Web Application for Toolsharing System

Analytical Documentation

Authors:

    Richard Šedivý
    Galymzhan Dosmagambet
    Tatiana Popova
    Vladislav Tarasenko
    Tomáš Bánhegyi

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Obsah

1. Business processes

This chapter contains a description of the main processes required in the toolsharing application:

- Returning tools
- Borrowing tools
- User subscriptions
- Administration
- Registration
- New tool suggestion

1.1 Administration
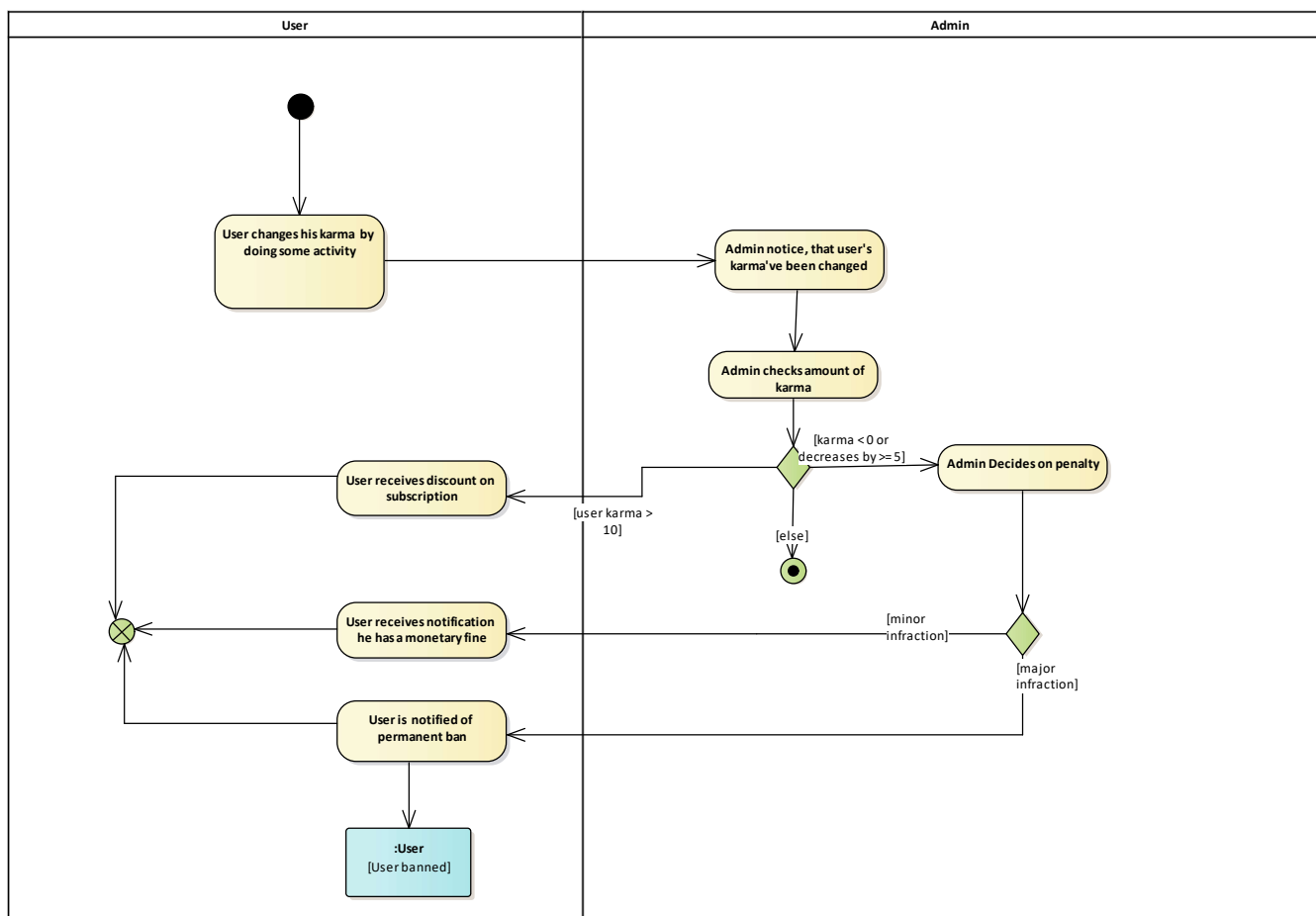
Obrázek 1 - Administration

If a user's karma value is raised above 10, then the user will automatically receive a discount on their subscription. Alternatively, if a user's karma drops by 5 or more, or if the user's karma is below 0 after the karma drop, then an admin is notified about this user, and can issue a penalty. This is used for cases where a user consistently returns tools late, or damages/loses them.

The admin can choose from a monetary fine that is applied immediately to the user's account, or he may outright ban the user, which will cancel his subscription and prevent him from using the service. The user will be notified of the action taken.

1.1.1 User receives discount on subscription

When user's karma is more than 10, user can receive benefits. The benefit means discount on subscription. User will pay for subscription less than full price.

