Describing Requirement in More Detail

School of Computer Science | Software Requirements and Design
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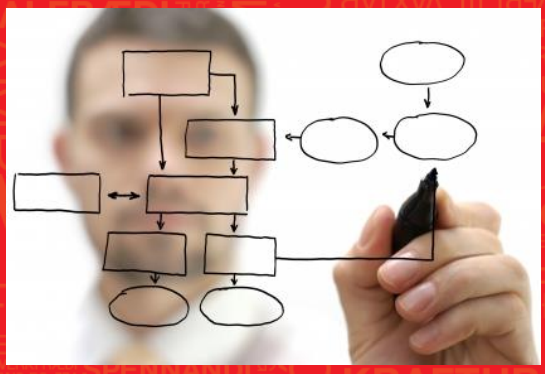
30. August 2019

Content

1. Requirement analysis report
2. Describing requirements in more detail

- Reading material:
  - Chapter 11.4, 11.5, 11.6 – Interaction Design

Requirement Analysis Report



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Requirement analysis report

- In Icelandic: þarfagreiningarskýrsla
- A document which explains *__what__* the system should do
  - Note: It will NOT include **anything about how** the functionality will be implemented!
- Can we give a finite list of what should be in this document?
  - No, anything that might be useful to explain what the system should do could be in there

What is the purpose of this document?

1. First and foremost: state *what* the system should do
2. Communicating with stakeholders of the project
   - requires the document to be written in a non-technical language, regular users/ managers/ developers must all be able to understand the report
3. Used as input to later stages of the development process
   - development
   - testing
   - documentation

Contents of a requirement analysis report

- Although this won't be an exhaustive list, the following is often found in a requirement analysis report:
  - general description (free text)
  - requirement list
  - prioritization of requirements (often included in the requirement list)
  - use case diagram
  - list of use cases
  - role list
  - etc.

General description

Typically, a general description of the system/project would mention:

- The main purpose of the system
- What assumptions are made about the system
- Implementation suggestions
  - is it a web application? for a smart phone? etc.
- System boundaries
  - where do we stop?
  - will this system interface with other systems?
  - what is out of scope?
- Environment

What is a requirement?

- A well defined, testable statement that can be verified
- Example of a good requirement:
  - “All users shall be able to rent a book" (short, single responsibility)
- A bad requirement:
  - "The system should be really fast" (vague, how fast is really fast?)

– Better:
  - "The average response time should be less than 500 milliseconds when executing a query" (measurable)

Functional and non-functional requirements

- Functional requirements
  - implemented features
    - "it should be possible to borrow a book"
  - rules
    - "a user may not borrow more than 3 books simultaneously"
  - etc.
- Non-functional requirements
  - requirements such as:
    - Extensibility/scalability
    - Portability, reusability
    - Performance, hardware concerns
    - Cost savings
    - Usability/user experience
    - Training needs, etc…

Requirement list

- A requirement list will often look something like this:

Number	Name (and possibly a short description)	User group(s)	Priority (A/B/C)	Additional info
...	...	...	...	...

- Number:
  - an incrementing number which identifies each requirement
- Name/description:
  - short description of the requirement
- User group(s):
  - a list of user groups which have to do with this requirement
- Priority:
  - how important this requirement is:
  - A: absolutely essential
  - B: useful, but not mission critical
  - C: nice-to-have
- Additional information:
  - Can be used to connect to more detail, such as use case descriptions

Requirement list - Example

Number	Name	User group	Priority	Additonal info
1	Send in an order for each week for the ingreedienses of meals	Vegan, paleo, keto, classic	A	Use case description #5
2	Check what was ordered for a particular week both past in time and in the future	Vegan, paleo, keto, classic	B	
3	Rate a particular recipe of how tasty it was	Vegan, paleo, keto, classic	B	
4	Check how others rated a particular recipe	Vegan, paleo, keto, classic	B	
5	Make a new ingredience/recipe/group of recipes that the customers are ablty to buy	Employee	A	Use case description #3

- Additional information is used for comments
  - Often to refer to other documentation of the requirement like the use case description
- The Name field is for the description of the requirement

