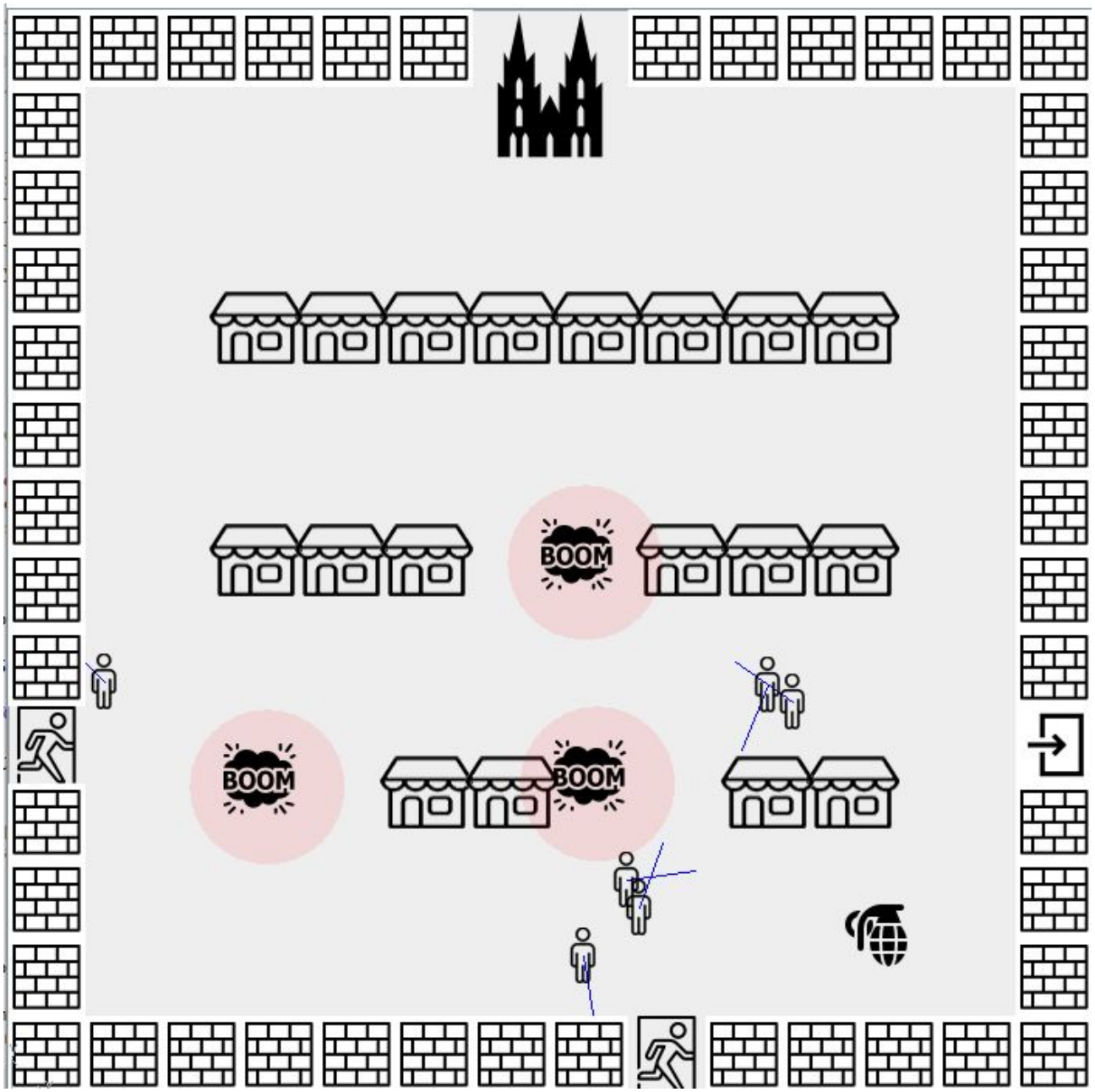
IA51 PROJET

«CROWD SIMULATION»



