SUMMER PRACTICE PROJECTS 2020
IAȘI

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PROCESUL DE SELECȚIE PENTRU PRACTICA DE VARĂ

1. APLICARE:
Completează formularul de aplicare. Te rugăm să menționezi în formularul de aplicare proiectul pentru care dorești să aplici (sau primele 3 proiecte preferate).

2. INTERVIU TEHNIC
În funcție de proiectele alese, vei fi invitat la o discuție tehnică, iar aceasta va fi bazată pe ariile tehnice menționate în broșură, la 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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<td>2 martie - 20 martie 2020</td>
<td>Postarea și promovarea proiectelor de practică</td>
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<td>2 martie - 20 martie 2020</td>
<td>Studentii cursantii care vor finaliza cel putin anul II de studii in vara anului 2020, pot aplica pentru proiectele preferate</td>
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<td>23 martie - 27 martie 2020</td>
<td>Alocarea studentilor pe proiecte si stabilirea procesului de recrutare</td>
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AUTONOMOUS MOBILITY AND SAFETY
REQUIREMENTS DERIVATION IN SYSTEMS ENGINEERING. DEVELOPMENT OF A PRE-REVIEW REQUIREMENTS ANALYSIS SOFTWARE TOOL

PROJECT DESCRIPTION
One of the most challenging goals of the Requirements Engineering activities within the MBSE is to define the problem space that a later proposed solution should solve. The first part of this project proposes to follow the systems engineering 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 for writing good requirements that will lead to identification of patterns in syntax that deviate from the correct structure. Based on the identified patterns, the students will develop a pre-review tool that will find incorrect written requirements in a requirements document.

MAIN RESPONSIBILITIES
The internship student will perform the following activities:
- familiarize with systems engineering processes;
- elicitation of functional and non-functional system requirements;
- 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 abstractization 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

CLOUD BASED REMOTE CONTROL & TRACKING SYSTEM

PROJECT DESCRIPTION
Nowadays, taking into account that the automotive industry is in a continuous development in regards of automated driving this project will involve an electronic control unit which will be programmed to provide remote starting capability, car status monitoring and various other functions, as climate remote-controlling, remote-locking and unlocking etc. The main purpose of the project is that the students will enjoy learning the processes involved in designing a complex automotive system. The functional concept of this project is based on a programmed MCU which will permanently be connected to a Cloud Service thorough the GSM network and report the GPS coordinates and other various car parameters in the scope of remote control and monitoring of the car.

Besides the outcome of completing the technical part of the project, the students will get the chance to gain new Software, Hardware, Testing and System Engineering competencies further on being able to bring value to the company and gain experience for their upcoming career.

MAIN RESPONSIBILITIES
- Requirements Engineering 35%
- Hard & Electrical Engineering 15%
- Software Engineering 50%

KNOWLEDGE MUST HAVE
- Analytical and abstractization skills
- Basic knowledge of electrical components
- Good knowledge of C/C++
- Microcontrollers programming

KNOWLEDGE NICE TO HAVE
- Electrical Design
- System Engineering

YOUR WORKING CONTRACT COULD BE:
8h per day
DATA TRANSMISSION USING EZW ALGORITHM

PROJECT DESCRIPTION
The project main target is to realize the communication between two nodes in a safety manner. Using Embedded Zerotree Wavelet algorithm is done a signal data compression at the sending node level, sequential sending of the priority elements and in the end, signal reconstruction at the receiving node. The benefit of using this sending manner is that in case of a problem at a communication channel at the data transmission time window the information is not completely lost.

MAIN RESPONSIBILITIES
Developing programming skills to be able to implement the algorithm (Python). Configuring a development platform (Raspberry Pi). Algorithm implementation, compression/decompression and communication channel configuration (Internet/SPI/UART).

KNOWLEDGE MUST HAVE
- Knowledge of microcontrollers. Programming skills.

KNOWLEDGE NICE TO HAVE
- Experience in using Raspberry Pi development platform
- Python programming skills
- Signal processing knowledge.

