Background information
Formal model driven engineering is increasingly being used in software architecture and engineering in ASML. With the introduction of the DCA design pattern that allows the clear separation of concerns between Data, Control and Algorithms and the associated tools such as ASD that facilitate the pattern, model driven engineering is slowly becoming the new standard. However, functional requirements are still specified in documents and are used as the basis for software designs. Due to project timing and budget constraints, concurrent engineering is commonly seen in practice resulting in functional and software designs being made nearly simultaneously. Functional requirements are modified even when the software designs have already been made and are in the implementation phase. Moreover the different formats and documents used to communicate functional requirements can lead to multiple interpretations/ misinterpretations which in turn can lead to faulty software designs. Inconsistencies can arise when multiple functional teams write requirements in separate documents and there is no automated way to synchronize or check them.

Another big challenge faced is that software DCA designs are not easy to read or review by functional engineering teams. What is needed is a common model driven framework/tool where functional requirements can be specified and as far as possible also verified and validated. This will opens gates to allow seamless functional-software interaction to replace the current erroneous documentation-based approach while also allowing functional teams to closely understand and review software designs.

Your assignment
In the first step of this assignment, you will analyze different formal specifications that can be used to specify sequence and data flow functionality together. The formal specification languages should have close mapping to the DCA software design patterns to enable clear functional-software interaction. You will develop a prototype tool or discover an existing one that is simple and usable by functional teams and also integrates well with the ASML development environment.

In the second step, once the functional formal modelling tool is in place and requirements have been specified in it, you will study different analysis techniques that help to deduce a schedule of the triggers of actions that is deterministic and can be used to make ASD designs. You will also analyze model to model transformations that can be used to translate functional models to software models.

Your profile
You are a Computer science/ Electrical engineering master student with knowledge of model driven engineering/ formal methods and C/C++. Please keep in mind that we can only consider students (who are enrolled at a school during the whole internship period) for our internships and graduation assignments.

What ASML offers
Your internship will be in one of the leading Dutch corporations, gaining valuable experience in a highly dynamic environment. You will receive a monthly internship allowance of 500 euro (maximum), plus a possible housing or travel allowance. In addition, you’ll get expert, practical guidance and the chance to work in and experience a dynamic, innovative team environment.

ASML: Be part of progress
We make machines that make chips – the hearts of the devices that keep us informed, entertained and safe; that improve our quality of life and help to tackle the world’s toughest problems.

We build some of the most amazing machines that you will ever see, and the software to run them. Never satisfied, we measure our performance in units that begin with pico or nano.

We believe we can always do better. We believe the winning idea can from anyone. We love what they do – not because it’s easy, but because it’s hard.

Students: Getting ready for real-world R&D
Pushing technology further is teamwork, and our R&D team is more than 5,500 people strong, with major sites on three continents. Dozens of diverse, interdisciplinary teams work in parallel to meet a challenging development schedule.

In such an environment, your colleagues may be sitting next door, or they could be thousands of kilometers away in a different country, or even working for a different company.

An internship at ASML is your opportunity to get to know this world of industrial-strength R&D and get a feel for that excites you most. Will you design a part of the machine, or make sure it gets built to the tightest possible specifications? Will you write software that drives the system to its best performance, or work side-by-side with the engineers of our customers in a fab, optimizing a system to the requirements of the customer?

How will you be part of progress?

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