SUMMER PRACTICE PROJECTS 2021
IAŞI
**PROCESUL DE SELECȚIE PENTRU PRACTICA DE VARĂ**

1. **APLICARE:**
   Completează formularul de aplicare. Te rugăm să menționezi în formularul de aplicare primele 3 proiecte (titlurile din broșură) la care ai vrea să contribui pe perioada practică de vară.

2. **INTERVIU TEHNIC**
   În funcție de proiectele alese, vei fi invitat la o discuție tehnică, iar aceasta va fi bazată pe arile tehnice menționate în broșură, la proiectul respectiv/proiectele respective.

3. **INTERVIU HR**
   În urma interviului tehnic, în funcție de feedback-ul primit, vei putea fi invitat în etapa finală, un interviu de grup - o activitate practică.

**CALENDAR**

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<th>CE?</th>
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<td>1 martie 2021</td>
<td>Postarea şi promovarea proiectelor de practică</td>
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<td>1 martie - 21 martie 2021</td>
<td>Studenții cursanți, care vor finaliza cel puțin anul II de studii în anul 2021, pot aplica pentru proiectele preferate.</td>
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<tr>
<td>22 martie - 26 martie 2021</td>
<td>Preselecția aplicaților și alocarea acestora pe proiecte *Locurile sunt limitate. În cazul în care numărul aplicaților va depăși numărul locuințelor alocate, se va realiza o preselecție pe baza mediei anului de studiu precedent.</td>
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<td>29 martie - 14 mai 2021</td>
<td>Desfășurarea procesului de recrutare: -Interviuri tehnice -Interviuri HR -Rezultate finale</td>
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AUTONOMOUS MOBILITY AND SAFETY
TRANING MANAGEMENT PLATFORM

PROJECT DESCRIPTION
A web application to manage trainings, technical presentation and knowledge sharing from company. All this are stored and visible to all employees.

MAIN RESPONSIBILITIES
- Researching, designing, implementing, and managing software programs
- Testing and evaluating new programs
- Writing and implementing efficient code
- Training users
- Present the final product

KNOWLEDGE MUST HAVE
- Knowledge of an OOP language
- Knowledge about Databases
- Experience with HTML, CSS, JS
- Knowledge about HTTP, REST
- The ability to learn new technologies quickly
- An analytical mind
- Good communication skills
- Attention to detail

KNOWLEDGE NICE TO HAVE
- Knowledge of a back-end framework (.NET, Spring)
- Knowledge of a front-end framework (Angular, reactJS, vueJS ...)
- Knowledge of an ORM
- Experience with a database (PostgreSQL, MongoDB)
- Experience with a DBMS

YOUR WORKING CONTRACT COULD BE:
8 h per day

PYTHON DEBUGGER API

PROJECT DESCRIPTION
Use the Python API (library) from a debug tool to execute software tests and save results to a report.

MAIN RESPONSIBILITIES
- Get familiar with the existing Python implementation.
- Update existing implementation with feature requests.
- Bring optimization to existing implementation.
- Implement features and optimizations in GitHub.
- Offer support for the Python implementation.
- Get familiar with the existing C Source Code.
- Understand the Requirements and Design of the C Source Code.
- Use the Python script to debug C Source Code.

KNOWLEDGE MUST HAVE
- Basic Programming Skills

KNOWLEDGE NICE TO HAVE
- Python/HTML Basics
- Git/GitHub

YOUR WORKING CONTRACT COULD BE:
6/8h per day
QR MANAGER

PROJECT DESCRIPTION
Generate QR Codes from a GUI.
Update a database when someone scans a QR Code.

MAIN RESPONSIBILITIES
- Get familiar with the existing Python implementation.
- Get familiar with the database used by the project.
- Get familiar with the QR Code concept.
- Update existing implementation with feature requests.
- Bring optimizations to the existing implementation.
- Implement features and optimizations in GitHub.
- Offer support.

KNOWLEDGE MUST HAVE
- Basic Programming Skills
- Python preferably

KNOWLEDGE NICE TO HAVE
- SQL Basics
- Git/Github

YOUR WORKING CONTRACT COULD BE:
6/8h per day

MCAL DEVELOPMENT BASED ON V-CYCLE APPROACH

PROJECT DESCRIPTION
Develop an MCAL source code using generated and manual code based on a V-cycle implementation:
- Get accustomed with the automotive world using the actual tools used in Continental
- Follow the quality assurance steps in the development
- The aim of the project is to prepare the students for the next step in their career as a software developer in automotive
- The students should acquire the necessary skills in order to easily integrate in an automotive project

MAIN RESPONSIBILITIES
- Develop a MCAL source code based on given requirements
- Develop the design
- Create a MCAL configuration in the Trosos and integrate the generated code into the project
- Configure components like MCU, GPIO, ADC, Timers
- Write code to fully implement the requirements
- Create test cases and the implementation
- Debug and fix the software if needed
- Develop the application on an automotive microcontroller (Infineon - Aurix)
- Introduction in Autosar standard
- Handle generated and manual code based on a V-cycle implementation
- Get familiar with tools used in Continental (Trosos, Trace32, Catch)

KNOWLEDGE MUST HAVE
- C language
- Microcontroller knowledge

KNOWLEDGE NICE TO HAVE
- Electrical/electronical knowledge

YOUR WORKING CONTRACT COULD BE:
4h per day
**BOOST CONVERTER USED TO SUPPLY A HIGH CAPACITIVE LOAD (ENERGY BUFFER)**

**PROJECT DESCRIPTION**
Capacitors are used to store energy (acting as buffer) that can be used later when the main voltage supply is interrupted or turned off.

