

User REquirements Specification



First Version

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# Introduction

User Requirements Specification document introduces you to the requirements which our application will meet and the features it will possess. Every software application which is to be developed needs to meet two kinds of requirements – functional and non-functional.

We described the functional requirements using use-cases.

Use-cases can be very helpful describing the flow of actions between the user and the system. Inside the document there are [X] use-cases. They are described in a structured and neat way. Each use-case has its own extensions below their Main Success Scenario.

Non-functional requirements of an application have to deal with its quality aspects. We briefly emphasized on the most important non-functional requirements. We included brief examples about accessibility, efficiency, maintainability, usability and reusability.

# Functional requirements (use-cases)

## Remove a crossing

Goal level: Sea level

Actor: User

Pre-condition: The application is running and the simulation isn’t running.

Main Success Scenario:

1. User drags the crossing into the recycle bin.

2. System removes it from the grid and places it into the recycle bin.

Extensions:

1a. User ends drag before on top of recycle bin.

1a1. System does nothing, crossing remains in place.

## Create a new file

Goal level: Sea level

Actor: User

Pre-condition: The application is running.

Main Success Scenario:

1. User clicks “New” button.
2. System creates an empty project.

Extensions:

1. Other project is already open.

2a1. System will ask the user whether to save or not save the current project.

## Save simulation

Goal level: Sea level

Actor: User

Pre-condition: There are some components on the grid.

Main Success Scenario:

1. User clicks on “Save File” option in the menu.
2. System shows save file dialog.
3. User specifies file name and location.
4. System saves the simulation.

Extensions:

3а. User does not specify name or location.

3а1. The system shows an error message informing the user.

3b. File with such name already exists.

3b1. The system shows message informing the user.

3b2. User selects to overwrite file or change the name of the file.

## Edit a road traffic flow

Goal level: Sea level

Actor: User

Pre-condition: The application is running and the simulation isn’t running.

Main Success Scenario:

1. User clicks on a road
2. System highlights the road and shows the current traffic flow
3. User inputs the new flow
4. System sets the number as the current flow

Extensions:

3a. User sets a negative or a value that is too high.

3a1. System gives an error message.

## Start a simulation

Goal level: Sea level

Actor: User

Pre-condition: The application is running and the simulation isn’t running.

Main Success Scenario:

1. User clicks “Start” button.
2. System check the status.
3. System starts simulation.

Extension:

1. There is uncompleted required information.

2a1. System will display errors and let the user fix them.

1. There are required information not meeting the rules.

3a1. System will display errors and let the user fix them.

## Stop a simulation

Goal level: Sea level

Actor: User

Pre-condition: Simulation is started.

Main Success Scenario:

* 1. User selects “Stop” button.
  2. System stops running simulation.
  3. System shows message informing the user that simulation was stopped.

Extensions:

2a. There is no running simulation.

2a1. System displays message informing user that there is no running simulation.

## Pause a simulation

Goal level: Sea level

Actor: User

Pre-condition: The application is running and the simulation is running.

Main Success Scenario:

* 1. User clicks the “Pause” button.
  2. System pauses the simulation.

## Undo an action

Goal level: Sea level

Actor: User

Pre-condition: The simulation is not currently running.

Main Success Scenario:

1. User clicks “Undo” button.
2. System performs undo to the last action.

Extensions:

1. The simulation is still running.

2a1. System will display an error message and ask the use to stop the simulation.

## Redo an action

Goal level: Sea level

Actor: User

Pre-conditions: User performed some actions on the grid.

Main Success Scenario:

1. User selects “Redo” button.
2. System repeats actions which were aborted.
3. System updates grid.

Extensions:

2a. There are no actions to redo.

2a1. Nothing happens.

## Show the help window

Goal level: Sea level

Actor: User

Pre-condition: The application is running.

Main Success Scenario:

1. User clicks the “About” tab from the application menu.
2. System shows a drop down menu with the available options.
3. User clicks on “Help”.
4. System shows a window with basic instruction on how to use the application.

