User Requirements Specification

Final Version

PROPHTECH

final version
use cases ++
non funct.req. +
describing trafficlight systems
and car flows
(source, destination) --

total 8.

Elaborate what exactly is
a state of the system. What states
do we have. The scope of the
states.

Group B

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Class: EI7s1/s2

Course: Project C-phase
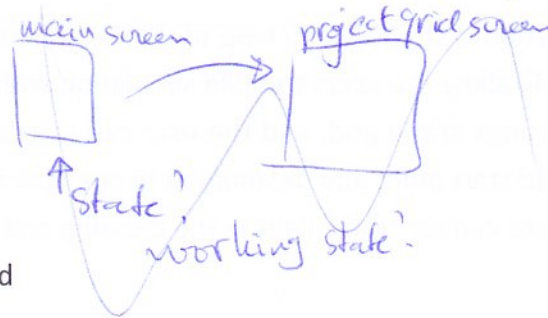
Mentor: Bert Van Gestel

States:

Initial state- where you build the simulation (crossings,etc.)

Simulation running state- when you test the simulation

Pause state-where you stop to see the progress of the simulation till this point

Working state-the application is started and you are in main menu screen.

Use-cases:

1.Name: Add crossing

Goal: Adds a crossing to our grid

Actor: User

Pre-condition: System is displaying a new or a loaded project so that the user can modify the grid. System is in state "paused state" or "initial state".

MSS:

1. User chooses a crossing he wants to add

2. User drags a crossing to the cell he wants to place it in

3. User drops the crossing in the cell

4. System redirects user to traffic light system setup

5. System asks user what kind of traffic light system he would like to choose(Optional)

6. User selects a traffic light system(Optional)

7. System asks user to input values of the traffic light system

8. User input values for each traffic light system state

9. System places the crossing on the grid

10. System adds new cell to the calculation of the flow

Exception (Extension, Alternatives):

3.1: Cell already has a crossing on it -> Go to use case "Change crossing"

9.1: User doesn't give inputs for traffic light system

   System configures the traffic light system with default values

9.2: User inputs wrong values

System outputs an appropriate message "You have to input values of type integer 1-100"

9.3: User sets the time to too high or too low

    System notifies the user of the boundaries

Post-condition: Our grid now has a new crossing on it.

2.Name: Delete crossing

Goal: Deletes an existing crossing from the grid

Actor: User

Pre-condition: System is displaying a new or a loaded project so that the user can modify the grid and there's already a crossing on the grid to delete. System is in state "paused state" or "initial state".

MSS:

1. User right clicks on existing crossing on the map
2. User chooses the delete option
3. System asks the user for confirmation
4. The user confirms
5. System deletes crossing from the grid
6. System removes the cell from the calculation of the flow

Exception (Extension, Alternatives):

   5.1: Crossing was part of the path from start point to end point

     System deletes navigation route

Post-condition: Our grid now has one less crossing

just one or a specific one?

3.Name: Change crossing

Goal: Changes an existing crossing on the grid

Actor: User

Pre-condition: System is displaying a new or a loaded project so that the user can modify the grid and there's already a crossing on the grid to change. System is in state "paused state" or "initial state".

MSS:

1. User right clicks on a cell with a crossing

2. User chooses the change option

3. System redirects user to crossing settings

4. User choose crossing he wants to place in said cell

5. System asks user to input values of the traffic light system

6. User input values for each traffic light system state

7. System removes previous crossing from the grid

8. System places the new crossing in the cell

9. System automatically changes the flow of the traffic

Exception (Extension, Alternatives): *1: what if you click on an empty cell?*

Post-condition: The grid now has a different kind of layout.

4.Name: Rotate crossing

Goal: Rotates an existing crossing on the map

Actor: User

Pre-condition: System is displaying a new or a loaded project so that the user can modify the map and there's already a crossing on the map to rotate.

