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# User Requirements specifications

# Traffic Lights

# Version I

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# Introduction

Our group consists of six members: Rosen Danev, Blagovest Tsarev,Monica Stoica, Alexandru Vinerean, Ventsislav Yotov and Dmyro Bunin students of class EI7S2.

The following document describes the implementation of an object-oriented software product using UML techniques.

The goal of this software system is to build a traffic lights simulator consisting of traffic lights, sensors and crossings.In addition, the User Requirements Specification (URS) will be described such as functional and non-functional requirements and user interface.

The functional requirements are represented by use cases. We have chosen the most suitable use cases so that the most functionality of our system will be covered. In this way, we were able to determine the most appropriate user-friendly interface.

In the ‘User-interface’ chapter, the process of creating a simple traffic situation is explained.

# Functional requirements

# (use-cases)

*The following use-cases represent the functional requirements that the traffic light simulator software will be providing.*

**Goal:** Add a crossing.

**Pre:** There is no other crossing drown

**Actor**: User of the system

**MSS**:

1. The actor selects the one of the two crossing types by clicking on it
2. The actor clicks on the screen where he/she wants to place it
3. The system adds the element to the internal structure and draws it on the screen

**Extensions:**

**2a**. There is already a crossing on the same spot. The system displays an error and the use case ends.

**3.a** The newly created crossing is connected to an already existing crossing.

**1.** The system updates the internal structure by setting the flow of the new crossing equal to the flow of the already exiting crossing (depending on the side that connects them).

**Goal:** Remove a crossing

**Pre:** There is at least one crossing on the drawing board

**Actor**: User of the system

**MSS**:

1. The actor selects the crossing he/she wants to remove by double clicking on it

2. The user presses the ‘Delete’ button

3. The system removes the element from the internal structure and removes the selected crossing

**Goal:** Add an element (sensor or traffic light)

**Pre:** There is at least one crossing drawn

**Actor**: User of the system

**MSS**:

1. The actor selects the element he/she wants to add by clicking on it
2. The actor clicks on a spot on the screen where he/she wants to place the element
3. The system adds the element to the internal structure and draws it on the screen

**Extension:**

**2a.** There is already an element on that spot. The system displays an error and the use case ends

**3a.**  If the element is a traffic light/sensor for pedestrians and there is no crossing drawn, the system displays an error and the use case ends.

**Goal:** Remove an element.

**Pre:** There is at least one element on the drawing board

**Actor**: User of the system

**MSS**:

1. The actor selects the element he/she wants to delete by double clicking on it.
2. The actor presses the ‘Delete’ button
3. The system removes the element from the internal structure and from the screen.

**Extension:**

**1a.** The element is a pedestrian crossing. The system will delete all elements related to that crossing (pedestrian lights/sensors)

**Goal:** Save a file

**Actors**: User of the system

**MSS:**

1. The actor presses the ‘Save’ button.
2. The system displays the time and date of the last save in a label informing the actor that the save is done

**Extensions:**

1a.The file has no location or name on the disk then the system displays a dialog box asking the actor if he wants to save it.

1. b If the actor wants to save it, he is sent to ‘Save as file’ use case, step 2. If not, the use case ends.

**Goal:** ‘Save as’ file

**Actors**: User of the system

**MSS:**

1. The actor presses the ‘Save as’ button.
2. The system displays a dialog box.
3. The actor chooses a location.
4. The actor chooses a name for the file.
5. The actor confirms by clicking the Save button.
6. The system saves the file.
7. The system closes the dialog box.

**Extensions:**

**2a.**The actor presses the ‘Cancel’ button and the use case ends.

**4a.**There is already a file with that name

1. The system displays a warning and asking the actor if he/she wants to override the exiting file. If yes, the use case continues. If not, the actor is returned to step 4.

**Goal:** Open an existing file

**Actors**: User of the system

**MSS:**

1. The actor presses the ‘Load file’ button.
2. The system displays a dialog box.
3. The actor presses the browse button and selects the file.
4. The actor confirms by clicking the Open button.
5. The system closes the dialog box.
6. The system loads the file.
7. The system displays all the information from the file.

**Extensions:**

**1a**.The system displays a dialog box asking the actor if he/she wishes to save the current file. If yes, go to use case save file and come back to step 2.

**3a**.The actor presses the ‘Cancel’ button and exits the use case

**5a**.The file is not in the correct form

1. The system displays a warning.
2. The actor is returned at MSS-step 3.

**Goal:** Change the greentime of the traffic light

**Actor:** User of the system

**MSS:**

1. The actor chooses a traffic light by double clicking on it
2. The actor presses the ‘change green time’ button.
3. The system displays a dialog box.
4. The actor inputs new time and confirms the change.
5. The system updates the internal structure and changes the green time.

**Extensions:**

**4a**.The input of the actor is not an integer.

1. The system displays a warning
2. The actor is return to MSS-step 3

**4b.** The input of the actor is out of range

1. The system displays a warning
2. The actor is return to MSS-step 3

**4c**.The actor presses the ‘Cancel’ button and exits the use case

**Goal:** Set the flow for cars/pedestrians

**Actors**: User of the system

**MSS:**

1. The actor chooses a crossing.
2. The actor choses a lane
3. The actor presses the ‘change flow’ button.
4. The system displays a dialog box.
5. The actor chooses cars, or pedestrians.
6. The actor inputs the new flow.
7. The actor confirms the change.
8. The system closes the dialog box.
9. The system changes the flow

**Extensions:**

**5a**.The input of actor is not an integer.

1. The system displays a warning
2. The actor is return to MSS-step 2

**5b.** The input of actor is out of range

1. The system displays a warning
2. The actor is return to MSS-step 2

**5c**.The actor presses the ‘Cancel’ button and exits the use case

**Goal:** Start the simulation.

**Pre:** There is at least one crossing on the drawing board.

**Actor**: User of the system

**MSS**:

1. The actor presses the ‘Start’ button.
2. The system starts the timer for the lights and sensors
3. The system displays the flow of cars/pedestrians is displayed on the screen

**Extension:**

1a. If the simulation was paused before this action, the animation will continue where it was paused

**Goal:** Pause the simulation.

**Actor**: User of the system

**MSS**:

1. The actor presses the ‘Pause’ button

2. The system will pause the traffic flow simulation

**Extension:**

1a. If there is no crossroad on the board the system will display a warning message

1b. If the simulation was not started the system will display a warning message and the use case ends

**Goal:** Clear the screen

**Actors**: User of the system

**MSS:**

1. The actor presses the ‘Clear’ button.
2. The system displays the dialog box asking the user to confirm or cancel
3. The system deletes everything from the drawing board

**Extensions:**

**1a**.If there is something on the drawing board and not saved, the system asks if the user wants to save it. If yes, go to use case ‘Save as’

**2**. The actor presses the ‘Cancel’ button and exits the use case

# Non-functional requirements

To begin with, the software system will have a user-friendly interface so that all users, no matter how experienced they are, will be able to create a simple traffic flow simulation. Also, reliability by assuring the user that the application will not crash at unexpected times. To achieve reliability, our team will deliver test plans.

The final product will be an installation file and will have a user manual with it. The source code will be delivered. We are not providing service or updates. The program won’t have any auto save feature and won’t be able to repair corrupt save files.

In order to run the software application, the following items are required:

* Microsoft Windows XP (Service pack 2) and further, Microsoft Vista, Microsoft Windows 7, Microsoft Windows 8, Microsoft Windows 10
* Desktop computer, notebook
* Monitor with a minimum screen resolution of 1024 x 768
* A mouse
* A keyboard