## Exit application

Goal level: Sea level

Actor: User

Pre-condition: The application is running.

Main Success Scenario:

1. User clicks “x” (on the top right) button.
2. System closes the application.

Extension:

1. The currently project is not saved.

2a1. System will ask the user whether to save or not save the current project.

## Override simulation (Add police, ambulance, firetruck cars)

Goal level: Sea level

Actor: User

Pre-condition: User started simulation.

Main Success Scenario:

1. User selects start and end points of “special” cars route.
2. User selects button to start moving of “special” cars.
3. System overrides simulation according to selected route.
4. System displays changed simulation.

Extensions:

1a. It is not possible to create selected moving route.

1a1. System displays message that selected route cannot be created.

1a2. User changes the route or cancels it.

## Startup the application

Goal level: Sea level

Actor: User

Pre-condition: The application is not running.

Main Success Scenario:

1. User double clicks on the executable.
2. System starts the application.

## Show simulation result

Goal level: Sea level

Actor: User

Pre-condition: The application is running.

Main Success Scenario:

1. User clicks “Show Simulation” button.
2. System pops up a load simulation result dialog.
3. User chooses the simulation result file.
4. System displays the simulation result.

Extension:

1. There is current simulation result shown.

2a1. System will check whether the simulation result is saved or not.

2a2. System will ask the user whether save or not the result if it is not saved.

2a3. System will ask the user whether close the current and open a new one or not.

## Select crossing to make changes

Goal level: Sea level

Actor: User

Pre-condition: User added crossing to the grid.

Main Success Scenario:

1. The user clicks on the editing properties tool from the toolbox.
2. The system highlights the tool.
3. User clicks a crossing from the grid.
4. The system highlights the crossing.
5. The system declares the appropriate properties of the crossing, from the properties section under the toolbox.
6. The user edits properties of the crossing.
7. The user clicks on “Update” button.
8. The system updates the crossing.

Extensions:

3a. if the user selects a pipeline.

3a1. Nothing happens, pipelines are not available for edit.

3a2.Continue with MSS#3 or Terminate the operation.

5a. if the user has specified invalid settings.

5a1. Message is shown that the user has specified invalid settings for the crossing.

5a2. The system does not apply the changes

## Edit a crosswalks pedestrian flow

Goal level: Sea level

Actor: User

Pre-condition: The application is running and the simulation is not running.

Main Success Scenario:

1. User clicks on a crosswalk.
2. System highlights the crosswalk and shows the current flow in a text box.
3. User inputs a new value for the flow.
4. System sets the value as the current pedestrian flow.

Extensions:

3a. User sets a negative or a value that is too high.

3a1.System gives an error message.

# User interface

# Non-functional requirements

Of course when using an application the things that can bother us or make us happy are not always related to the product’s functionality. What about Usability, Reliability, Performance and Maintainability?

1. Usability – Our application will meet all the requirements to achieve quantified objectives with effectiveness, efficiency and user satisfaction.
2. Performance – The amount of useful work accomplished by the application compared to the time and resources used is relatively huge.
3. Reliability – Our application will be able to function under stated conditions for a specified period of time. All the results returned from the software will be absolutely correct and precise.
4. Maintainability – Our software will be free of defects, it will meet all the requirements and if and error occurs it will be easily dealt with.

# Appendix A: Definitions

1. Crossing:

* Representation of real crossroad, displayed on the grid in the application. Crossings are of two types.

1. Road:

* Representation of real road, which is a connection between crossings or connection to crossing.

1. Simulation:

* Simulation is a representation of real situation on the crossroad. Including the cars, the pedestrians and traffic lights. It gives realistic view of what will happen in a certain situation.

1. Traffic Flow:

* The amount of car objects which are present on the roads in a certain stimulation (in the application).

1. Pedestrian Flow:

* The amount of pedestrian objects, which are present on a certain stimulation (in the application).

1. Simulation results:

* Graphical representation of statistics. Information about traffic statistics on a certain stimulation.

1. Help menu:

* Option menu, which is present in the application. It gives assisting information to the user about how to use the application.