Institut of Information Systems Engineering
Devision Information & Software Engineering
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Project
Bac Thesis
Master Thesis

Reference:	**M3 PlantUML Adaptation for PPR**
Topic:	**Adaption of PlantUML Domain-Specific Language for Product-Process-Resource modeling**
Course-Type:	Project, Bac-/Masterthesis
Start:	As soon as possible
End:	To be defined
Industrypartner:	STIWA
Contact:	Kristof Meixner (kristof.meixner@tuwien.ac.at)

Background:

In multi-disciplinary engineering of Cyber-Physial Production Systems (CPPS), projects, similar to software projects, undergo different subsequent phases employing a variety of domain-specific roles. For example, basic engineers in early stages design matching production *processes* from *product* characteristics and select production *resources* (machines like welders or cutters). Schleipen *et al.* in [1] coined the dependencies among these concepts as Product-Process-Resource (PPR). The Formal Process Description (FPD) [2] is a modeling language capable of expressing PPR knowledge. Figure 1 illustrates a simple cake-baking example in this language.
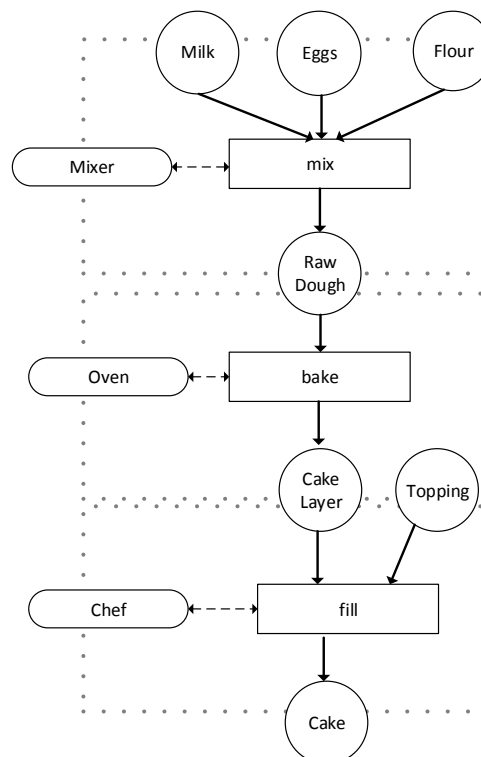

Figure 1: Product (circles), Process (squares), Resource (rounded squares) model for a simple cake.

PlantUML [3] is an open-source project that allows creating UML diagrams (e.g., class diagrams and activity diagrams) but also other kinds of diagrams (like entity relationship diagrams) neatly and straightforward, based on simple textual, domain-specific languages (DSL).

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In the context of the advertised work, this topic aims at extending PlantUML with a textual DSL for PPR, resp. FPD, using a model-based approach such as JetBrains MPS [3] and an integration to PlantUML.

The complexity of this topic requires an iterative and incremental approach, which, depending on the course type and effort, offers several sub-topics to be investigated and worked on.

This topic is provided and supervised in cooperation with our industry partner STIWA Group (www.stiwa.com)

Tasks:

- DSL definition for PlantUML based on [2]
- Integration to PlantUML platform

Expertise:

For this topic a set of skills is recommended (at least two are mandatory).

- Java programming skills
- Model Engineering
- Empirical evaluation, e.g. case study, pre/post comparison
- Jetbrains MPS or Eclipse EMF (is an advantage)

[1] Schleipen, M., Lüder, A., Sauer, O., Flatt, H., & Jasperneite, J. (2015). Requirements and concept for Plug-and-Work. at-Automatisierungstechnik, 63(10), 801-820.

[2] VDI/VDE 3682 2005. VDI/VDE 3682: Formalised process descriptions. Beuth Verlag

[3] http://plantuml.com/

[4] https://www.jetbrains.com/mps/