



University of Applied Sciences

Traffic Control System

Software Design Document

**Agnes Wadee
Coen Stange
Wen Li
Yongshi Liang**

Background and Context

This software design document provides details and decisions made for building the "Traffic control system" application. For this a graphical representation UML is used including class diagrams and sequence diagrams.

Definitions and abbreviations

UML	Unified Modeling Language
MVVM	Model view viewmodel

Contents

1	System overview	3
1.1	Abstraction layers	3
1.1.1	Common layer	3
1.2	View layer	4
1.3	Business Layer	4
1.4	Data Layer	4
1.5	Other layers	4
2	Class diagrams	5
3	Sequence diagrams	11

1 System overview

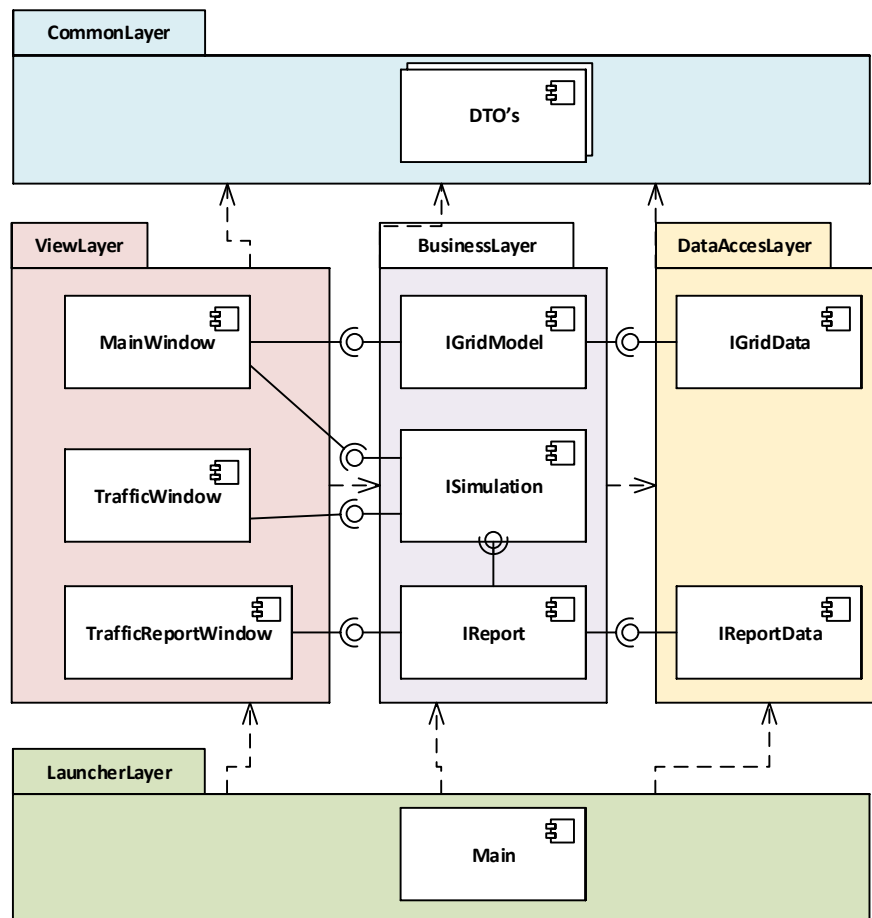


Figure 1: System overview

1.1 Abstraction layers

We design the software according to SOLID principles, which are common rules used for the design of the software. The classes should have only one responsibility, hence our representation logic and business logic are separated. We also use an interface driven design combined with the dependency inversion principle, hence we handle dependencies using dependency injection. By following these rules the system is more testable and abstracted.

1.1.1 Common layer

The **CommonLayer** can be accessed by any layer, and the layer only contains DTO's. Important about the classes of the **CommonLayer** is that they contain no logic at all, hence they only have data. The purpose for this is for easy serialization and a easy way to pass the data through all the layers.

1.2 View layer

Inside of the `ViewLayer` is all the representation logic, this layer handles showing an user interface. For the representation the MVVM model is used, this pattern keeps the design and the code of the view separate.

1.3 Business Layer

This layer contains the business logic of the system, it makes sure that all the business rules are followed. Hence this is the brain of the application which is allowed to make changes to the DTO's from the `CommonLayer`.

