Vienna University of Technology

183.243 VU Advanced Software Engineering 2015S

Project Contract

Time Management

1. Team Members

Member	Student #	Email	Role
Anela Osmanovic		osmanovic.anela@gmail.com	UI
			Documentation
			Technical Architect
			Project Manager
			Build and Release Management

2. Initial Situation and Existing Similar Products

Every construction worker, who works for PORR or is employed in some other company, which does specific kind of work for PORR, should record daily tasks and forward it to his superior, who manually inputs those data in an excel file, that contains: name of employee, selected number of work type and spent hours per it. Every construction unit has its own catalog of predefined work types, which are numbered in a specific way using unique keys, therefore superiors of employees can instead of work type write down just few numbers.

Goal of the work recording is easier analysis by the management. The management needs to know at the end of the month how many hours are spent in each work type and how many hours has spent every employee doing a specific work type - this is also important for salary calculations, which are part of the other system, from which is our system independent.

A the end of the month management compares spent hours with predicted one, with the aim to provide appropriate project costs control in every phase of project.

At this moment, management for this kind of tasks uses Macro program included in Excel. Data review doesn't look attractively and existing system requires a lot of manually work.

Existing similar products are following:

- TSheets: https://www.tsheets.com
- Base Sync: http://www.basesync.com/features/

3. Project Description

3.1. Project idea

The project focuses on the optimization of business processes in construction domain, especially management of working hours on a construction site. After interviewing a manager in PORR construction company, we have identified that they use old fashioned way, i.e., excel sheets, for recording daily tasks and working hours for construction workers working on a specific project, i.e., construction site. The interviewed manager complained that the filling of excel sheets with the data that each construction worker provides in a written form, i.e., a report, consumes a lot of time and that they would like to make the process more efficient.

The project idea is to develop both, mobile and web applications, in order to make the process more efficient. Mobile applications, running on iphones or ipads, are meant to be used by the construction workers and the web application by the managers. In this way, construction workers utilize the application to report their tasks and working hours to the manager, instead of that the superior of construction workers manually inputs data for each worker in the excel sheet. Moreover, construction workers do not prefer to write down a lot of things, such as reports, thus we should optimize inputs so that they just have to select input data. Proposed data workflow retains data consistency and integrity since the input data cannot be altered, e.g., by a manager, once when the construction worker records them in the system. We expect that this approach decreases the time a construction worker needs to report his daily activities, as well as the time the manager needs to process and analyze the data.

3.2. Domain

Although the project is defined and developed in a collaboration with the construction company PORR, the final product can be used in all other industries where time tracking is requirement.

Following are potential users, i.e., application domains:

- construction industry - managing/supervising/monitoring workers on a construction site
- timber industry - managing/supervising/monitoring workers in woods
- quarry and mining industry - managing/supervising/monitoring workers on a site
- agricultural industry - managing/supervising/monitoring workers on a field
- fishing industry - managing/supervising/monitoring workers on a ship or ships

The application can be utilized in any labour intensive industry where a set of workers has to be managed in some way.

4. Target Audience

System will be used by two types of users with different roles: manager and employee, who represents PORR's employees or employees from some other company, which does specific kind of work for PORR.

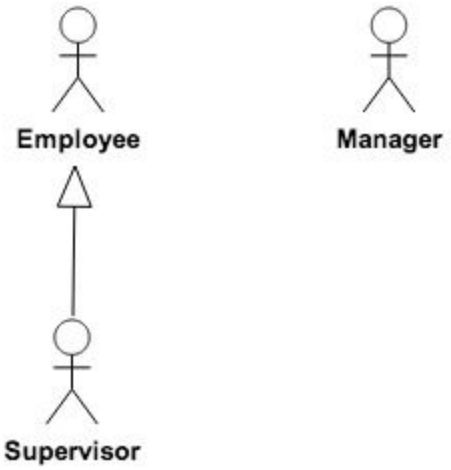

Figure 1: Overview of system users

4.1. Manager

Manager creates adequate environment for the current project, and depending on project idea enters employees, companies, categories, appropriate work types/tasks and objects in the system. Manager should have possibility to import data about employees and tasks via CSV file into the system and also to do it manually. It is of crucial importance that system makes possible for manager to control project costs using different kinds of reports and data reviews.

4.2. Employee

Employees/Construction workers enter in the system daily performed work, by recording the spent hours in a specific work type/task and on a specific object, which has managment already established in advance. They should also have possibility to enter brief job description.