Describing Requirements in More Detail

Describing the users and user goals

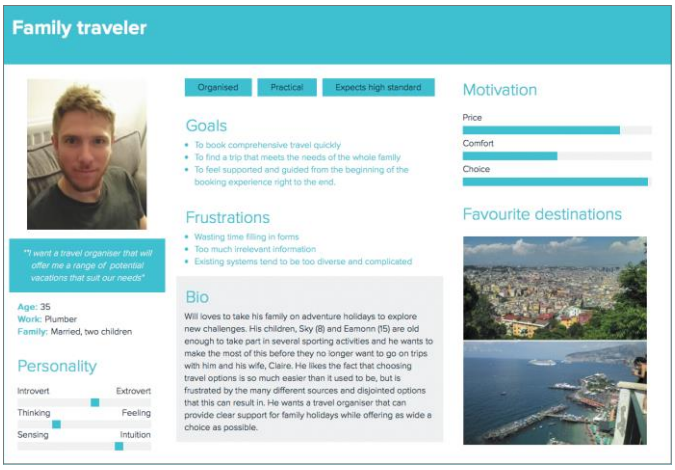
- A few user centered design methods that can be used to do this.
- We have looked at user groups analysis to describe users
  - Now we will look at Personas
- To describe user goals:
  - User stories - part of e.g. Scrum
  - Scenarios
  - Use cases - part of UML

Personas

Describing Users using Personas

- Capture a set of user characteristics (user profile)
- Synthesized from real people based on user research
- Typical, not idealized
- Bring to life with name, characteristics, goals, and personal background
  - Relevant to product under development
- Good persona helps designer with design decisions and reminds team about who will use the product
- Develop a small set of personas with one primary

Example Persona



Developed using Xtensio Templates

Scenarios

Scenarios

- A fictional story about a person (representing a user group), using the system to achieve a goal (and the interruptions he/she might encounter)
- Scenarios create a context and “actual” physical world
- Can set the scene of requirements and help in getting the right requirements (real needs)
- Focuses on interaction between user and system
- Can be high-level or detailed
- Often used in usability testing

Example of a scenario

- Mary wants to fly to Iceland next Friday, returning late on Sunday. She wants to know how much this would cost, and also whether it would be cheaper to fly a different day back. She is not quite sure of the airport name in Iceland. When she has found the right flight, she wants to confirm the purchase with a credit card and get a receipt.

- More on scenarios:
  - http://en.wikipedia.org/wiki/User-centered_design#Scenario
  - http://www.usability.gov/methods/analyze_current/scenarios.html

Scenario for group travel organizer

"The Thomson family enjoy outdoor activities and want to try their hand at sailing this year. There are four family members: Sky (8 years old), Eamonn (12 years old), Claire (32), and Will (35). One evening after dinner they decide to start exploring the possibilities. They want to discuss the options together but Claire has to visit her elderly mother so will be joining the conversation from her mother's house down the road. As a starting point, Will enters an idea they had been discussing over dinner – a sailing trip for four novices in the Mediterranean. The system supports users to log on from different locations and use different devices so that all members of the family can interact easily and comfortably with it wherever they are. The system's initial suggestion is a flotilla, where several crews (with various levels of experience) sail together on separate boats. Sky and Eamonn aren't very happy at the idea of going on vacation with a group of other people, even though the Thomson's would have their own boat. The travel organizer shows them descriptions of flotillas from other children their ages and they are all very positive, so eventually, everyone agrees to explore flotilla opportunities. Will confirms this recommendation and asks for detailed options. As it's getting late, he asks for the details to be saved so everyone can consider them tomorrow. The travel organizer emails them a summary of the different options available."

Scenarios

- May be textual descriptions, animations, audio or video
- Example animation scenarios

Source: Keirnan et al. (2015), Figure 1. Reproduced with permission of ACM Publications.

Scenarios and personas

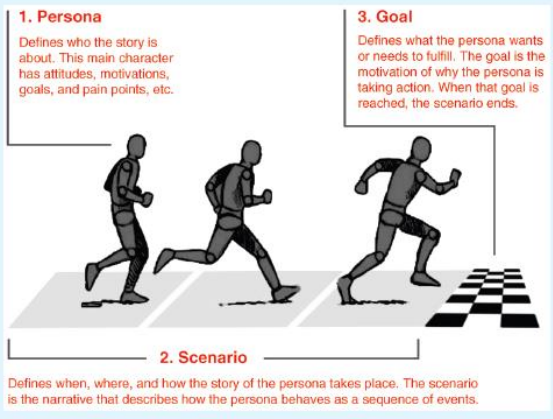
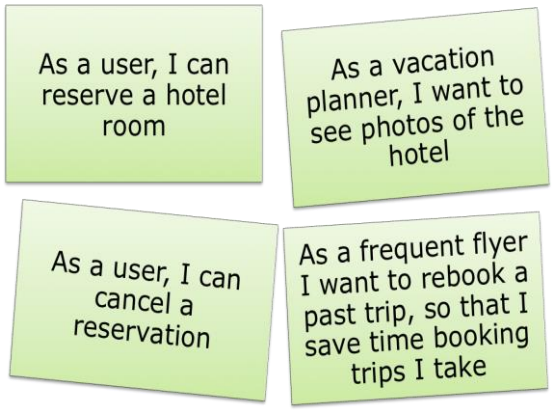