1.4 Data Layer

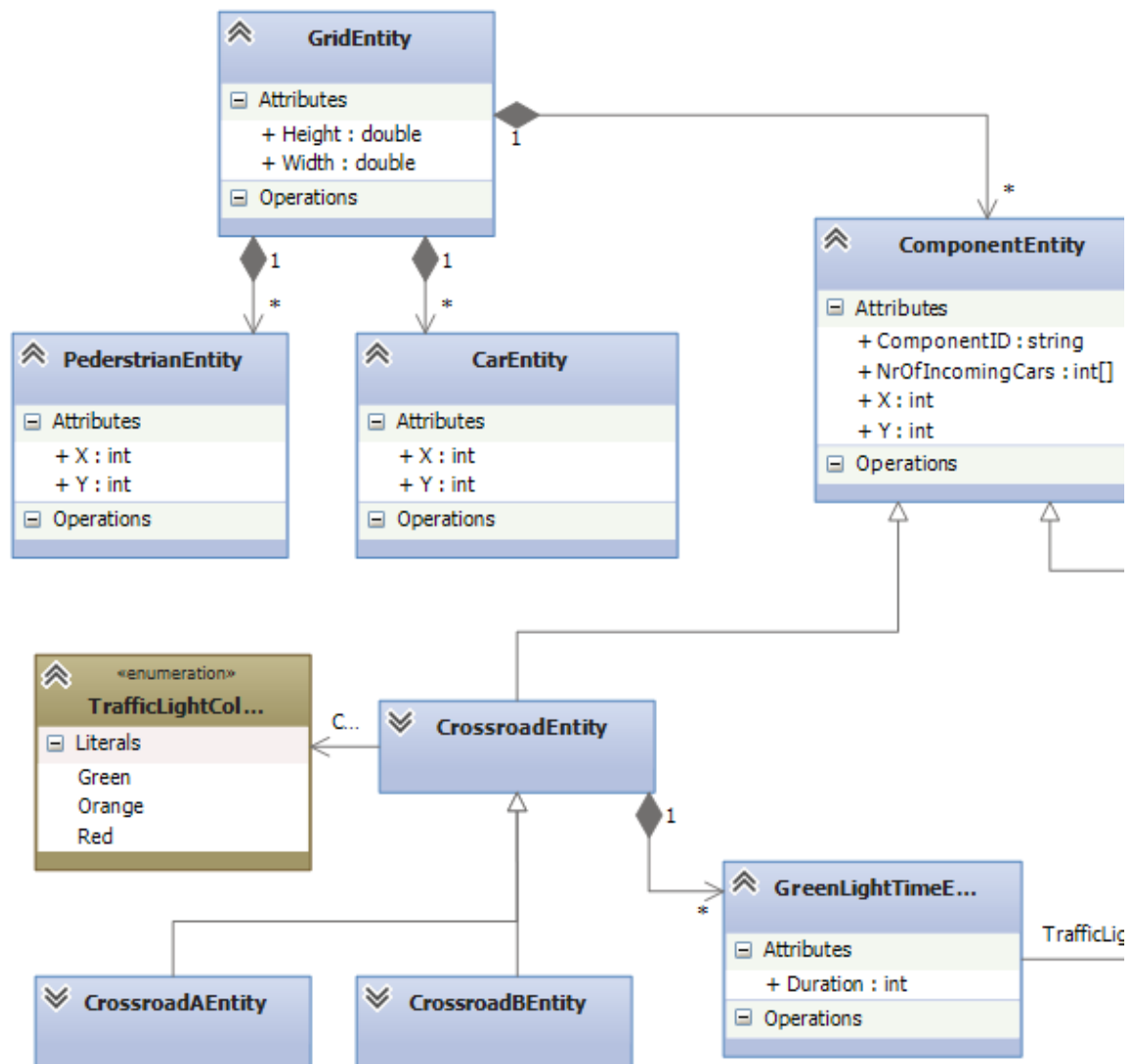
The data layer contains the logic for serializing the objects from the `Common Layer` to another storage. For this application the objects will be serialized to a file.