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Catalog

1 Historique du document

Version	Date	Auteur	Description
1	18/03/2019	Tous les membres	Create use case diagram
	25/03/2019	Tous les membres	Create class diagram
	27/03/2019	Tous les membres	Create organisation / sequence diagram
	29/03/2019	Tous les membres	Correct and Modify diagrams
2	05/05/2019	Tous les membres	Change demands
	12/05/2019	Tous les membres	Update UML
3	10/06/2019	Tous les membres	Update UML with real functions
	12/06/2019	Tous les membres	Update descriptions
	17/06/2019	Tous les membres	Final check

2 Descriptions and goals

This project is about to create a demo simulating the situation of Christmas stocking in front of the church. This demo aims to focus on how people move randomly, how the speed of moving influenced by the number of people and so on.
This report explains the main logic by using several graphs. Graphs UML discusses how the demo works, the communication in and between each organization. Graphs statistic show the tendency of each situation such as the human speed with a different number of people. Here's the detail.

Goals:

- Simulation of the movement of crowded
- Arrangement of the booths
- Movement of crowded in an accident: explosion

Agents

-persons: visitors, the seller

Behaviors

-For each people, he can find the booth the most attractive, and move to the booth
-People can travel the whole market
-Find the nearest exit and move out
-People can change the speed and the target(shop/ exit/ cathedral)
-People can leave the square when there is an explosion

Interactions

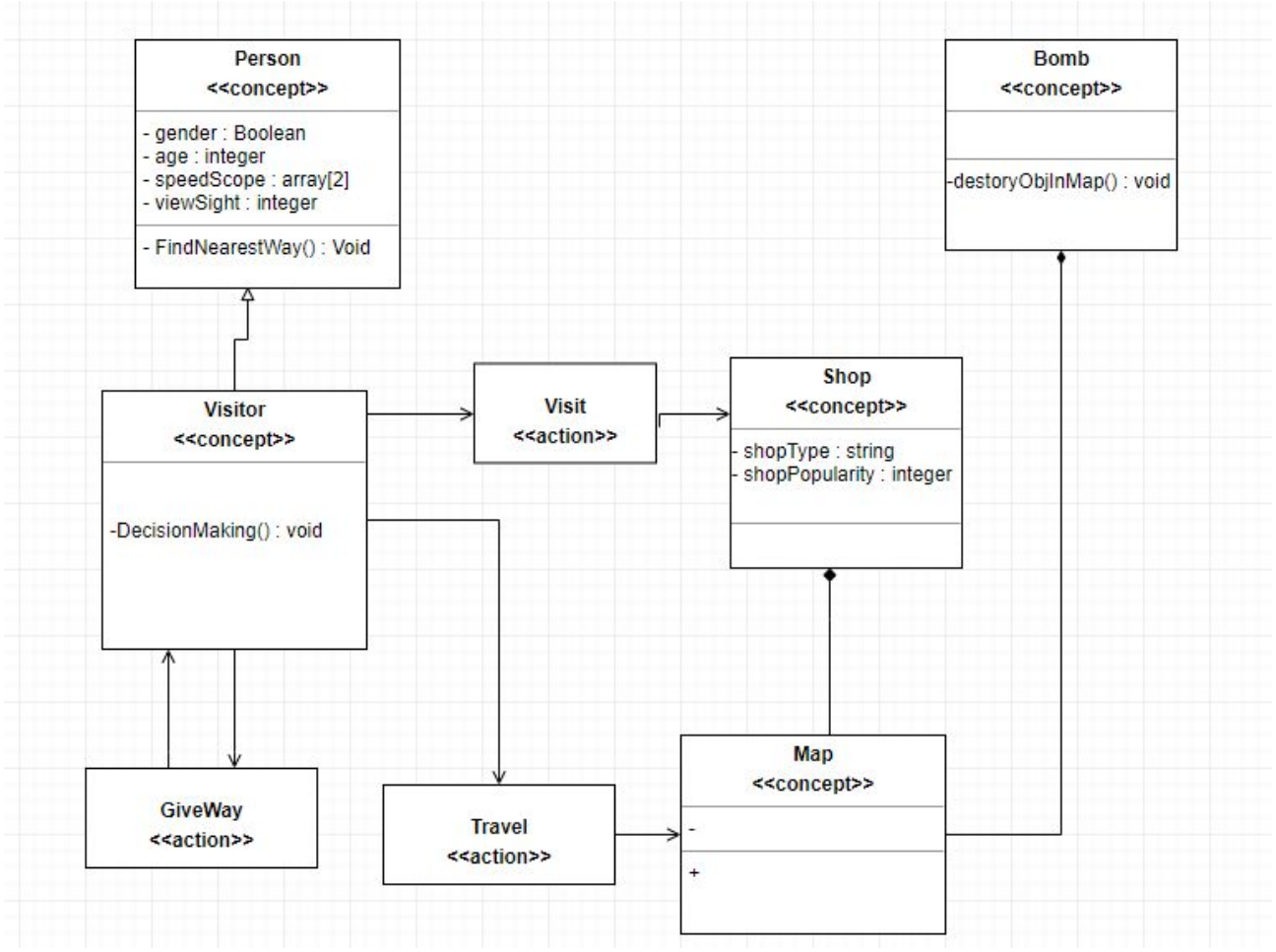
-If the road is blocked, people need to stop and waitting for the leaving of other people
-If a visitor meets a friend, il will stop and communicate