Figure 10.10 The relationship between a scenario and its associated persona
Source: http://www.smashingmagazine.com/2014/08/06/a-closer-look-at-personas-part-1/

User stories



User stories

- Used in Agile methods, e.g. Scrum (popular today)
- A quick and informal way to express what a system must do (requirements according to users)
- Uses everyday language and not very detailed - > conversation starter
  - But use a particular format – see next slide
- Are prioritized and later may be broken down into tasks and time estimated by programmers

Examples of user stories

- Format: "**As a <user type> I want to <do some action> so that <desired result>"**
- As an office user closing the application, I want to be prompted to save if I have made any change in my data since the last save so that I will not lose my data
- As a non-administrative user, I want to modify my own schedules but not the schedules of other users so that only mine has changed

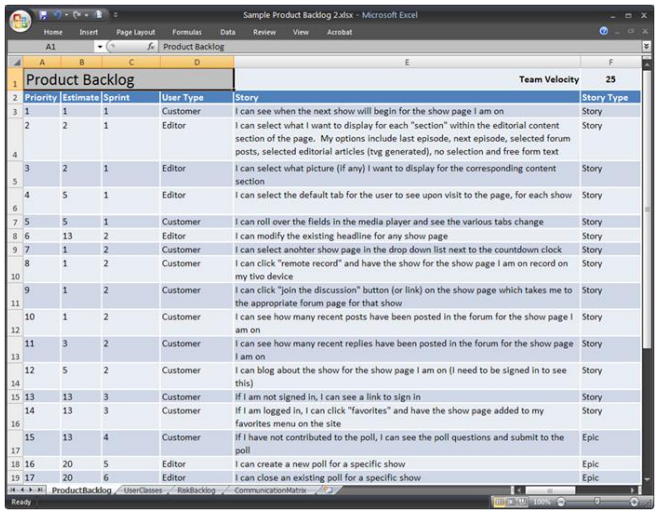
- More on user stories:
  - http://en.wikipedia.org/wiki/User_story

Where are the details ?

As a user, I can cancel a reservation so that I can get money back.

- Does the user get a full or partial refund?
- Is the refund to her credit card or is it site credit?
- How far ahead must the reservation be cancelled?
- Is that the same for all hotels?
- For all site visitors? Can frequent travelers cancel later?
- Is a confirmation provided to the user?
  - How?
- A description is needed
  - Use case, scenario, prototype, written text,.....