YOUR WORKING CONTRACT COULD BE:
6h per day

SMART TRACKED ROBOT WITH CONNECTIVITY THAT CAN PERFORM SOME SIMPLE TASKS I

PROJECT DESCRIPTION
Modular tracked robot, remotely controlled, that can perform different tasks:
- cut the grass (summer);
- remove the snow (winter)

MAIN RESPONSIBILITIES
Create a software module able to:
- control the movement of the robot (accelerate, break, turn left, right);
- control the assigned task (cut the grass/remove the snow);
- wireless control of the robot;
- ability to view images of the installed camera;
- monitor parameters about the load of the robots (power consumption, engine rotation, etc) - optional
- detect (some) obstacles and react to them - optional
- assemble the required mechanical components/parts.

KNOWLEDGE MUST HAVE
- Embedded systems basic
- Programming skills
- Networking and communication protocols;
- Basic electronics

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

YOUR WORKING CONTRACT COULD BE:
6h per day
SMART TRACKED ROBOT WITH CONNECTIVITY THAT CAN PERFORM SOME SIMPLE TASKS II

PROJECT DESCRIPTION
Modular tracked robot, remotely controlled, that can perform different tasks:
- cut the grass (summer);
- remove the snow (winter)

MAIN RESPONSIBILITIES
Design and create a chassis for the smart tracked robot

KNOWLEDGE MUST HAVE
- ME design basic

KNOWLEDGE NICE TO HAVE
- ME design advanced

YOUR WORKING CONTRACT COULD BE:
4h per day

SMART TRACKED ROBOT WITH CONNECTIVITY THAT CAN PERFORM SOME SIMPLE TASKS III

PROJECT DESCRIPTION
Modular tracked robot, remotely controlled, that can perform different tasks:
- cut the grass (summer);
- remove the snow (winter)

MAIN RESPONSIBILITIES
The students should make an analysis to motivate the used/required/selected electronic components:
- the engine power;
- requirements for the battery;
- other calculations (electrical design and worst case calculation, functional safety analysis)

KNOWLEDGE MUST HAVE
- Embedded systems basic
- Basic electronics

KNOWLEDGE NICE TO HAVE
- Embedded systems
- Advanced electronics

YOUR WORKING CONTRACT COULD BE:
6h per day
OBJECT RECOGNITION SYSTEM

PROJECT DESCRIPTION
Using a Raspberry Pi 3 platform, that includes an on-board 8Mpx camera and running a custom developed image processing algorithm able to detect and recognize objects, you need to implement an object recognition system using specific image processing libraries.

MAIN RESPONSIBILITIES
Your main tasks will include:
- learn about image processing algorithms used in object recognition
- identify and propose two approaches that can be used to implement an object recognition algorithm using image processing
- implement the proposed approaches
- make an comparison study regarding the accuracy, recognition rate, uncertainty and processing time

KNOWLEDGE MUST HAVE
- Basic electronics
- C/C++ programming
- Python

KNOWLEDGE NICE TO HAVE
- Image processing
- Linux OS
- Open CV

YOUR WORKING CONTRACT COULD BE:
4h per day

AMBIENT (OFFICE) NOISE MONITOR I

PROJECT DESCRIPTION
Implement an embedded system that is used to monitor and indicate the noise level in an office. The system shall be able to:
- indicate the sound/noise level, alert for exceeding a max level and indication for direction of max level
- store level data and provide access to it
- ready to be expandable - offer the possibility to also work in a network of such devices that will offer a more precise monitoring

MAIN RESPONSIBILITIES
Your main tasks will include the following:
- HW design – create an electrical system capable to capture noise (sound) and provide it to a computation platform.

