TECHNISCHE UNIVERSITÄT DRESDEN

Software Technology Group

Faculty of Computer Science Institute of Software and Multimedia Technology, Software Technology Group

WS2017/18 – Model-driven Software Development in Technical Spaces

Multi-Level-Modeling with Melanee

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1 Multi-Level-Modeling

This exercise introduces the notion of multi-level modeling as brought forward by Atkinson and Kühne [2]. They address the issue of classical metamodeling languages, which model both types and instances as metaclasses on the same level, such as the metaclass `Class` and `Object` in UML. In particulare, they introduce the notion of `Clabjects` as entities including aspects of both classes and objects, i.e., the can inherit from other `Clabjects` on the same level and can be instantiated on the next level. Consequently, any `Clabject` and its features (i.e., attributes, methods) are annotated with a potency that is decreased whenever it is *instantiated* on the next level [2]. Figure 1 depicts an illustrative multi-level model for companies. In accordance to the modeling approach, they provided *Melanee* [1],[1] a corresponding model-driven editor for multi-level modeling. In this exercise, you are tasked to apply the multi-level modeling approach to define both *petri nets* and *state machines* as instances of the same metamodel. Additionally, you will be tasked to specify suitable visual representations for their instances.

[1] http://www.melanee.org/

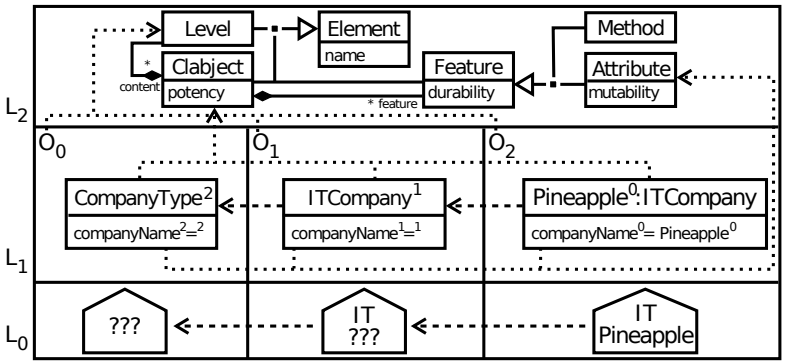

Figure 1: Illustration of multi-level modeling, extracted from teatkinson2016flexible

1.1 Task 1: Unifying Petri Nets and State Charts

The first task will be to apply the multi-level modeling approach to model a coherent multi-level model for both *petri nets* and *state machines*.

- Understand the *multi-level modeling* approach [2],
- Draw a corresponding common metametamodel, and finally
- Draw both *petri net* and *state chart* metamodels as instances of this metametamodel.

1.2 Task 2: Melanee

Afterwards, your task is to utilize *Melanee* to design a multi-level model.

- Download and install the Eclipse-based modeling editor *Melanee 2.0* [1],[2] and
- Design the coherent multi-level model for *petri nets* and *state charts*, from task 1.
- Optionally, define individual graphical representations for instances of *petri nets* and *state charts*.

The multi-level model created with *Melanee* must be designed as `*.lml` file and handed in on the day before the next exercise.

1.3 Additional Information

- Melanee,[3] is available within a prepackaged version of Eclipse.
- Melanee Screencasts,[4] are a set of small tutorials on the use of *Melanee 2.0*.

References

[1] Colin Atkinson and Ralph Gerbig. Flexible deep modeling with melanee. In *Modellierung (Workshops)*, volume 255, pages 117–122, 2016.

[2] Colin Atkinson and Thomas Kühne. The essence of multilevel metamodeling. *UML 2001 - The Unified Modeling Language. Modeling Languages, Concepts, and Tools*, pages 19–33, 2001.

[2] http://www.melanee.org/download/
[3] http://www.melanee.org/
[4] http://www.melanee.org/download/