**Lecture "Software Engineering** SoSe 2023

Free University of Berlin, Institute of Computer Science, Software Engineering Group Lutz Prechelt, Linus Ververs, Oskar Besler, Tom-Hendrik Lübke, Nina Matthias

Exercise sheet 4 **Requirement determination** to 2023-05-15

## Task 4-1Æ: Paper "Requirements Engineering: A Roadmap

Read the paper "Requirements Engineering: A Roadmap" by Nuseibeh and Easter- brook (found in KVV) and answer the following questions, indicating the exact passages in the text (page, column, paragraph) to which you refer:

**a)** Which aspects of *requirements engineering (RE)* do the authors mention in their definition of RE?

**b)** Which disciplines do the authors name as the basis for RE and to what extent does each discipline come into play in RE?

**c)** What is the relationship between theoretical and practical computer science and RE?

**d)** What five basic activities of RE do the authors identify and what are their respective key points?

**e)** What advantage of goal-oriented requirements elicitation do the authors cite?

**f)** What is the premise from which contextual elicitation techniques start?

**g)** What requirements modeling techniques do the authors mention and what are their respective key points and suitability?

**h)** What do the authors say regarding the commonality of requirements and scientific theories?

## Task 4-2: Requirements definition for your software idea

Elicit (e.g., via introspection) and describe at least 10 requirements for your software idea:

**a)** Group them according to the *target groups of* your software (if there are different ones).

**b)** In the lecture, different types of requirements were presented (see slide *"Types of Requirements"*). For each of your requirements, specify the respective type.

**c)** In addition to the electronic submission together with the solutions of the other tasks via the KVV, please also add the identified requirements to your project idea wiki page. Please note the type and target group of the requirement.

## Task 4-3: Requirements modeling in a foreign domain

**Background: Imagine** you are to develop a software system for the (fictitious) public Goethe Library in Berlin, with which the duty rosters can be created and distributed to the employees. You have already heard from the library management that there have been great difficulties in the past because all steps are essentially carried out manually. Last week you conducted interviews on site at the library. Now a temporary employee in your IT company has typed up the interviews recorded by dictaphone and sent them to you.

First conversation, with the person in charge of the rosters:

<Question: WHAT ARE THESE SERVICE PLANS?>
Yes, I create the duty rosters here. There always has to be at least one person per floor at the circulation desk. And that's early, before the first readers arrive, and late, when the last readers are swept out and cleaned up, I'd say. For the lunch breaks, there is also a
Break substitutions, that's mostly done by the late shift. That's always a lot in the fall, when the new trainees arrive. They can't sit alone yet, so they often do it with their practice supervisor. Later, however, they can do it well on their own. Except on the ground floor! That's where the main entrance is, and if someone wants a new ID card or a Wi-Fi ticket, it's better to sit in pairs.

<Question: HOW DO YOU CREATE THESE PLANS?>
Every Thursday afternoon I sit down to make the plan for the next week. Then I go to my own files, open the file with the plan in it and then write the date of next week on top. So from Monday to Saturday. Then I have to see which of my colleagues is on vacation or sick. I can't use them! I cross them out of the plan. I have to fill in the gaps with other names - everyone has their own abbreviation.

<Question: WHAT IS THIS FILE?>

Well, such a Word table.

<Question: AND HOW DO YOU CONTINUE?>
So and then the big back and forth starts. Some prefer to work late, others early. Then there are appointments away from home and then you have to divide up the services. And that's different every week.

<Question: AND THEN?>
Then I print out the plan and put it on the bulletin board and then the colleagues see it.

Immediately afterwards, you met another employee in the hallway in front of the bulletin board and briefly questioned her:

Every week the same chaos with the duty roster. There's always someone who looks at the duty roster and then sees that he's supposed to be working late, even though he's not.
he didn't want to be there at all. Or sometimes someone is sick and Elli, who makes the duty rosters, has forgotten and someone is listed there for the loan. Then she has to do it again, because that's not true.

