

LHB Project	Version: 1.3
Project Plan	Date: 20.01.2013

# **LHB Project Project Plan**

**Version 1.3**

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## Revision History

Date	Version	Description	Author
28.10.2012	0.1	initial draft	Hrvoje Novak
29.10.2012	0.2	document review	Robert Pofuk
02.11.2012	1.0	release version	Aleksandar Nikodinovski, Petar Stojanac, Hrvoje Novak, Danijel Jambrecina
12.01.2013	1.1	final version	Aleksandar Nikodinovski, Hrvoje Novak
19.01.2013	1.2	Quality revision of the English used in the document, minor content changes	Gonçalo Silva
20.01.2013	1.3	Final review	Antonio Gallucci, Aleksandar Nikodinovski

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## 1. Introduction

### 1.1 Purpose of this document

- Introduction of the project
- Initial project plan
- Introducing parties involved in the project
- Presenting the scope and goals of the project
- Defining risks and configuration management
- Project timetables

### 1.2 Intended Audience

This document is intended for the project supervisor, the steering group and the development team in order to be able to follow the progress of the project. It is also used by the customer as an overview of the intended flow of the project, which creates a feedback system between the customer and the team. This way, if the project strays away from the intended path, the development team can quickly make corrections in order to guide the product towards the customer's wishes. This version of the document is reviewed in the initial state of the project.

### 1.3 Scope

This documents discusses the preliminary setup of the project and the intended goals and plans. It gives answers to such questions like:

- Who is it for
- How is the organization and hierarchy of the development team formed
- How does the project need to be realized
- What is the implementation methodology
- What are the risks
- How are the steps of the project distributed over time

This document does not specify the detailed requirements specification and implementation architecture nor does it define the technologies that will be used to implement the product.

### 1.4 Definitions and acronyms

#### 1.4.1 Definitions

Keyword	Definitions
ABB CRC	The Corporate research center of ABB, a multinational corporation operating in robotics and mainly in the power and automation technology areas

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#### 1.4.2 Acronyms and abbreviations

Acronym or abbreviation	Definitions
LHB	Let's Help Bo
SVN	Subversion
FER	Faculty of Electrical Engineering and Computing
MDH	Mälardalen University
SDK	Software Development Kit