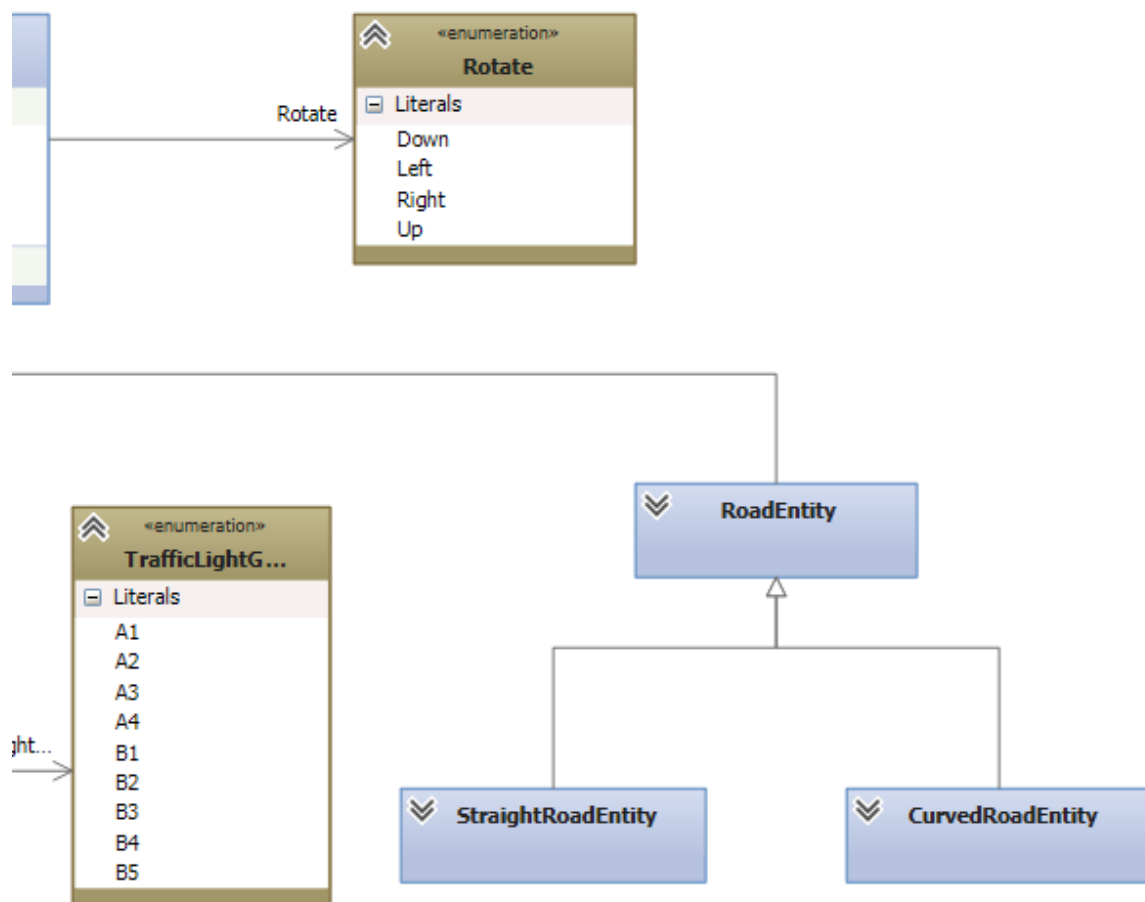
1.5 Other layers

The application has tests and it also require a launcher layer. Because the application can not be launched from the `ViewLayer` since it has no reference to the `DataAccessLayer`. So in the launcher layer all the dependencies will be handled.