KNOWLEDGE MUST HAVE
- Embedded systems basic
- Basic electronics

KNOWLEDGE NICE TO HAVE
- Embedded systems
- Data acquisition
- Signal processing
- Advanced electronics

YOUR WORKING CONTRACT COULD BE:
6h per day
**AMBIENT (OFFICE) NOISE MONITOR II**

**PROJECT DESCRIPTION**
Implement an embedded system that is used to monitor and indicate the noise level in an office. The system shall be able to:
- indicate the sound/noise level, alert for exceeding a max level and indication for direction of max level
- store level data and provide access to it
- ready to be expandable - offer the possibility to also work in a network of such devices that will offer a more precise monitoring

**MAIN RESPONSIBILITIES**
Create a SW that will be capable to read multiple analog signals and based on the extracted parameters to take special reactions

**KNOWLEDGE MUST HAVE**
- Embedded systems basic
- Programming skills
- Networking and communication protocols;
- Basic electronics

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

**YOUR WORKING CONTRACT COULD BE:**
6h per day

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**AUTOMATION ERROR MANAGEMENT TOOL**

**PROJECT DESCRIPTION**
The student should continue to develop an existing automation tool (Python Code) regarding error management. The tool should help the developers in debug process on HONDA projects.

**MAIN RESPONSIBILITIES**
- Develop and implement software for the tool
- To improve the GUI

**KNOWLEDGE MUST HAVE**
- Python
- Memory on Embedded Systems

**KNOWLEDGE NICE TO HAVE**
- Embedded Systems

**YOUR WORKING CONTRACT COULD BE:**
6h per day
SMART CAR

PROJECT DESCRIPTION
The project for this year is a continuation of the one from 2019, where we already have partially implemented the motor control part and distance sensors. For this year the goal is to continue development of the project started last year. The project's goal is to obtain an application that includes both a SW and a HW implementation of a Smart Car. The SW implementation is supposed to implement an algorithm onto a microcontroller and to develop a smartphone application using an IDE (e.g. Android Studio). The microcontroller algorithm is based on Real Time Operating System (e.g. FreeRTOS, OSEK). The HW implementation focuses on how to make the connection between the development board and the external peripherals. The project will use a variety of peripherals like:
- ultrasonic sensors;
- camera module;
- wi-fi module;
The development will consider that the vehicle must be able to work in two main modes: autonomous or controlled through a smartphone.

MAIN RESPONSIBILITIES
- Develop and implement software for embedded devices and systems
- Interface with hardware design and development

KNOWLEDGE MUST HAVE
- Knowledge of embedded systems and C programming

KNOWLEDGE NICE TO HAVE
- Hardware
- Real time Operating Systems

YOUR WORKING CONTRACT COULD BE:
6h per day

DESIGN AND IMPLEMENTATION IN MATLAB/ SIMULINK ENVIRONMENT OF SCALAR / TRAPEZOIDAL CONTROL OF PMSM / BLDC MOTORS

PROJECT DESCRIPTION
Extended mathematical modelling and implementation in MATLAB / Simulink environment (by considering both Analytical and SimPowerSystem libraries approaches - depending on specific case) of the considered motor control algorithm(s).

MAIN RESPONSIBILITIES
- Prioritize / organize project into step by step actions to successfully complete it during the summer practice period;
- Documentation and knowledge acquired on the specified topics;
- Implementation in MATLAB / Simulink environment of at least one of the motor control algorithms (scalar / trapezoidal) of PMSM / BLDC motor;
- Different / specific simulation tests scenarios are required for step by step development, comparison, verification and validation of the implemented model (against data sheet / test bench measurements – if available).

KNOWLEDGE MUST HAVE
Basics of:
- Electromagnetism;
- Electric and Electronic Circuits;
- Power Converters and their Functionality;
- Electrical Machines.

KNOWLEDGE NICE TO HAVE
Basics of:
- Electromagnetism;
- Electric and Electronic Circuits;
- Electrical Machines (such as: PMSM / BLDC motors);
- Motor Control;
- MATLAB / Simulink Environment.

YOUR WORKING CONTRACT COULD BE:
6h per day
DRIVER MONITORING WITH AI

PROJECT DESCRIPTION
Until autonomous driving cars are the norm, people still have to drive themselves and this can get very tiring.

This project aims to develop a basic driver monitoring system that is able to monitor, via video feed, the driver alertness and also check his or her level of vigilance, using artificial intelligence.