Environment:

-booths
-walls
-roads
-exits
-entrances
-square
-cathedral
-explosions

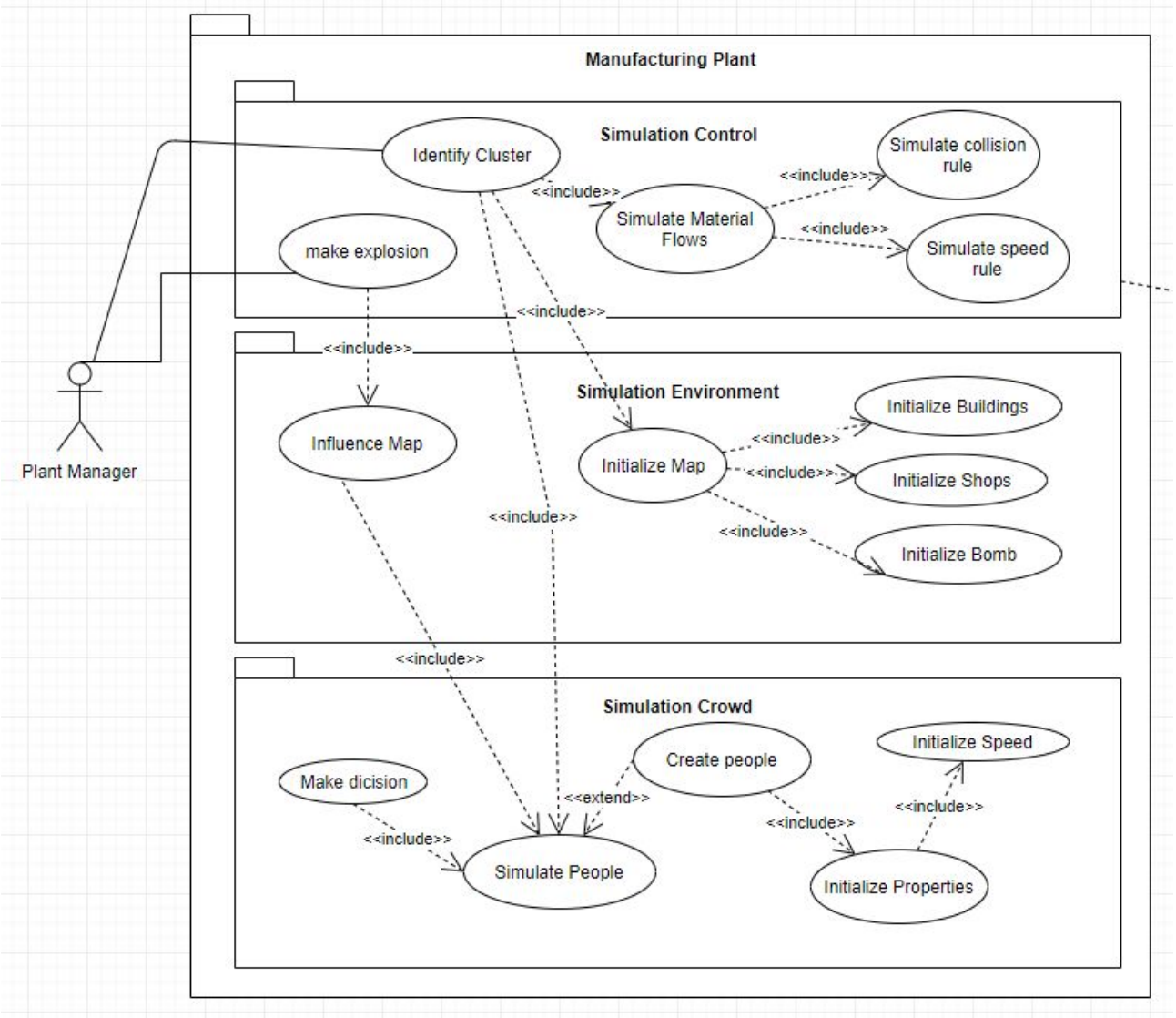
2.1 Diagrams

I.Class Diagram



According to the actual situation, we decide to create several classes. First of all, we need a crowd. The crowd is made up of visitors, and so on. And the visitors have different shopping tendency. So they can travel the whole square to find the shop which they like and move to the shop. If they are blocked by others, they can stop and wait for the leavings of others people.
In the same time, we have an additional situation: explosions. We use the mouse to control the explosions. If there is an explosion, people will do some reactions.