It's always stupid that we only see the duty rosters on Monday morning. Sometimes you arrive at eight o'clock and see that you don't have to be at the circulation desk until 3 p.m., but then you have to be there until 7:30 p.m.! You can go home right away, because we're not allowed to work that long.

After the two conversations, you took the current roster off the bulletin board and copied it:

| | | 10:00 Lesung: Kra, Mur | 10:00 Lesung: Kle | | | |
|---|---|---|---|---|---|---|
| | Montag 2.5. | Dienstag 3.5. | Mittwoch 4.5. | Donnerstag 5.5. | Freitag 6.5. | Samstag 7.5. |
| 2. OG früh | Kle | Lie | Kle | **Feiertag** | Gla | Der, Rau, Drc, Bay |
| 1. OG früh | Rab | Bet | Len | | Kos | |
| EG früh | Drc | Gla | Rau | | Kle | |
| EG 10-13 | | | Krü | | | |
| Mitteldienst | 13-15 Len<br>15-18 Cal | Ab 13:30 Rab | Kau | | Drc | |
| 2. OG spät | Gla | Ab 15 Kle | Gla | | Der | |
| 1. OG spät | Kos | Ab 16:30 Kra | Bet/Kle | | Kau | |
| EG spät | Krü | Kos | Drc | | Rab | |
| | | | | | | |
| Ohne Pultdienst | Der, Kau, Lie, Rau | Der | Der, Kos, Lie, Rab | | - | |
| Pausendienst | Spätdienst | Spätdienst | 1. OG: Rab<br>2. OG: Kos | | Spätdienst | |
| Nicht eingesetzte Reserve | - | - | Spät: Lie | | - | |

Stand: 19.04.16

**Task**: Understand the problem domain (**a)** and **b)**), identify problems and opportunities (**c))** and prepare the completion of the requirements (**d)**).

**a)** First, shed light on the properties of the domain "Diensteinteilung in der Goethe-Bibliothek". List the relevant concepts from the domain outlined in the two discussions, their properties, and relationships among them.

Remember that your requirements elicitation should be as complete as possible. Find at least **eight relevant domain concepts**. Choose a suitable form of presentation.

Keep the following in mind:

- We are here still in the *problem world*, and not in the *solution world*! The idea here is not to think about a software system yet, but to understand how exactly the environment works into which one later integrates a software system. (In the article from task **4-1 this** was called "domain modeling"; in the requirements elicitation slide set these were "domain proper- ties").
- Make sure that you make a clear distinction between the copy *level* and the *concept level. The* fact that there is a counter on the second floor of the Goethe Library, for example, is *not a* concept; a real concept would rather be that there are *counters* at all, and that they each have a *location.*

For each concept and concept-relationship, indicate from which of the two conversations you took it.

**b)** Now take a closer look at the copied duty roster in addition to the conversations. You should be able to think of a number of open questions regarding your domain modeling from task **a).** These can be, for example, missing concepts, incomplete concepts, or unclear relationships between concepts. Also pay attention to ambiguous statements in the conversations.

List at least **eight open-ended questions** that have arisen from the previous considerations of the problem domain. Formulate the questions in such a way that you could ask them in a second round of interviews.

**c)** Now turn to the actual requirements. The discussions so far have not made any explicit statements about what exactly the new planning system should do.

First, identify any target groups and name their current **problems and difficulties**. Formulate at least **three functional requirements in** such a way that the future users would understand them.

Go for breadth rather than depth here, i.e. pay attention to the completeness of the requirements; we are *not* yet talking about detailed user interactions. Only formulate requirements that you are already convinced are correct.

**d)** Surely you have also noticed gaps or unclear places in the planned system functionalities. Formulate **at least two questions** you would ask the bi- librarians to fully understand the possible functionality of a system helpful in the above domain.

Now take a step back in your mind and reflect on the requirement determination itself:

**e)** Which of the survey techniques presented in the lecture have already been used in this pro- ject?

Do you see a problem with this (e.g. in terms of effectiveness or efficiency)? What other techniques would be appropriate here? Justify.