2 Class diagrams

Figure 2: Class diagram common layer





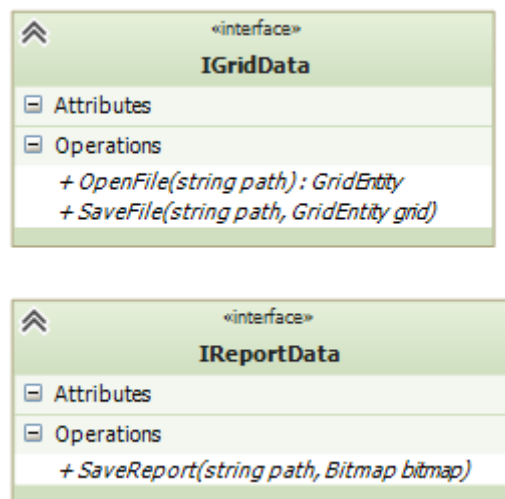


Figure 3: Class diagram data access layer

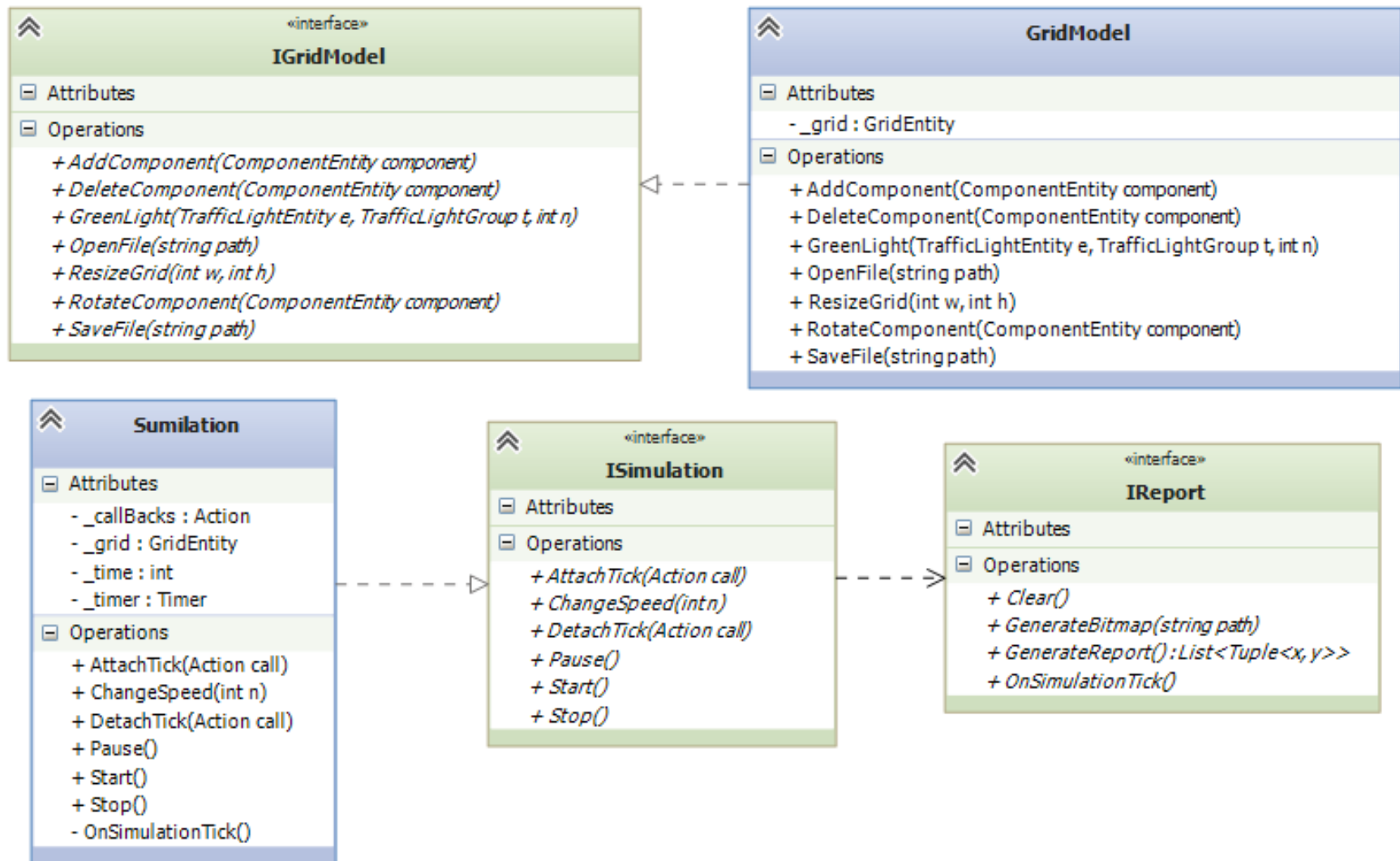


