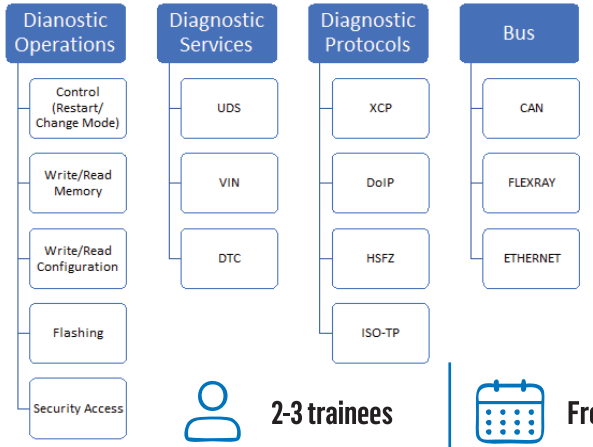
In the automotive industry although the diagnostic operations performed by user are usually simple, the variations of possibilities between protocols/ busses makes it difficult to implement a consistent toolchain.

- Keywords:

Diagnostic tool, Busses,

- Required tasks:

- To simplify the complexity, we would define all operations as terminal/shell like commands.
A catalog of commands and their possible arguments need to be defined.
- Implement the commands defined in part 1 for at least 1 protocol and 1 bus
- Implement a GUI that run the commands defined in Part 1.



Technologies:
C#, Python

Required Educational background
Computer Science Engineer

Skills: Desirable

Any additional comments ...
Access to existing implementations in the company (A2L parser, XCP, ANDi Ediabas wrapper...)

Language:
English

2-3 trainees

From 4 to 6 months

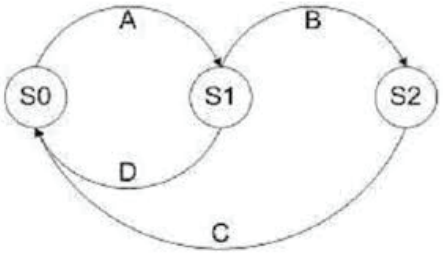
Project 03: Graphic Test suite design

Ref: 2021GP-03

Project detailed description :

- Objectives:

Software testing is an essential and important technique for assessing the quality of a software/product. In order to simplify the strategic design and technique of the test case and to improve the quality of the software testing process, a Graphical test suite design helps the tester to design the relation between the different test cases, execute the test suite and generate reports based on the output result.



- Keywords:

software testing, Graphical test, design

- Required tasks:

- Simulate the different system transition: State transition – Black Box techniques
- Define the different relations between the testcases
- Define a generic strategy to set the input/output of suite test cases

Technologies:

C#, Python

Required Educational background

Computer Science Engineer

Skills: Desirable

Language:

English

1 Trainee

From 4 to 6 months

Project 04: Robot GUI test Automation

Ref: 2021 GP-04

Project detailed description

- Objectives:

Currently, we create Robot tests for testing user interface in desktop applications manually which is time consuming, and prone to error for small user interface changes.

- Keywords:

Robot tests

- Required tasks:

- Provide a desktop application that records the testers actions and saves them as a robot script

The final application will need to support detection of buttons using their icons + OCR, and not based on screen

Technologies:

Robot test Framework

Required Educational background

Computer Science Engineer

Skills: Desirable

Language:

English

1 Trainee

From 4 to 6 months

Project 05: Gateway Rules Processor

Ref: 2021 GP-05

Project detailed description

- Objectives:

Implementation of a configurable, flexible, and optimized "**software gateway rules processor**" for automotive domain. The gateway rules should be controllable and configurable remotely through a standard web navigator.

- Required tasks:

- Implement a software gateway rules processor application.
- Optimize the application implementation to reach real-time constraints.
- Implement a light HTTP server to:
- Configure the gateway rules
- Control the application (shutdown, restart, collect statistics, ...)
- Validate the implemented application:
- Unit tests
- Implement python scripts to validate:
- Integration tests
- Performance tests to collect performance statistics
- Stress tests to check application stabilitys

Technologies:

Linux, C++17, Python 3

Required Educational background

Computer Science Engineer

Skills: Desirable

Language:

English

1 trainee

From 5 to 6 months

Project 06: Calibration Graphical tool

Ref: 2021 GP-06

Project detailed description

- Objectives:

The purpose of this project is to create a user-friendly GUI, which allow testers to connect and calibrate the electronic control units, ECUs. In fact, they will be able to read and write access to variables and memory contents of microcontroller systems at runtime.