1.2 New tools
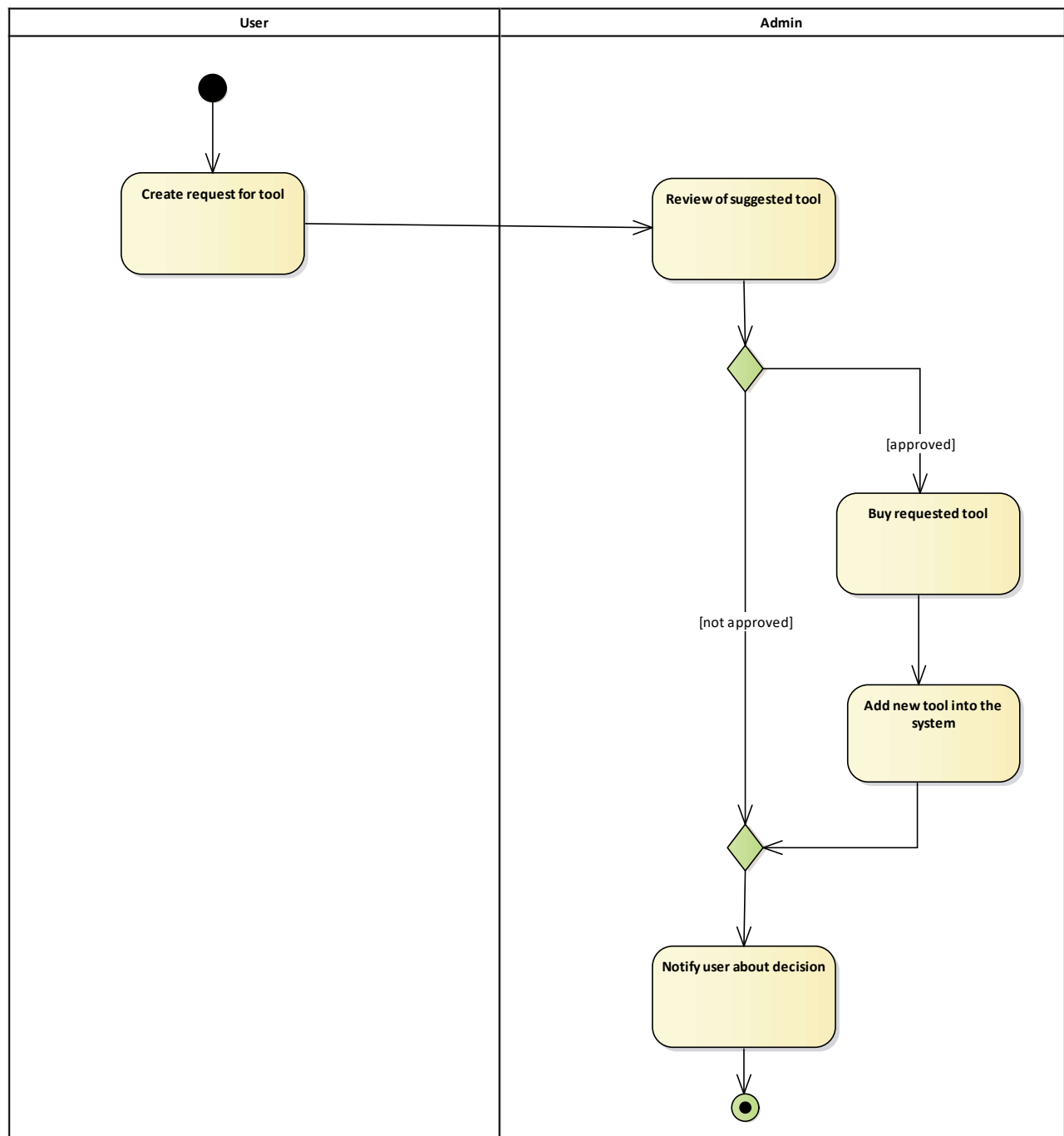
Obrázek 2 - New tools

Suggestions of new tools from users is one of main ideas for making project useful for end customer. User actually does not need to do much - only create a request with desired tool. After Admin will do investigation and if it is possible to add new tool into the system. In the end user will be notified about the result of request.

1.3 Renting

Obrázek 3 - Renting

The user begins by creating a reservation for the tool that he wishes to reserve. Before the tool is ready to be picked up by the user, it must be prepared by an administrator. The preparation will vary by tool, but usually will consist of moving the tool from some central warehouse to the pickup-location, and may also include maintenance and configuration for more complex tools.

At any time during between the creation of the reservation and the start date of the reservation, the reservation can be canceled by either the admin or the user.

The user has to pick up the tool on the start day of the reservation, by entering an authentication code into a code-locked box which contains the tool. The user can the take and keep the tool for the duration of the reservation.
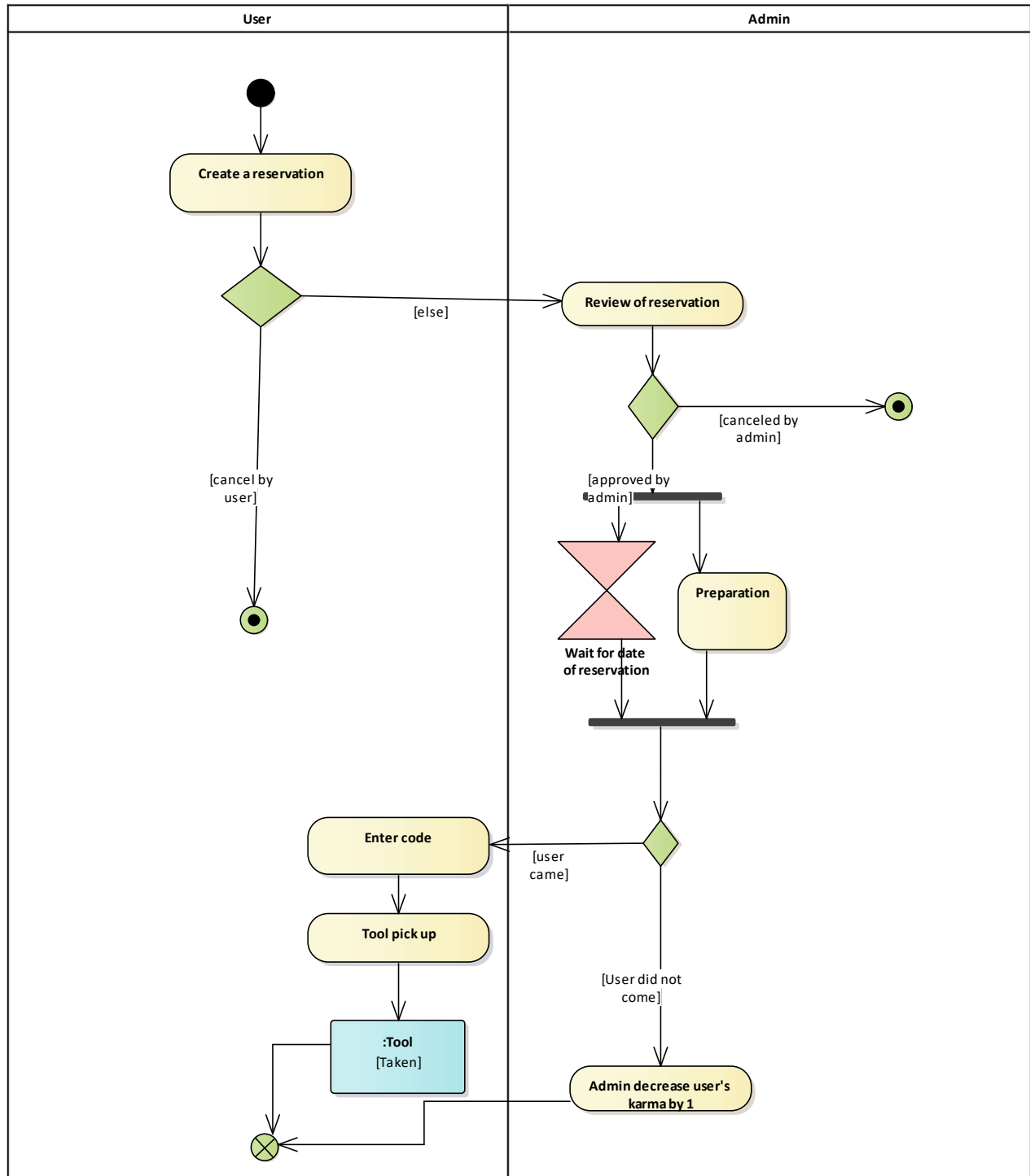
If the user fails to pick up the tool on the day of the reservation, he will be penalized by a decrease in karma, since resources will be wasted (code lock box and tool could have been used by someone else).