MSS:

1. User right clicks on existing crossing

2. User chooses the rotate option

3. System swaps the properties of the 4 roads with the properties of the one on the right.

4. System rotates the crossing picture(90 degrees counter clockwise)

5. System alters the flow appropriately

Exception (Extension, Alternatives):
Post-condition: The map has now a different kind of layout.

1. User right clicks on a cell with a crossing

2. User chooses the change option

3. System redirects user to crossing settings

4. User choose crossing he wants to place in said cell

5. System asks user to input values of the traffic light system

6. User input values for each traffic light system state

7. System removes previous crossing from the grid

8. System places the new crossing in the cell

9. System automatically changes the flow of the traffic

Exception (Extension, Alternatives): *1 : what if you click on an empty cell?*
Post-condition: The grid now has a different kind of layout.

4.Name: Rotate crossing

Goal: Rotates an existing crossing on the map

Actor: User

Pre-condition: System is displaying a new or a loaded project so that the user can modify the map and there's already a crossing on the map to rotate.

MSS:

1. User right clicks on existing crossing

2. User chooses the rotate option

3. System swaps the properties of the 4 roads with the properties of the one on the right.

4. System rotates the crossing picture(90 degrees counter clockwise)

5. System alters the flow appropriately

Exception (Extension, Alternatives):
Post-condition: The map has now a different kind of layout.

5.Name: Modify traffic light system

Goal: Modify an existing traffic light system on the grid

Actor: User

Pre-condition: System is displaying a new or a loaded project so that the user can modify the grid and there must already be a crossing with a traffic light. System is in state "paused state" or "initial state".

MSS:

1. User hovers over a cell

2. System output a small icon in the top left corner

3. User clicks on the icon

4. System redirects user to traffic light and flow settings

5. User chooses to modify the interval times of the states of the traffic light system

6. System shows the user the current parameters

7. User changes the values of the inputs of the states

8. User clicks confirm

9. System modifies traffic light system with new parameters

10. System recalculates total interval time

[handwritten note: 7 some traffic lights are green at the same time. that is the input of the state.]

Exception (Extension, Alternatives):

7.1: User leaves input value blank

    System modifies the traffic light with default value

7.2: User inputs wrong values

    System outputs an appropriate message "You have to input values of type integer 1-100"

7.3: User sets the time to too high or too low

    System notifies the user of the boundaries.

Post-condition: The selected traffic light has now changed parameters.

7.Name: Alter flow for crossing

Goal: Alter flow for existing crossing

Actor: User

Pre-condition: System is displaying a new or a loaded project so that the user can modify the grid and there's already at least one crossing on the map. Available modifiable incoming lane will show in "Crossing Setting" window. System is in state "paused state" or "initial state".

[handwritten: ? Border lane!]

MSS:

1. User right clicks on the existing crossing
2. User chooses "Crossing Setting"
3. User modify car flow for each incoming lane .
4. User click "confirm" button.

Exception (Extension, Alternatives):

2.1: If user do not change anything for flow, then it will remain default value.

Post-condition: none.

8.Name: Navigate

Actor: User

Precondition: System is in state "initial state".

MSS:

1. User chooses "navigation" option.
2. User sets the starting point on the screen.
3. User sets the destination point on the screen.
4. User confirms the starting point and destination point.
5. User input the flow number.
6. System calculates the route and executes the "Add flow" use case with the input flow number for the related roads.
7. System goes to state "Simulation running state".

[handwritten: where is it? Alter flow]

Extension:

4.1 User cancels the operation.

Post-condition: The system simulates the situation and changes the flow of the related roads correctly.

9.Name: Play Simulation

Goal: The system simulates the project.

Actor : User *Check others pre-conditions*

Pre-condition: Actor opens the application and he is at the "Project-grid screen". System is in state "paused state" or "initial state".

MSS:

    1. Actor click play button.

    2. System starts the simulation(the play button is changed with a pause button-so you can pause the simulation).

Exception : Some error happened when click play button ------System stop playing, it sends you back to grid screen. *Refer to rules.*

10.Name: Pause Simulation

Goal: Pause the system

Actor: User

Pre-condition: The actor is at "Project-grid screen". System is in state "Simulation running state".