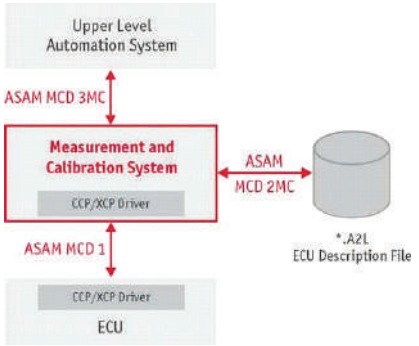
- Keywords:

XCP, ASAM, A2L, C#, DevExpress, Regex.

- Required tasks:

- Parse one or multiples A2L files In Parallel threading.
- Develop a GUI to calibrate an ECU by setting/getting values of a specific measurement having unique address memory at runtime.
- Convert this value from an ECU-internal format, which is optimized for implementation, to a physical format, which is easily understood by human beings.
- Start the communications between the master (Canape/Canoe) and the slave (BCP). Sending and receiving messages and deserializing them.

* Create a readable logger for each step.



Technologies:

C#, DevExpress, Git, XCP.

Required Educational background

Computer Science Engineer

Highly required

Language:

English

1 trainee

From 5 to 6 months

Project 7 : Message catalogue database collection

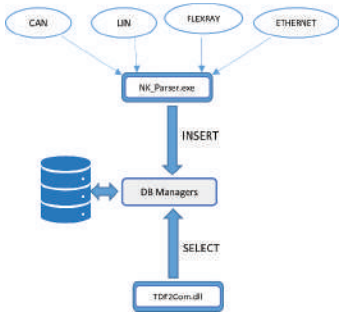
Project detailed description

- Objectives:

The time needed to parse and load data from all NKs (message catalogs) is ~20% of the execution time for each TC.

The purpose of this project is to decrease (as much as possible) the time needed for the execution of the TC.

Therefore, we need to parse the message catalogs only once and save the data in the DB. During the execution of the TC, we select only needed data from DB...



- Keywords:

- Database
- Message Catalogs
- Execution Time

- Required tasks:

- Design of a Database to contain the different NKs for all the Buses (CAN, LIN, FlexRay, Ethernet, ...)
- Design and implement an application that parses the different NKs and inserts the data into a database.
- Modify the "Com Layer" of TDFNext to use the Database to select data for each TC.

1 Trainee

From 4 to 6 months

Ref: 2021 GP-07

Technologies:

C++, SQL, XML

Required Educational

Computer Science Engineer

Skills:

Highly required:

POO, Specification, and design

Desirable:

Database high knowledge, XML

Any additional comments ...

We have, approximately, in the full validation more than 40 000 testcases.

The average execution time of a TC is 100sec. (i.e. a total execution time more than 3 weeks).

In order to reduce the execution time, we need to parse the message catalogs only once before the execution of Full Validation and select only needed data during the execution of the TC.

Language: English

Project 8 : Custom protocol Encoder Decoder

Project detailed description

- Objectives:

The objective of project is to create an extensible mechanism of serializing structured data.

User can define the data to be structured once, then he can use special generated source code to easily write and read the structured data to and from a variety of data streams. Basically, The Custom Encoder Decoder project allows to generate a source code using IronPython from an input specification file (xml, json, yaml, or a custom format) defined by user, using a compiler (Protocol buffer, KaitaiStruct)

- Required tasks:

- Creation of protocol catalog compiler
- Encode Decode Messages using protocol catalog

1 Trainee

From 4 to 6 months

Ref: 2021 GP-08

Technologies:

Compiler, Protocol Buffer, KaitaiStruct, Desktop application , C++, C#, WinForms, Ironpython, YAML, XML, JSON

Language: English

Project 9 : Test cases results management tool

Ref: 2021 GP-09

Project detailed description

- Objectives:

The project objective is to collect Testcases results from executors, allowing the tester to visualize reports based on the investigation for each full validation.
Created report will be presented in Dashboard contains flaky tests, detected bugs by testcases, refactored testcases, Passed and Failed testcases statistics and release status.