To increase the buffer time, a higher voltage can be used to charge the capacitors.

Outcomes:
1. Boost converter design and practical implementation;
2. Performance evaluation of the buffering circuit in considering different configurations and parameters;

**MAIN RESPONSIBILITIES**
- Get familiar with the operating principles of a boost (step-up) converter;
- Create schematic and layout of the circuit;
- Create the associated technical (design) documentation;
- Practical realization of the project;
- Performance analysis and possible design improvement measures.

**KNOWLEDGE MUST HAVE**
- Good knowledge of passive components (especially capacitors - types, characteristics)
- Basic knowledge of Analog electronics (active components - transistors, diodes, Op-Amps, comparators)
- Basic knowledge of Power Electronics (e.g.: using transistor as a switch)
- Linear power supply circuits
- Basic knowledge in working with an EE CAD software (KiCAD/Eagle/Proteus)

**KNOWLEDGE NICE TO HAVE**
- Knowledge about switching mode power supplies (SMPS)

**YOUR WORKING CONTRACT COULD BE:**
4/8h per day

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**ERRAND PLANNING WITH GENETIC ALGORITHMS**

**PROJECT DESCRIPTION**
A classic problem of everyday life is scheduling errands. You have to pay several bills, go shopping in a few different places, visit some people, all in one day. Given the addresses of all the places you have to visit, in which order should you visit them so that the entire trip is as short as possible?

This project aims to solve this scheduling problem using real data from Google Maps through Genetic Algorithms, a branch of AI focused on optimization problems.

**MAIN RESPONSIBILITIES**
- Interfacing with the Google Maps API
- Address processing (e.g. from an address to latitude/longitude)
- Trip data (duration, etc.)
- Research and implementation of Genetic Algorithms

**KNOWLEDGE MUST HAVE**
- Intermediate Programming knowledge (any language)
- Intermediate algorithms and data structures (lists, graphs)

**KNOWLEDGE NICE TO HAVE**
- Basic web knowledge (requests, using an API)
- Basic Genetic Algorithms knowledge
- Python Knowledge

**YOUR WORKING CONTRACT COULD BE:**
4/6/8h per day
HIL (HARDWARE-IN-LOOP) BUILDUP AND MACHINE QUALIFICATION PROCESS

PROJECT DESCRIPTION
The project target is to build and qualify the HiL hardware architecture for running Hardware-in-Loop simulation projects.

MAIN RESPONSIBILITIES
- Follow the available documentation and the Mentor guidelines in order to help build a working hardware configuration compatible with IPG simulation projects
- Mechanical frame buildup
- Functional modules integration
- Wiring for High & low power signals

KNOWLEDGE MUST HAVE
- Soldering skills
- Digital & analog signals
- Multimeter usage

KNOWLEDGE NICE TO HAVE
- English and/or German language

YOUR WORKING CONTRACT COULD BE:
8h per day

AUTOMATIC BRAKE LIGHT ENABLE FOR MOTORCYCLE WHEN BRAKING BY ENGINE BRAKE

PROJECT DESCRIPTION
When driving a motorcycle, the engine brake is sufficient to slow down the motorcycle without applying the brakes. The project will be aimed to develop a system which will detect the deceleration and enable the brake light, independently of brake application.

MAIN RESPONSIBILITIES
- Find a solution to implement the project
- Develop a hardware for the identified solution
- Develop a software for the identified solution
- Integrate the SW and HW on a demo design
- Identify from where and why the “magic smoke” has vanished and find a solution to fix the situation :D
- Create a presentation and present the project at the end of the summer practice

KNOWLEDGE MUST HAVE
- Embedded system knowledge and programming
- Basic Electronics

KNOWLEDGE NICE TO HAVE
- Desire to learn

YOUR WORKING CONTRACT COULD BE:
6h per day
REQUIREMENTS DERIVATION IN SYSTEMS ENGINEERING. DEVELOPMENT OF A PRE-REVIEW REQUIREMENTS ANALYSIS SOFTWARE TOOL

PROJECT DESCRIPTION
One of the greatest challenges in systems engineering is to define the problem that a proposed system should solve by gathering all the needs that arise within the product life cycle, and then, to transform them into technical demands that shall be met by a solution. This is the main goal of the Requirements Engineering activities within the Model Based Systems Engineering.