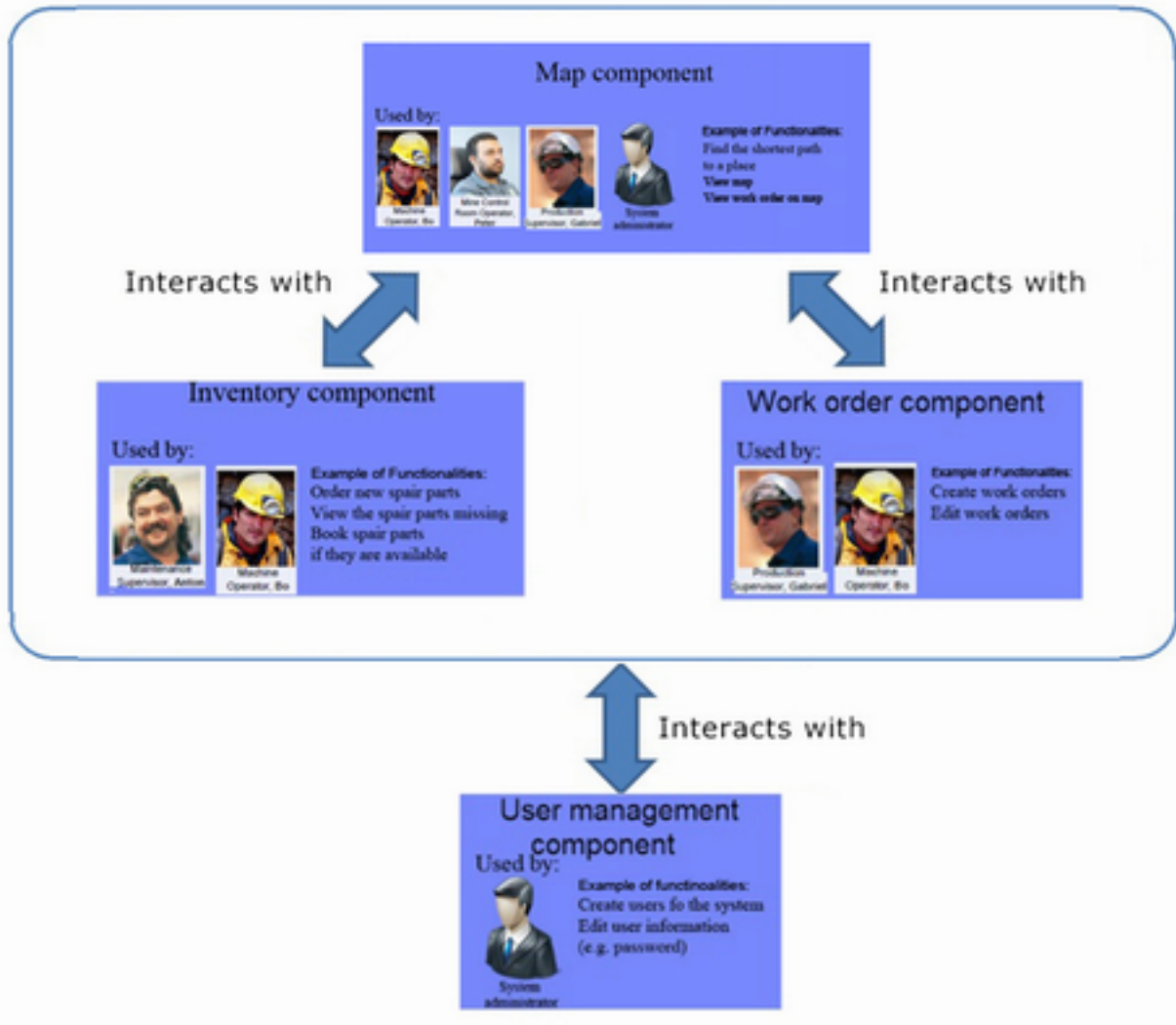
## 2. Background and Objectives

The main purpose of the project is to develop an inventory support system for future mines, which intends to help machine operators in their everyday work. Since the machines and equipment used in the mine are prone to malfunction, spare parts need to be acquired from warehouses spreaded across the mine. In normal circumstances, this uses up quite some time from the workers. This project resolves that issue by automating the whole process. Machine operators can now access the central booking system via an application to order the necessary spare parts. They also get a notification upon completion of the order and directions to the location where to pick it up. In this project is also a feature to manage the working schedule that needs to be changed during the pickup of the spare parts.

The project offers extra functionalities that aim to help on the daily activities of some people that work in the mine. There are more people working in a mine other than machine operators, and for those people, these features were created to make certain tasks easier for them.

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Below are the components that will be part of the system, and the actors that will interact with them.



The inventory support system to be built should be easy to use, considering the environment in which it will be used and the restrictions imposed by the customer. A detailed description of all requirements to be fulfilled is defined in the Requirements Definition Document.

General milestones are:

- Project Vision
- Project Plan
- Requirements Definition
- System Architecture
- Alpha Prototype
- Beta Prototype
- Final Product

Deliverables include:

- Project Plan Document
- Requirements Definition document
- Design Description document
- Summary Week Reports

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- Minutes of Meeting
- Alpha mockups
- Code policy
- SVN policy
- Traceability matrix
- Acceptance Test Plan
- Test Report
- Instructions videos of the system for the customers
- Installation manual
- Final Project Report
- Final Product

To assure that the system is working and to remove bugs from the product, the software needs to be tested. Unit testing should be performed on each individual module, to detect early problematic system modules, and to avoid problems to spread over the entire system. Additionally, integration tests should be performed to assure the good combination and interaction between all the developed modules, as one unique piece of software to be delivered to the user. Usability tests are also advisable, in order to maximize the performance of the users of this system during a work day.