1.3.1 Cancel by admin

If there was some unexpected complications, admin can cancel user's reservation.

1.3.2 Cancel by user

If the user will decide to delete the reservation.

1.4 Returning

Obrázek 4 - Returning

The return process is initiated by the user. The user can return the tool at any date up to and including the last day of the reservation without penalty.

The tool is returned into a code-locked box. The user will enter his verification code into the box to authenticate himself, and will place the tool inside the box.

If the user has not returned the tool by the last day of the reservation, then his karma will decrease. If the tool then is subsequently not returned within 30 days of the last day of the reservation, the tool will be marked as lost, and the user will have his karma decreased proportionally to the value of the tool.
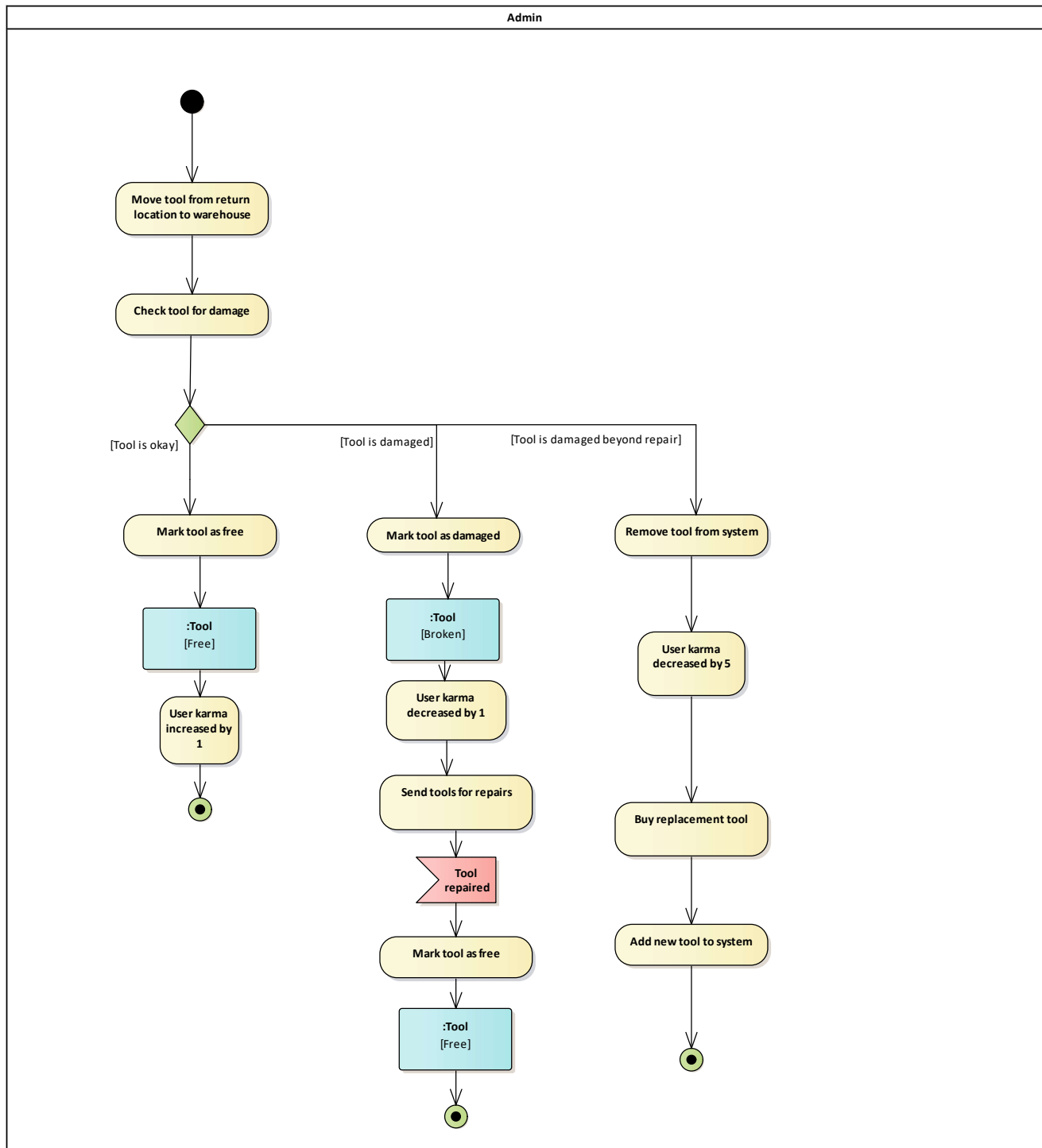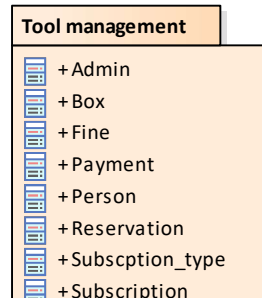
1.4.1 Check the tool

Administrator checks the tool for damage

Obrázek 5 - Check the tool

2. Domain model

This chapter contains entities (classes) that are relevant to the domain.

Tool management

- +Admin
- +Box
- +Fine
- +Payment
- +Person
- +Reservation
- +Subscption_type
- +Subscription

Obrázek 6 - Domain model

2.1 Tool management

Obrázek 7 - Tool evidence

2.1.1 Admin

Admin that moderates the system.

Název atributu	Popis
works from	Date when he started work from.

2.1.2 Box

Location where the tool can be picked up.

Název atributu	Popis
address	Adress of code lock box
number	Box identification number - printed on front of box
status	

2.1.3 Person

Person that used the system.