The first part of this project proposes to analyze and follow the systems engineering workflows with focus on requirements processes, in order to gather the system requirements of a fully automated robot delivery system based on Continental Urban Mobility Experience (CUbE) platform.

The second part of the project will establish a general methodology and principles for writing good requirements that will lead to identification of pattern in requirements synthax that deviate from the correct structure of a requirement. Based on these identified patterns, the internship students will develop a software tool that will find incorrect written requirements in a requirements document. The tool will have a great impact in the preparation of requirements review sessions.

MAIN RESPONSIBILITIES
The internship student will perform the following activities:
- Familiarize with systems engineering processes for automated driving by taking a short systems engineering training performed by mentors;
- Familiarize and review the Operational Concept Document (OCD) and Stakeholder Requirements Document of the automated delivery system.
- Elicitation of functional and non-functional system requirements, including documenting the requirements in DOORs;
- Define an ideal structure and methodology for writing requirements and find ways to identify patterns in requirements that deviate from the correct structure.
- Develop a script that identifies requirements from a requirements document that are not correctly written.

KNOWLEDGE MUST HAVE
- Analytical and abstractions skills
- Ability to synthesize
- Good knowledge of at least one object-oriented programming (OOP) language

KNOWLEDGE NICE TO HAVE
- Basic knowledge of system components (electrical, software, mechanical)

YOUR WORKING CONTRACT COULD BE:
8h per day
CNC FOR PCB PROTOTYPING - SW

PROJECT DESCRIPTION
Create a CNC machine to be used for fast prototyping of custom PCB

MAIN RESPONSIBILITIES
- develop and integrate software with mechanical and hardware components

KNOWLEDGE MUST HAVE
- Embedded systems basic
- Programming skills
- Basic understanding of mechanical operation and design basic
- Basic understanding of electronics operation and design

KNOWLEDGE NICE TO HAVE
- Embedded systems
- Networking
- Linux OS
- Python

YOUR WORKING CONTRACT COULD BE:
6/8h per day

CNC FOR PCB PROTOTYPING - MD

PROJECT DESCRIPTION
Create a CNC machine to be used for fast prototyping of custom PCB

MAIN RESPONSIBILITIES
- Design and create mechanical components
- Assembly of mechanical and hardware components
- Support in integration of software with mechanical and hardware components

KNOWLEDGE MUST HAVE
- Good knowledge of mechanical design and operation
- Basic understanding of software operation and design
- Basic understanding of electronics operation and design
- Practical experience/abilities

KNOWLEDGE NICE TO HAVE
- Advanced knowledge of mechanical design and operation
- Experience with CAD design
- Good understanding of software operation and design
- Good understanding of electronics operation and design
- Good understanding of embedded systems

YOUR WORKING CONTRACT COULD BE:
6/8h per day
CNC FOR PCB PROTOTYPING - HW

PROJECT DESCRIPTION
Create a CNC machine to be used for fast prototyping of custom PCB

MAIN RESPONSIBILITIES
- Identification and matching of hardware components
- Assembly of mechanical and hardware components
- Support in integration of software with mechanical and hardware components

KNOWLEDGE MUST HAVE
- Advanced knowledge of analogue and digital circuitry operation and design
- Good knowledge of electrical motors operation, design and control
- Basic understanding of software operation and design
- Basic understanding of mechanical operation and design
- Basic understanding of embedded systems operation and design
- Practical experience/abilities
- Self motivation

KNOWLEDGE NICE TO HAVE
- Advanced knowledge of electrical motors operation, design and control
- Good understanding of software operation and design
- Good mechanical understanding
- Good understanding of embedded systems operation and design

YOUR WORKING CONTRACT COULD BE:
4/6h per day

WIRELESS TEST FRAMEWORK

PROJECT DESCRIPTION
The goal of this project is to create a wireless device which is able to control and execute a basic test suite of VED system test (Wifi relay, GUI application python based/GUI web based, remote camera control).

MAIN RESPONSIBILITIES
- Build electronic device able to execute the defined testcases.
- Build python/web application which is interface between electronic board and user (tester).
- Be ready and implement the proposed tasks of the project.
- To regularly report the status of the project to your project coordinator.

KNOWLEDGE MUST HAVE
- Programming skills
- Basic knowledge of electronics, microcontrollers and IoT

KNOWLEDGE NICE TO HAVE
- Knowledge about WiFi protocols
- Basic usage of measurement and control equipment
- Basic knowledge of testing

YOUR WORKING CONTRACT COULD BE:
6h per day
LASER ENGRAVING AND CUTTING SYSTEM

PROJECT DESCRIPTION
Laser Engraving (or Laser Etching) is a method, that uses a laser beam to change the surface of an object. This process is mostly used to create images on the material, that may be seen at eye level.
In this project:
1. Need to mount/attach, from mechanically point of view, a laser module diode on an already existing rectangular frame with two steppers motors.
2. Control with an arduino: outputs step and direction signals for the stepper drivers and a laser enable signal for the laser driver.