4.3. Supervisor

A supervisor is an employee with additional rights, allowed to add project costs and to approve performed work, written by a group of workers/employees assigned to him by the manager.

5. Functional Requirements

5.1. Use Case Overview

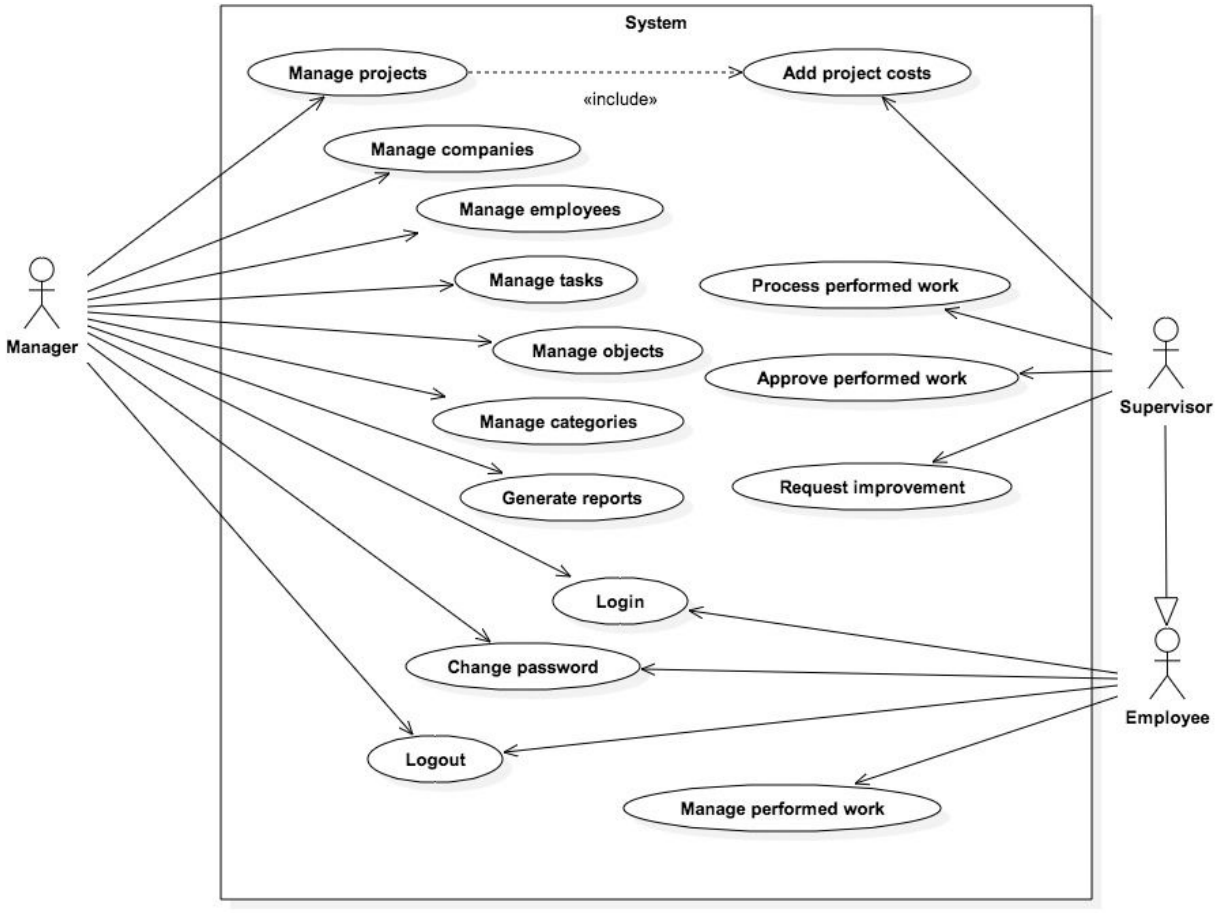

Figure 2: Use-Case diagram presenting basic functionalities

5.2. Iceberg List

#	Feature	Description	Aktor	Priority	Weight/Effort

1	**Manage Projects**	CRUD functionality of projects	**Manager**	**M**	**6**
1.1	Add project				
1.2	Edit project				
1.3	Add project costs	Employees marked by manager as a supervisors can enter in the system current project costs, by entering spent amount of money, name of resource on which is it spent (for example: construction material, machines etc.), date and brief description if it is necessary.	**Supervisor**		
1.4	Remove project				
1.5	View project				
2	**Manage Employees**	CRUD functionality of employees	**Manager**	**M**	**6**
2.1	Add employees	While adding employees in the system, manager assigns them to a specific supervisor.			
2.2	Edit employees	While changing informations about employees, manager can assign them to another supervisor.			
2.3	Remove employees				
2.4	View employees				
2.5	Import employees via CSV file				
3	**Manage Companies**	CRUD functionality of companies	**Manager**	**M**	**6**
3.1	Add company				
3.2	Edit company				