The Final Product should be delivered on 20.01.2012, along with the Final Project Report.

### 3. Organization

#### 3.1 Project Group

Name	Initials	Responsibility (roles)
<b>Aleksandar Nikodinovski</b>	<b>AN</b>	<b>Project Leader</b>
<b>Hrvoje Novak</b>	<b>HN</b>	<b>Team Leader</b>
Nives Bučić	NB	Requirement Manager Documentation Manager
Rasul Niyazimbetov	RN	User Interface Manager Usability Manager
Petar Stojanac	PS	Meeting Manager SVN Manager
Antonio Gallucci	AG	Requirements Manager Documentation Manager
Gonçalo Filipe Silva	GS	Testing Manager
Danijel Jambrečina	DJ	Database Manager
Niklas Gilström	NG	Design Manager Implementation Manager
Robert Pofuk	RP	Implementation Manager

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### 3.2 Steering Group

The Steering Group is composed of:

- Professor Ivica Crnković, from MDH;
- Professor Mario Žagar, from FER;
- Aneta Vulgarakis, which also is the Project Supervisor.

Prof. Crnković and Prof. Žagar, together, hold the DSD course and monitor how the teams are progressing over time.

### 3.3 Customer

Our external customer is the company ABB Corporate Research Center, which in the scope of this project is represented by the following members:

- Isak Savo
- Petra Björndal
- Aneta Vulgarakis
- Anton Jansen

Aneta Vulgarakis is also the Project Supervisor. The local team from MDH in Sweden can talk to her personally, while the rest of the team uses Skype to hold meetings and gather information. Communication with Isak Savo, Anton Jansen and Petra Björndal is done through Aneta Vulgarakis, or in certain occasions directly via email. They are a valuable resource to the development team, since feedback about the functionalities and intended behaviour of the system is returned through them.

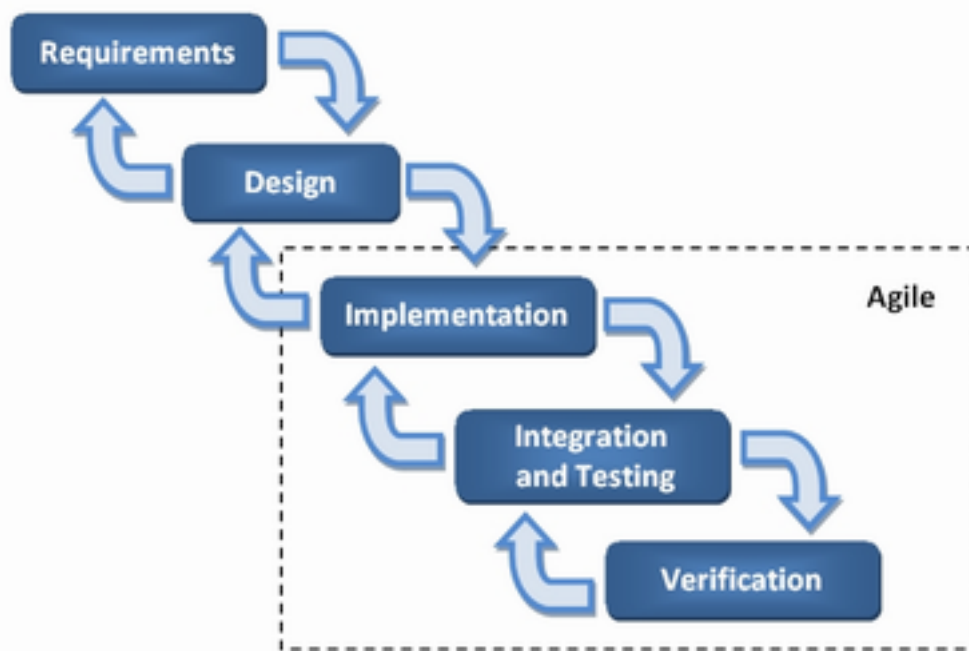
### 3.4 Supervisor

Aneta Vulgarakis is the Project Supervisor, but also has the roles of a customer and belongs to the Steering Group.