MAIN RESPONSIBILITIES
- Programming an Arduino microcontroller
- Getting familiar with stepper/BLDC motor (control)
- Perform basic design of the project;
- Support the project teams;
- Regularly report the status of the project;

KNOWLEDGE MUST HAVE
- Programming skills
- Basic knowledge of electronics, microcontrollers
- Basic usage of instrumentation for measurement and control (oscilloscopes, power supplies)

KNOWLEDGE NICE TO HAVE
- Electric motors control know how
- Mechanical skills

YOUR WORKING CONTRACT COULD BE:
6h per day

FAILURE INJECTION CARD

PROJECT DESCRIPTION
Project involve developing an embedded system (SW and HW) which will be used for injecting faults on various loads. System should receive the commands on CAN, set relays in order to generate requested faults on loads and send feedbacks.

MAIN RESPONSIBILITIES
- Develop SW using the STM32 development board.
- Design HW layout and schematic.
- Soldier the components on designed PCB.
- Test the system functionality.

KNOWLEDGE MUST HAVE
- Advance knowledge about C programming language.
- Basic knowledge about microcontrollers.
- Basic knowledge about electronics.

KNOWLEDGE NICE TO HAVE
Communication protocols(UART, I2C, SPI)

YOUR WORKING CONTRACT COULD BE:
8h per day
SMART HOME SECURITY SOLUTION

PROJECT DESCRIPTION
The main target of the project is to ensure the security and confort of your home.
The desired functionality is to monitor different aspect of the house: temperature, humidity, light and smoke and to automatically control the state in case one of the parameters is out of the normal range.
To demonstrate the concept it is necessary to implement a bi-directional secure communication between two microcontrollers using CAN FD protocol.
One of the microcontrollers will read and display the data using different types of sensors and the other will receive and display the data.
The messages must be secured for privacy and integrity reasons, ensuring no one from the outside will control the house. Both microcontrollers should store the received information in a secure way to prevent unauthorized manipulation.

MAIN RESPONSIBILITIES
- Collecting requirements
- Create the design of the system
- Learn about CAN FD and Implement the communication protocol
- Learn and implement different cryptographic algorithms
- Use microcontroller to read and display sensor information
- Create GUI for sending CAN messages

KNOWLEDGE MUST HAVE
- Good knowledge of C programming
- Basic knowledge of communication protocols
- Basic knowledge of embedded systems
- Basic knowledge of electronics and microcontrollers

KNOWLEDGE NICE TO HAVE
- Advanced knowledge of embedded systems
- Operating systems
- Have knowledge on cryptographic algorithms strengths, and cyber-attack methods

YOUR WORKING CONTRACT COULD BE:
6/8h per day

AUDIO SEARCH ALGORITHM

PROJECT DESCRIPTION
This project aims to implement techniques for recognizing songs based on the content developed by fingerprints. Given a short recorded audio fragment, the application can identify the special file that contains the recording in a library stored in the database. The software application developed for signal processing will be developed based on mathematical tools and libraries specific to audio signals.

MAIN RESPONSIBILITIES
Your main tasks will include:
- Learn about signal processing used in audio recognition
- Learn about working with databases(sql or non sql)
- Interpretation and calibration of quickly depth search algorithm
- Analog to digital conversion
- Know how to create spectrograms and generate fingerprints for audio signals
- Create searching algorithm

KNOWLEDGE MUST HAVE
- Signal processing
- Python3 programming
- SQL or No-SQL databases

KNOWLEDGE NICE TO HAVE
- Image processing with Python3
- MySQL
- PyQt
- FFT or CQT spectrograms

YOUR WORKING CONTRACT COULD BE:
4h per day
DUAL PHASE BUCK-BOOST CONVERTER

PROJECT DESCRIPTION
Design and test a 12.1V preregulator for a computer. We are looking for a buck-boost converter that would create a stable voltage for the rest of the power supplies on the board. The dual phase topology will be used in order to minimize losses and the output ripple.

Input voltage: 6V to 27V.
Output voltage: 12.1V.
Maximum output power: 180W.

MAIN RESPONSIBILITIES
- Choose the components
- Create the schematic
- Do a worst case analysis of the system
- Create the layout
- Create test specifications
- Test the design

KNOWLEDGE MUST HAVE
- Be human
- Have passion for electronics

KNOWLEDGE NICE TO HAVE
- Knowledge about switch mode power supplies

YOUR WORKING CONTRACT COULD BE:
4h per day

CAN COMMUNICATION BETWEEN 2 EMBEDDED SYSTEMS

PROJECT DESCRIPTION
The student should know at the end of the program what is a microcontroller, what are his uses, to understand the CAN communication between 2 embedded systems, to write code, to be capable to use the specific tools, ide’s and computer languages in order to establish the communication between 2 embedded systems.

MAIN RESPONSIBILITIES
- Write low level drivers for communication via CAN, SPI and with a LCD.
- Implement an algorithm for saving data into a memory.
- Implement an algorithm for displaying on a LCD of data received via CAN.