Product Backlog – List of User Stories



Sample Product Backlog 2.xlsx - Microsoft Excel

Product Backlog

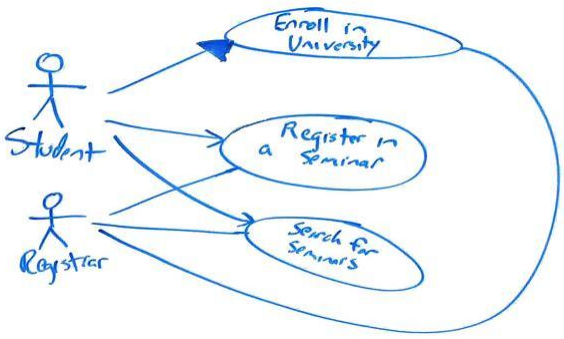
Team Velocity 25

Priority	Estimate	Sprint	User Type	Story	Story Type
1	1	1	Customer	I can see when the next show will begin for the show page I am on	Story
2	2	1	Editor	I can select what I want to display for each "section" within the editorial content section of the page. My options include last episode, next episode, selected forum posts, selected editorial articles (tvg generated), no selection and free form text	Story
3	2	1	Editor	I can select what picture (if any) I want to display for the corresponding content section	Story
4	5	1	Editor	I can select the default tab for the user to see upon visit to the page, for each show	Story
5	5	1	Customer	I can roll over the fields in the media player and see the various tabs change	Story
6	13	2	Editor	I can modify the existing headline for any show page	Story
7	1	2	Customer	I can select anohter show page in the drop down list next to the countdown clock	Story
8	1	2	Customer	I can click "remote record" and have the show for the show page I am on record on my tivo device	Story
9	1	2	Customer	I can click "join the discussion" button (or link) on the show page which takes me to the appropriate forum page for that show	Story
10	1	2	Customer	I can see how many recent posts have been posted in the forum for the show page I am on	Story
11	3	2	Customer	I can see how many recent replies have been posted in the forum for the show page I am on	Story
12	5	2	Customer	I can blog about the show for the show page I am on (I need to be signed in to see this)	Story
13	13	3	Customer	If I am not signed in, I can see a link to sign in	Story
14	13	3	Customer	If I am logged in, I can click "favorites" and have the show page added to my favorites menu on the site	Story
15	13	4	Customer	If I have not contributed to the poll, I can see the poll questions and submit to the poll	Epic
16	20	5	Editor	I can create a new poll for a specific show	Epic
17	20	6	Editor	I can close an existing poll for a specific show	Epic

Requirement List vs. Product Backlog

- Both describe the requirements for the whole system
  - The requirements are prioritized in both cases
  - There are references to more detailed descriptions either use cases, scenarios, prototypes, etc.
- User stories mention the user group, but users are not necessarily included in requirements
-

Use Cases



Use Cases – Will be described next week

- A more detailed description of a single activity or operation within a system
- A use case is not "drawn" like many UML diagrams, but written
- The format of a use case has not been standardized
  - you will see different forms in different books
- Should be understandable for people with little or no technical background
- Should describe in detail what happens and what should not happen
- Is often used as a foundation for test descriptions
- Will be described in more detail later in the course

Use cases

- Focus on functional requirements and capture interaction
- Can be used in design or to capture requirements
- Use cases are step-by-step descriptions of interactions
- Two styles:
  - Essential use cases: division of tasks, no implementation detail
  - Use case with normal and alternative courses: more detail

Example essential use case for travel organizer

RetrieveVisa

USER INTENTION	SYSTEM RESPONSIBILITY
Find visa requirements	Request destination and nationality
Supply required information	Obtain appropriate visa info
Obtain copy of visa info	Offer info in different formats
Choose suitable format	Provide info in chosen format

Note: The user intention and system responsibility are offset vertically, showing a sequence of interactions

Use case for travel organizer

1. The product asks for the name of the destination country
2. The user provides the country's name
3. The product checks that the country is valid
4. The product asks the user for their nationality
5. The user provides their nationality
6. The product checks the visa requirements of that country for a passport holder of the user's nationality
7. The product provides the visa requirements
8. The product asks whether the user wants to share the visa requirements on social media
9. The user provides appropriate social media information

Alternative courses for travel organizer

Some alternative courses:

4. If the country name is invalid:
   - 4.1: The product provides an error message
   - 4.2: The product returns to step 1
6. If the nationality is invalid:
   - 6.1: The product provides an error message
   - 6.2: The product returns to step 4
7. If no information about visa requirements is found:
   - 7.1: The product provides a suitable message
   - 7.2: The product returns to step 1

As a user I want to be able to buy a ticket

Use Case structure:

1. Pick a performance you want to go to
2. State what date you would like
3. Find a button to buy a ticket
4. State how many tickets you need
5. Select the tickets you like
6. Insert information for payment
7. Insert information on the delivery

Scenario description:

Marta wants to see the theater piece Njála in Borgarleikhúsið, because there has been a lot in the news about this piece. She finds a web site for Borgarleikhúsið and selects the show. She would like to go on a Sunday, because during the weekend she enjoys better going to the theater, so she selects February, 7th. She is going with her husband, so she wants two tickets. When she has done that the system shows her the tickets and she pays them and will pick them up 15 min before the show at the teather.

Functional requirements are important

- Then we can do
  - One user story per each requirement
  - One use case per each requirement
    - You will do that in this course
  - One scenario per each requirement
  - Design according to the requirements
  - At least one test case per user story/use case/scenario

Summary

1. Requirement analysis report
2. Describing requirements in more detail

- Reading material:
  - Chapter 11.4, 11.5, 11.6 – Interaction Design