Název atributu	Popis
e-mail	Person's email, used for contacting in case of any changes.
name	Given name
phone	Person's phone number, used for contacting the person and stored for legal purposes.
surname	Person's surname

2.1.4 Tool

One specific instance of tool.

Název atributu	Popis
ID	Tool identification number
name	Tool brand name
price	
series	
status	
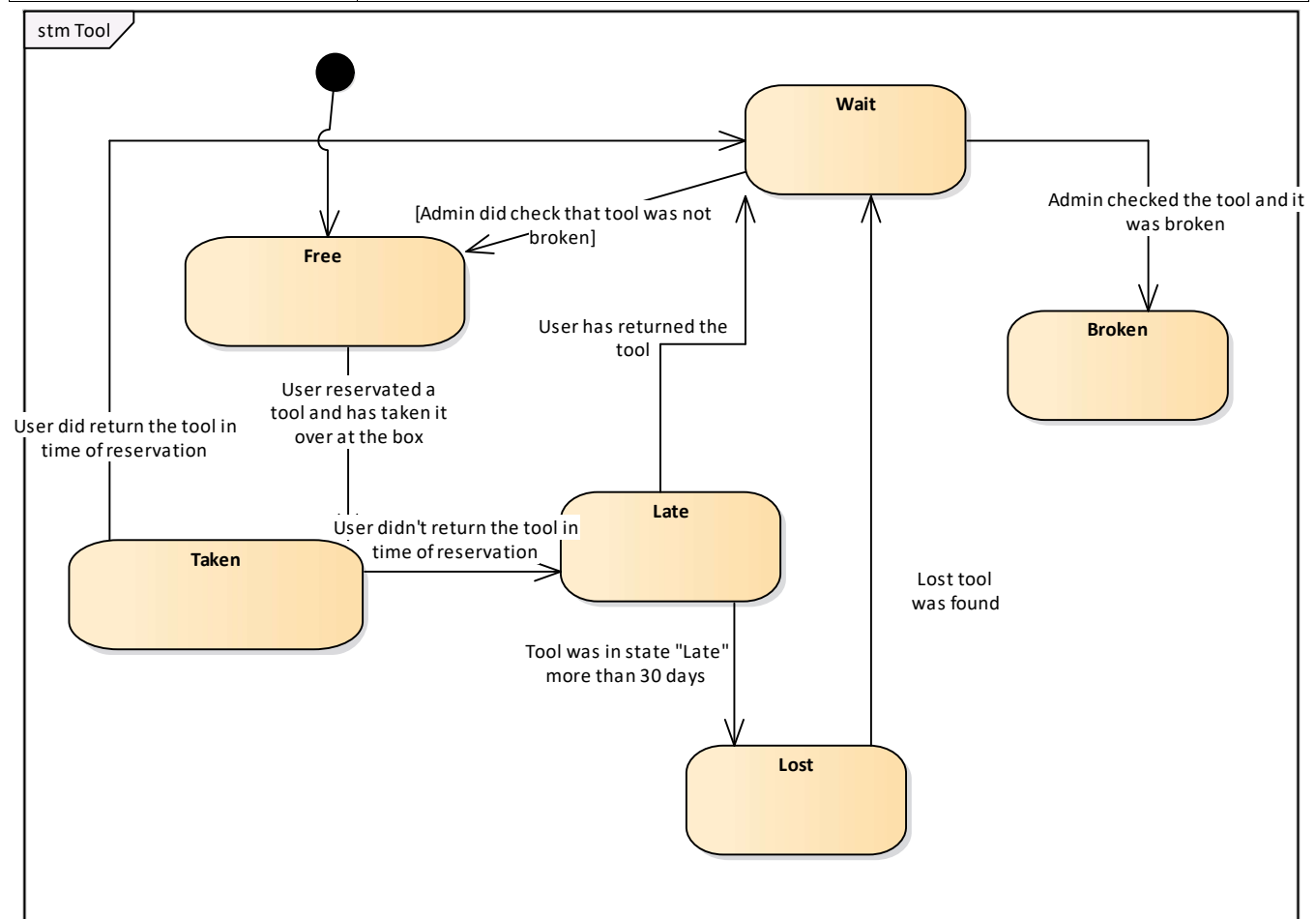
Obrázek 8 - Tool

- Free - tool is free to take and can be reserved by some user.

- Taken - user have that tool.
- Late - user didn't bring the tool back before the date of ends of reservation.
- Lost - tool was in state "Late" more than 30 days.
- Broken - tool is damaged, but can still be repaired.

2.1.4.1　Broken

Tool is damaged, but can still be repaired for later use. Unable to be rented.

2.1.4.2　Free

Tool is free to be reserved

2.1.4.3　Late

Tool was not returned by the last day of the reservation

2.1.4.4　Lost

Tool has not been returned for 30 days after the end of the reservation, and is considered lost.

2.1.4.5　Taken

Tool has been rented by a user

2.1.5 Tool type

Type of tool.

Název atributu	Popis
name	General description of tool - e.g. "Screwdriver", "Soldering iron", "Hand drill". Does not refer to a specific tool by brand name

2.1.6 User

User which uses the system.

Název atributu	Popis
karma	Karma is an attribute that increases or decreases based on the user's renting history. It increases for rents that proceed without problems, and decreases for late pickups or returns, or for damaging tools.