KNOWLEDGE MUST HAVE
- C embedded programming
- Microcontrollers
- Basic HW knowledge

KNOWLEDGE NICE TO HAVE
- Types of communication
- Memories
- Experience with low level driver programming

YOUR WORKING CONTRACT COULD BE:
6h per day
FUZZY TESTING USING PYTHON LIBRARIES AND DEVELOPMENT OF A SPECIALIZED TOOL FOR TESTING ECUS

PROJECT DESCRIPTION
Open source Python libraries for fuzzy testing:
https://pypi.org/project/fuzzing/
https://github.com/fuzzitdev/pythonfuzz
Ref:

MAIN RESPONSIBILITIES
- Security and privacy concept knowledge
- Python testing
- SW Tool development

KNOWLEDGE MUST HAVE
- Programming and uC

KNOWLEDGE NICE TO HAVE
- Hardware

YOUR WORKING CONTRACT COULD BE:
8h per day

ANALYSIS OF DRIVER BEHAVIOR BASED ON BIOMETRIC DATA

PROJECT DESCRIPTION
Observe and identify driver behavior based on remote eye tracking and face emotion recognition using computer vision methods.
Ref:
1. https://europepmc.org/article/PMC/6721362

MAIN RESPONSIBILITIES
- System and SW Architecture concept
- SW development

KNOWLEDGE MUST HAVE
- Programming and uC

KNOWLEDGE NICE TO HAVE
- Hardware

YOUR WORKING CONTRACT COULD BE:
8h per day
MYCONTINENTAL - PERSONAL EMPLOYEE CONTINENTAL APPLICATION

PROJECT DESCRIPTION
We propose a personal application for our company employees to access information and/or do some activities related to workplace.
Examples of activities:
- Schedule appointments.
- View free parking spots.
- Inventory:
  - Assignment of equipment to each colleague.
  - Automatic process of inventory, e.g. via scanning the QR code using the phone camera or inserting the inventory number in the application by each owner.
  - The transfer of equipment is recorded using the scan of QR code or inserting the inventory number in the application.
- View blocked timeslots in the calendar without any other information.
- Location news can also be published.

MAIN RESPONSIBILITIES
- Develop a mobile app / or web application (with login option)
- Integrate the needed information
- Align with involved departments (e.g. IT, HR) to ensure data is correct

KNOWLEDGE MUST HAVE
- Good programming skills
- Object oriented programming (OOP)
- Basic know-how of web technologies
- Knowledge of databases
- Logical and structural thinking
- Good communication skills

KNOWLEDGE NICE TO HAVE
- Python programming
- Web development: HTML5
- Frameworks REACT and FLASK
- Cloud base technologies (AWS)

YOUR WORKING CONTRACT COULD BE:
4/6/8 h per day

MAP CHARTING MACHINE LEARNING

PROJECT DESCRIPTION
In the Navigating Systems paradigm, we assume an uncharted territory (no unit traveled in that area before).
The objective is to have a candidate (traveling entity) which will be able in the end to choose a valid path to a destination.
The scope of the application would be to design an intelligent model which will learn and share with future units all the observed elements from the traveled area until a dead end is reached.
The learning process ends when all the route “landscapes” will be mapped and any unit could travel with a solid knowledge from ‘A’ to ‘B’.

MAIN RESPONSIBILITIES
- Design a GUI where a route map can be simulated.
- Create AI module for route traveling.
- Assess and classify results.
- If the students show good progress, there are some other upcoming tasks on top of those which could be introduced (e.g. additional AI layer: units will abandon paths before a dead end, based on previously discovered landscapes).

KNOWLEDGE MUST HAVE
- Programming (C based languages, sorting algorithms, optimal path finding algorithms)
- Logical / mathematical thinking
- AI and ML knowledge
- Team spirit

KNOWLEDGE NICE TO HAVE
- C# in MVS (since it has integrated ML modules and GUI available to design and could be easily used)

YOUR WORKING CONTRACT COULD BE:
4h per day
**ACALL/ECALL SERVER**

**PROJECT DESCRIPTION**
Proposal: The Acall/Ecall test server entertains assistance calls initiated. Examples of activities:
- Reply an incoming call.
- Request data via SMS/Inband.
- Decode ASN1 messages
- Filter incoming call.
- Play operator audio samples.
- Receive SMS.
- Store SMS and messages.
- Keep activity journal in a DB.
- Keep one configuration per number registered to server.
- Execute commands from Test PC.
- Send SMS to the target.
- Call target (waiting for callback)
- Send elements from activity journal to Test PC.
- Clean up activity journal upon Test PC request.