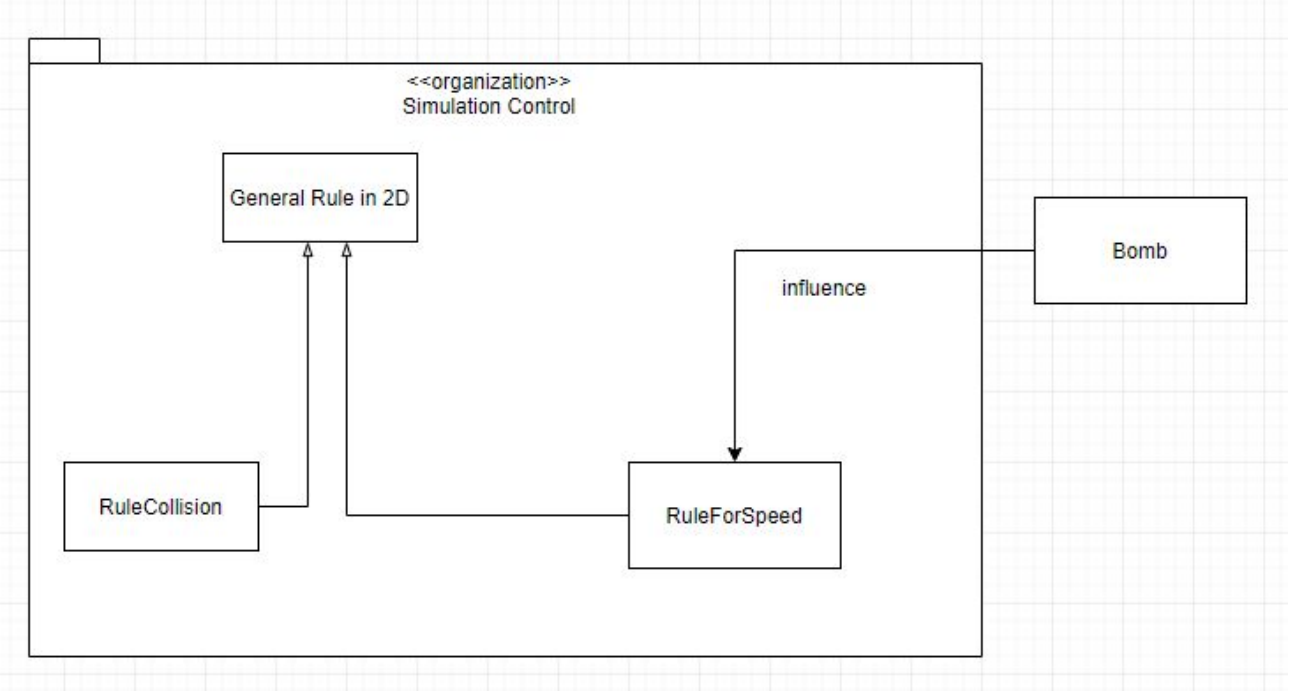
II. Use case Diagram



This graph explains how the demo works. First of all, the user will turn on the system and the control unit will identify cluster. After that, the control unit will simulate material flows and some physical rules, which will be explained in other graphs. then the control unit will spawn the environment unit, who will initialize the UI interface with a big map. The observation goes in this interface. At the same time, the control unit also spawns the unit of crowd simulation, then the user can see through UI interface.

III. Organization Diagram

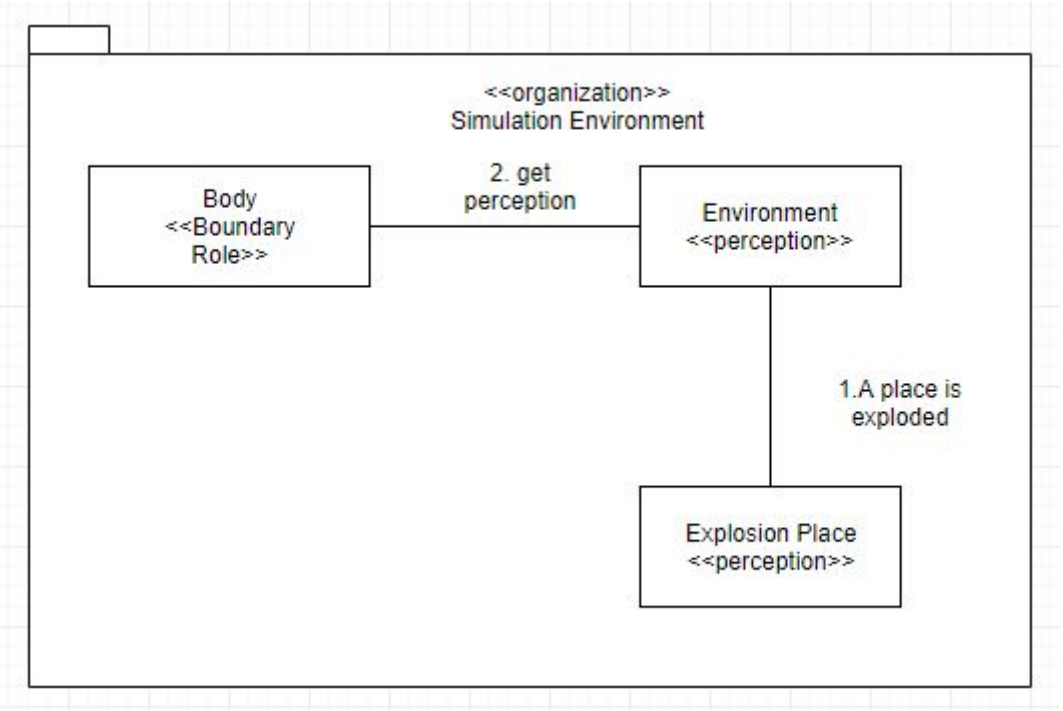
A. Simulation Control



This organization explains the deep situation of the control unit. After the system is on, there will be several physical rules to simulate reality. When there are explosion the visitors will run to the exit with their max speed. The part of cluster identify isn't drew because it does a little matter to the simulation.