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## 4. Development process



### 4.1 Description

The methodology the team chose to use on this project is an Iterative Waterfall Model, mixed with Agile methodologies in the implementation-testing-verification phases. In the early stages of the project the team will use the Waterfall methodology, and in the later stages such as implementation and testing, the team will switch to Agile methods. This is because the development team is a huge team composed of 10 members, located in two different countries. Because of that, the communication is not as good as it would be if the team were working locally in the same country - a pure Agile approach wouldn't be efficient in the current working scenario.

Another important reason is that our customers insist on user-centered design and high usability. In order to achieve that, requirements need to be gathered carefully and well documented. The Waterfall model allows the customers to clearly state their requirements, and allows the system architects to create a solid architecture that will respond to them.

Overall, the documentation that we need to produce and deliver during this course is a good match with the documentation that is created during the initial phases of the Waterfall methodology. Regarding the implementation steps, the Agile method is well suited for developing a component based system and to easily adapt to sudden changes in the requirements provided by the customer.

### 4.2 Project phases

#### 4.2.1 Requirements gathering phase

This phase emphasizes communication, whether it is inside the project team, with the Project Supervisor or with the customers. The goal is to obtain from the customer a well defined set of requirements for the product. These are meant to be documented and understood by every team member, in order to get the general picture of what the system is meant to do.

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#### 4.2.2 Design

In this phase, the project team focuses on designing the architecture and the graphical user interface of the application, in order to meet all the proposed requirements. This is a critical task of the project that needs to be completed, but there are also other important matters: namely, regarding the extensibility and scalability of the system. It's important to design the architecture in a way that allows new features to be added at any point in the future, and this is a good Software Engineering practice that our team will strive to do during the development of the system.

#### 4.2.3 Implementation

The Implementation phase consists mostly of writing source-code and unit testing, following a Test-Driven Approach. As in some Agile methodologies such as Scrum, each iteration of this phase creates a new working version of a system component, with new features that have been tested and proven to work. During this phase the managing skills of the managers are tested and they have to use the skills team members have most efficiently. This is where we will implement code sharing via Subversion repository to speed up the development.

#### 4.2.4 Integration and Testing

In this phase, the components that were developed separately are integrated to make the system a unique entity to be used by the customer. Integration tests must be done to ensure that the developed components can work together without any system errors or system. This phase is only concerned about the global behaviour of the system: unit testing, for each component, should be done in the Implementation phase. The output of this phase is a fully tested application, where the system works as a whole without any kind of anomalies.

#### 4.2.5 Verification and validation

This is the last phase of our development model. When the system integration is complete, before it can be delivered to the customer, it must be checked that it meets all the defined requirements. More types of testing can be done here, namely: Acceptance Testing, Load Testing, Functional Testing, Usability Testing, and so on.

### 4.3 Roles description

Our project team consists of 10 members divided into two local teams, one in Sweden and the other in Croatia. This is considered to be a big team and to properly manage it we have assigned manager roles that alleviate responsibilities between team members and speed up the development process. The managers are responsible for coordinating specific aspects of the development process, like testing, usability issues, user interface design, database management, etc.

#### 4.3.1 Project Leader

The Project Leader is responsible for: distributing tasks amongst the team members; constant communication with all the team members as well as with the Project Supervisor and the customers; managing and minimising project risks; follow the work progress of each team member and assign help if needed; motivate team members to meet their deadlines; gathering week reports from everyone and summarizing them in a summary week report.