**MAIN RESPONSIBILITIES**
- Develop a web application

**KNOWLEDGE MUST HAVE**
- Object oriented programming
- Programming Skills
- Knowledge of web technologies
- Logical and structural thinking

**KNOWLEDGE NICE TO HAVE**
- Python Language
- Angular or similar frontend languages

**YOUR WORKING CONTRACT COULD BE:**
8h per day

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**TRACE ANALYZER**

**PROJECT DESCRIPTION**
App in order to analyze Location specific traces on telematics projects:
- Application will read the traces from the target (eg: var/log/messages) and discover the problems (losing 3D fix without known reason, gaps in position frequency, incorrect coordinates, invalid values for multiple fields, etc.)
- GPS/GNSS simulator integration - route with known coordinates from Spirent
  - Comparison between the data received/available in Location Manager traces, on the target and the data simulated by the GNSS simulator (can identify: gaps, ex: the request to 20Hz (asil: involved: ongoing) lat. and long: comparison with what is in simulated route, etc...)
- Visual graphics, statistical data for each run or for historical data
- AI: investigate whether the simulator can handle routes made Google Maps

**MAIN RESPONSIBILITIES**
Web application that will:
- Automatically connect to the GPS/GNSS simulator, load a simulated route, play the simulation
- Connect to the trace feed and parse them in order to detect issues based on predefined thresholds
- Validate value and format of the received data
- The current value must be verified based on historical values received in similar tests

**KNOWLEDGE MUST HAVE**
- Good programming skills (scripting)
- Basic know-how of web technologies
- Knowledge of databases
- Logical and structural thinking
- Good communication skills

**KNOWLEDGE NICE TO HAVE**
- Web development: HTML5
- Frameworks REACT and FLASK/Django

**YOUR WORKING CONTRACT COULD BE:**
4h per day
OFFICE SPY CAM

PROJECT DESCRIPTION
- Array of cameras that can be viewed and/or controlled remotely via a web application (from PC or smartphone) from outside Continental
- The purposes will be:
  - Interact with colleagues inside the office via a intercone style device
  - Supervise remotely the test devices inside the test room

MAIN RESPONSIBILITIES
- Create camera array with sound module
- Web/mobile app to manage/receive/control the video feed

KNOWLEDGE MUST HAVE
- Good programming skills
- Object oriented programming (OOP)
- Basic know-how of web technologies
- Knowledge of databases
- Logical and structural thinking
- Good communication skills
- Basic robotics/electronics skills

KNOWLEDGE NICE TO HAVE
- Web development: HTML5
- Frameworks REACT and FLASK
- Cloud base technologies (AWS)
- Basic android programming, app development

YOUR WORKING CONTRACT COULD BE:
4h per day

AUTOMATIC CRASH DUMP ANALYZER

PROJECT DESCRIPTION
Currently the analysis of a CrashDump is a manual task (extract CrashDump from a larger trace, get proper mapfile, run python script. With an automated CrashDump analysis you would just upload the whole trace (or parts, if too large) to this server. The server then would automatically determine the required mapfile based on VAS-name and SW-Version information out of the trace. The server then would download the map file based on some product specific configuration (or based on some product specific download script). As a next step the server would run the script and provide the results.

MAIN RESPONSIBILITIES
- C/C++
- Scripting
- Web programming

KNOWLEDGE MUST HAVE
- C/C++, scripting, web;
- Good programming skills;
- Object oriented programming (OOP);
- Basic know-how of web technologies;
- Logical and structural thinking
- Good communication skills

KNOWLEDGE NICE TO HAVE
- 

YOUR WORKING CONTRACT COULD BE:
6h per day
DC MOTOR CONTROL OVER BT, WIFI, GSM

PROJECT DESCRIPTION
A DC motor (start/stop/ speed and direction) has to be controlled over WiFi/BT/ GSM.
An H-Bridge circuit contains four switching elements (MOSFETs) with the motor at the center. By activating two particular switches at the same time we can change the direction of the current flow, thus change the rotation direction of the motor.
PWM, or pulse width modulation is a technique which allows us to adjust the average value of the voltage that’s going to the electronic device by turning on and off. Also, through this technique, the speed of motor can be increased or decreased.
A schematic and layout design must be performed according to specifications and the prototype must be functional.

MAIN RESPONSIBILITIES
- Schematic and layout design
- C programming
- Prototype Building
- Electrical test

KNOWLEDGE MUST HAVE
- Analog and digital design
- DC motor basic
- BT, WiFi, GSM circuits basics

KNOWLEDGE NICE TO HAVE
- Microcontroller
- Layout design
- C programming, MPLAB, Proteus, Orcad, KiCAD

YOUR WORKING CONTRACT COULD BE:
8h per day

MY CONTINENTAL AUTOMATED INTERVIEWERS TOOL

PROJECT DESCRIPTION
We propose to create an internal tool which will help to designate the interviewer for Continental candidates.
The tool will check the availability of the interviewers by looking in their outlook agenda.
The tool will count how many times an interviewer participated to previous interviews.
Based on the above conditions, a using an algorithm an interviewer will be designated.

MAIN RESPONSIBILITIES
Develop an user friendly application for random interviewers extraction from a predefined list of interviewers.
The list of interviewers will be stored in a database.
Results of the interview must be sent automatically via email once the feedback is added in the tool.

