Continuous Delivery of Textual Specifications in Visual Studio Code (EXCALIBUR-1)

Type of Internship	Master thesis
Supervisor	Benoît RIES
Required Skills	Mandatory skills in Java programming Mandatory skills in Visual Studio Code. Skills in Eclipse will be a plus
Technical Environment	Visual Studio Code, Java, XText, LaTeX
Description	The SAGE group focuses on methods and tools for Software Engineering and Artificial Intelligence. This master thesis will be performed in the context of the MESSIR scientific for Software Engineering. This method is supported by the Excalibur toolset, which allows requirements modeling with a domain-specific language and generation of a full requirements specification model including UML-like diagrams and textual specifications. Currently this toolset uses technologies based on the Eclipse, the Sirius and XText frameworks. Current technologies, in particular the Eclipse framework, have limitations with respect to maintenance and deployability to the end-users, namely bachelor students of the University of Luxembourg. In this context, the master student will work on the migration from Eclipse Software Engineering Environment to Visual Studio Code focusing on the requirements specification part. The tasks include, but not limited to : ● Technological watchdog of the continuous delivery technologies in Visual Studio Code ● Detailed analysis of the currently offered Excalibur textual requirements functionalities. ● Description of the architecture of the new online Excalibur ● Migration of the existing "Eclipse"-specific code to "Visual Studio Code"-compliant code

Continuous Delivery of Graphical Specifications in Visual Studio Code (EXCALIBUR-2)

Type of Internship	Master thesis
Supervisor	Benoît RIES
Required Skills	Mandatory skills in Java programming Mandatory skills in Visual Studio Code. Skills in Eclipse will be a plus
Technical Environment	Visual Studio Code, Java, UML, Sirius, LaTeX
Description	The SAGE group focuses on methods and tools for Software Engineering and Artificial Intelligence. This master thesis will be performed in the context of the MESSIR scientific for Software Engineering. This method is supported by the Excalibur toolset, which allows requirements modeling with a domain-specific language and generation of a full requirements specification model including UML-like diagrams and textual specifications. Currently this toolset uses technologies based on the Eclipse, the Sirius and XText frameworks. Current technologies, in particular the Eclipse framework, have limitations with respect to maintenance and deployability to the end-users, namely bachelor students of the University of Luxembourg. In this context, the master student will work on the migration from Eclipse Software Engineering Environment to Visual Studio Code in order to provide . The tasks include, but not limited to : ● Technological watchdog of the continuous delivery technologies in Visual Studio Code ● Detailed analysis of the currently offered Excalibur graphical requirements specifications functionalities. ● Description of the architecture of the new Excalibur ● Migration of the existing "Eclipse"-specific code to "Visual Studio Code"-compliant code

Development of an Ecosystem Resilience Dataset Synthesizer (SAGE-1)

Type of Internship	Master thesis
Supervisor	Tiago SOUSA
Required Skills	Strong programming skills in Python Proficiency in data manipulation, analysis and modeling Experience with machine learning and data synthesis techniques Understanding of software engineering principles and methodologies
Technical Environment	Python and usual machine learning libraries and frameworks, LaTeX, Git, Software development lifecycle tools (e.g., JIRA)
Description	The SAGE group focuses on methods and tools for Software Engineering and Artificial Intelligence. This master thesis will be performed in the context of the "Ecosystem Resilience Dataset Synthesizer (SAGE-1)" project which aims to integrate the domains of ecosystem resilience, machine learning and software engineering. This master's thesis will concentrate on designing, implementing, and validating a software tool that synthesizes realistic ecosystem resilience datasets, facilitating advanced ecological studies. The thesis work will encompass all phases of the software engineering lifecycle, ensuring a comprehensive and robust solution. The tasks include, not limited to : - Requirements Analysis and Specification: Understand research needs, define dataset characteristics with the team. - System Design and Architecture: Plan SAGE-1's modular, scalable structure for various ecosystem scenarios. - Implementation and Coding: Use Python to develop SAGE-1, including data synthesis, user interfaces, and customization. - Testing and Quality Assurance: Create rigorous tests, validate dataset fidelity against expected patterns and scenarios. - Documentation and User Support: Document code, produce user guides and tech specs for stakeholder assistance with the utilization of SAGE-1. - Version Control and Deployment: Utilize Git, explore deployment options for accessible usage. - Project Management and Communication: Employ tools like JIRA to maintain clear stakeholder communication and project overview.