University of Zurich[UZH]

RERG

Requirements Engineering II

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, Koziolek, 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

Themes will be assigned by the assistant who tutors this course; your group can apply for a theme.

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

Jarke, M. (1998). Requirements tracing. *Communications of the ACM* 41(12):32-36.

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Ingram, C., and Riddle, S. (2012). Cost-benefits of traceability. In J. Cleland-Huang, O. Gotel, A. Zisman (eds.): *Software and Systems Traceability* (pp. 23-42). Springer London.

Cleland-Huang, J. (2012). Traceability in agile projects. In J. Cleland-Huang, O. Gotel, A. Zisman (eds.): *Software and Systems Traceability* (pp. 265-275). Springer London.

Cleland-Huang, J., Settimi, R., Romanova, E., Berenbach, B., Clark, S., (2007). Best practices for automated traceability. *IEEE Computer* 40(6): 27-35.

Rempel, P., and Mäder, P. (2015). Estimating the Implementation Risk of Requirements in Agile Software Development Projects with Traceability Metrics. In *Requirements Engineering: Foundation for Software Quality(REFSQ 2015)* (pp. 81-97). Springer.

Ben Charrada, E., Koziolek, A., Glinz, M. (2015). Supporting requirements update during software evolution. *Journal of Software: Evolution and Process* 27(3):166-194.

De Lucia, A., Fasano, F., Oliveto, R. (2008). Traceability management for impact analysis. In *Frontiers of Software Maintenance (FoSM 2008)* (pp. 21-30). IEEE.

Hayes, J. 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.