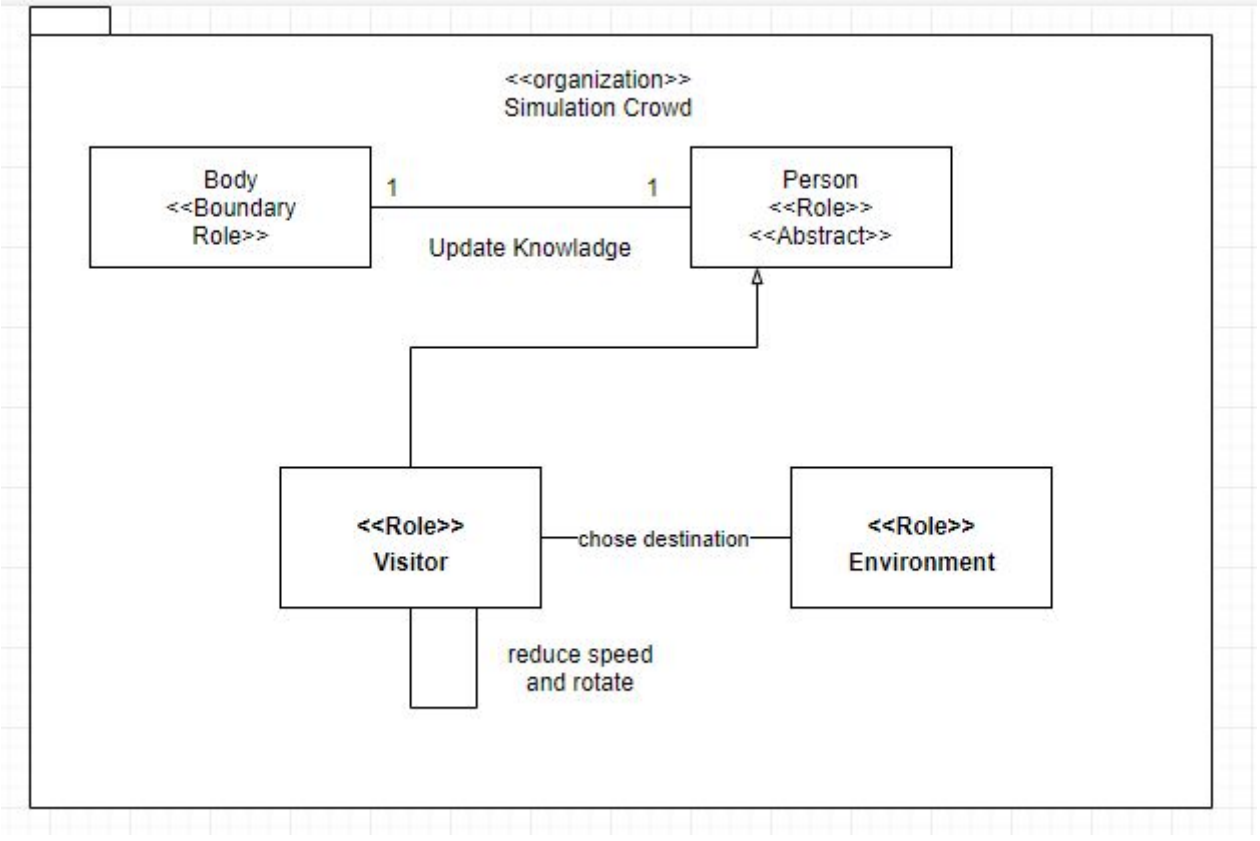
B. Simulation Environment

Human bodies can be seen as perception in the map and can also be seen as a role.



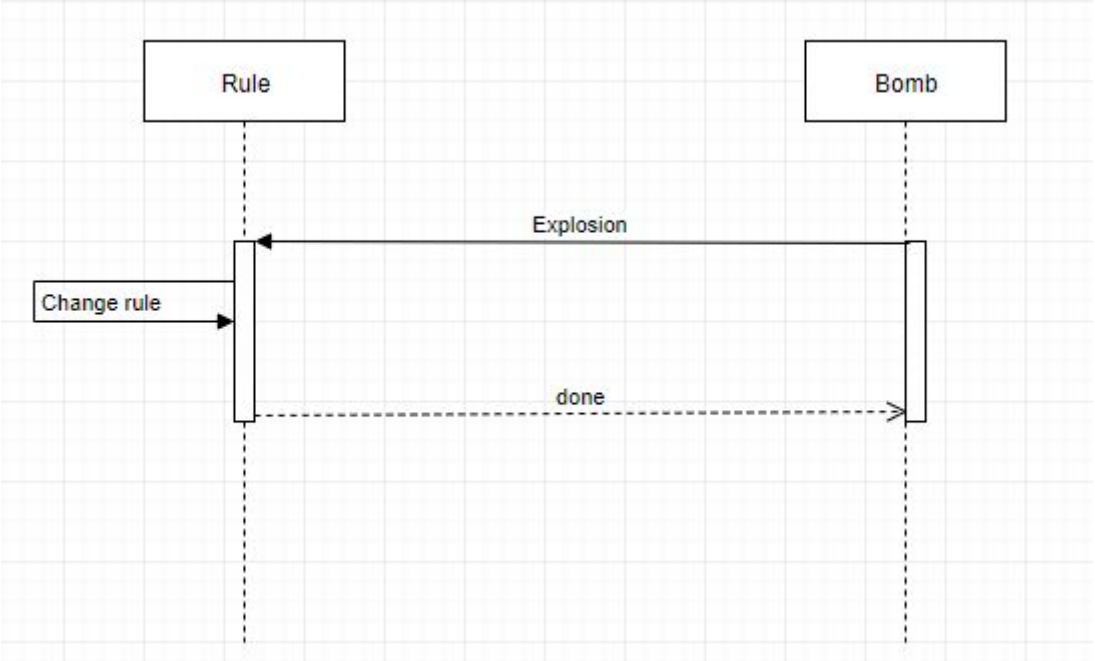
So the body will be a << Boundary Role>>. The condition change(explosion happened) and body movements will update the environment. And each body can get the perceptions around them.

