

# USER REQUIREMENTS SPECIFICATIONS

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# INTRODUCTION

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This document is going to cover all the required features that the user has specified from our application.

We are going to represent those requirements in a form of use cases.

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# USE CASES

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In this section we're going to list all the required use cases that our application is going to have:

## Start Simulation

**ID:** 1

**Name:** Start Simulation

**Goal:** Start the simulation

**Actors:** User

**Description:** The user clicks a button that starts the flow of cars hence the simulation

**Pre-conditions:** The user has constructed a road system by placing roads on the map

**Trigger:** Click of the button "Start Simulation"

**Main Success Scenario:**

1. User click button "Start Simulation"
2. System starts the simulation

**Post-condition:**

1. User can stop the simulation or exit
2. User can pause the simulation

**Extensions:**

2A: *System shows error:*

- Use case ends

2B: *User restarts the program:*

- Use case ends

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## Stop Simulation

**ID:** 2

**Name:** Stop Simulation

**Goal:** Stop the simulation

**Actors:** User

**Description:** The user clicks a button that stops the simulation and clears the currently build road system

**Pre-conditions:** The simulation is running

**Trigger:** Clicking the button "Stop Simulation"

**Main Success Scenario:**

1. User clicks button "Stop Simulation"
2. System stops the simulation
3. System resets the road map

**Post-condition:**

1. User can start simulation again or exit

**Extensions:**

-3A: *System shows error and cannot reset the map:*

- Use case ends.

-3B: *User restarts the program:*

- Use case ends.

## Pause Simulation

**ID:** 3

**Name:** Pause Simulation

**Goal:** Stop the simulation for a while/pause the simulation

**Actors:** User

**Description:** The user clicks a button that stops the simulation but does not end it

**Pre-conditions:** The simulation is running

**Trigger:** Clicking the button "Pause Simulation"

**Main Success Scenario:**

1. User clicks button "Pause Simulation"
2. System pauses the simulation without resetting the map

**Post-condition:**

1. User can continue the simulation or stop it

**Extensions:**

-2A: *System shows error and cannot pause:*

- Use case ends.

-2B: *User restarts the program:*

- Use case ends.

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## Generate a report

**ID:** 4

**Name:** Generate a report

**Goal:** Generate a report for the user of a simulation that already took place.

**Actors:** User

**Description:** The user is indicating to display a report that contains the stats of the simulation that just took place. The system displays the result.

**Pre-condition:**

1. The application is running.
2. A simulation has just ended.
3. The simulation had at least one dynamic element.

**Trigger:** Simulation has just ended, and the user indicates to display a report.

**Main success scenario:**

1. User indicates to display a report for the simulation.
2. System displays the report.

**Post-condition:**

- The report is shown, and the user can choose to continue.

**Extensions:**

-1A: *The simulation had no dynamic elements (cars, pedestrians):*

- System displays an error message.
- The use case is over.

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## Reset Road Map Layout

**ID:** 5

**Name:** Reset road map layout

**Goal:** Remove all the elements off the grid.

**Actors:** User

**Description:** A user can choose to reset a layout displayed on the screen.

**Pre-condition:**

1. The application is running
2. A map is already loaded on the grid.
3. The simulation is not running.

**Trigger:** User wants to remove all elements off the grid.

**Main success scenario:**

- 1- User clicks on "Reset map"
- 2- System displays a verification message
- 3- User chooses to proceed.
- 4- All elements are removed off grid.

**Postcondition:**

- Map grid is now empty.

**Extensions:**

-3A: *User chooses to cancel:*

- Use case ends.

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## Add one-way road

**ID:** 6

**Name:** Add one-way road

**Goal:** Adding one-way road in the running application

**Actors:** User

**Description:** A user can choose to add one-way road to the grid

**Pre-condition:**

1. Application is running

**Trigger:** User indicates to add one-way road by clicking the button

Main success scenario:

1. Actor clicks add one-way button
2. Actor clicks on the grid
3. System add the road into the grid

**Post-condition:** The chosen road is added in the grid

**Extensions:** *None*

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## **Remove one-way road**

**ID:** 7

**Name:** Remove one-way road

**Goal:** Removing one-way road in the running application

**Actors:** User

**Description:** A user can choose to remove one-way road in the grid

**Pre-condition:**

1. There is at least one-way road on grid
2. Application is running

**Trigger:** User wants to remove the one-way road by clicking the button

**Main success scenario:**

1. Actor clicks remove one-way button



2. Actor clicks on the grid
3. System remove the road into the grid

**Post-condition:** The clicked remove button Inform there is no road anymore if the road in the grid is empty

**Extensions:** *None*

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## Add two-way road

**ID:** 8

**Name:** Add two-way road

**Goal:** Adding two-way road in the running application

**Actors:** User

**Description:** A user can choose to add two-way road to the grid

**Pre-condition:**

1. Application is running

**Trigger:** User indicates to add two-way road by clicking the button

**Main success scenario:**

1. Actor clicks add two-way button
2. Actor clicks on the grid
3. System add the road into the grid

**Post-condition:** The chosen road is added in the grid

**Extensions:** *None*

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## Remove two-way Road

**ID:** 9

**Name:** Remove two-way road

**Goal:** Removing one-way road in the running application

**Actors:** User

**Description:** A user can choose to remove two-way road in the grid

**Pre-condition:**

1. There is at least two-way road on grid
2. Application is running

**Trigger:** User wants to remove the two-way road by clicking the button

**Main success scenario:**

1. Actor clicks remove two-way road button
2. Actor clicks on the grid
3. System remove the road into the grid

**Post-condition:** The clicked remove button Inform there is no road anymore if the road in the grid is empty

**Extensions:** *None*

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## Add intersection

**ID:** 10

**Name:** Add intersection

**Goal:** Add an intersection to the map on the grid.

**Actor:** User

**Description:** A user can choose to place an intersection on an empty space on the grid.

**Pre-condition:** The software is running.

**Trigger:** User wants to add an intersection to the grid.

**Main success scenario:**

1. System shows the available intersections.
2. User chooses one and clicks on it.
3. User click on the grid where he wants to put the intersection.
4. System draws the intersection on the grid.

**Post-condition:** an intersection is placed on grid.

**Extensions:**

**-3A: *The place on the map is already taken by another object:***

- the system triggers an error message.
- Back to step 1.

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## Remove intersection

**ID:** 11

**Name:** Remove intersection

**Goal:** Remove an intersection from the current map.

**Actor:** User

**Pre-condition:** The software should be running

**Trigger:** User wants to remove an intersection from the current map

**Main success scenario:**

1. User clicks on the intersections that he wants to remove
2. User chooses from the menu the remove option
3. System removes the selected intersection

**Post-condition:** Intersection is removed from the screen.

**Extensions:** *None*

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## Add Road with traffic light

**ID:** 11

**Name:** Add road with a traffic light

**Actor:** Person who is using the software

**Goal:** To add a road with a traffic light to the current map.

**Pre-condition:** The Software should be running

**Trigger:** User wants to add a road with a traffic light to the map

**Main success scenario:**

1. System shows the available roads with traffic lights
2. Actor chooses one and clicks on it
3. Actor click on the map where he wants to put the road with traffic lights
4. System draws the road with traffic lights on the map

**Post-condition:** Road with traffic lights is drawn on screen.

**Extensions:**

- 3A: *If the place on the map is already taken by another object:*
  - the system triggers an error message.
  - Back to step 1.

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## Remove road with traffic light

**ID:** 12

**Name:** Remove road with traffic light

**Actor:** User

**Goal:** To remove a road which has a traffic light

**Pre-condition:** The Software should be running

**Trigger:** User wants to remove a road with a traffic light

**Main success scenario:**

1. Actor clicks on the road with traffic lights that he wants to remove
2. Actor chooses from the menu the remove option
3. System removes the selected road with traffic lights

**Post-condition:** Road with traffic lights is removed from the screen.

**Extensions:** *None*

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## Save a file

**ID :** 13

**Name:** Save a file

**Goal:** Save the contents of the currently open application

**Actor:** User

**Trigger:** User chooses option "Save"

**Main Success Scenario:**

1. The application saves the contents using current name and location of file.
2. The system displays the time and date of the last save in a message.

**Post-condition:** The content of the application is stored in a file.

**Extensions:**

-1A: *Current application has not been given a name and location*

1. System goes to "Save As" use case
-

## Save as a file

**ID:** 14

**Name:** Save As file

**Goal:** Saving contents of currently open file

**Actor:** User

**Trigger:**

- User chooses option "Save As"
- User tried to perform "Save a file" use case but did not specify location nor name for the file.

**Main Success Scenario:**

1. Application asks for name and location of file to be saved
2. Actor provides name and location of file
3. Actor confirms by clicking the "Save" button
4. Application saves contents using given name and location of file

**Extensions:**

**-2A: *Actor presses "Cancel" button:***

1. Use case ends

**-3A: *There is already a traffic file with the same name and path:***

1. The system displays appropriate message and offers choice to replace existing file.
2. If yes, the use case continues.
3. If not, the actor is returned to step 4.

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## Specify number of cars generated

**ID:** 12

**Name:** Specify number of cars generated

**Goal:** Specify the number of cars that will take part in the traffic flow

**Actor:** User of the system

**Trigger:** User signals to change the default value of cars generated

**Main Success Scenario:**

1. User types in text box the desired number of cars to be shown

**Extensions:**

-1A: *The value entered is not a number type/ exceeds the maximum value allowed/ is not a positive value:*

- The system shows appropriate message.
- Return to step 1 of MSS.