Figure 4: Class diagram business layer

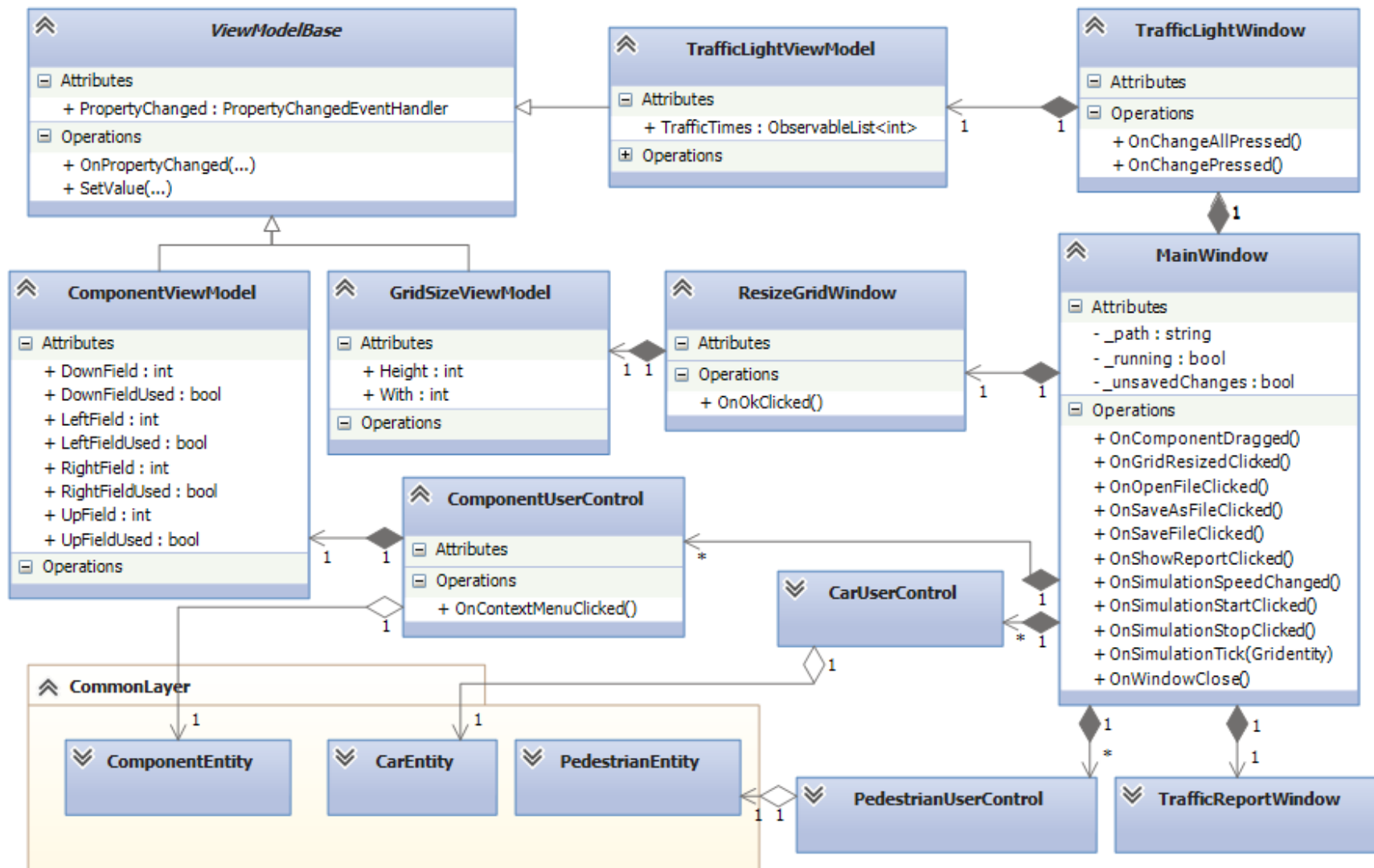


Figure 5: Class diagram presentation layer

3 Sequence diagrams

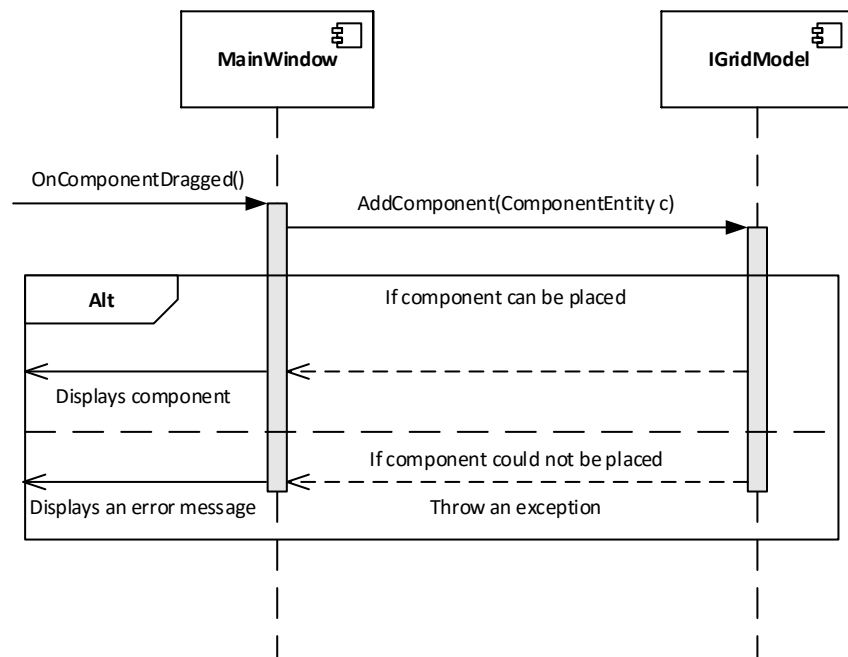


Figure 6: Positioning crossroad.