MAIN RESPONSIBILITIES
- Hw/sw interfacing with feed from video capable device
- Processing image for face/features detection
- Research and implementation of algorithm for:
  1st part: monitoring driver attentiveness (considering eye tracking techniques)
  2nd part: monitoring driver fatigue (detection of potential drowsiness situations)

KNOWLEDGE MUST HAVE
- Programming skills
- Basic linear algebra (matrix multiplication)
- Basic calculus (simple derivatives)

KNOWLEDGE NICE TO HAVE
- Python
- Basic OpenCV knowledge
- Basic knowledge/understanding of machine learning

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

BATTERY SPOT WELDER

PROJECT DESCRIPTION
Create a PCB on which we have the control part of a battery spot welder using as controller a (pic16f690 18f25k20,...) with which:
- we control the energy used in the soldering process by externally modifying the time duration of the soldering (controlling the on time of a mosfet that turns on the relay connected to a battery);
- display the values of the selected soldering time on a LCD display;
- use an potentiometer to connected to an ADC pin of the microcontroller to modify by hand the energy (by modifying the time) of the welding;
- activate the soldering by using an external interrupt routine (external interrupt activation);

MAIN RESPONSIBILITIES
- Hardware design of the modules on the PCB (it implies calculations and simulations of the circuit);
- Layout design of the PCB;
- Create and populate the PCB;
- Software implementation on the PCB;

KNOWLEDGE MUST HAVE
- Hardware design medium;
- Layout design basic;

KNOWLEDGE NICE TO HAVE
- Software basic (especially for the PIC family of microcontrollers)

YOUR WORKING CONTRACT COULD BE:
8h per day
CAR ENGINE GENERATOR WITH D-CLASS AUDIO AMPLIFIER USED FOR ELECTRICAL VEHICLES (EVS)

PROJECT DESCRIPTION
Create a project that generates a car engine sound with variable pitch and output power depending on the speed and acceleration of an electrical vehicle. Different engine patterns depending on the characteristics of the car and driver's preferences should be considered and an additional ultrasound output for animal alert is nice to have.

MAIN RESPONSIBILITIES
- Collecting requirements;
- Analysis and system design (pseudocode, basic concept);
- Block diagram and electronic schematic for each module;
- MCU software development for:
  - recording and playback of sounds specific to thermal motors
  - the interaction with the driver / car;
- Practical realization and measurements of different parameters

KNOWLEDGE MUST HAVE
- Analog and Digital HW
- Microcontrollers
- Embedded programming

YOUR WORKING CONTRACT COULD BE:
4h per day

LOW VOLTAGE POWER SUPPLY CONSISTING IN A MULTI-PHASE DC-DC CONVERTER CONTROLLED BY A MICROCONTROLLER

PROJECT DESCRIPTION
Create a project that consists in a basic DC-DC converter (buck, boost or buck-boost topology) with multiple-phase output, having a dedicated MCU to set different parameters of the supply like: voltage output, current limitation and controlling the phases.

MAIN RESPONSIBILITIES
- Collecting requirements;
- System design (basic concept);
- Block diagram and electronic schematic for each module;
- MCU software development;
- Practical realization and measurements of different parameters

KNOWLEDGE MUST HAVE
- Analog and Digital HW
- Microcontrollers
- Embedded programming

KNOWLEDGE NICE TO HAVE
- 

YOUR WORKING CONTRACT COULD BE:
4h per day
ELECTRONIC DC LOAD BASED ON FIXED OR VARIABLE RESISTORS

PROJECT DESCRIPTION
Create a project consisting in a resistor box (fixed or variable types) that will be used to test the behavior of power supply modules. The project needs to be controlled by a MCU to set the required resistance value and additional parameters like: transition between two different resistance values, time interval, transition speed, etc.

