



# Assignment 4

## Traceability and Requirements Evolution

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### I. Tasks

#### Individual Tasks

- Read the mandatory items in the reading list
- Prepare a critique of each mandatory paper. For each paper, we will select a student to present her or his critique orally in class (3-5 minutes). Particular questions to be addressed are:
  - What is the main message of the paper?
  - What are the expected practical benefits?
  - What are the strengths and weaknesses of the paper?
  - What questions do you have about the paper? (prepare at least two questions)
  - What is your personal opinion about the paper? Do you agree or disagree with its findings?
- Be prepared to answer the questions given in Sect. III below in class

#### Group Tasks

- Prepare a 10-12 minutes presentation (plus 6-8 minutes of discussion) on the theme assigned to your course group (cf. Sect. IV) and choose two persons from your group to present it.
  - At the beginning of your presentation, relate your topic to the session's topic (as represented by the mandatory reading)
  - Browse/read additional papers and/or web pages where necessary.
  - Send your presentation to Norbert after the session to share it with others.

### II. Reading List

#### Mandatory reading

[Jarke 1998] motivates and introduces traceability, [Gotel et al. 2012] present the fundamental concepts relating to it while [Ingram and Riddle 2012] discuss its costs and benefits.

#### Theme-specific reading

[Hayes et al. 2007], [Cleland-Huang et al. 2007]: Automated traceability.

[Cleland-Huang 2012], [Rempel and Mäder 2015]: Traceability in agile projects.

[De Lucia, Fasano and Olivieto 2008], [Ben Charrada, Koziolk, and Glinz 2015]: Traceability for impact analysis and co-evolution.

### III. Questions

- What is requirements traceability?
- What is the benefit of requirements traceability and what does it cost?
- How can one establish and maintain traces?

- What is trace granularity and what role does it play?
- What is the role of tools?

## IV. Themes for Presentation

### A. Automated Traceability

How can traceability links be automatically generated? How effective are current traceability link recovery techniques? Can and should humans be replaced for defining traceability?

### B. Traceability in Agile Projects

What are the benefits of tracing in Agile projects? What kind of tracing is adapted for small projects, for large projects and for safety-critical projects?

### C. Traceability for Impact Analysis and Co-Evolution

What is post-requirements traceability used for? How can traceability support the evolution of software systems and their documentation?

## References

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- C. Ingram and S. Riddle (2012). Cost-Benefits of Traceability. In J. Cleland-Huang, O. Gotel, A. Zisman (eds.): *Software and Systems Traceability*. Springer, London. 23-42.
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- J. Cleland-Huang, Settini, R., Romanova, E., Berenbach, B., Clark, S., (2007). Best Practices for Automated Traceability. *IEEE Computer* 40(6): 27-35.
- P. Rempel and P. Mäder (2015). Estimating the Implementation Risk of Requirements in Agile Software Development Projects with Traceability Metrics. In *Requirements Engineering: Foundation for Software Quality (REFSQ 2015)*. Springer. 81-97.
- E. Ben Charrada, A. Koziolk, M. Glinz (2015). Supporting Requirements Update during Software Evolution. *Journal of Software: Evolution and Process* 27(3):166-194.
- A. De Lucia, F. Fasano, R. Oliveto (2008). Traceability Management for Impact Analysis. *Frontiers of Software Maintenance (FoSM 2008)*. Beijing, China. 21-30.
- J. Hayes, H., A. Dekhtyar, S. Sundaram, E. Holbrook, S. Vadlamudi, A. April (2007). REquirements TRacing On target (RETRO): Improving software maintenance through traceability recovery. *Innovations in Systems and Software Engineering* 3(3):193-202.