3.3	Remove company				
3.4	View company				
3.5	Import companies via CSV file				
4	**Manage Objects**	CRUD functionality of objects	**Manager**	**M**	**6**
4.1	Add object				
4.2	Edit object				
4.3	Remove object				
4.4	View object				
5	**Manage Tasks**	CRUD functionality of tasks	**Manager**	**M**	**6**
5.1	Add task				
5.2	Edit task				
5.3	Remove task				
5.4	View task				
5.5	Import tasks via CSV file				
6	**Manage Performed Work**	CRUD functionality of performed work	**Employee**	**M**	**6**
6.1	Add performed work	Performed work consists of the following attributes: a task, an object, working hours and brief description			
6.2	Edit performed work	Employee can edit performed work just in the first 24 hours.			
6.3	View performed work				
7	**Manage Categories**	CRUD functionality of categories	**Manager**	**M**	**6**
7.1	Add category				
7.2	Edit category				
7.3	Remove category				

7.4	View category list				
7.5	View category details				
8	**Reports Management**	Create Reports, Charts for specific time intervals, show differences to previous time units	**Manager**	**M**	**7**
8.1	Burn down curve	The manager can view the burn down curve illustrating the ratio between spent and planned costs for particular project/task.	**Manager**	**M**	**3**
8.2	Project costs	The manager can view the costs for the project in the selected time period, e.g., week, month.	**Manager**	**M**	**3**
8.3	Task costs	The manager can view the costs for the specific task in the project in the selected time period, e.g., week, month.	**Manager**	**M**	**3**
8.4	Personnel costs	The manager can view the costs for the personnel in the project in the selected time period, e.g., week, month.	**Manager**	**M**	**3**
9	**Control of the input data**				
9.1	Processing of the input data	The supervisor has to process the task reports he/she receives from the workers each day. Arrived task reports are presented in a listview.	**Supervisor**	**M**	**2**
9.2	Task report approval	The supervisor approves the task report. The supervisor can either approve each task report individually or approve all of them at the same time by the end of a week in which the task report arrived.	**Supervisor**	**M**	**2**

		The task report is stored in the database.			
9.3	Request the task report improvement	The supervisor notifies a worker that the improvement of the task report is needed. The worker has to do the improvement before creating a new task report.	**Supervisor**	**M**	**4**
10	**Rights and Account Management**			**S**	**7**
10.1	Authentication	Check given username and password against data provided during registration (1.1), create session. Show error on mismatching data	**Manager/Employee**		
10.2	Change user type	Mark employees as supervisor.	**System**	**C**	
10.3	Logout	Automatic after idling/browser close, or forced by user. Destroy session	**Manager/Employee**		
10.4	Change password		**Manager/Employee**	**C**	**3**
11	**Security**		**System**	**S**	**3**
11.1	Encrypted transmission	HTTPS connections at all times are mandatory			
11.2	Use of personal data	Avoid storing personal data extending the lifetime of a session			
12	**Generation of the test data**				
13	**Data export to CSV and PDF**		**Manager**		
13.1	Employee - Task relation	Table showing how many hours particular employee spent on a specific task and total spent hours by employee	**Manager**	**S**	**3**

13.2	Costs per subcontracted company	Table showing costs in the last month/overall for each subcontracted company	**Manager**	**S**	**3**
13.3	Hours per subcontracted company	Table showing hours that in the last month/overall spent each subcontracted company on a specific task and total spent hours by company	**Manager**	**S**	**3**
13.4	Spent hours per Task	Table showing how many hours are spent doing particular task	**Manager**	**S**	**3**

Legend: M.... Must (feature must be implemented)
S..... Should (high priority feature)
C.... Could (nice to have)
Weight is relative 9 is highest 1 is lowest (effort)

6. Non Functional Requirements

6.1. Usability

As the main part of the audience is not especially tech-savvy and the solution should bring a benefit over the current analog one, the application view presented to that part of the audience must be highly useable.

This will be addressed using shallow click-depths and recognizing the usability heuristics presented by Jakob Nielsen.

6.2. Interoperability

The application must be fitted within an existing und currently used environment. Preparations for full integration with the existing PORR systems must be taken.

This will be done by sticking to enterprise standards and a service oriented architecture.