MAIN RESPONSIBILITIES
- Collecting requirements;
- System design (basic concept);
- Block diagram and electronic schematic for each module;
- MCU software development;
- Practical realization and measurements of different parameters

KNOWLEDGE MUST HAVE
- Analog and Digital HW
- Microcontrollers
- Embedded programming

KNOWLEDGE NICE TO HAVE
- 

YOUR WORKING CONTRACT COULD BE:
4h per day

DIGITAL SIGNAL GENERATOR IMPLEMENTED WITH FPGA

PROJECT DESCRIPTION
Develop an Digital Signal Generator implemented with FPGA which produces wave signal with variable frequency. The generator consists of a memory block, a multiplying DAC, an address accumulator, an address increment register and an adder.

MAIN RESPONSIBILITIES
- Create block diagram of Software;
- Simulate, develop and test the individual parts of block diagram;
- Documentation of the solution.

KNOWLEDGE MUST HAVE
- Basic electronic knowledge
- Digital and analog signal processing;
- Embedded systems;
- Programming skills;

KNOWLEDGE NICE TO HAVE
- Verilog
- VHDL
- Quartus tools knowledge

YOUR WORKING CONTRACT COULD BE:
6h per day
PROJECT DESCRIPTION
Develop an embedded system that shall be able to monitor thermal behavior on an ECU in the automotive context.

MAIN RESPONSIBILITIES
- Perform system requirements analysis
- Based on system requirements elicitation, shall perform basic system architecture and design
- With help of requirements and design, develop a simulink model which shall contain the necessary algorithms in order to validate the temperature inputs. (in order to keep the ECU safe thermal wise).
- Simulink model testing and validation
- Code generation based on the tested and validated Simulink model, with Embedded Coder.
- Deploy generated code in the microcontroller environment in order to validate the final product.

KNOWLEDGE MUST HAVE
- MATLAB/Simulink basic
- Embedded system
- Digital and analog signal processing
- Basic electronics
- Basic C/C++ programming skills

KNOWLEDGE NICE TO HAVE
- MATLAB/Simulink advanced
- Ability to use measuring instruments (oscilloscope)

YOUR WORKING CONTRACT COULD BE:
4h per day
VEHICLE NETWORKING AND INFORMATION
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:
4h 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:
4h 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 knowledge of schematic and layout design (e.g. Eagle/OrCAD/Altium/Proteus);
- Basic software developing skills (e.g. Arduino);

KNOWLEDGE NICE TO HAVE
- 

YOUR WORKING CONTRACT COULD BE:
4h per day
HOW DIFFERENT AUTOMOTIVE DOOR FEATURES WORKS USING VIRTUAL REALITY/AUGMENTED REALITY (UNITY)

PROJECT DESCRIPTION
Create an Automotive Door replica using Unity for an Android app, so you can explore its features in a VR/AR environment using hand gestures. A web cam is needed and VR/AR glasses that can use a smartphone for the Android app.

MAIN RESPONSIBILITIES
- Create a Neural Network for hand gestures.
- Create the Automotive Door in VR/AR

KNOWLEDGE MUST HAVE
- OOP
- Python
- Unity
- Android

KNOWLEDGE NICE TO HAVE
Neural Networks

YOUR WORKING CONTRACT COULD BE:
8h per day

VEHICLE GATEWAY DATA LOGGER

PROJECT DESCRIPTION
Vehicle Gateway is an ECU developed by Conti which assures communication with user smartphone via BLE, with Conti cloud via 3G.

The scope of the summer practice is to develop a Data Logger for this ECU. Data Logger System will communicate with the Vehicle Gate Way ECU via UART. Data logger will download the debug data onto the PC via UART interface.

It records data of interest during singular / multiple driving cycles and stores it on Removable media. After detaching from Vehicle Gate Way, the Data Logger System offers access to stored data from PC side

MAIN RESPONSIBILITIES
- Analyse the top requirements and break them down to module level.
- Programming in Python and deploy the SW directly on the target board.
- Debug/test the code, interacting with IDE and embedded system components like serial Flash, UART, LCD, Beagle Bone etc.

