Ivonne Berenice Lemus Martínez | Embedded Software Engineer

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Embedded Software Engineer with over 5 years of experience in developing and executing complex embedded software projects. Proficient in **real-time** operating systems (**RTOS**) and **low-level** programming, with a strong knowledge of communication protocols including **CAN**, **I²C**, **SPI**, and **UART**. Demonstrated expertise in utilizing **AUTOSAR** architecture throughout the **automotive** software development life cycle. Experienced in conducting rigorous testing of secure and critical software systems, ensuring reliability and compliance with **automotive** industry standards.

PROFESSIONAL EXPERIENCE

Embedded Software Engineer - BorgWarner. 19-03-2024 – 09-06-2024

-Integrated **pull request** code updates into the project's main branch using **version control tools** such as **Bitbucket**, **Git**, **GitHub**, Plastic, and SmartGit.

-Ensured the proper startup of the **bootloader** and application by utilizing **CANoe** and **CANalyzer**, verifying part numbers to confirm correct software deployment.

-Collaborated with a **global cross-functional team** to develop customized solutions that resolved customer needs.

Embedded Software Engineer - CIDEC. 16 - 06 2021 - 04-12- 2023

-Improved **ECU** reliability by resolving over 10 code **issues** using analysis and **debugging** tools such as **Ozone** and the **JTAG** interface to identify root causes.

-Optimized software development by 80% through the precise specification of software requirements, in accordance with specified guidelines and following the sprint dynamics of the **Agile methodology**.

-Completed tasks on schedule, including software design testing, software requirements analysis, and **peer code reviews**, using **Jira** and **Polarion** management tools.

-Conducted **cybersecurity** testing to ensure the correct generation and secure storage of **cryptographic** keys within the Hardware Security Module (**HSM**) of the main Electronic Control Unit (**ECU**).

-Designed software **architecture** using dynamic and activity **UML** diagrams in **Enterprise Architect**, increasing coding efficiency by 80%.

-Implemented **software development** in accordance with the V-Model of the **ASPICE** (**Automotive** SPICE) process to fulfill the Software Development Life Cycle.

-Identified 10+ code vulnerabilities through static analysis using LDRA and TRICORE tools in Eclipse, reporting MISRA violations, **Secure C** issues, and quality warnings.

-Performed software **unit tests** with VectorCAST to verify the detailed software design, ensuring high-quality software delivery and full condition coverage of functions.

-Configured the **ComStack** module using the **DaVinci Configurator** to enable communication via the **CAN** protocol and support diagnostic message transmission over the **UDS** protocol.

Project Engineer - CIDESI. 12-04-2019 -14-06-2021

-Developed software in **Embedded C** language for **ARM microcontrollers** to store data in external NAND flash memory, improving storage speed by 80% in a glider datalogger system.

-Maximized the efficiency of TMS570LS3137 **microcontroller** system up to 30%, by developing **embedded software i**mplementing **RTOS (Real Time Operating System)**, using **GIT** for program version control.

-Visited customer and internal locations to provide hands-on support to **systems engineers**, identify **hardware** requirements, and contribute to the digitalization of the existing railway driving system in Mexico City.
-Enhanced the Mexico City railway software system by applying **MISRA-C** and **Secure-C** coding standards, resulting in up to a 90% increase in peripheral **communication security** and reliability.
-Developed **low-level drivers** for **I²C**, **CAN**, **SPI**, & **UART** communication protocols, supporting **debugging** and validation activities, including **troubleshooting** issues.
-Implemented the **RSA cryptographic algorithm** to encrypt critical data transmitted via the **CAN** protocol, ensuring software protection for the Mexico City railway driving system project.
-Performing **software testing** on train tracks and troubleshooting during system start-up to verify correct implementation of the system update.

Graduate Studies- Instrumented equipment Department - CIDESI. 27-09-2017 – 15-12-2020

-Implemented **I²C** and **SPI** communication protocols on an embedded system using **C language** to transmit and store acquisition data from Hall sensors.
-Created an electronic **architecture** for signal acquisition of 80 Hall sensors implemented in **FPGA**, which allowed to get 400 µs in acquisition time and reduce by 70% the implementation costs.
-Assisted in prototyping a mechatronic device for gas pipeline inspection validating the Magnetic Flux Leakage (MFL) technique.

Internship - Instrumentation Equipment Department - CIDESI. 27- 04-2017 - 15-09-2017

-Developed a virtual instrumentation applying least squares **algorithms** to model the dynamic control of a DC motor using **Embedded C** language on a **TI microcontroller**.

EDUCATION

B.S. in Mechatronics Engineering | 09 -02-2012 - 10-02-2017

National Technological Institute of Mexico | San Luis Potosí

-Developed **firmware** for Texas Instruments, Microchip, and ST **microcontrollers** with **Assembly** and **C languages**.

M.Sc. & T. Mechatronics | 07-09-2017 - 09-12-2019

CIDESI | Querétaro

-Developed and executed **embedded** software to test a **hardware architecture** for analog data acquisition.

SKILLS

Programing Languages: C, Assembler & Matlab
DevOps: Git & Plastic
CPU architectures: FPGA (Artix-7), FPGA (Spartan 3E), TMS570LS3137, MSP430F2618, PIC4550, STL microcontroller.
Communication protocols: I2C, SPI, UART & CAN
Operating systems: RTOS, **SafeRTOS** & FreeRTOS
Languages: English & Spanish

COURSES

C++: UDEMY. 2024-09-10 - 2024-10-10
Vector tools: CIDEC. 2021-06-16 - 2021-09-27