Requirements and Analysis Document

Table of contents

Version: 1.5
Date: 2012-05-17

Authors: Andersson Rikard, Askviken Filip, Brodefors Oscar, Nyström Emil

This version overrides all previous versions.

1 Introduction

When attending courses at Chalmers you tend to need books. These books are expensive and mostly useful only under the course of the course. At this moment the authors of this document have at least 10 such books at home, collecting dust. These could be useful to other students who are now taking the courses connected to those particular books. Wouldn’t it be swell if

we could find those students and sell them our old books for a lower price than it would cost them to buy new once, preferably with minimum work effort?

1.1 Purpose of application

A simple application for smartphones where students can sell and buy used books needed at courses given at Chalmers (and possibly other Universities). Users can register books for sale and other users can search and find these books. The unique selling point compared to existing sites like blocket or tradera is the nische market. When buying from our application you know that the seller is close by and that you can set up a meeting to get the book the same day.

1.1.1 Stakeholders

There are several stakeholders for our application.

- Students (buyers and sellers called ST)
- Student organizations (called SNI)
- Book stores (Cremona in particular)
- Teachers
- Developers (called DEV)
- Testers
- Beta-testers
- Supervisors
- Maintenance
- Server-side supplier

We aim to sell our product to student organisations and therefore view them as our most important stakeholder along with, of course, the actual users of the application. Most of our requirements will be connected to them. Since we develop towards users we anticipate that a lot of test cases will be needed.

We have already been in contact with the student study organization at Industrial Engineering and Management and we have got some requirements from this stakeholder. We have also talked to some students at Chalmers regarding the application in order to get some actual requirements from real stakeholders.

1.2 General characteristics of application

No transactions are handled by the application. The application simply matches buyer with seller and provides the opportunity for market mechanisms to function in the interaction between these two parties.

Functionality to add a plethora of attributes about the book and for users to search for books on these criterias. Also the ability to describe a book in general and to upload a photo of the book taken with the mobile camera. A book could be uploaded by filling in a ISBN-number and then obtaining book title, author and edition.

The ability for other users to comment on the book.

Possible functions to be added in future versions:
- Auctions
- Connection to Cremona to compare price and to buy new books
- A website connected to the application

1.3 Scope of application

There is no platform available for buying and selling books but exchanges happens anyway in other forums, for example “bokbytarmingel” arranged by SNI. However this application aims to find more sellers and to build a natural platform where buyers can meet sellers without knowing each other.

The application is to be sold to different student organisations who can then brand it and market it to their users.

An alternative market plan is to offer it for free to start with and to build a user base. When there is a bulk of users a small fee can be charged for adding books for sale.

1.4 Objectives and success criteria of the project

A objective for the application is to complete and fulfill all the requirements for the application. Another objective is to launch the application on time, according to the market plan.

Server side

Database
Books table
Server

Client side
GUI
Communication layer
Functionality layer

Another objective for the project is that all members of the project should be able to work in many different areas (Database connection, GUI, Scrum, testing etc) of the project in order to learn new things.

1.5 Definitions, acronyms and abbreviations

GUI - Graphical user interface
GPLv3 - General Public License, v3
LGPL - Lesser General Public License

1.6 Licensing

Since we may be using code that is copylefted in the project and the fact that we are using Github for version control, we believe that a GPLv3 license is appropriate for our project. We support all four requirements for free software. We also want to impose similar requirements on those who use our software and therefore chooses not to use the licence LGPL.

This project is using Google gson for parsing json. Licensed under the Apache License, Version 2.0. This license is compatible with our GPLv3 license.

2 Proposed application

We propose a client-server application where users communicate with a database. Users can add and get information from the database and get contact information about other users.
The application will be available for phones with Google's Android Operating System. In the future we intend to port the application to work on phones with Apple's iOS Operating System.