- Required tasks:

- Creation of statistics Dashboard for testers and managers
- Creation of middleware web application between Test Executors and Dashboard

Technologies:

Jenkins, scrapy, Data collection, Flask, Angular, robot framework

Language: English

1 Trainee

From 4 to 6 months

Project 10 : Customer requests classification

Ref: 2021 GP-10

Project detailed description

- Objectives:

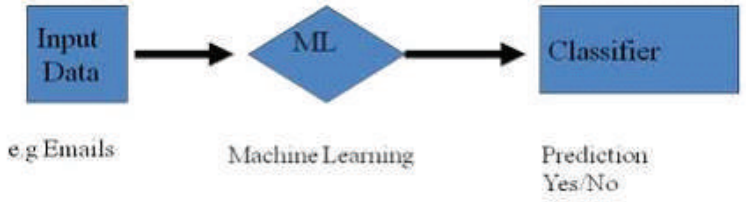
Flash Acceptance Tool (FAT) automatically performs many tests for several system functions. Users usually sends emails to FAT support for further information and support. These emails are the analyzed and treated in brief delays.
In order to save time and effort, FAT internal tool will help to store the FAT support requests and their analysis. By treating these data, the tool will be able to help developers to provide quicker results.

- Keywords:

Prediction, Machine learning

- Required tasks:

- Database design
- Benchmark to choose the machine learning algorithm
- Desktop App development



Technologies:

Java, Python

Required Educational background

Computer Science Engineer

Skills: Knowledge in machine learning field

Any additional comments ...

This require the access to the support history.
This tool can be extended to support more useful modules.

Language: English

2 Trainees

From 4 to 6 months

Project 11: Framework Benchmarking Automation

Project detailed description

- Objectives:

Each month, new TDFNext (Test Framework) version is released. The validation of this version, can be covered in many levels: Unit Test, Smoke Test, Integration Test, Acceptance Test.
Those kinds of test cannot detect the performance issue that could be introduced during the last development month. We can even define a Stress Test, but it will take too much time and it is hard to analyze the result, especially with the short releases cycle.
For that the benchmarking need to be introduced and should be automated, to detect the performance problem as early as possible, to fix the root cause from the stabilization phase.

- Keywords:

- Performance measurement
- Test Framework
- C++ knowledge

- Required tasks:

- Understand TDFNext Architecture and source code
- Internal Process Communication (IPC) benchmarking
- Online statics using Virtual bus (for each Framework Layer), no need for hardware connection
- Offline analysis (Scripting using python and ANDI tool)
- Setup a Testbench that has Lin/CAN and Flexray connected and use it in the reporting phase
- Compare the version to be released with the Last released version.
- Implement a Jenkins job

1 Trainee

From 4 to 6 months

Ref: 2021 GP-11

Technologies:

C++ / C# and Python
Jenkins and Scripting

Required Educational background

Computer Science Engineer

Skills:

Highly required:

POO, Specification, and design

Desirable:

C++ 14, Python, Google Test

Any additional comments ...

Internal Comments:
- Very Confidential
- PC Highly Secured
- It will be better that the candidate stays in the office, next to infra team

Language:

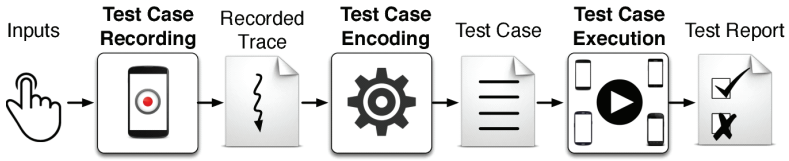
English

Project 12: Test case Replay

Project detailed description

- Objectives:

TDFNext is an internal Framework used by the testing projects, implemented in collaboration with BMW.
This Framework is used to test several ECU (BCP, xpad, hpad, CSM ...).
TDFNext is useless if we do not have a Testbench* where we can execute our testcases (cost a lot). To reproduce a bug in this framewok, we need to have a Testbench connected to the ECU to be tested (Flashed with the same Software version and the same configuration) to be able to debug the problem. The accessibility to the testbench is not always allowed (too many requests at the same time). In addition to that, for the Sporadic bugs, we need to spend a lot of time to reproduce the issue (especially for the simulations that need interaction with the device under test).
For that, we need to setup new environment that allow us to replay the impacted testcases using only the developer PC. The Testcase has as result some log files (pcap, asc, xml, txt). Based on ASC and PCAP, we can make a replay to the whole testcase, using TDFNext Framework.



