



## Advanced Software Engineering

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### Reading Assignment: Problem Frames / Problem Solving

#### 1. Mandatory preparation tasks (to be done PRIOR to the lecture)

- Read Jackson (2005) and then Chapter 4 (pp. 76-104) from Jackson (2001). For deepening your understanding you should study the slides by Jackson (2006) and maybe also those by Hall (2006).
- Repeat/recall other problem solving approaches such as
  - Design patterns and architectural patterns, in particular Model-view-controller (Krasner and Pope 1988)
  - Abstraction / Information hiding (Parnas 1972) / Design by Contract (Meyer 1992) and analyze what & how they contribute to problem solving.
- From Jackson (2005) extract
  - Problem Frames as a problem solving technique,
  - The impact of the entailment  $S, W \vdash R$ ,
  - The role of normal vs. radical design.
- For which class of problems does Parnas' four-variable model (Parnas and Madey 1995) provide a generic problem solution? (see section on Parnas Tables in Herrmannsdörfer et al. (2008) for a short account of the four-variable model)
- Be prepared to
  - answer questions in class,
  - present your insights from your reading.

#### 2. Lecture

There will be no classic lecture. Instead, we will first discuss the topic based on your reading.

#### References

J. G. Hall (2006). *Practically Perfect Problem Frames*. BCS RESG Problem Frames Day, The Open University, Milton Keynes, UK. 10 May 2006.

Herrmannsdörfer, M., S. Konrad, B. Berenbach (2008). Tabular Notations for State Machine-Based Specifications. *Crosstalk*, issue 3/2008. 18-23. M.

Jackson (2001). *Problem Frames: Analysing and Structuring Software Development Problems*. Harlow: Addison-Wesley.

M. Jackson (2005). Problem Frames and Software Engineering. *Information and Software Technology* **47**, 14. 903-912

M. Jackson (2006). *A Tutorial on Software Development Problem Frames*. BCS RESG Problem Frames Day, The Open University, Milton Keynes, UK. 10 May 2006.

Krasner, G.E., S.T. Pope (1988). A Cookbook for Using the Model-View-Controller User Interface

Paradigm in Smalltalk-80. *Journal of Object-Oriented Programming* **1**, 3. 26-49.

Meyer, B. (1992). Applying “Design by Contract”. *IEEE Computer* **25**, 10 (Oct. 1992). 40-51.

Parnas, D.L. (1972). On the Criteria To Be Used in Decomposing Systems into Modules. *Communications of the ACM* **15**, 12 (Dec. 1972). 1053-1058.

Parnas, D.L., J. Madey (1995). Functional Documents for Computer Systems. *Science of Computer Programming* **25**, 1 (October 1995). 41-61.

### **Please note**

- Jackson (2001) is available in the Ifl library (Standardliteratur Glinz)
- The other papers/slides can be downloaded from:  
<http://www.ifi.unizh.ch/rerg/teaching/courses/ase/>
- The Problem Frames notation is summarized in Appendix 1 (pp.354-360) of Jackson (2001).
- There are typesetting errors in Jackson (2005):
  - On p. 905, left column:  $S, W \mid R$  should be  $S, W \vdash R$
  - In Fig. 2 and 3:  $\varkappa$  should be  $\approx$