#### 4.3.2 Team Leader

The Team Leader is responsible for: communicating intensely with the project leader and local team members; distributing tasks amongst the local team; keep track of the work progress of the local team; arranging local team meetings.

#### 4.3.3 Requirements Manager

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The Requirements Manager is in charge of documenting, analyzing, tracing, prioritizing and agreeing on requirements, and lastly, controlling requirements changes and communicating that to relevant stakeholders.

#### **4.3.4 Design Manager**

The Design Manager coordinates work on application design and further divides the tasks given by the Project Leader and Team Leader into sub tasks, distributing them to the rest of the team members. The design manager will also advise the rest of the team on the proper practices when designing the architecture of the application and resolve any arising questions and problems.

#### **4.3.5 Database Manager**

The Database Manager is in charge of: setting up the virtual machine for the database server; coordinate team members and give advice on how to build a correctly designed database; implement the designed database and fill in the initial data; responsible for regular maintenance of the database.

#### **4.3.6 User Interface Manager**

The User Interface Manager is responsible for organizing and distributing tasks when it comes to implementation of the user interface, and also must be coordinated with the Usability Manager.

#### **4.3.7 Usability Manager**

This is a specific role that was created to better handle customer requirements targeted for usability issues and user-centered design. The task of the manager is to keep track of the graphical interface design and make sure that it is in accordance to the principles of user centered design. It is also to give advice to the designers on the right approach to designing such interface.

#### **4.3.8 Documentation Manager**

The Documentation Manager is responsible for writing the main content of the software documentation and reviewing all the documents before delivery to the customer and other relevant stakeholders.

#### **4.3.9 SVN Manager**

The SVN Manager must: keep a regular backup of all the files that are on SVN repository; upload the final version of deliverable documents to the SVN repository; work together with other team members when a SVN conflict appears in order to solve it.

#### **4.3.10 Testing Manager**

The Testing Manager is responsible for performing various types of code testing during the implementation and coordinating writing work of the Test Report Document.

#### **4.3.11 Meeting Manager**

The Meeting Manager must: write a "Minutes of Meeting" document where he summarizes everything that was said on the meeting, including who needs to do what and when; upload the document to the DSD course website.

#### **4.3.12 Implementation Manager**

The Implementation Manager must coordinate the activities related with the implementation and is also responsible for the integration of the code. Additionally, the manager needs to be in close contact with User Interface Manager and Usability Manager, and is responsible for determining the code policy, in order to prevent the conflicts that could arise from distributed development: for example, different coding standards between team members.

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#### **4.4 Quality Assurance**

Quality Assurance is related with two good practices of Software Engineering, Verification and Validation. Validation ensures that the final product meets the requirements of the customer: namely, if the team is “building the right product”. This is a very important aspect, since one of the huge failures in software development is building a product that the customer doesn’t want. Verification is concerned with robust testing of the product, assuring its quality, reliability, and ideally no system anomalies on the final product.

##### **4.4.1 Organization**

A good organization is one step towards achieving a good product. We aim to create a “quality culture” in the team, by encouraging the team members to meet the deadlines. Additionally, we improve quality by using a well known software development methodology that produces standard documentation for each phase of the development process. The produced documents are sent for confirmation to the Project Supervisor and the customers.

##### **4.4.2 Planning**

We can improve the quality of the product by planning ahead of schedule: by identifying all the potential risks and threats, we can come up with appropriate counter measures and successfully protect the product from these risks.

##### **4.4.3 Software Quality**

Team members with more experience can help others on how to produce well-defined documents. After a document is finished, it needs to pass a review done by other team members. Besides that, two important documents fall into this aspect: the code policy and SVN policy establish a set of rules and guidelines on how to code and use Subversion, so everyone on the team is following the same coding standards and minimize the risk of incomprehension of other people’s work.