High karma can lead to discounts on subscriptions, while low karma can lead to fines or bans. |
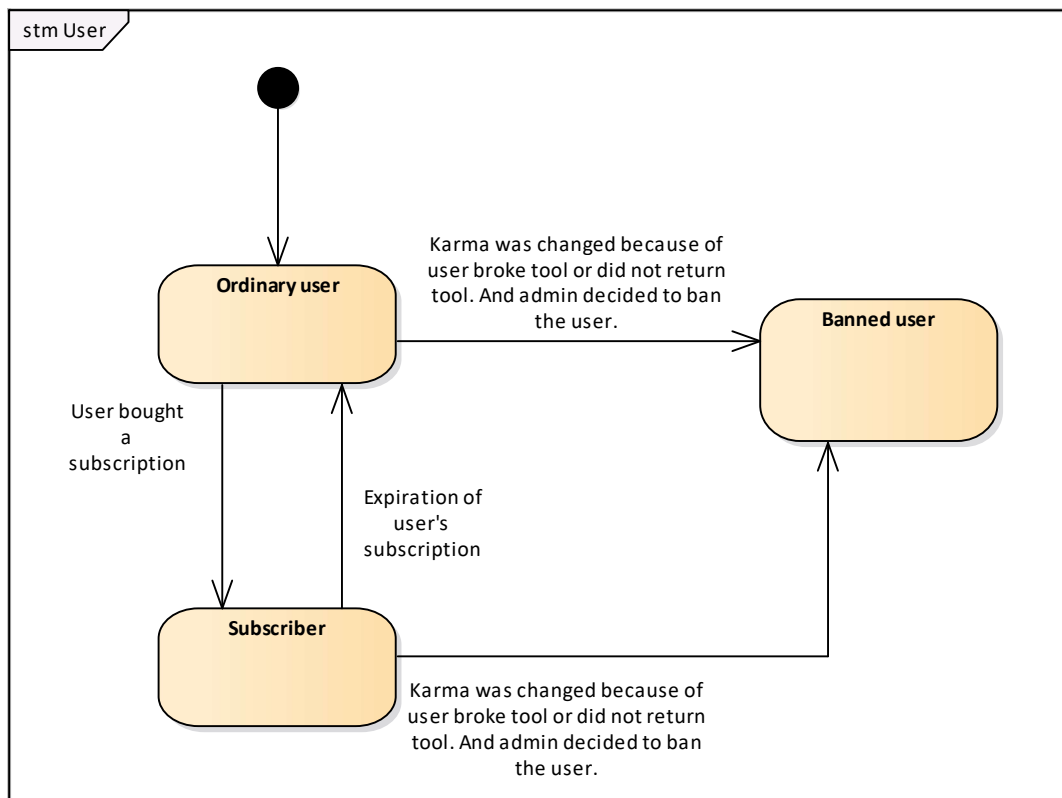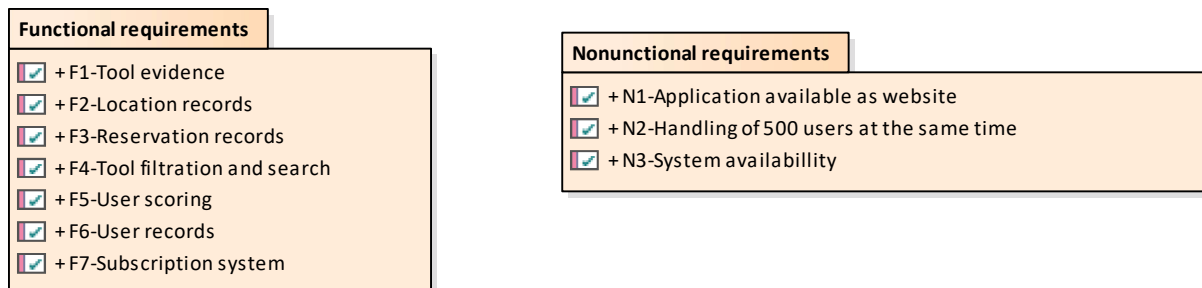
Obrázek 9 - User

- Ordinary user - user who does not have subscription.
- Subscriber - user with subscription, who can create a reservation for any tool.
- Banned user - user with low enough karma, who can not buy subscription anymore nor create a reservation.

3. Extended requierments model

Chapter contains the description of all requirements, that system should handle. Those are divided into two main parts: functional and nonfunctional.

Functional requirements

- ☑ +F1-Tool evidence
- ☑ +F2-Location records
- ☑ +F3-Reservation records
- ☑ +F4-Tool filtration and search
- ☑ +F5-User scoring
- ☑ +F6-User records
- ☑ +F7-Subscription system

Nonunctional requirements

- ☑ +N1-Application available as website
- ☑ +N2-Handling of 500 users at the same time
- ☑ +N3-System availabillity

Obrázek 10 - Extended requierments model

3.1 Functional requirements

Chapter contains the description of functional requirements, that system should handle.

F1-Tool evidence

F2-Location records

F3-Reservation records

F4-Tool filtration and search

F5-User scoring

F6-User records

F7-Subscription system
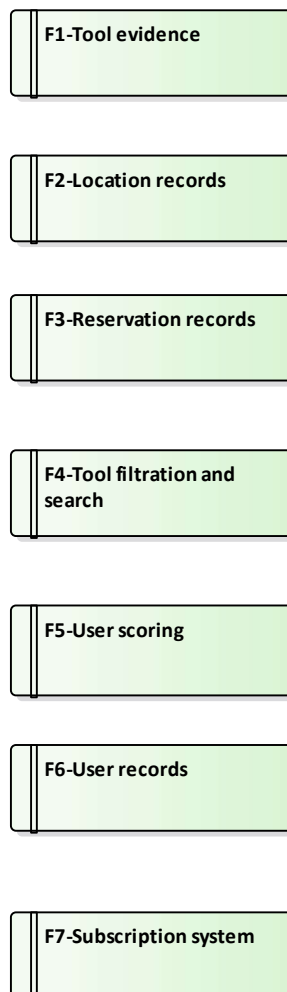
Obrázek 11 - Functional requirments

3.1.1 F1-Tool evidence

System preserves records of individual tools with their value, working condition and unique identification. System should also group the tools by their type or model type depending on the admin decision.

3.1.2 F2-Location records

System should store the location of individual tools, that would be changeable only by administrator. The location will be used to help locate the tool in storage. At the same time if the tool is ready for client the location will be the place for pick-up by the subscriber.

3.1.3 F3-Reservation records

System will maintain history of reservations with their current status. Only users with active subscription are allowed to create new reservation. On closing an reservation there will be possibility to add comments or rating/evaluation by both the subscriber and administrator.

3.1.4 F4-Tool filtration and search

Users will be able to search and filter the tools based on their availability, model, name and value. The search will be performed above the database of grouped tools based on type/model and not on the tools instances itself.

3.1.5 F5-User scoring

The system will keep "karma" value of individual users based on the reservation evaluation done by administrator. If the value will be below set value the user will get banned from using the service. And if the karma will by get above set value, the user will get discount on next subscription.
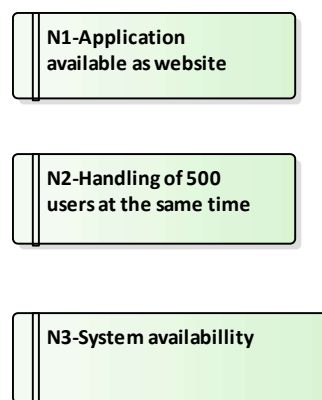
3.1.6 F6-User records

The system we have records of individual users with specific personal information e.g. name and contact information. Users will be able to register by themselves.

