In all our projects you will be part of an agile project setup and be supported by specialists with an international background.

Parallelization of flow-based programming application

Suitable for: bachelor thesis, internship

In this project you work with an in-house application that allows to create customized execution flows. The application contains a configuration interface in which the user can configure each step of the execution flow and how each step is related (flow-based programming). An example could be a flow which compiles a series of C files and links them together to an executable file, run tests, determine coverage and generate a report. The application is implemented in Python and follows the flow-based programming concept. Your task is to realize parallelization support for the application.
Some of the flow steps can be executed in parallel, either by running in parallel on the local machine or by utilizing a cluster with multiple nodes. The project involves all step of a project life cycle, from analyzing requirements to then designing, implementing and prototyping and the parallelization API.

Visualization of an execution flow in flow-based design

Suitable for: bachelor thesis, internship

In this project you work with an in-house application that allows to create customized execution flows. The application contains a configuration interface in which the user can configure each step of the execution flow and how each step is related (flow-based programming). An example could be a flow which compiles a series of C files and links them together to an executable file, run tests, determine coverage and generate a report. The application is implemented in Python and follows the flow-based programming concept.

Flow-based programming is by its nature very suitable for visualization. The goal of this project is to generate a flow graph that shows the nodes of the flow and how they are related to each other. You must examine different approaches, design a concept and prototype it.

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Property-based testing (fuzzing) approaches for embedded C projects

Suitable for: internship, maybe bachelor thesis

When verifying hardware designs it is already custom to use random constraint verification and formal verification. Fuzzing and property-based testing can be regarded as equivalent approaches for software testing. In our company we want to explore these options to test software.

Your task will be to familiarize yourself with available test suits and approaches and convey this knowledge to our software developers. As hands-on project we want you to set up a Python test suite that can work with embedded C projects. The project – analyzing new technologies, working with different programming language technologies and selecting approaches – reflects our everyday work reality and will therefore give you a good impression about work life.

Extension of an EMF-based modeling framework and model-driven development of small applications

Suitable for: internship, maybe bachelor thesis

Model-driven development significantly simplifies the generation of applications and allows shifting the focus from implementation details to design decisions. We have developed an in-house frame that uses EMF (Eclipse Modeling Framework) and several template engines.

In this project we want you to realize Python support for the framework (via PyECore/pyecoregen) which has so far only run in Java. We also want you to use the framework to build small applications – that way you will also get familiar with model-driven development itself. You will get in contact with several widely-used technologies while at the same experiencing the typical work environment we are confronted with on our daily base.

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