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## 5. Deliverables

To	Output	Planned week	Promised week	Late +/-	Delivered week	Remarks
All stakeholders	Project plan	w43	w43	-	w43	-
All stakeholders	Alpha GUI Mockups	w44	w44	-	w44	-
All stakeholders	Requirement definition	w44	w44	-	w44	-
All stakeholders	Design Description	w44	w44	-	w44	-
All stakeholders	Code policy	-	-	-	w47	-
All stakeholders	SVN policy	-	-	-	w47	-
All stakeholders	Alpha prototype	w48	w48	-	w48	-
All stakeholders	Beta prototype	w51	w51	-	w51	-
All stakeholders	Acceptance test plan	w52	w52	-	w52	-
All stakeholders	Test report	w3	w3	-	w3	-
All stakeholders	Final project report	w3	w3	-	w3	-
All stakeholders	Final product	w3	w3	-	w3	-
All stakeholders	Summary Week Reports	-	-	-	-	R_01
All stakeholders	Minutes of Meeting	-	-	-	-	R_02
All stakeholders	Traceability matrix	w3	w3	-	w3	-

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All stakeholders	Instructions videos of the system for the customers	-	-	-	-	-
All stakeholders	Installation manual	w3	w3	-	w3	-

### 5.1.1 Remarks

Remarks ID	Description
R_01	Needs to be delivered every Monday at 23.59 during the whole course of the project
R_02	Needs to be delivered after every team meeting and after the meetings with the customers during the whole course of the project

## 6. Inputs

From	Required item	Planned week	Promised week	Late +/-	Delivered week	Rem
Project supervisor	Personas description	w43	w43		w43	
Steering Group (DSD)	Virtual machine	w45	w45	-	w45	-
Customers	Database inputs	w46	w46	-	w46	-
Test group	Application usability testers	w1	w1	-	w1	-

Comment: **Required week** is deadline required by the project; **Promised week** indicates when the **From** entities expect to receive the document; **Late** indicates a discrepancy between **Required week** and **Promised week**; **Delivered week** is the time when it was actually delivered; **Rem** is a remark index number.

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## 7. Project risks

Possibility	Risk	Preventive action
High	Members have other courses to attend	Divide work according to member possibilities
Medium	Members being late with their work and missing deadlines	Internal deadlines established earlier than the official ones. Redistribution of work not done to other members.
Medium	Impossible to meet schedules	Have more working hours or exclude some features
Medium	Some members have no experience with some technology	Members with experience provide assistance and tutorials
Low	Members are not reachable	Have many communication channels
Low	Misunderstandings	Discuss and write all things that could lead to misunderstanding
Low	Conflicts	Try to resolve them on meetings
Low	Losing database	Backup of database
Low	Corrupt database	Database Manager should fix corruptions and create backups
Low	Hardware malfunctions	Regular SVN commits

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## 8. Communication

For this project we use several types of communication tools.

### 8.1 Meetings

Our team is in constant communication. We use several communication tools and organize regular global and local meetings. Most of the time, each team member is connected at his own place to the group chat. "Minutes of Meeting" documents are written for every regular meeting and for meetings with the customer.

#### 8.1.1 Regular team meetings

Regular team meetings are scheduled on Wednesdays at 18:00. Each side of the team (Croatian and Swedish) meet together locally and then a communication channel is established: typically through real-time video conferences on Skype between both teams.

#### 8.1.2 Local team meetings

Beside the regular team meetings on which all the team members participate, we also have local meeting for the two teams on the different universities. Those meetings usually take place before the regular team meetings, but can also be arranged on other days if needed.

#### 8.1.3 Meetings with the customers

The Swedish part of the team has regular meetings with the supervisor and customers more often, since the core of the project and the customer entity (ABB) is located in Sweden. The Croatian part of the team will also sometimes be included on the meetings through Skype to get a better understanding of the current tasks.