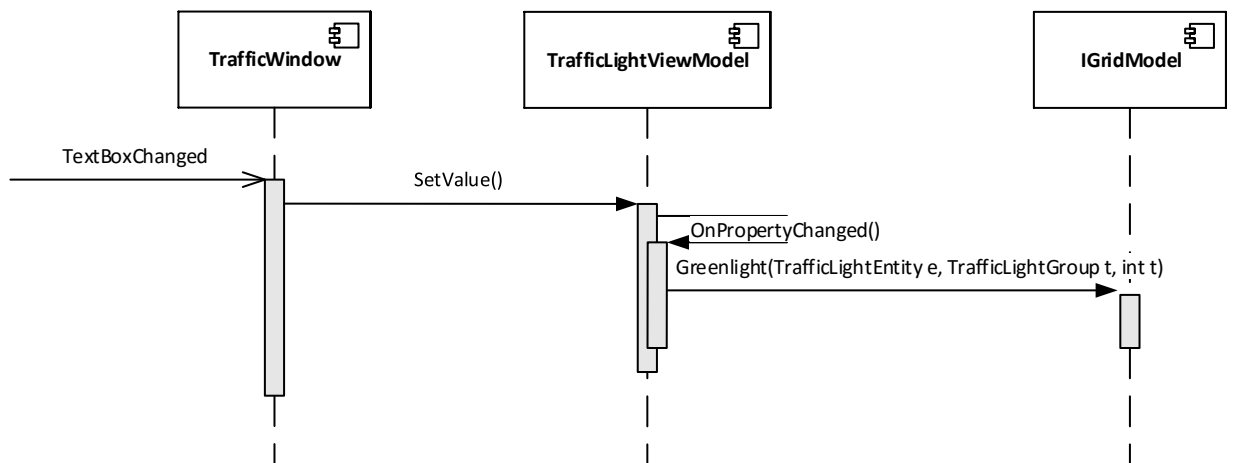


Figure 7: Configuring traffic light times.

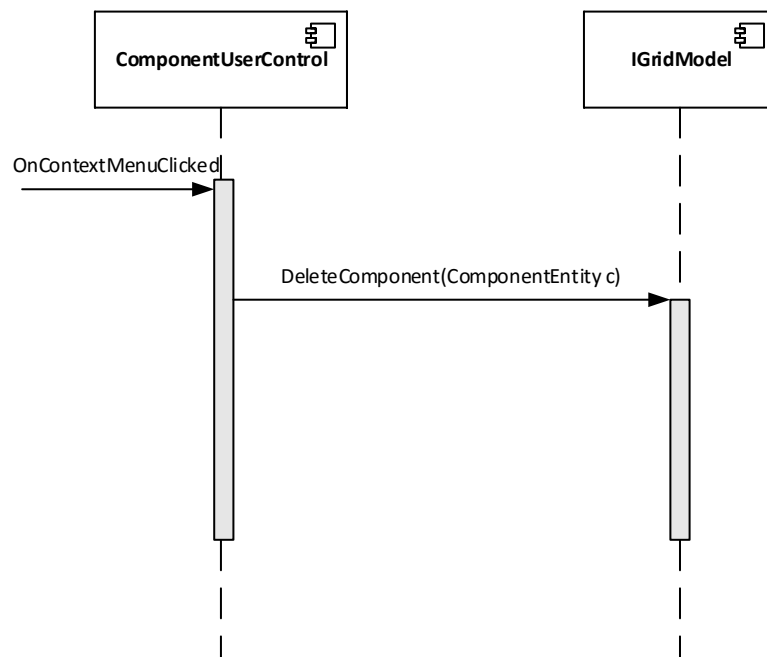


Figure 8: Deleting components.