2.1 Overview and traceability

Traceability is important in software development and enables

testers and developers to derive issues/bugs to a specific commit and/or a release. This makes the

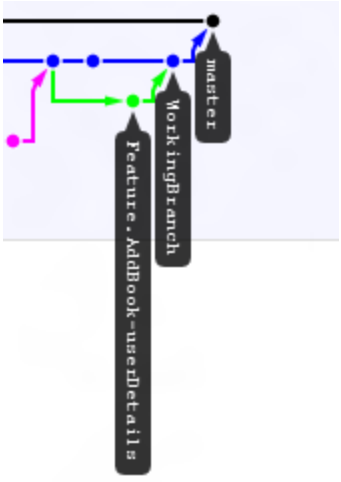
Traceability in this project have been conducted by using a strict project commit syntax (see next chapter) and using unique requirement ID's. Further, traceability have been achieved by building new GitHub-branches for bugs and new functionality and an integration with GitHub-issues in Eclipse. For example, test 1.1.5-N led to finding a new bug, which was connected to a specific requirement, and a specific issue.

2.1.1 Commit standard and syntax for traceability

We will use the following standard for our commit messages:
RID: TID: m:
Where RID is Requirement ID, TID is Task ID which is optionally, and then m for message. The message should include what you have done in your commit and in which file.

2.1.2 Use of branches in GitHub

In order to increase traceability and well-structured coding in this project, GitHub-branches have been used, as the picture below illustrates.



The master-branch has been used mainly for releases. Ontop of the master-branch, there has then been a branch for work in progress (WorkingBranch) from which we've branched out whenever a new feature was to be implemented or a bug was to be fixed. The pink branch in the picture merging into the WorkingBranch was previously a bug which was fixed, merged and closed.

2.2 Functional requirements for base functionality

Functional requirements for a system describes what the system should do. The requirements can be written at different levels of detail and can be based on both user requirements and system requirements (Sommerville, 2007). The requirements in this project are supposed to be verifiable (done with proper testing), understandable (done with clear formulation), traceable (done by project commit syntax and unique requirement ID's, new GitHub-branches for bugs and new functionality and integrated GitHub-issues in Eclipse), and possible to adapt (done by making the requirements realistic).

Requirement ID 1

A book store that provides the possibility for a **seller** to register a book for sale and that this book is then marketed to potential buyers.

Requirement ID 1.1, stakeholder ST

Use case: **The seller can register a book for sale**
Trigger: A seller press the button for "add a book"
Precondition: The seller has the application installed
Basic path: The seller presses the button for uploading a book and then gives the possibility to fill in ISBN, title, author, edition of the book, actual course, quality of the book, minimum price, email to seller, and phone number to seller. The seller also fills in a password which enables editing of the advertisement later. If ISBN is filled in, the fields of title, author, and edition is filled in automatically.
Exception path: The seller should get a exception if some of the required fields are not filled in. The seller should also have the possibility to quit the uploading process at any time through a cancel-button.
Post condition: A new book is uploaded to the market.

Requirement ID 1.1.1, stakeholder ST, SNI

Use case: **The seller can set a price for the book**
Trigger: A seller is in the process of uploading a book
Precondition: The seller has the application installed
Basic path: The seller presses the button for adding a book and then needs to fill in the required field regarding price. The price should be in SEK and made by 1-4 integers.

Exception path: The seller should get a exception if no INT-character is typed into the price-field.
Post condition: A new book is uploaded to the market with a minimum price.

Requirement ID 1.1.2, stakeholder ST, SNI

Use case: **The seller can upload a picture of the book for sale**
Trigger: A seller are in the process of uploading a book
Precondition: The seller has the application installed
Basic path: The seller presses the button for uploading a book and then gives the possibility to upload a picture of the book. Either from the mobile phone's picture library or by taking a new photo with the phone-camera.
Exception path: The seller should get a exception if the picture is too big to handle or in a wrong format.
Post condition: A new book is uploaded to the market with a picture showing the book.

