

DIPLOMA THESIS

Documentation

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Form, academic year	5AHWIN, 2025/26
Topic	Examination and Analysis of Linux Driver Development
Co-operation partners	FH Joanneum, Kapfenberg

Assignment of tasks	The goal is to develop two functional Linux drivers in C and Rust, as well as to conduct a theoretical examination of key kernel concepts such as kernel space and user space, memory management, common sources of errors, and best practices.
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Realisation	Completion of the paper by the end of January 2026.
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Results	<p>At the end of this project, both of us aim to possess a comprehensive technical and theoretical understanding of the functionality and architecture of the Linux kernel, as well as the development of drivers within kernel space. The project's outcome includes the implementation of two drivers—one written in C (by Zugaj) and one in Rust (by Wieser). Both drivers will provide comparable functionality to allow an in-depth analysis of differences in performance, memory management, security, and maintainability.</p> <p>In addition to the practical component, a written report will be prepared that analyzes the Linux driver architecture with particular emphasis on the interaction between kernel space and user space. It will compare C and Rust in terms of security, memory management, and code quality.</p>
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while also documenting common errors, challenges, and best practices in driver development. Furthermore, the report will present a practical guide designed to assist future developers working with Linux kernel modules.

Through the combination of theoretical analysis and practical implementation, this project aims to build strong programming skills in both C and Rust and foster a deeper understanding of system programming and the Linux kernel's architecture. In the long term, it seeks to illustrate how Rust, as a modern and safe programming language, can serve as a sustainable alternative to traditional C-based kernel development.

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Illustrative graph, photo (incl. explanation)	

Participation in competitions Awards	...
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Accessibility of the Diploma Thesis	...
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Approval (Date / Signature)	Examiner	Head of College
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