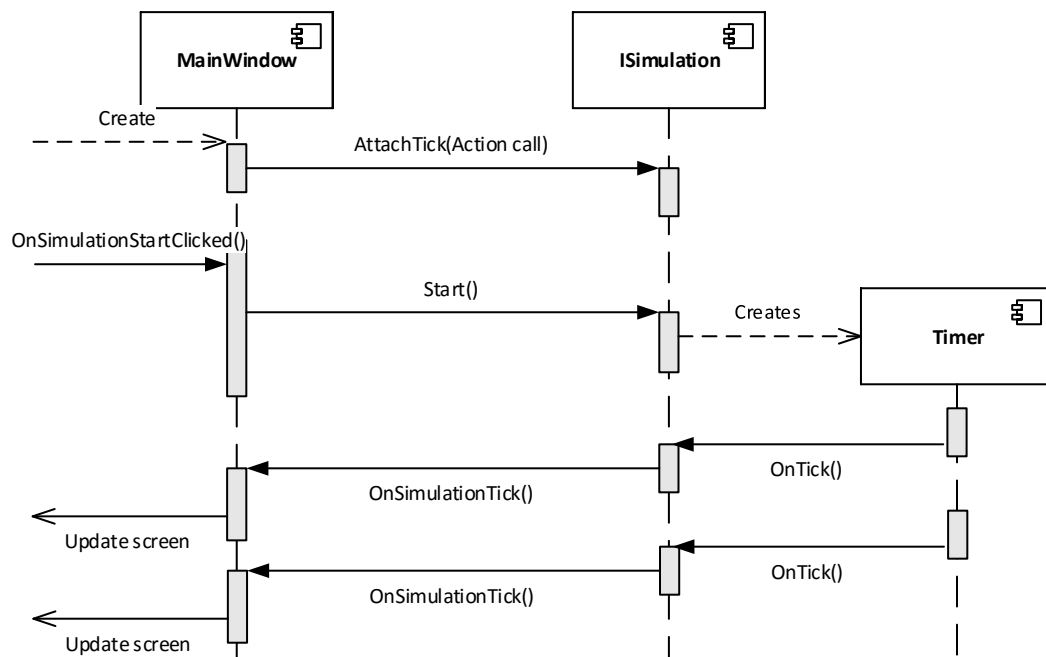


Figure 9: Running simulation.

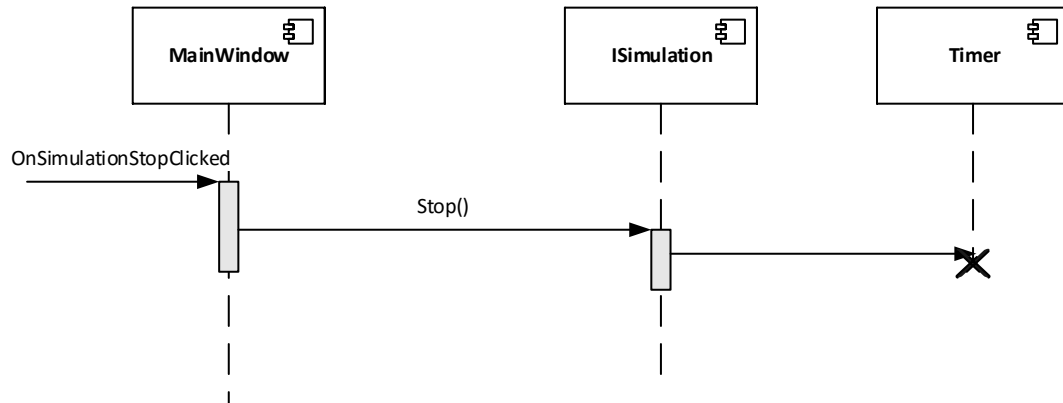


Figure 10: Stopping simulation.

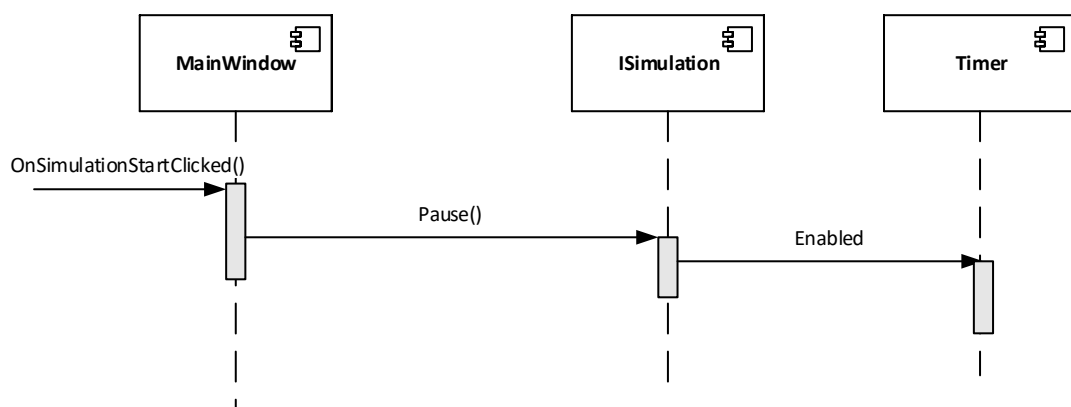


Figure 11: Pausing simulation.