3.1.7 F7-Subscription system

Every user in the system will be able to purchase subscription for at least one month. After successful payment the user will became a subscriber and will be able to create a reservation for a tool. For the payment there will be used third-party payment gateway.

3.2 Nonunctional requirements

Chapter contains the description of nonfunctional requirements, that system should handle.

N1-Application available as website

N2-Handling of 500 users at the same time

N3-System availabillity

Obrázek 12 - Non-funcitional requirements

3.2.1 N1-Application available as website

System will be available as web application mainly for Firefox 47 and Chrome 53. The design should be responsive for compatibility with mobile interface, there is no need for native application or AMP technology to be implemented.

3.2.2 N2-Handling of 500 users at the same time

It is expected that during peak hour there will be around 500 users at the same time. System should be able to handle at least the mentioned 500 users. It is expected that all mentioned users will be from czech republic.

3.2.3 N3-System availabillity

It is crucial that the system is available during evening hours at the same time the lowest number of users is expected between 2am and 8am, any downtime should be scheduled for this time of day.

4. Use case model

This chapter contains a list of use cases for the Toolsharing application. It also describes the roles of all users in the system.

Actors		Use cases
+ Admin		+ Location management
+ User		+ Subscription sytem
		+ Tool management
		+ User management

Obrázek 13 - Use case model

Below is a list of use cases for the toolsharing application.

4.1 Actors

Obrázek 14 - Actors

The following is a list of all end-user roles that will interact with the application.

4.1.1 Admin

The administrator's role is to maintain the tools that are to be rented to users. This is done by preparing them before the rental period and checking for damage/loss after the rental period. The administrator may also punish frequent offenders with fines/bans.

4.1.2 User

The end user of the product. If they have a subscription, they have the ability to reserve and rent tools.
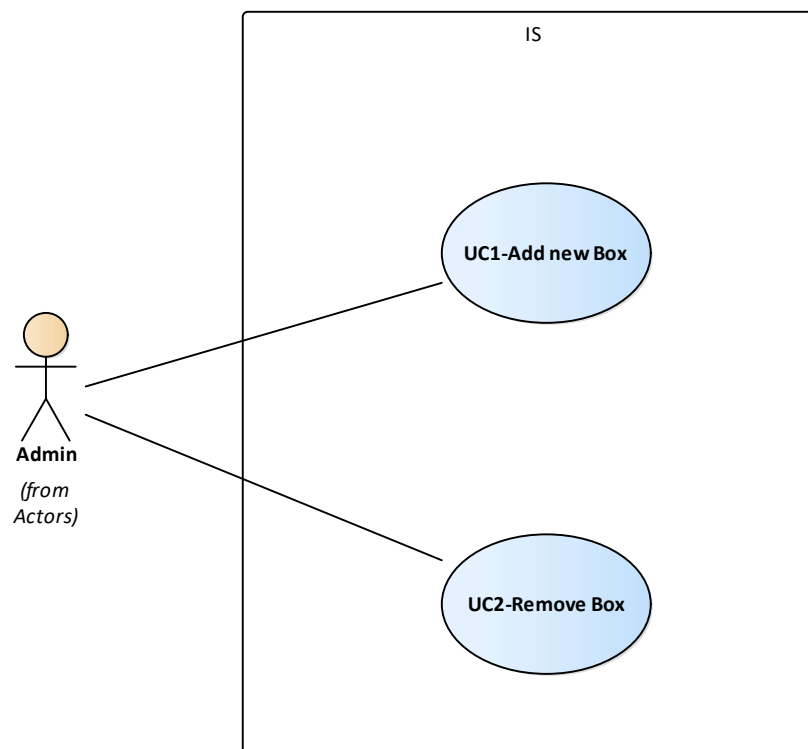
4.2 Use cases

The following is a list of use cases within the toolsharing application. It consists of location, tool, subscription, and user management, as well as user records.
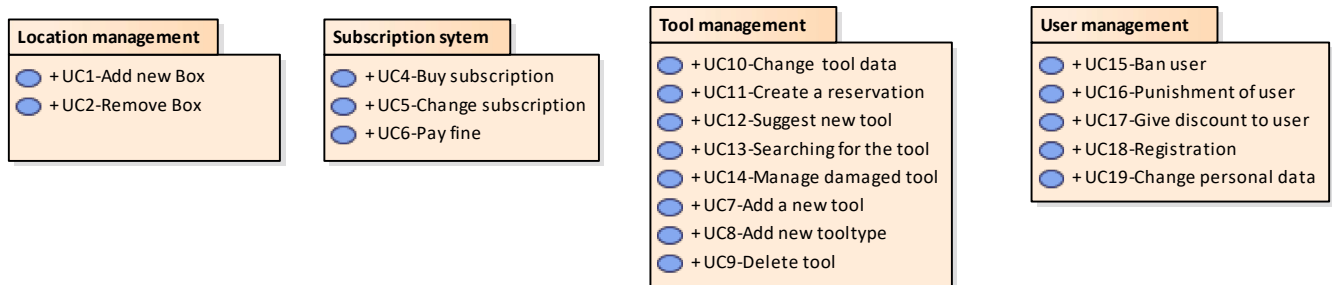
Obrázek 15 - Use cases

4.2.1 Location management

This chapter details the functionality of adding and removing rental locations (code-lock boxes).

Obrázek 16 - Location managment

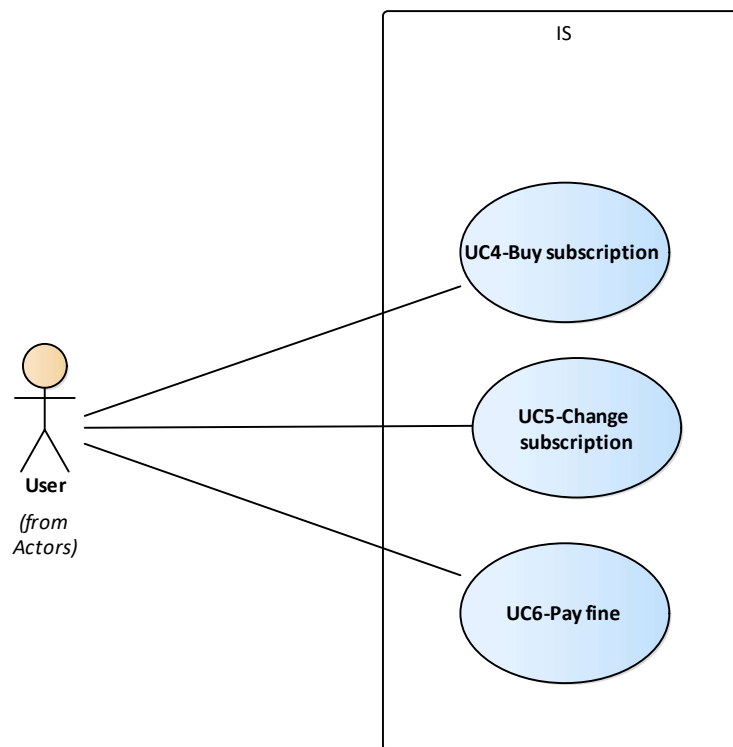### 4.2.1.1   UC1-Add new Box

Allows administrators to add a new code-lock box into the system.