- Keywords:

- Test Framework
- C++ knowledge
- Pcap traces
- ASC traces
- Virtual Bus

*: Hardware boards that support CAN/Lin/FLexray/IO (Vector, BTS) , Ethernet adapters, MediaGetway, Switcher,Performant PC ...

- Required tasks:

- Json Configuration Convertor from Real to virtual bus
- Implement ASC Replay / Implement PCAP Replay

1 Trainee

From 4 to 6 months

Ref: 2021 GP-12

Technologies:

C++ / C# and Python
Jenkins and Scripting

Required Educational background

Computer Science Engineer

Skills:

Highly required:

POO, Specification, and design

Desirable:

C++ 14, C#

Any additional comments ...

Internal Comments:
☒ Very Confidential
☒ PC Highly Secured
☒ It will be better that the candidate stays in the office, next to infra team

Language:

English

Project 13: Hardware Filter for Automotive Ethernet

Project detailed description

Objectives:

Implementation of a configurable and optimized "Hardware Filter for Automotive Ethernet". The Filter should be configurable via Ethernet interface using a configuration core.

Required tasks:

- Implement the Filter core using VHDL language.
- Implement the configuration core using VHDL language.
- Validate the implemented Cores:
- Implement the Testbench environment using VHDL language.
- Test the Filter using ModelSim
- Implement python scripts and UI to configure the Filter: generate configuration frames.

Environment:

- ModelSim
- Intel Quartus

Ref: 2021 GP-13

Technologies:

VHDL,Python: for the Filter configuration environment

Required Educational background

Computer Science Engineer

Language: English

1 Trainee

From 4 to 6 months

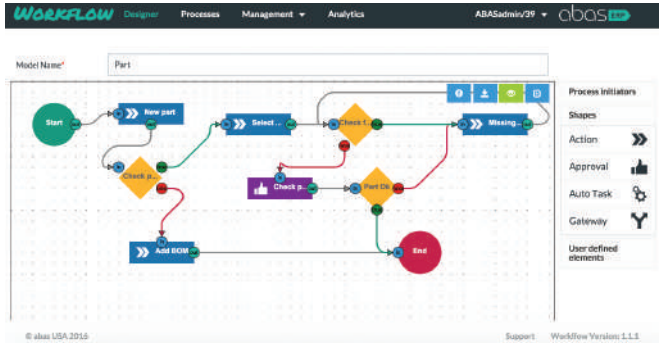
Project 14 : WORKFLOW MANAGEMENT SYSTEM

Project detailed description

- Objectives:

Workflow Management Systems(WfMSs) and Enterprise Resource Planning (ERP) systems, have been used to support ebusiness process redesign, integration, and management. While both technologies can help with business process automation, data transfer, and information sharing, the technological approach and features of solutions provided by WfMS and ERP are different.

So, we need to create WMS inside our ERP as a flow layer to manage existing process and add the possibility to add and configure new process as work attendances; leave request ..



1 Trainee

From 4 to 6 months

Ref: 2021 GP-14

Technologies:

ReactJS, ExpressJS, BPMN, BPM, Workflow Management System (WMS), SQLServer

Required Educational background

Computer Science Engineer end of study

Language: English

Project 15 : KPIs Measurement and follow up of Quality and Security Management Systems

Ref: 2021 GP-15

Project detailed description
- Objectives:

For our ISO27001 certification we need to develop a platform that serves in:

- Collecting data from different Tools we are using e.g. Redmine, ITOP and Excel.
- Using these data to calculate KPIs defined for our management systems.
- Generating dashboards for KPIs follow up

Technologies:

C/C++,Embedded System, Image Processing, Linux

Required Educational background

Computer Science or relevant degree

Language: English

1 Trainee

From 4 to 6 months

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