KNOWLEDGE MUST HAVE
- Analytical thinking, good coding skills , English;
- Python language programming, Basic electronics understanding

KNOWLEDGE NICE TO HAVE
- 

YOUR WORKING CONTRACT COULD BE:
6h per day
ETHERNET BASED MEASUREMENT TEST SYSTEM

PROJECT DESCRIPTION
Create a self-calibrating and high accuracy voltage measurement test system using a ST Nucleo development board.
- Reading up to 40 analog signals multiplexed to microcontroller ADCs.
- Expose all readings to a PC custom GUI via ethernet communication.
- Self-adjusting and self-calibration functions of the system are intended.

MAIN RESPONSIBILITIES
- Develop a programming project, with online mbed.org compiler.
- Design and develop a PCB circuit for relay matrix.

KNOWLEDGE MUST HAVE
- Problem-solving, communication and self-motivation skills;
- Basic electronic and programming skills.

KNOWLEDGE NICE TO HAVE

YOUR WORKING CONTRACT COULD BE:
8h per day

MEMORY MAP MANAGER

PROJECT DESCRIPTION
Develop of an application that can be used for creating, edit and export memory layout of a microcontroller. The same application must be available to compare memory dump sent by production in development for product validation. Validation is the process of comparison the memory layout (exported by tool developed) with memory layout exported by production after product assembly. The purpose of this tool is to ease the work of the product development team to create, edit and check memory map of the microcontroller.

MAIN RESPONSIBILITIES
- Getting familiar with microcontroller memory map and product development process;
- Gather the information for the microcontroller used in development;
- Develop the application;
- Document each step of the project;
- Prepare a presentation at the end of the project;

KNOWLEDGE MUST HAVE
- Programming knowledge
- C Data type
- Basic Electronics
- Initiative
- Flexibility
- Self-motivation
- Self-management
- Problem solving
- Integrity

KNOWLEDGE NICE TO HAVE

YOUR WORKING CONTRACT COULD BE:
8h per day
**UDROL - ULTRA DEBUG RASPBERRY ONLINE LOGGING**

**PROJECT DESCRIPTION**
Develop a standalone device with 3.5” display, touchscreen, USB port, Wifi, wire connections for SPI and CAN to Door Control Unit, SPI integrated module, optionally CAN module, optionally SIM card module for internet access. In this way it will be removed restrictions of using our internal tool on Customer side caused to Customer PC installing limitations.

**MAIN RESPONSIBILITIES**
- Porting of Ultradebug tool developed in python, from Windows to Linux/Raspberry
- Develop RPI display user interface
- Load templates, make traces, put results on USB storage or send on email

**KNOWLEDGE MUST HAVE**
- Programming knowledge
- C Data type
- Basic Electronics

**KNOWLEDGE NICE TO HAVE**

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

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**RED C**

**PROJECT DESCRIPTION**
Develop a multi-module application that is capable of receiving test scenarios from user, analyse the input to find logical errors, generate software requirements, design diagrams and C code based on the input received. The scenarios are stored in Json files.

**MAIN RESPONSIBILITIES**
- Create intuitive user interface to allow user to input and edit data(C#)
- Analyse Json files to find logical errors and generate C code based on the Json files (Python)

**KNOWLEDGE MUST HAVE**
- Programming knowledge
- Problem solving
- Python
- OOP

**KNOWLEDGE NICE TO HAVE**

**YOUR WORKING CONTRACT COULD BE:**
8h per day
**OVERTIME RECORDING APP**

**PROJECT DESCRIPTION**
Add new features to Overtime recording application (analyze records, create statistics, etc.)

**MAIN RESPONSIBILITIES**
Extended functionality of existing Overtime recording Web application

**KNOWLEDGE MUST HAVE**
- HTML
- PHP
- MySql - Basic (not mandatory)

Knowledge acquired by the student at the end of the project: Improve HTML, PHP, MySql knowledge

**KNOWLEDGE NICE TO HAVE**

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

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**NFC-BASED DATA ACQUISITION**

**PROJECT DESCRIPTION**
Creation of a statistical machine using an embedded device (e.g., Raspberry Pi).

**MAIN RESPONSIBILITIES**
- Development of skills for working with an embedded device (within limited resources development environment)
- Data acquisition from different sources (from STD user input to RadioFrequency Identification via NFC)
- Data visualization (user-friendly output, from single-line display to web-based UI)

**KNOWLEDGE MUST HAVE**
- Analytical thinking
- Programming essentials
- Comfortable with at least one programming language: C, C++, python, java

**KNOWLEDGE NICE TO HAVE**
- *C
- *C++
- Java
- python
- Development experience in an embedded environment

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

**PROJECT DESCRIPTION**
Creation of an application that will allow an user to see the neighbouring vehicles around his own.