KNOWLEDGE MUST HAVE
- Good programming skills
- Object oriented programming (OOP)
- Basic know-how of web technologies
- Knowledge of databases
- Logical and structural thinking
- Good communication skills

KNOWLEDGE NICE TO HAVE
- Sql
- Python
- Php/HTML
- GUI

YOUR WORKING CONTRACT COULD BE:
8h per day
MATHCAD LIBRARY

PROJECT DESCRIPTION
Train your ability to read and understand electrical component datasheets in deep detail. Be the lead of extract relevant information according to given specifications (e.g. standards, design guidelines) and update a new generation of a common/generic database. Understand electrical components parameters with support and guidance of our experts in order to extract essential/relevant values and use them to create a Unique General Electronic Components (UGEC) libraries.

MAIN RESPONSIBILITIES
- Extract relevant parameters from components datasheets;
- Insert extracted information into predefined Mathcad templates;
- Project review with library responsible.

KNOWLEDGE MUST HAVE
- Basic knowledge of electronic components behaviour;
- Attention to details, focused on quality, analytical skills;

KNOWLEDGE NICE TO HAVE
- 

YOUR WORKING CONTRACT COULD BE:
8h per day

ULTRA HIGH PRECISION NANO-AMPEREMETER

PROJECT DESCRIPTION
Increase the accuracy of current measurements in nano-ampere and micro-ampere range. Indented use is for measuring Semiconductors current in OFF(Blocked) state - leakage current measurements. Build an electronic device board that precisely converts the measured current into a voltage. The expected accuracy is better than 0.2% in the nano-ampere and micro-ampere range.

MAIN RESPONSIBILITIES
- Understand the functionality of the electrical circuit schematic (provided by the mentor);
- Build & populate the PCB board;
- Perform current measurement tests with the electronic board;
- Perform current measurements tests with certified equipment;
- Compare the results provided by the measurements / create test report;
- Project review and support with mentor / responsible person.

KNOWLEDGE MUST HAVE
- Basic knowledge of electronic components behaviour and electrical measurements;
- Basic experience on SMD soldering on PCBs is a plus;
- Attention to details, focused on quality, patience, analytical skills

KNOWLEDGE NICE TO HAVE
- 

YOUR WORKING CONTRACT COULD BE:
6h per day
POWER MOSFET’S. PSpICE THERMAL MODELLING BASED ON FIELD DATA ACQUISITION.

PROJECT DESCRIPTION
Ability to understand heat flow in power electronics by thermal performances measurements and PSpice thermal simulations. Measure the thermal parameters of Power MOSFETs. Create a MOSFET’s measurement library/database containing thermal impedance data and equivalent FOSTER thermal models for power MOSFETs.

MAIN RESPONSIBILITIES
- Prepare the experimental set-up and perform MOSFET measurements;
- Fill the measured results into an Excel file and generate thermal impedance diagrams;
- Generate FOSTER thermal models using predefined Mathcad templates;
- Perform PSpice thermal simulations and compare the results with experimental measurements;
- Project review mentor / responsible person.

KNOWLEDGE MUST HAVE
- Basic knowledge of electronic components behaviour;
- Basic knowledge of PSpice simulation tool;
- Attention to details, focused on quality, analytical skills;

KNOWLEDGE NICE TO HAVE

YOUR WORKING CONTRACT COULD BE:
8h per day

TESTER FOR SEMICONDUCTORS PERFORMANCE

PROJECT DESCRIPTION
An electronic device capable to measure, process and display or send out to serial bus the semiconductor input/output characteristics in different electrical and thermal conditions.

MAIN RESPONSIBILITIES
- Brainstorming with the mentor for deciding the main device functions;
- Design (HW and SW) and implementation;
- Prepare the experimental set-up and perform measurements;
- Compare the test results with the datasheet specs / create test report;
- Project review his work with the mentor / responsible person

KNOWLEDGE MUST HAVE
- Basic knowledge of electronic components behaviour;
- Basic software developing skills (e.g. Arduino);

KNOWLEDGE NICE TO HAVE

YOUR WORKING CONTRACT COULD BE:
8h per day
KEYLESS LOCK/UNLOCK CAR

PROJECT DESCRIPTION
Using a fingerprint sensor installed on the door handle, you’ll need to be able to lock/unlock the door (i.e command the door lock motors via the output of the fingerprint sensor).

MAIN RESPONSIBILITIES
- Brainstorming with the mentor for deciding the main device functions;
- Design (HW and SW) and implementation;
- Prepare the experimental set-up and perform measurements;
- Compare the test results with the datasheet specs / create test report;
- Project review his work with the mentor / responsible person

KNOWLEDGE MUST HAVE
- Basic knowledge of electronic components behaviour;
- Basic software developing skills (e.g. Arduino);

KNOWLEDGE NICE TO HAVE
-

YOUR WORKING CONTRACT COULD BE:
8h per day

REMOTE KEY WITH EXTENDED RANGE FOR CAR

PROJECT DESCRIPTION
Model/simulate/make a remote key so that you’ll be able to send signals to the car (unlock/lock, lift/drop the windows etc) from a greater distance than a usual remote key. Be sure that the HW components are well chosen to filter the signals and to optimize the battery consumption).