Requirement ID 1.1.3, stakeholder ST, DEV

Use case: **The seller has to set a title for the book**
Trigger: A seller presses the button for "uploading a book"
Precondition: The seller has the application installed
Basic path: The seller presses the button for uploading a book and then has to fill in a book title. The title must be more than 4 characters long and maximum of 200 characters.
Exception path: The seller should get a exception message if a title is not filled in or the title have less than 4 characters (the 200 character limit should be implemented in the text box).
Post condition: A book for upload have a title.

Requirement ID 1.1.4, stakeholder ST, DEV

Use case: **The seller can set an ISBN for the book for sale**
Trigger: A seller press the button for "uploading a book"
Precondition: The seller has the application installed
Basic path: When uploading a book, the seller has the possibility to fill in ISBN-code for the book in a text box.
Exception path: The seller should get a exception message if the number of characters in the ISBN-number is any other

than 10 or 13 digits.
Post condition: An uploaded book can have a ISBN-number.

Requirement ID 1.1.5
Use case: **The seller can set a publishing year for the book**
Trigger: A seller press the button for "add a book"
Precondition: The seller has the application installed
Basic path: The seller types in the publishing year of the book, four digits.
Exception path: The seller should get a exception message if the "filled in year" is not a valid year (type YEAR)
Post condition: An uploaded book have a publishing year.

Requirement ID 1.1.6, stakeholder SNI
Use case: **The seller can set a course for which he/she used the book**
Trigger: A seller press the button for "add a book"
Precondition: The seller has the application installed
Basic path: The seller can fill in which course the book is used in.
Exception path: The seller have a possibility to not fill in the course, therefore no specific exception path.
Post condition: An uploaded book have a connection to a course.

Requirement ID 1.1.7, stakeholder ST
Use case: **The seller can add a comment about the book**
Trigger: A seller press the button for "add a book"
Precondition: The seller has the application installed
Basic path: The seller types in comments about a book in a text box.
Exception path: -
Post condition: An uploaded book might have comments.

Requirement ID 1.1.8
Use case: **Author must be more five characters or more**
Trigger: A seller presses the button for "uploading a book"
Precondition: The seller has the application installed
Basic path: The seller presses the button for uploading a book and then has to fill in a author of the book. The author must be more than 4 characters long.
Exception path: The seller should get a exception message if the author name is not filled in or the title have less than 5 characters.

Post condition: A book for upload have a author.

Requirement ID 1.2

Use case: **The seller can update information about a book or take a book off of the market**

Trigger: A book is sold (not for sale any more) or not up to date.

Precondition: The seller has the application installed

Basic path: The seller looks at his/hers uploaded books and press one of them. The seller then sees the information concerning the book and have the possibility to update information or delete the book from the market, by pressing a "edit-button" and typing in a password.

Exception path: If a book is not deleted or updated within two months, the book will be deleted from the market.

Post condition: A book is updated with new information or deleted from the market.

Requirement ID 2

A book store that provides the possibility for a **buyer** to search for and browse books and put him/her in touch with sellers

Requirement ID 2.1, stakeholder SNI

Use case: **A buyer can search the database for available books**

Trigger: A buyer needs information about a specific book or course

Precondition: The buyer has the application installed

Basic path: A buyer fills in a attribute in the search field and then gets the answers from the search presented in a list.

Exception path: If the searched text does not match any attribute, the searcher should get a exception message "No results are found. Please make sure you are connected to the internet"

Post condition: The searcher finds the information he/she wants.

Requirement ID 2.1.1, stakeholder SNI

Use case: **In a search, a buyer can specify a book's title**

Trigger: A buyer needs information about a specific book

Precondition: The buyer has the application installed

Basic path: A buyer fills in a book title in the search field and then gets the answers from the search presented

in a list.
Exception path: If the searched text does not match any book titles, the searcher should get a exception message "your search did not match any information at the market"
Post condition: The searcher finds the information he/she wants.

Requirement ID 2.1.2

Use case: **In a search, a buyer can specify a book's author**
Trigger: A buyer needs information about a specific book
Precondition: The buyer has the application installed
Basic path: A buyer fills in a author in the search field and then gets the answers from the search presented in a list.
Exception path: If the searched text does not match any authors, the searcher should get a exception message "your search did not match any information at the market"
Post condition: The searcher finds the information he/she wants.