6.3. Efficiency

The main goal of this application is to save time and resources. Therefore it is of utmost importance that the application can be used efficiently.

This will be guaranteed by following the Nielsen usability guidelines introduced in point 6.1.

6.4. Trust

To change an existing behavior is a non-trivial task. The application must inspire trust in every stakeholder to be successful. Especially management must feel confident in the applications capabilities.

This will be addressed by ongoing feedback from PORR employees.

6.5. Functional Correctness

The application functions must be correct and the results reproducible. The data handled within the application directly translate to person hours and wages.

To guarantee a high level of correctness, we will focus on extensive testing of the relevant use cases.

6.6. Non-repudiation

The data handled within the application must be non-repudiable and changes must be back-traceable.

This will be addressed using a historized data model.

6.7. Modifiability

To make future adaptations and changes to core objects possible, we will use a service oriented architecture, make use of patterns when applicable and use consistent naming conventions.

7. Domain Model

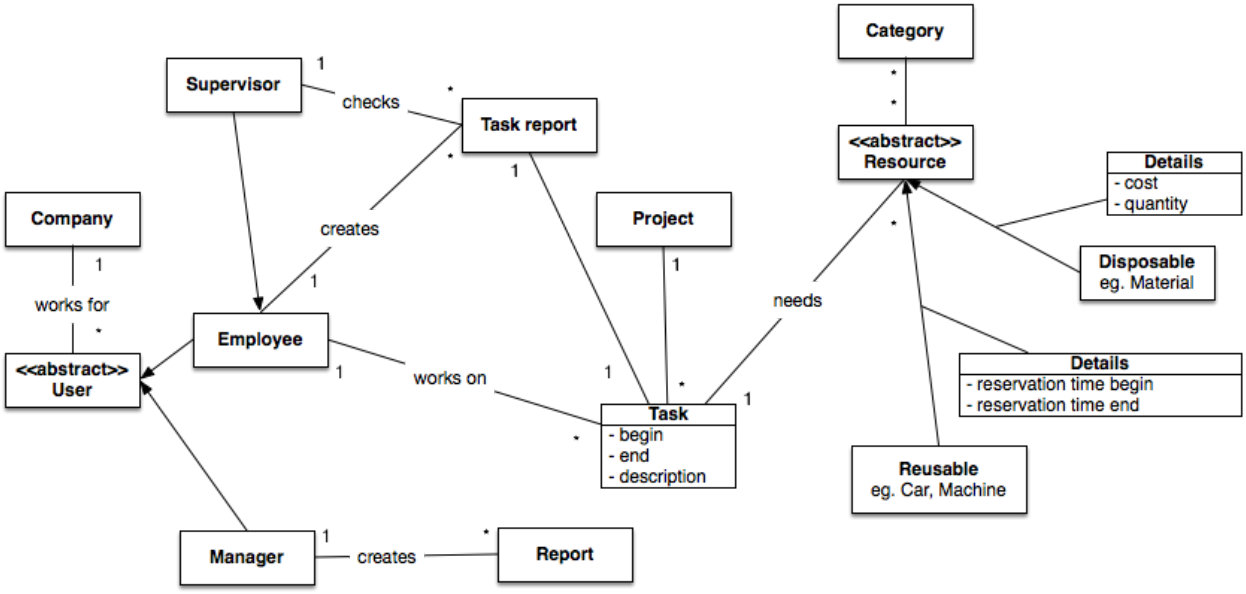

Figure 3: Domain model

8. Working Structure and Simple Project Plan

First part of the section introduces team members and describes their mapping to the provided roles. After that, described is an assignment of the team members to the development of project features. Finally, the section presents a simple project plan with relevant tasks and milestones.

8.1. Distribution of Roles

The team consists of six people assigned to six different roles in a following way.

Member	**Role**
Anela Osmanovic	UI
Nathaniel Boisgard	Testing
Alexander Prennsberger	Documentation
Lukas Steinbrecher	Technical Architect
Tomas Sedivy	Build and Release Manager
Domagoj Drenjanac	Project Manager

8.2. Horizontal Responsibilities

Following table describes the responsibilities of specific roles in the project. TT stands for Testing role, DOC for Documentation, TA for Technical Architect, BRM for Build and Release Manager, and PM for Project Manager roles.