**MAIN RESPONSIBILITIES**
- Development of the mobile application that will display a detailed map near the current position: other vehicles, special service vehicles;
- Development of a server that will receive positions from all vehicles and forward them to the right vehicles

**KNOWLEDGE MUST HAVE**
- Good programming skills in an object oriented programming language
- Mobile applications development skills (eg. Android)
- Analythical thinking

**KNOWLEDGE NICE TO HAVE**
- Web service development knowledge

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

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**POSITION NAV ANALYZER**

**PROJECT DESCRIPTION**
Application that will plot and analyze location information.

**MAIN RESPONSIBILITIES**
- Extending and working with an already developed application in javascript that displays and plots the location information on different types of maps based on PGL logs (google, OSM).
- The extension must include possibility of live replay of the sensor and GPS data.
- Application must be extended to offer statistics regarding behavior of data.

**KNOWLEDGE MUST HAVE**
- Familiar working with web based applications.
- Languages: javascript, c++

**KNOWLEDGE NICE TO HAVE**
- Web services
- Javascript
- C++

**YOUR WORKING CONTRACT COULD BE:**
8h per day
REMOTE CONTROL OVER WIFI, BLUETOOTH AND ETHERNET

PROJECT DESCRIPTION
Remote control over WiFi, Bluetooth and Ethernet is a development board used to communicate and remote control auxiliary devices. The board is able to communicate over the specified protocols.

MAIN RESPONSIBILITIES
- Simulate and calculate the circuitry necessary for the device to perform in requested parameters
- Schematic entry and PCB design
- C programming
- Create a prototype
- Electrical test
- System test

KNOWLEDGE MUST HAVE
- Logical analysis skills to determine the best approach for EE and SW design
- Soldering skills
- Basic schematic design, basic microcontrollers and C programming
- Knowledge of the basic EE components utilisation and functionality

KNOWLEDGE NICE TO HAVE
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YOUR WORKING CONTRACT COULD BE:
8h per day

AUTOMATIC ISSUE DETECTION (AID)

PROJECT DESCRIPTION
Developers analyze software problems based on text traces. It is common that during development phase, traces for sporadic issues are not enough to detect the root cause and developers need to reproduce the problem (manually or during overnight tests). This operation consumes long periods of developer’s time. In addition, when a problem is easily reproducible on our device farm, Jira tickets are cut for every occurrence of the issue. Thus, we end up with multiple tickets that will be duplicated but this will cost increased amounts of time on the developers’ side. Because we want our developers to focus on solving real issues, we want to have a web-based application that detects if issues reproduced overnight are already existing as tickets in Jira. If yes attaches the new traces to give developer more context.

MAIN RESPONSIBILITIES
- Collect and store all the logs resulted from our device farm during test-case execution in a database
- Allow introduction and storage of "trace patterns" for bugs through the front end.
- Performs automatic searches in the database based on "trace patterns". (Elastic search)
- Be integrated with Jira ticketing system
- In case a problem is reproduced during tests, instead of creating a new ticket, an occurrence counter is increased for the Jira ticket and the responsible developer is notified by email

KNOWLEDGE MUST HAVE
- OOP
- Linux Development
- Java/Python
- MySQL
- Basic Scripting Knowledge

KNOWLEDGE NICE TO HAVE
- Elastic Search
- AWS, Kubernetes
- Jenkins
- Jira

YOUR WORKING CONTRACT COULD BE:
6h per day
REAL-TIME TIMETABLE FOR CONTINENTAL BUS STATION

PROJECT DESCRIPTION
Since December 2019, CTP Iasi started to make available the GPS location of all its buses in Iasi (via a json file updated every 30 seconds).