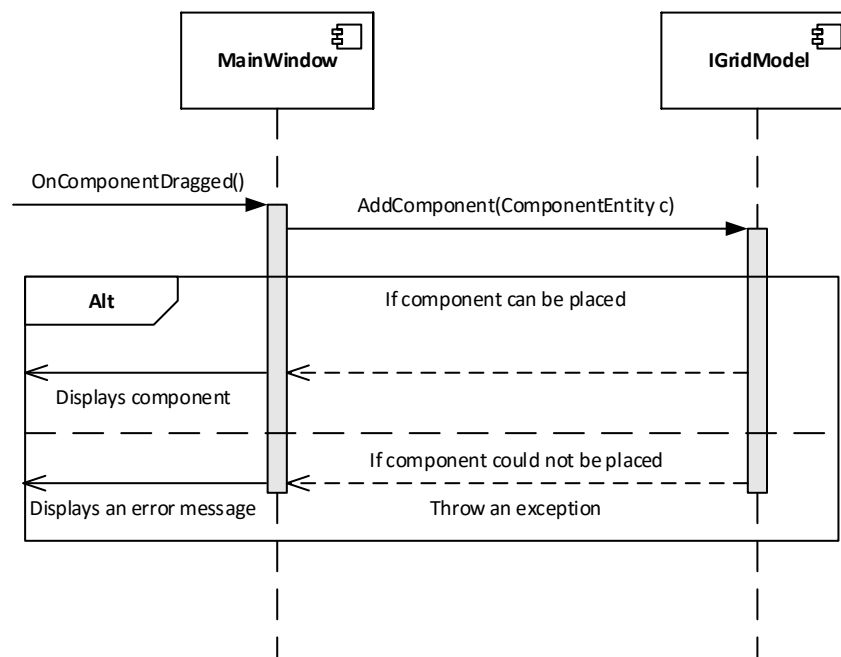


Figure 12: Open a file.

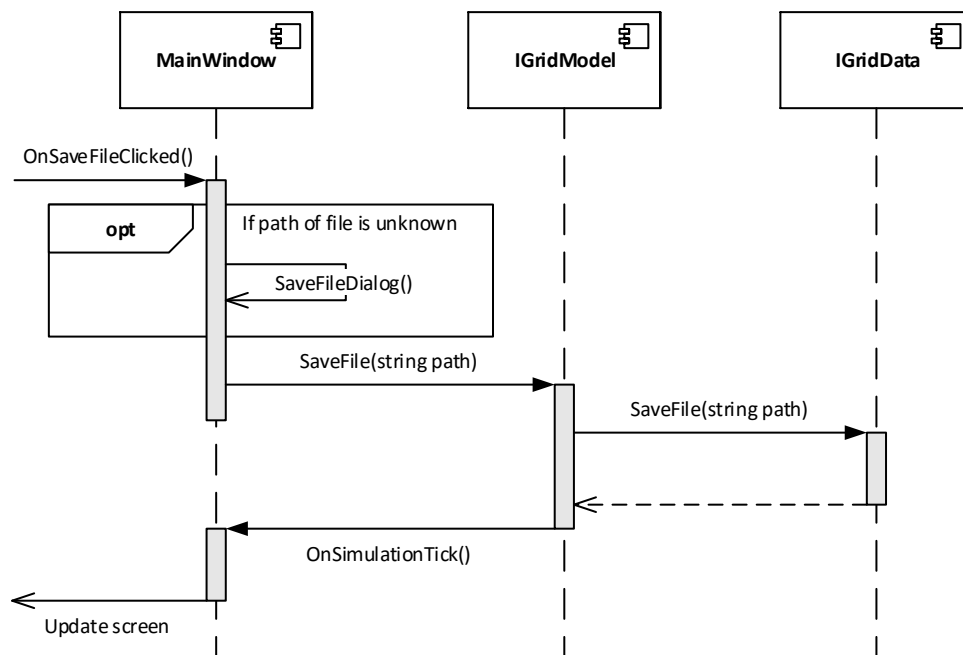


Figure 13: Save a file.

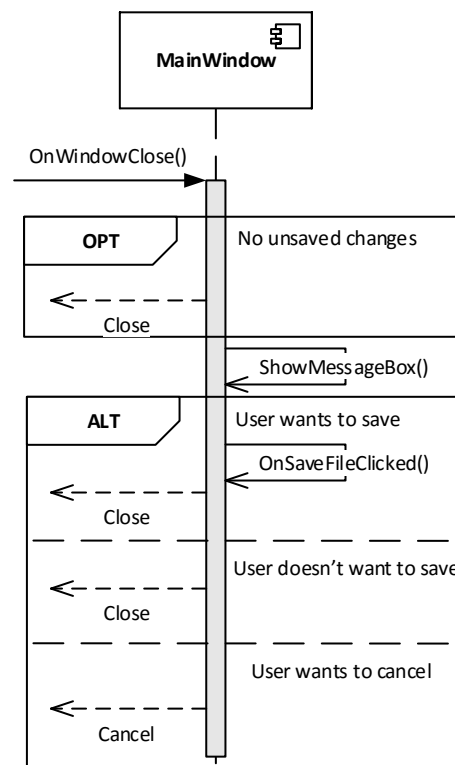


Figure 14: Close window.