Requirement ID 2.1.3

Use case: **In a search, a buyer can specify which course the book should be used in**
Trigger: A buyer needs information about a specific course
Precondition: The buyer has the application installed
Basic path: A buyer fills in a course in the search field and then gets the answers from the search presented in a list.
Exception path: If the searched text does not match any authors, the searcher should get a exception message "your search did not match any information at the market".
Post condition: The searcher finds the information he/she wants.

Requirement ID 2.1.4

Use case: **A search can be sorted on any of the available attributes that a book can have. Originally it is sorted by price**
Trigger: A buyer finds some attributes more important than others.
Precondition: The buyer has the application installed.
Basic path: a buyer searches for a book and then get the books presented in a list. The buyer then have the possibility to sort by other attributes, for example "recently added", "latest edition" etc.

Post condition: The buyer finds a book with the right attributes.

Requirement ID 2.1.5

Use case: **When obtaining answers on a search, a book can be pressed in order to read more details**
Trigger: A buyer searches for a book.
Precondition: The buyer has the application installed.
Basic path: A buyer searches for a book and then get the books presented in a list. The buyer then presses one of the books (author and title) and sees more information about the book.
Post condition: The buyer can read more details about the books aswell as contact information.

Requirement ID 2.1.6

Use case: **When obtaining answers on a search, the short list should present book title and price**
Trigger: A buyer searches for a book.
Precondition: The buyer has the application installed.
Basic path: A buyer searches for a book and then get the available books presented in a short list. The short list shows book title and price.
Post condition: The buyer can read the most useful information directly (in the short list).

Requirement ID 2.2

Use case: **Buyer can upload a buy request (see ID 1)**
Trigger: A buyer needs a book which is not found at the market
Precondition: The buyer has the application installed.
Basic path: A buyer press the button “add buy request” and fills in the information concerning uploading a book.
Exception path: The buyer needs to have a book title and/or course, otherwise the buyer will get an exception message and the buying request will not be conducted.
Post condition: A buying request is uploaded to the market.

Requirement ID 3

ISBN-connection

Requirement ID 3.1

Use case: **Working connection with LIBRIS-database**
Trigger: Adding a book by ISBN.
Precondition: Details regarding the LIBRIS-database has to be available.

Basic path: A developer obtains information from the LIBRIS-database regarding title, author, and version of a book by a ISBN-number.
Exception path: -
Post condition: A ISBN-number provides the information title and author.

Requirement ID 3.2

Use case: **A book can be uploaded by ISBN-number**
Trigger: Adding a book.
Precondition: A user have a cell phone and wants to use the application and presses the button "add a book".
Basic path: A user fills in ISBN-number and then the information regarding author and title fills in automatically.
Exception path: The seller should get a exception message if the number of characters in the ISBN-number is any other than 10 or 13 digits.
Post condition: A book is added by ISBN-number.

Requirement ID 4

Settings view

Requirement ID 4.1, stakeholder SNI

Use case: **The user should be able to store his/hers user details on the internal memory**
Trigger: "save data" button pressed
Precondition: A user must have the application open at the settings-view and has entered the information to save.
Basic path: User fills in information in the settings-activity.
Post condition: A file has been created in the internal storage, containing the information entered by the user.

Requirement ID 4.2, stakeholder DEV

Use case: **The previously saved data should be loaded upon entering the settings-tab and autofilled into the fields**
Trigger: Settings-tab accessed
Precondition: User details should previously have been saved.
Basic path: -
Post condition: The information previously entered and saved by the user should be autofilled in the correct fields at the settings-screen.

Requirement ID 4.3, stakeholder DEV

Use case: **The user should be able to delete previously saved user details**

Trigger: The user wants to change user details

Precondition: There is already saved data

Basic path: The user presses the "Delete data" button.

Post condition: UserDetails-file deleted and fields emptied.