Task	Roles					
	UI	TT	DOC	TA	BRM	PM
Design of the user interface on the client	x					
Data presentation to the end users	x					
Set up test infrastructure		x				
Creating test plans and test runs		x				
Supervising integrations and system testing		x				
Regularly run Unit-Tests		x				
Updating documents and making them available			x			
Documenting system components – packages, APIs			x			
Expert knowledge in applied tools and technologies				x		
Expert knowledge in architecture and software design				x		
Managing components development				x		
Defining interfaces between system components				x		
Set up environment infrastructure					x	
Expert knowledge on build management and SCM					x	
Organization and planning of the tasks execution						x
Control and track task statuses and working hours						x
Organizing internal and external meetings						x

8.3. Simple Project Plan

This section introduces a simple project plan where we decomposed the project into smaller working units which are prioritized and mapped to the timeline. Moreover, defined are milestones where functional system components are expected to be delivered.

8.3.1. Work Breakdown Structure

Following figure illustrates a Gantogram with described Work Packages (WP) and encompassing tasks. Tasks correspond to the main features presented in the feature list. Due to the short duration of the project (16 weeks), working units are scaled to two weeks, i.e., one cell corresponds to two weeks. Four milestones defined in the project are denoted on the Gantogram as well. Black cells with Mx denote a milestone.

WP	Task	Apr-15		May-15		Jun-15	
1	**System Requirements and Design**			M1			
1.1	Define and Analyse System Requirements		x				
1.2	User Interface Design		x	x			
1.3	Design System Components		x	x			
1.4	Define Interactions and Data Exchange between Components		x				
1.5	Setup Initial Infrastructure and Build Management		x				
2	**System Domain Objects**				M2		
2.1	Manage Projects		x	x			
2.2	Manage Workers		x	x	x	x	
2.3	Manage Companies			x			
2.4	Manage Tasks		x	x			
2.5	Manage Objects		x	x	x	x	
2.6	Manage Categories			x	x		
2.7	Manage Performed Work			x	x	x	
3	**Facilitating Services**					M3	
3.1	Reports Management			x	x	x	
3.2	Control of the Input Data			x	x	x	
3.3	Interface to the other Business Systems					x	x
3.4	Rights and Account Management				x	x	
3.5	Security			x	x		
4	**Integration and Functional Testing**						
4.1	Generation of Test Data		x	x	x		
4.2	System Integration			x	x		x
4.3	Testing and Verification			x	x		x

8.3.2. Milestone Description

Four milestones defined in the project are described as follows:

- **M1 (end of week 5)**
  - Working build system
  - Automatic test environment embedded into the build system
  - Rights and Account Management
  - Test data
  - CSV import system
  - Manage Workers
- **M2 (end of week 7)**
  - Manage Companies
  - Manage Categories
  - Manage Projects
  - Reports Management
  - Manage Objects

- Manage Tasks
- Manage Performed Work

- **M3 (end of week 10)**
  - Control of input data
  - Reports Management
  - Interface to other business systems
  - Encrypted (https) transmission

9. Project Borders

The application does not replace processes like accounting or cost planning. The purpose is to facilitate the data input and management and thus provide an interface for further processing.
The application will not be integrated with other internal PORR systems since we have no access to it.

10. Supplied Components

The following section defines what software components and what documentation artifacts will be delivered to the customer.

10.1. Software

After the project is finished, following core components of the software will be delivered:

- Database with designed scripts for initialising
- Configuration data for Web Server and Database
- Web application with an UI for time management

10.2. Artifacts and Documentation

Following components will be delivered to the customer:

- Domain model
- Iceberg List/Feature List
- ER - diagram and description of database design
- UML class diagram
- Testing plan, test cases, test reports

10.3. What Won't be Delivered

Following components will NOT be delivered to the customer:

- GANTT - chart
- Internal protocols, protocols of meetings
- Time recording of the project members

11. Risk Assessment

11.1. Rejection by target audience

11.2. Lack of trust by management

11.3. Functional incorrectness

11.4. Missing interoperability and subsequent rejection by PORR's IT

Likelihood	High	11.4	**11.3**	
	Medium			**11.1**
	Low	**11.2**		
		Low	Medium	High
	Impact			

12. Risk Mitigation

Being aware of the possible (project specific) risks, the risk mitigation was already worked into the non-functional requirements.

13. Information Process

The information process consists of the following parts:

- Permanent team-intern information exchange via the online collaboration tool twoodo.
- Weekly meetings with the tutor (Jour fixe)
- 3 management reviews (MR)

Communication

Internally we use an online collaboration tool called “twoodo”. This tool is used for sending messages, making decisions with votes, sharing files and scheduling using a team-wide calendar.
External communication with the tutor and the professor happens via E-Mail and meetings/reviews.