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Testing System Plan

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# Version

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| --- | --- | --- |
| Date | Type | Description |
| 08/10/2023 | Creation |  |
| 09/10/2023 | Version One |  |
| 10/10/2023 | Version Two | Updated test cases. |
| 25/10/2023 | Version Three | Updated use cases which leads to updated test cases. |

# Testing the system

## Requirements in order of importance:

* At all times traffic must be safe and secure.
* Traffic must be directed in the most optimal way possible.
* Traffic must be redirected in case of emergency.
* Waiting time for every vehicle, cyclist and pedestrian must be as close as possible.
* Traffic lights react to emergency services.

# Test case one

A cross-section of a road

Description automatically generated

In the figure above is the most basic intersection that our system must be able to handle. In this intersection the traffic must be optimally handled.

The test case about must take the requirements into account. The system will be decentralized, and each individual traffic light will have its own system that will communicate with the other traffic lights to make sure traffic will be managed optimally.

## Requirements for successful test

* Traffic must be always safe.
* Traffic is handled better than with a contemporary system.
* Desired outcome and undesirable outcomes are handled well.

## Test Plan

Our plan for testing the system is to think of scenarios to test our use cases. We will use the basic intersection as presented in the figure in the previous section. We will use a button for incrementing and decrementing the number of cars that are in front of a traffic light node. The state machine and message protocol will be used in the testing of the system expected results and actual results will be documented to make sure our system test was a pass or failure based on that result we may have to improve our system and fix bugs.

## Test scenarios

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Scenario | Description | Expected result | Covered use case scenario | Actual result | Pass/fail |
| 1 | One car passes the crossroads from W->E. | Green light from node W will turn green after car has been recognized. The node W will turn red after the car has passed. | 1 |  |  |
| 2 | Two cars want to pass. One from W->E and another one from E->W | Check if the cars can safely cross the intersection. If they can safely cross, let them cross. | 3 |  |  |
| 3 | Two cars want to pass. One car (W->E) approaches the intersection. Another car (N->S) approaches the intersection after the first car. | The car that came to the intersection fist (car W->E) will be able to pass the intersection for S03. The car (car N->S) will only be able to pass after the first car has passed the intersection. | 4 |  |  |
| 4 | Four cars come from every part of the intersection. The car that has arrived first came from direction N->S. The rest arrived at the same time. | The cars from N->S and S->N will pass first and the cars on W->E and E->W will pass after the other two cars have already passed the intersection. | 5 |  |  |
| 5 | We have 2 long rows of cars. One coming from W->E and another coming from N->S. W->E arrived first. | Cars from W->E are able to pass first and after a certain time the system will determine that the cars in the other lane will have a chance to pass. | 6/7/8 |  |  |
| 6 | Something is blocking the intersection from letting any cars pass. | The system will notify that it is obstructed and will return some kind of notification or error. | 9 |  |  |
| 7 | When trying to communicate with a node it seems to not be reachable i/e not working. | Traffic lights will go into yellow blinking mode after a certain time of not receiving anything from the node. | 10 |  |  |