MSS:

    1. Actor clicks the Pause button.

    2. The system is paused and it stays in a "pause state" (the pause button is change with a play button-so you can start the simulation).

Exception: None

11.Name: Stop Simulation

Goal: Stop the system

Actor: User

Pre-condition: The actor is at "Project-grid screen". System is in state "Simulation running state" or "paused state".

MSS:

    1. Actor click stop button.

    2. System stop the simulation and we can work on the "Project-grid screen" again(the system is in "initial state").

Exception: None

12.Name: Create new project

Goal: Create new project

Actor: User

Pre-condition: System is in working state.

MSS:

  1. Actor click new simulation button.

  2. The system creates a new project and the user sees the Project-Grid screen (the system changes it status to initial state).

Exception: None

13.Name: Load project and statistics

Goal: Load a Project

Actor: User

Pre-condition: System is displaying the application main screen. System is in state "working state".

MSS:

  1. User clicks the "Load" button;
  2. A file-dialog window will pop-up and user chooses the file which is going to use;
  3. User selects a file and clicks "Ok";
  4. System loads the file and displays the project-traffic simulation screen(the system is in "initial state");

// multiple files opened.

Exception (Extension, Alternatives):

4 – a) If the system doesn't have enough permissions to open the file, it displays a message "Not enough permissions to open this file" and the use case ends.

4 – b) If the system can't parse the file correctly, it displays a message "This file could not be loaded." and the use case ends.

Post-condition: The project-grid screen will be ready for the user.

You can't have multiple projects opened.
Check if there is already an open project and ask
user if he wants to close previous one.

14.Name: Save project and statistics

Goal: Save to a file

Actor: User

Pre-condition: System is displaying project- grid screen. System is in state "initial state".

MSS:

1. User chooses "File-Save" option, on the top left corner;
2. System saves the current grid to a file;

Exception (Extension, Alternatives):

2 – a) If the current grid hasn't been saved before, the system displays a file-dialog where the user needs to choose the folder and the name of the file he wants to save.

2 – b) If the system doesn't have permissions to save the file, it displays a message "Not enough permissions to save this file" and the use case ends.

Post-condition: The file is saved by the system.

15.Name: Exit Application

Goal: Close a file

Actor: User

Pre-condition: System is displaying project-grid screen. System is in state "initial state".

MSS:

1. User chooses "File-Close" option, on the top left corner;
2. System asks the user for confirmation;
3. The system exits;

Exception (Extension, Alternatives):

2 – a) User clicks 'No' option, the system will not exit.

2 – b) There are files that have been edited without being saved.

> The system asks if you want to save opened files.
>
> User may close file without saving. *But can also save it.*

Post-condition: The file is closed by the system.

Check it you have unsaved progress, ask user it he wents to change.

change states accordingly

Screen

16.Name: Go to Main Menu

Goal: Takes the user back to the main screen

Actor: User

Pre-condition: System is displaying project-grid screen. System is in state "initial state".

MSS:

1. User chooses "File- main menu" option, on the top left corner;
2. System closes project- grid screen and opens main screen(the system is in "working state");

Exception (Extension, Alternatives):

2 – a) If the user didn't save the progress, the system will show a message asking if the user wants to leave without saving. The user can choose "Yes" or "No".

Post-condition: Main screen is displayed.

17.Name: Undo

Goal: Undo a step

Actor: User

Pre-condition: System is displaying project-grid screen and the user did at least one step (add crossing, change flow, etc.) System is in state "initial state".