MAIN RESPONSIBILITIES
- Brainstorming with the mentor for deciding the main device functions;
- Design (HW and SW) and implementation;
- Prepare the experimental set-up and perform measurements;
- Compare the test results with the datasheet specs / create test report;
- Project review his work with the mentor / responsible person

KNOWLEDGE MUST HAVE
- Basic knowledge of electronic components behaviour;
- Basic software developing skills (e.g. Arduino);

KNOWLEDGE NICE TO HAVE
-

YOUR WORKING CONTRACT COULD BE:
8h per day
AUTOMATED REPORTING

PROJECT DESCRIPTION
The purpose of this project is to create an automated way of generating reports and inform stakeholders.

MAIN RESPONSIBILITIES
- Researching, designing, implementing, and managing software programs
- Testing and evaluating new programs
- Writing and implementing efficient code
- Training users
- Present the final product

KNOWLEDGE MUST HAVE
- Python

KNOWLEDGE NICE TO HAVE
-

YOUR WORKING CONTRACT COULD BE:
6h per day

APPLICATION: DATABASE OF TEST CARS AVAILABLE

PROJECT DESCRIPTION
The scope of this application is to have available all the information related to the car:
- Availability
- Functionality
- Type of tires
- Vehicle paperwork (insurance, vignette)

When a car is booked, the person in charge will receive the notification and he will approve or decline it.

When the car is taken over, the reservation will be checked.

When the car is returned, the “questionnaire” will be completed in the app.

MAIN RESPONSIBILITIES
- Researching, designing, implementing, and managing software programs
- Testing and evaluating new programs
- Writing and implementing efficient code
- Training users
- Present the final product

KNOWLEDGE MUST HAVE
- OOP / C++
- Python

KNOWLEDGE NICE TO HAVE
-

YOUR WORKING CONTRACT COULD BE:
6h per day
SMART WORK LOGGER

PROJECT DESCRIPTION
One of the most common issues of Agile development is that people forget about logging their hours on the ticket that they're working on. Also, the logging process may be inaccurate most of the times because they have to calculate the time of their own.

MAIN RESPONSIBILITIES
- Researching, designing, implementing, and managing software programs
- Testing and evaluating new programs
- Writing and implementing efficient code
- Training users
- Present the final product

KNOWLEDGE MUST HAVE
- C++ / Java / C#

KNOWLEDGE NICE TO HAVE
-

YOUR WORKING CONTRACT COULD BE:
6h per day

EXTERNAL SOUND DETECTION IN A CAR

PROJECT DESCRIPTION
If drivers listen to the music louder in the car, sometimes it is hard to hear police / ambulance siren. The car should detect specific sounds from outside regarding emergency and reduce the volume of music / noise in the car.

MAIN RESPONSIBILITIES
- Researching, designing, implementing, and managing software programs
- Testing and evaluating new programs
- Writing and implementing efficient code
- Training users
- Present the final product

KNOWLEDGE MUST HAVE
- OOP / C++

KNOWLEDGE NICE TO HAVE
-

YOUR WORKING CONTRACT COULD BE:
6h per day
REVIEW STATISTICS ANALYZER

PROJECT DESCRIPTION
The purpose of this project is to create a Python GUI application that is able to retrieve informations from the code reviews and generate various reports based on the retrieved information. Examples of statistics needed: solved / unsolved defects per each patch, reviewers and their contribution, duration for a review per a patch.

MAIN RESPONSIBILITIES
- Researching, designing, implementing, and managing software programs
- Testing and evaluating new programs
- Writing and implementing efficient code
- Training users
- Present the final product

KNOWLEDGE MUST HAVE
- Python
- OOP

KNOWLEDGE NICE TO HAVE
- 

YOUR WORKING CONTRACT COULD BE:
8h per day

FIJAC - FAULT INJECTION AUTOMATIC CONTROLLER

PROJECT DESCRIPTION
Normally in any project which involves a software+hardware embeded system, beside functional and systems tests, there is an additional type of testing, named fault injection (or insertion). It shall make some errors like short to GND or Vbat or even short between lines / pcb layout paths. More over, there we have cases where we shall test fault insertions in communication lines, like SPI between microcontroller and PCU / SBC. During the years were developed different solutions from passive / manually to automatic, with high or low costs, resources (licenses, HW, modification knowledge) etc, but they are limited to the speed/processing frequency and more important, are not connected with SWATT HILL or PLAST.

MAIN RESPONSIBILITIES
- Create a microcontroller C application
- Design and create a hardware circuit including Schematic, PCB layout with microcontroller and other components
- Create a driver and library for communication protocol in C, Python
- Try to make simple tests with SWATT to validate the project

KNOWLEDGE MUST HAVE
- Basic knowledge of electronic components

KNOWLEDGE NICE TO HAVE
- 

YOUR WORKING CONTRACT COULD BE:
6h per day