4.2.1.2   UC2-Remove Box

Allows administrators to remove a new code-lock box from the system.

4.2.2 Subscription sytem

The following are use cases that are relevant to subscriptions and user payments

Obrázek 17 - Subscrition system

4.2.2.1   UC4-Buy subscription

If user is not banned, he is able to choose the type of subscription. There are two subscription types: basic and premium. Basic means that user can borrow only small tools that are not very expensive. Premium user can borrow everything that toolsharing has to offer. If user bought premium subscription, his karma increases.
Basic Path: Basic Path

1. Usecase starts when registered user decides to buy subscription, chooses the type of subscription and clicks the button "buy subscrition"
2. Banned users are not permitted to buy subscriptions, so if user was banned, system rejects the request and scenario ends in failure, else the scenario continues to 3rd step.
3. User is able to choose the type of subscription. There are two subscription types: basic and premium. If user buys premium subscription, his karma increases.
4. System processes user's choice and displays warning that the payment can be completed only by paying online with credit card.
5. User accepts this payment method by clicking the button
6. System displays third-party payment gateway.
7. User proceeds in the payment gateway.

8. System recevies response from payment gateway.

4.2.2.2 UC5-Change subscription

User can change type of subscription to downgrade or upgrade.
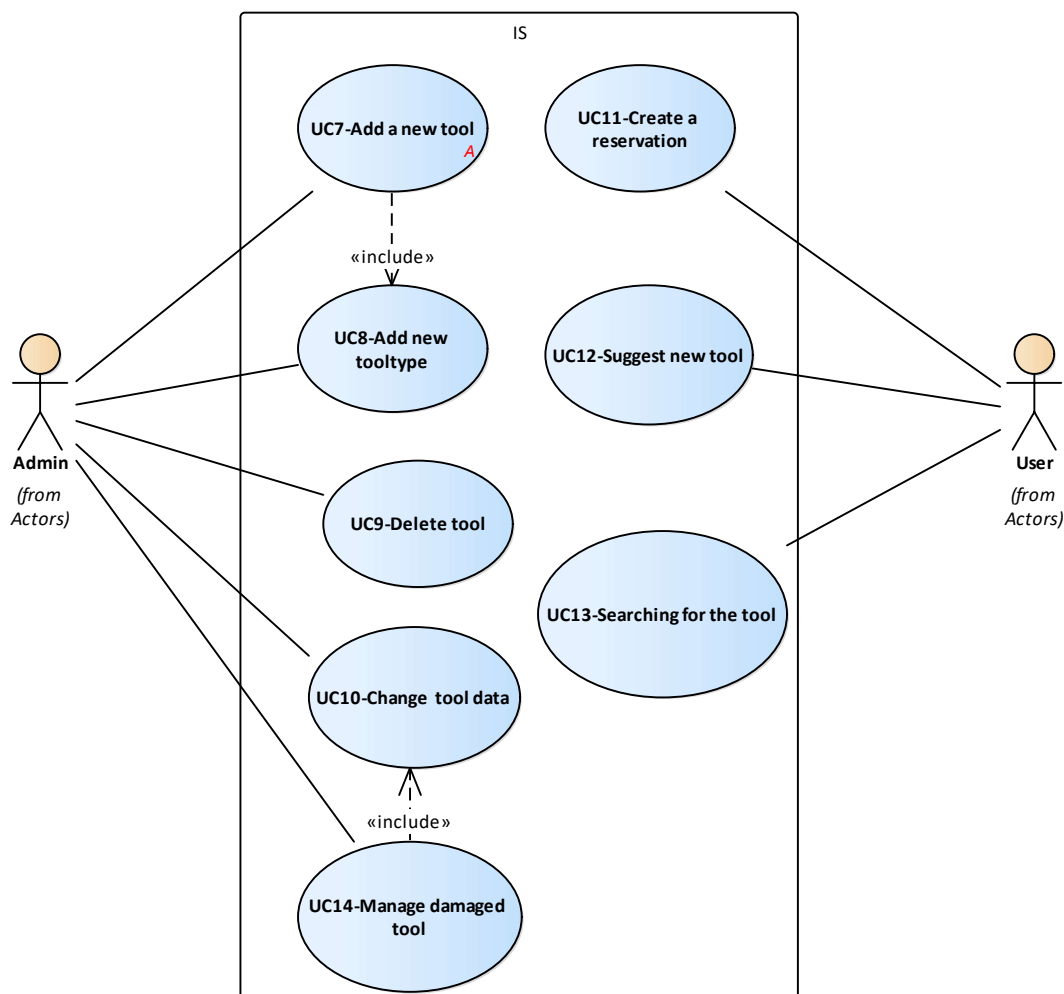**Basic Path: Basic Path**

1. Use case

4.2.2.3 UC6-Pay fine

User must pay fine if he broke the rules.
Basic Path: Basic Path

4.2.3 Tool management

This chapter deals with the management and rental of tools.

Obrázek 18 - Tool managment

4.2.3.1   UC10-Change tool data

Admin changes data of specific tool.

4.2.3.2   UC11-Create a reservation

User creates new reservation of a tool.
Basic Path: Basic Path

1. Usecase starts when User starts to choose the tool he searches for.
2. System will show window with calendar of available dates of reservation.
3. User will choose two dates : day of borrowing and day of returning.
4. System will show a window with a list of location, where user can found location by its adress.
5. User will choose location.
6. System will show user a tool, date of reservation and the location. And will ask user to confirm the reservation.
7. If everything is okay user confirms that he is ready to create a reservation. Otherwise user returns on step 2 or 4 of that scenario if he wants to change something.