Goal of the project is to create a real-time timetable for bus arrivals in Continental bus station (in both directions). Timetable should contain the bus line and the estimated time of arrival (should be expressed in minutes and in number of bus stations).

Bus timetable should be made available via:
1) intranet web page;
2) mobile application.

MAIN RESPONSIBILITIES
- Starting from a small set of requirements, design, implement and test the application in collaboration with an assigned mentor

KNOWLEDGE MUST HAVE
- OOP
- Web development

KNOWLEDGE NICE TO HAVE
- Android

YOUR WORKING CONTRACT COULD BE:
8h per day

LIFE-SIGNS IN THE CAR

PROJECT DESCRIPTION
Reason: People “forget” pets and worse, kids in the car, sometimes in the sun or chilly weather, with very negative consequences.

What to do: On car locking, start the in-car life-signs detection and notify the owner / police about it if the temperature gets dangerously high / low. A cheap way to implement idea to detect life in the car is to use the built-in mic to detect life-sounds (marks, meows, child cry). A less-cheap way is to use a thermal camera. Maybe an even better way is to use an ultrasound-movement detector because it is cheap and effective and easy to use and we have one in the office from a project we had last year.

Outcome: No more videos of people saving pets from cars left in the sun in the Walmart parking lot.

MAIN RESPONSIBILITIES
- Starting from a small set of requirements, design, implement and test the application in collaboration with an assigned mentor

KNOWLEDGE MUST HAVE
- OOP
- Python/C++

KNOWLEDGE NICE TO HAVE
- Sound processing

YOUR WORKING CONTRACT COULD BE:
8h per day
RPG W/ VOICE

PROJECT DESCRIPTION
Reason: Kids in the car need to be entertained.

What to do: Make a Speech (TTS + Voice Recognition) interface for a good text-based RPG to be played by kids on the back seat.

Bonus: using a build-in tablet-like device (not necessarily Android) we can also have GUI (smile)

Outcome: Kids are happy => everybody is happier!

MAIN RESPONSIBILITIES
- Starting from a small set of requirements, design, implement and test the application in collaboration with an assigned mentor

KNOWLEDGE MUST HAVE
- OOP
- Python/C++

KNOWLEDGE NICE TO HAVE
- Android
- Speech (TTS + Voice Recognition).

YOUR WORKING CONTRACT COULD BE:
8h per day

AUTOMATIC / INTELLIGENT FRONT-DESK

PROJECT DESCRIPTION
The scope of the project is to act as an automatic (& intelligent) front-desk when a defect needs to be assigned to the right team (domain).

When a new defect is found by testers, it first has to be pre-analyzed by a front-desk team, then re-assigned to the correct team/domain which should find the root-cause and provide a fix.

The project should use NLP / Natural Language Classifier to train a model using defects from past, then use the model to automatically identify which domain is in charge whenever a new defect is discovered.

MAIN RESPONSIBILITIES
- Starting from a small set of requirements, design, implement and test the application in collaboration with an assigned mentor.

KNOWLEDGE MUST HAVE
- OOP
- Python/ C++ / C#

KNOWLEDGE NICE TO HAVE
- Natural Language Processing

YOUR WORKING CONTRACT COULD BE:
8h per day
HMI RESOURCE MANAGER

PROJECT DESCRIPTION
Develop an application that aims to ease the management of hardware resources inside HMI (laptops, Canoe simulations, head units, telematic control units, etc.). Possible features: reserve a certain resource, mark it as “needs repairing” or “needs software upgrade”, search for an available resource in a certain timeframe, subscribe to notifications related to a certain resource. A matching Android client would also be nice.

MAIN RESPONSIBILITIES
- Software development of the application: starting from a small set of requirements, design, implement and test the application in collaboration with an assigned mentor

KNOWLEDGE MUST HAVE
- OOP
- C++

KNOWLEDGE NICE TO HAVE
- Android

YOUR WORKING CONTRACT COULD BE:
8h per day