MSS:

1. User clicks the "Undo" button;
2. The system shows grid before the user's last action on the screen;

Post-condition: The grid is the way it was before the last step.
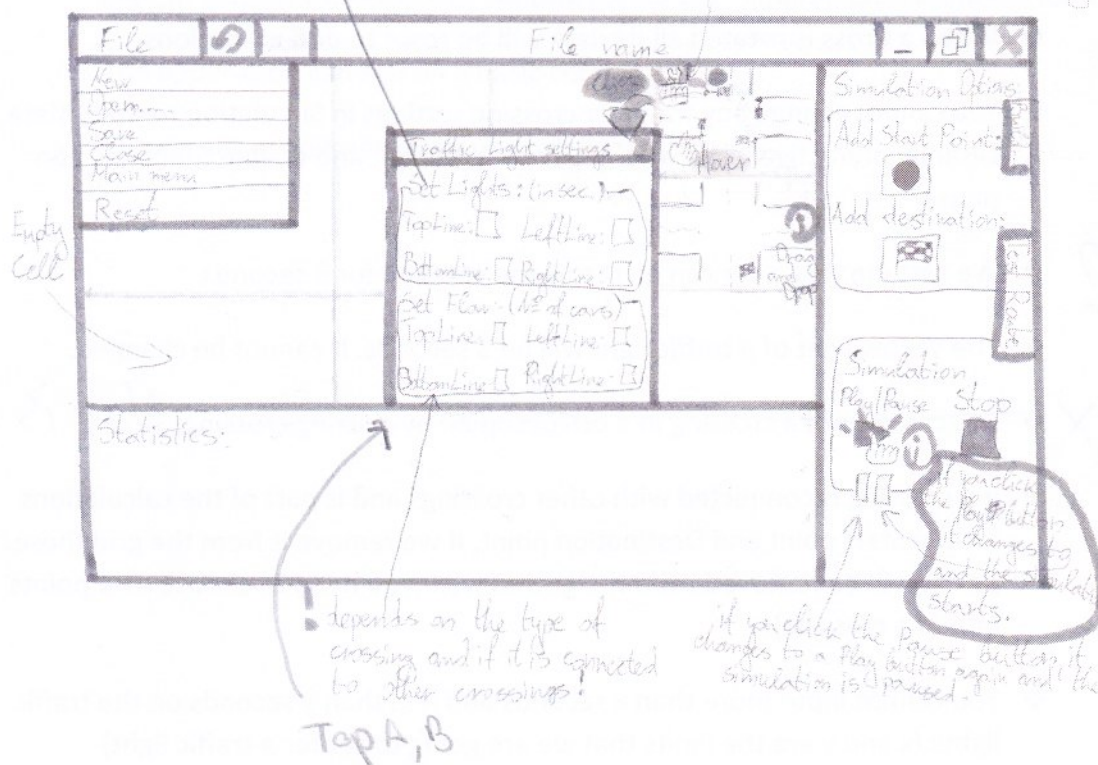
18.Name: Redo

Goal: Redo a step

Actor: User

Pre-condition: System is displaying project- grid screen and the user did at least one undo action. System is in state "initial state".
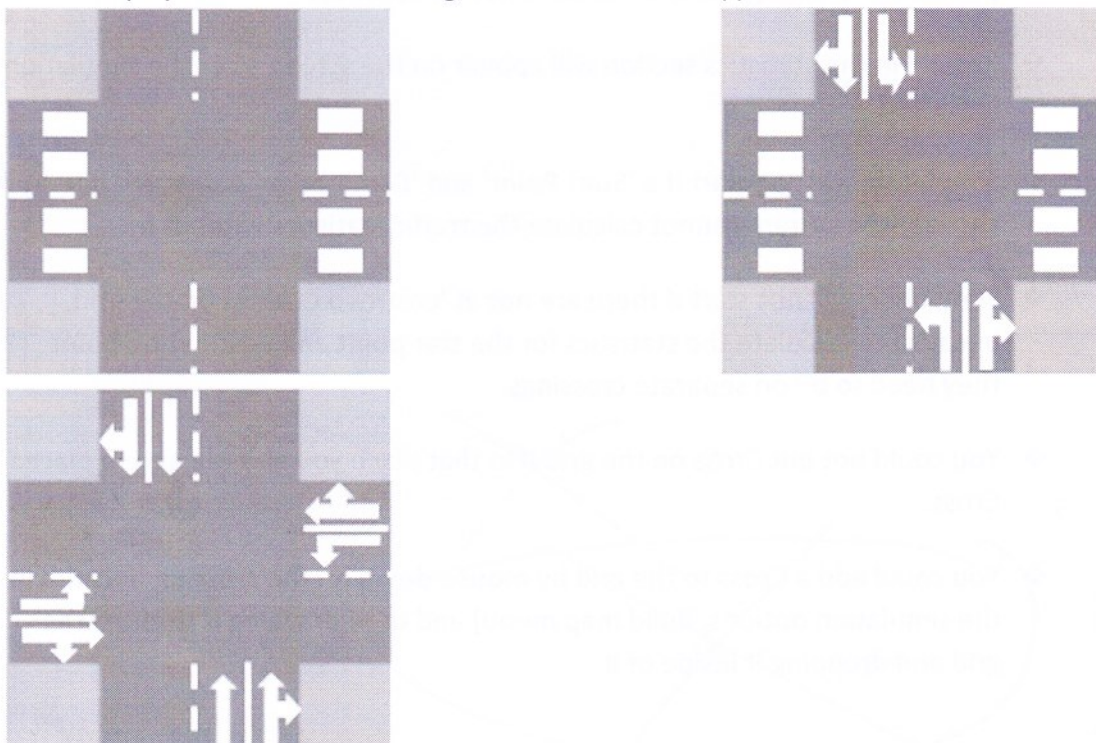
MSS:

States of traffic light system instead of lanes

'A small in Appears when you hover over a crossing

File | File name

New
Open...
Save
Close
Main menu
Reset

Empty Cell

Traffic Light settings
Set Lights: (in sec)
Top Line: ☐   Left Line: ☐
Bottom Line: ☐   Right Line: ☐
Set Flow: (N° of cars)
Top Line: ☐   Left Line: ☐
Bottom Line: ☐   Right Line: ☐

Statistics:

Simulation Options
Add Start Point:
Add destination:

Simulation
Play/Pause   Stop

depends on the type of crossing and if it is connected to other crossings.

Top A, B

if you click the Play button changes to and the simulation starts.

if you click the Pause button it changes to a Play button again and the simulation is paused.

Crossings:

This is our proposal for suitable crossing for the traffic advisor application.

Rules:

- ❖ When a Cross is rotated all its data will be reset to default options.

- ❖ You cannot change any traffic or crossing settings in Simulation running state. Disable interactive icons when in state "playing", and enable them back on pause.

- ❖ We assume that a car can go throw the crossing for 3 seconds. *(handwritten: ?)*

- ❖ The yellow light of a traffic light will be 3 seconds. It cannot be changed.

- ❖ ~~You cannot put a crossing in a cell occupied by existing crossing.~~ *(handwritten: (*) X)* *(handwritten: No, is possible uc 3.)*

- ❖ If a crossing is connected with other crossings and is part of the calculations for the Start point and Destination point, if we remove it from the grid these points will be removed from the grid as well (you need to choose new points or add a crossing).

- ❖ You cannot input more than x seconds and less than y seconds on the traffic lights.(x and y are the limits that we are going to set for a traffic light)

- ❖ If there is a pedestrian crossing on a Cross the system counts that each pedestrian crossing has a Green Light for 30 seconds.

- ❖ Results in the statistics section will appear on the screen after the simulation is started.

- ❖ Simulation will not start if a 'Start Point' and 'Destination' points are not chosen.(the system cannot calculate the traffic statistics without it) *(handwritten: change uc 9)* *(handwritten: // not accor- ding uc 9.)*

- ❖ Simulation will not start if there are not at least two Crosses on the grid, because to calculate the statistics for the star point and destination point they need to be on separate crossings. *(handwritten: // u)*

- ❖ You could not put Cross on the grid if in that place you already have a placed Cross. *(handwritten: Like (*))*

- ❖ You could add a Cross to the grid by mouse-down on the crossing (located in the simulation options, Build map menu) and then dragging it through the grid and dropping it inside of it. *(handwritten: ?)*

Non-functional Requirements