4.2.3.3   UC12-Suggest new tool

User sends request for a new tool to the system.
Basic Path: Basic Path

1. Use case starts when User found tool he/she wants to be added to system.
2. User clicks button Suggest tool in the system.
3. System shows form to feel.
4. User provides name of tool , web link with description, web link were it could be bought and justification why this tool should be added.
5. User waits for decision from Admins.

4.2.3.4   UC13-Searching for the tool

User searches for required tool.

4.2.3.5   UC14-Manage damaged tool

Admin manages tools that have been found to have been damaged after being returned
Basic Path: Basic Path

1. Admin changes tool data to mark the tool as damaged
2. After the tool is sent off for repair, the admin will mark which repair shop it was sent to in a text field
3. The admin fills in the billing estimate
4. The admin decreases a user's karma relatively to the value of the damaged tool
Alternate: Tool damaged beyond repair

1. The admin will remove the tool from the system
2. The admin will mark the supplier and cost of the replacement tool, for billing purposes
3. The admin will also have a textbox to be able to directly lower the responsible user's karma by an amount proportional to the value of the tool

4.2.3.6   UC7-Add a new tool

Admin adds a new tool to the system.

Basic Path: Basic Path

1. Admin buys new tool and want's to add it to the system.
2. System will list all tools.
3. if in the system doesn't exist aprorpiate tooltype, then UC8-Add new tooltype.
4. Admin will choose Tooltype of a new tool.
5. Form to for data about the new tool will be shown.
6. Admin will add data about new tool into form and save it.
7. System generates id number and shows it to admin.
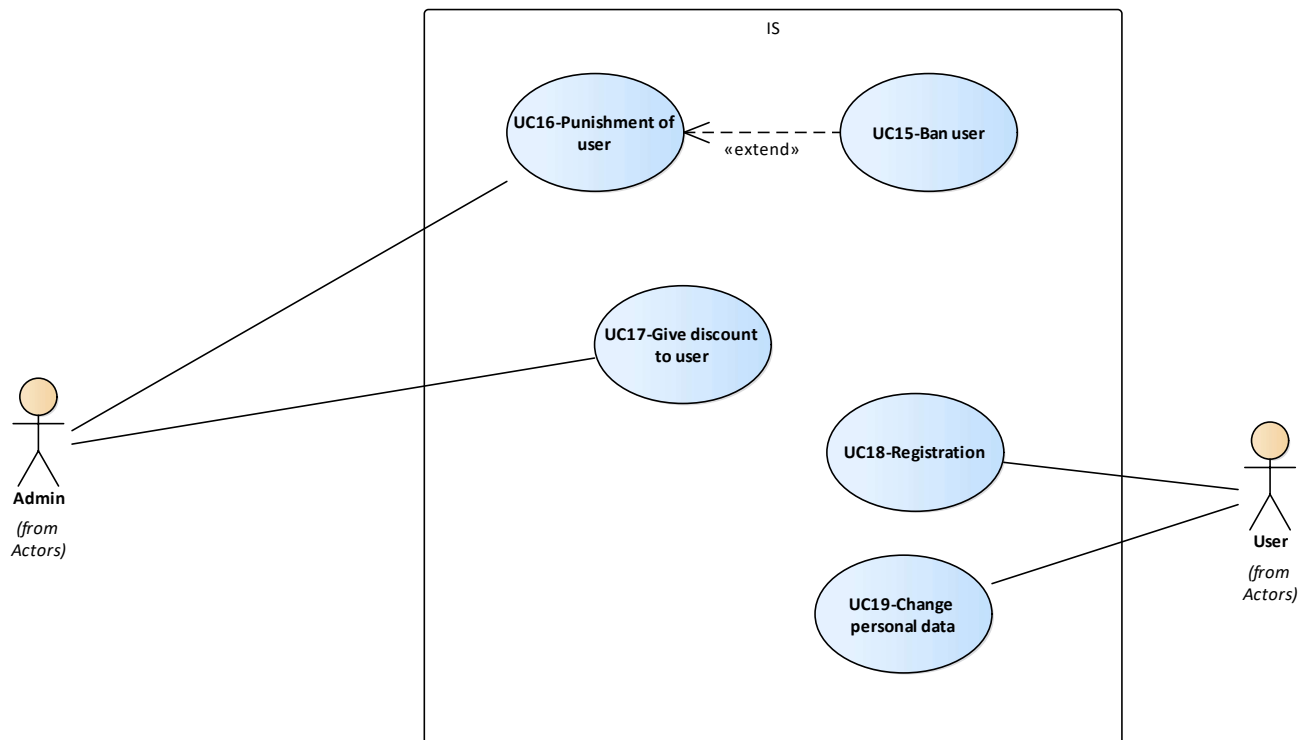8. Admin will stick id number on the tool.

4.2.3.7 UC8-Add new tooltype

Admin adds a new tooltype.

4.2.3.8 UC9-Delete tool

Admin deletes tool.

4.2.4 User management

User management deals with the punishment/reward system for users, such as discounts, fines or bans.

Obrázek 19 - User managment

4.2.4.1 UC15-Ban user

If user's karma is too low, admin bans user. It means that admin changes state of user to banned and the user is not able to borrow tools.

4.2.4.2   UC16-Punishment of user

Admin can punish user. If user break tool or don't return it, admin can decrease user's karma.

4.2.4.3   UC17-Give discount to user

Allow an admin to discount a user's subscription plan if the user has a high karma
Basic Path: Basic Path

4.2.4.4   UC18-Registration

Users can register accounts, which gives them a user account without a subscription. User inserts his personal data to create an account and if user was invited by someone, the referral gets bonus points to karma.
Basic Path: Basic Path

1. Use case starts when someone would want to registrate in the system.
2. System will show form, where user must write his name, surname, e-mail, phone and password.
3. User will fullfill the form and confirm.
4. System verifies user's email adress. If user with this email is already registered, system will send the report to the user and usecase will end.
5. System verifies user's username. If user with this username is not already registered, system is ready registrate new user, otherwise return to step 2.
6. If somebody invited the user to the application, system increases referral's karma.
7. System registrates new user

4.2.4.5   UC19-Change personal data

Users need to be able to change their personal data in case it changes, such as surname, credentials phone number, and email.
Basic Path: Basic Path

1. The use case will start, if user will want to change his personal data.
2. System will show the form where user can change his data. Like in registration.
3. User will fill the form and confirm.
4. If everything is fine usecase ends, otherwise go to step 2.