Requirement ID 5

About the application view

Requirement ID 5.1

Use case: **A user can read about how to use the application in the settings view**

Trigger: A user needs help with the functionality of the application

Precondition: A user have the application

Basic path: A user needs help with something and goes into Settings and "help". Here, the user can read a tutorial document regarding the functionality of the application.

Post condition: A user understand the functionality in the application.

Requirement ID 5.2, stakeholder DEV

Use case: **A user can read about the application developers in the settings view**

Trigger: A user is interested in application details

Precondition: A user have the application

Basic path: A user goes into Settings → Application details and finds contact details to the developers, the application version in use, details regarding licenses etc.

Post condition: A user can read the application details

Requirement ID 5.3

Use case: **A user can read his/hers details in the settings view**

Trigger: A user needs to see his/hers user details

Precondition: A user have the application

Basic path: The first time a user adds a book, the user needs to fill in: mail, phone number and password. This information is stored under Settings.

Post condition: User information is stored in settings

2.3 Non-functional requirements for base-functionality

Non-functional requirements are constraints on the services of functions offered by the system, for example regarding timing och the development process. Non-functional requirements often apply to the system as a whole (Sommerville, 2007).

Requirement ID: NF0
The application has to be startable using a smartphone.

2.3.1 Usability

Requirement ID: NF1
The system will have to be intuitive and a user should be able to work the system without the use of a manual.

A user should be able to register a book for sale with ease. It should take no more than 5 minutes for a first time user to register a book for sale with the minimum amount of required information.

A user should easily be able to find if the book he/she needs is available for sale. This can be done by doing an extensive search for the exact information by a book or by browsing different available books in different categories. The search of a book should not take more than five seconds.

The design should be minimalistic and easy on the eyes.

Requirement ID: NF2
A user should be able to read about the application in a help-view. The help-view will contain all information needed for using the application and understanding the functionality.

2.3.2 Reliability and security

Requirement ID: NF3
The application will experience the most pressure during the first weeks of the four "läsperioder" during the Chalmers year. During this time there needs to be a very low probability of failure.

Since no actual transactions are handled by the application the severity of a failure has little economic effect on the users

which would indicate a lower need for reliability. However the system needs to be stable in order to attract users.

The system has to reliable in the sense that information about the users have to be kept safe. Information stored about user is always sensitive so the system will keep a minimum amount of information about the users. The only required information stored about the the users are: name, email address, and phone number.

The application users should only get information from a web-based layer/server instead of information directly from the server. This is due to safety reasons.

2.3.3 Performance

Requirement ID: NF4
Performance needs will vary over different periods. As stated under reliability, the system will experience the most pressure during the first few weeks of every period ("läsperiod"). In the middle of these periods bandwidth and server capacity can be limited. A solution where bandwidth and server capacity is paid for depending on usage, should be considered.

The function and use of the application is dependent on internet access. Since the phone can have limited bandwidth it is desirable to minimise the size of data being transferred. Users must be able to get an overview of the availability of books quickly. More detailed information like images can be allowed to take more time and bandwidth but must then be optional to view. When you lose your internet connection on the phone, you should be able to see the information viewed at your last login.

2.3.4 Supportability

Requirement ID: NF5
Maintenance, upgrades and changes have to be made during periods of low usage, that is not during the first few weeks of every period. This is to be done by professionals with insight into software engineering. However the documentation should allow for any such professional to do it, hence the life of the system is not dependent on the engagement of the creators.

2.3.5 Implementation

Requirement ID: NF6
The implementation needs to be done without any major investments. The solutions used will probably be free to use and must fit within the confines of the law. Software must be possible to release under GPLv3. Client-side software must be runnable on Android OS and adhere to the concept of object oriented programming.

The client-side application cannot exceed 10 MB.

2.3.6 Verification

Requirement ID: NF7
To verify that the system does what it should user tests and unit tests will be designed and evaluated continuously throughout the production. External testers will be used to conduct black box testing and find errors or unclear features.

2.3.7 Packaging and installation

Requirement ID: NF8
The application will be available through the application outlets available electronically and accessible directly through your phone. This includes, to begin with, Android-market and in future releases also via Appstore.