### 8.2 Google Groups

We use Google Groups for broadcasting news and announcements about the project, lists of tasks to be done, tutorials to help the team, discussions regarding the work being done, among other topics. All the team members monitor the groups closely and receive notifications for every update or new topic created.

## 9. Configuration management

This section mentions the tools and methods used to keep track of the changes done to the system.

### 9.1 Tools and technologies

In the scope of this project, we will get access to a virtual machine located at FER. On that virtual machine, the operating system **Windows Server 2008 R2 Service Pack 1** will be installed.

For the database administration we will use **Microsoft SQL Server 2008 Express Edition**. This is a relational database management system which enables database creation, usage and administration.

**Microsoft Visual Studio 2010** will be used to develop the application code. This is an Integrated Development Environment (IDE) which includes a code editor, debugger, forms designer, and automated test tools.

For version control and code management we will use a **SVN repository**, which is also offered by FER. Every team member has credentials to access it, and it's located on the following URL: `svn://lapis.rasip.fer.hr/svn/dsd12/Inventory`.



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In order to quickly create visual prototypes and mockups of the application, **Pencil** 2.0.3 will be used. It is a very simple and effective tool to make small User Interface sketches.

The mobile application will be developed for Android devices, and so the **Android SDK** will be used.

## 9.2 Coordination

Team members in charge for coordination are, first and foremost, the Project Leader and Team Leader. They are the ones who keep track of the changes in the software and the development process, and distribute general tasks. The other manager roles previously described are responsible for coordination on a lower level, mostly during the implementation process. No specific tool will be used to assign tasks to team members. Instead, announcements are made on Google Groups: a detailed task description for each member is posted, along with some document templates or examples of how the end result should look like.

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## 10. Project plan

### 10.1 Time schedule

ID	Milestone description	Responsible dept./initials	Planned week	Promised week	Late +/-	Delivered week	Metr	Rem
M-01	Project Vision	AN, HN	43	43	0	43	0	
M-02	Project Plan	AN, PS	44	44	0	44	0	
M-03	Requirements Definition	AG, NB	44	44	0	44	0	
M-04	System Architecture	NG	45	45	0	45	0	
M-05	Alpha Prototype	All team members	48	48	0	48	0	
M-06	Beta Prototype	All team members	51	51	0	51	0	
M-07	Final Project	All team members	3	3	0	3	0	

## 10.2 Plan

Activity/Week Number	Week 42	Week 43	Week 44	Week 45	Week 46	Week 47	Week 48	Week 49	Week 50	Week 51	Week 52	Week 1	Week 2	Week 3
Requirement gathering and analysis	█	█	█	█	█					█				
Design of GUI		█	█	█	█									
Architecture Design		█	█	█	█									
Alpha version implementation				█	█	█	█							
Alfa Testing					█	█	█							
Beta version implementation								█	█	█				
Beta Testing								█	█	█				
Final version implementation											█	█	█	
System Testing											█	█	█	
Documentation	█	█	█	█	█	█	█	█	█	█	█	█	█	█

Some of the activities in the following table, like meetings and presentations, are not displayed in the gantt chart.

ID	Predecessor	Activity	Days	Mdays	Rem.
1	-	Requirement gathering and analysis	25	11	R_01
2	-	Design	20	42	
3	1,2	Alpha version implementation	20	73	
4	1,2	Alpha version testing	20	14	
5	4,5	Beta version implementation	15	95	
6	4,5	Beta version testing	15	25	
7	6,7	Final version implementation	15	20	
8	6,7	Final version testing	15	15	
9	-	Preparing and rehearsing presentations	-	45	

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10	-	Writing documentation	70	95	
11	-	Meetings	70	68	
12		Contacting customers	-	3	
13		Setting up and managing VM, Database and SVN	-	4	

Planned effort (days)	Planned effort (man-days)
70	520

10.2.1 Remarks

Remarks ID	Description
R_01	1 man-day is 4 man-hours (work hours)