Installation must be automatic and application needs to be executable once it is downloaded.

2.3.8 Legal

Requirement ID: NF9
The application is to be sold to student organisations which in turn can market it with their brand. The application will be sold under GPLv3 license and should be compatible with the requirements forced upon software under this license.

2.4 Test cases and test plan

Please see the test planning document for details. The test

plan is connected to written requirements. The test reports are conducted after every release of the application. Every release is connected to a finished sprint.

Testplanning.pdf

2.5 Possible future directions

This application can be used in various ways. For example, all universities in Sweden could have usage, and benefit, from this application. The aim is to make a quite generic application which easily can be customized for another university. The application could also be used in other areas, for example selling other products than second-hand books.

2.5.1 Functional requirements for add-on functionality

Requirement ID 6
A book could be sold in an auction

Requirement ID 6.1
Use case: **The seller can specify if he/she wants to have an auction, a buyout-price or both**
Trigger: A user has a book for sale.
Precondition: The user has the application.
Basic path: A user presses the button “add a book” and then chooses between auction or pricing, or both.
Postcondition: A book is added for sale, on auction or pricing or both.

Requirement ID 6.2
Use case: **A book out for auction can have a reservation price**
Trigger: A user has a book for sale and chooses auction as selling method.
Precondition: A user has the application.
Basic steps: A user presses the button “add a book” and then chooses auction. Next view, the user can fill in a reservation price in a text box which is optionally.
Postcondition: A book is added for auction sale with a reservation price.

Requirement ID 6.3
Use case: **A book out for auction have an ending date**

Trigger: A user has a book for sale and chooses auction as selling method.
Precondition: A user has the application
Basic steps: A user presses the button "add a book" and then chooses auction. Next view, the user can fill in a ending date for the auction. The ending date is required to fill in.
Postcondition: A book is added for auction sale.

Requirement ID 6.4

Use case: **Anyone can make a bid for a book out for auction except for the owner of the auction ad/book**
Trigger: -
Precondition: A book is on auction sale at the market.
Basic steps: A user presses the auction ad for a book, and then fills in a bid for the book. The application then compares the user's email-address and phone number to the user making the advertisement.
Postcondition: All users without the auction owner can bid on the book for sale.

Requirement ID 6.5

Use case: **A bid have to exceed the previous bid with at least 10 SEK and in even 10 SEK intervals**
Trigger: A user wants to bid at a book ad
Precondition: A book is on auction sale at the market.
Basic steps: A user presses the auction ad for a book, and then fills in a bid for the book. The application then tests that the amount of money (in SEK and Integer) exceeds the last bid by 10 SEK or more.
Postcondition: A user can bid on a book auction ad

Requirement ID 6.6

Use case: **If the time for an auction runs out, the book is automatically taken off the market.**
Trigger: A sold book should not be at the market
Precondition: A user have the application
Basic path: After a finished auction, the book is taken away from the market. The winner and seller both get e-mails to their filled in email-addresses with details.
Postcondition: No already sold book is left on the market.

Requirement ID 7

Cremona Bookstore integration

Requirement ID 7.1

Use case: If a buyer search for a book without any sellers, the buyer should get information regarding if the book is available at Cremona Bookstore at Chalmers.

Requirement ID 8
Reservations of books

Requirement ID 8.1
Use case: When a reservation is made, the user making the reservation gets access to the buyer's contact information.

Requirement ID 8.2
Use case: A buyer can only make one book reservation at the time.

Requirement ID 9
Saving statistics

Requirement ID 9.1
Use case: The application saves statistics for book pricing and number of sold books. This enables users to see interesting information regarding pricing.

Requirement ID 10, stakeholder SNI
Renting

Requirement ID 10.1
Use case: A book can either be sold or rented, or both.

Requirement ID 10.2
Use case: When a book is rented, the user should be able to take the book of market.

2.6 References

Sommerville, Ian (2007). *Software engineering*. Eight edition, Pearson Education Limited, Edinburgh Gate, England.