C. Simulation Crowd



This graph shows the interactions between different Roles.
When a visitor is interested with another visitors which means he is blocked, he can reduce the speed and rotate an angle for passing the visitor who is in front of him.

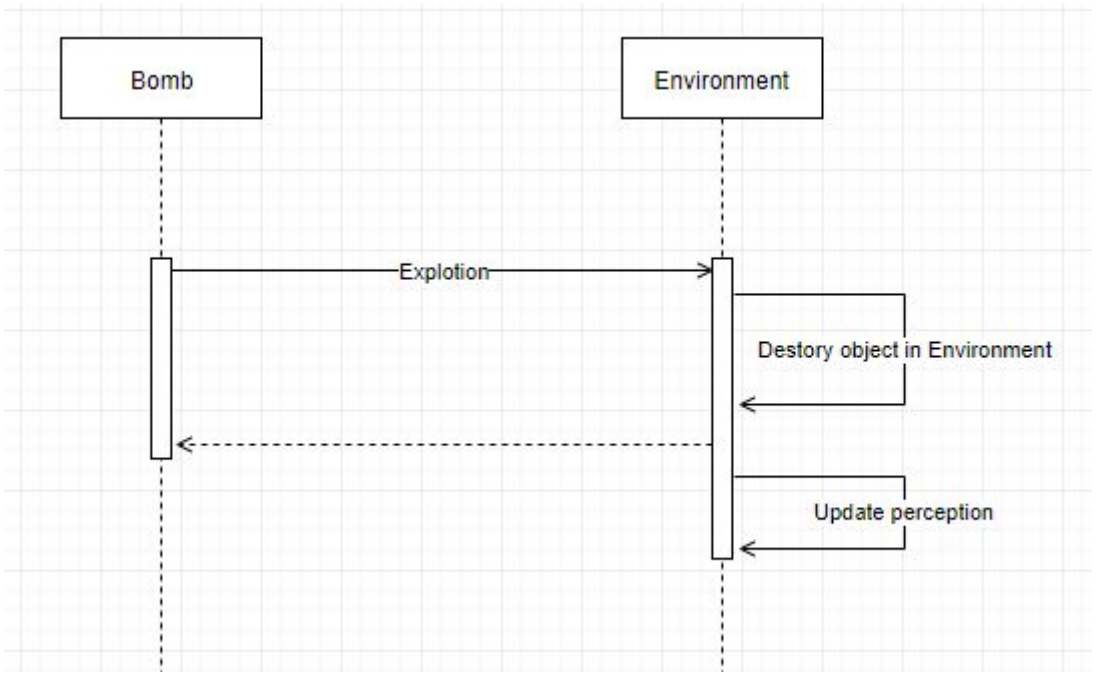
Organization – Simulation Control



The behavior of the control unit is like this. As the bomb exploded, the rule will change. For example, if there's an explosion, people will begin to escape even if he has not visited all the shop.

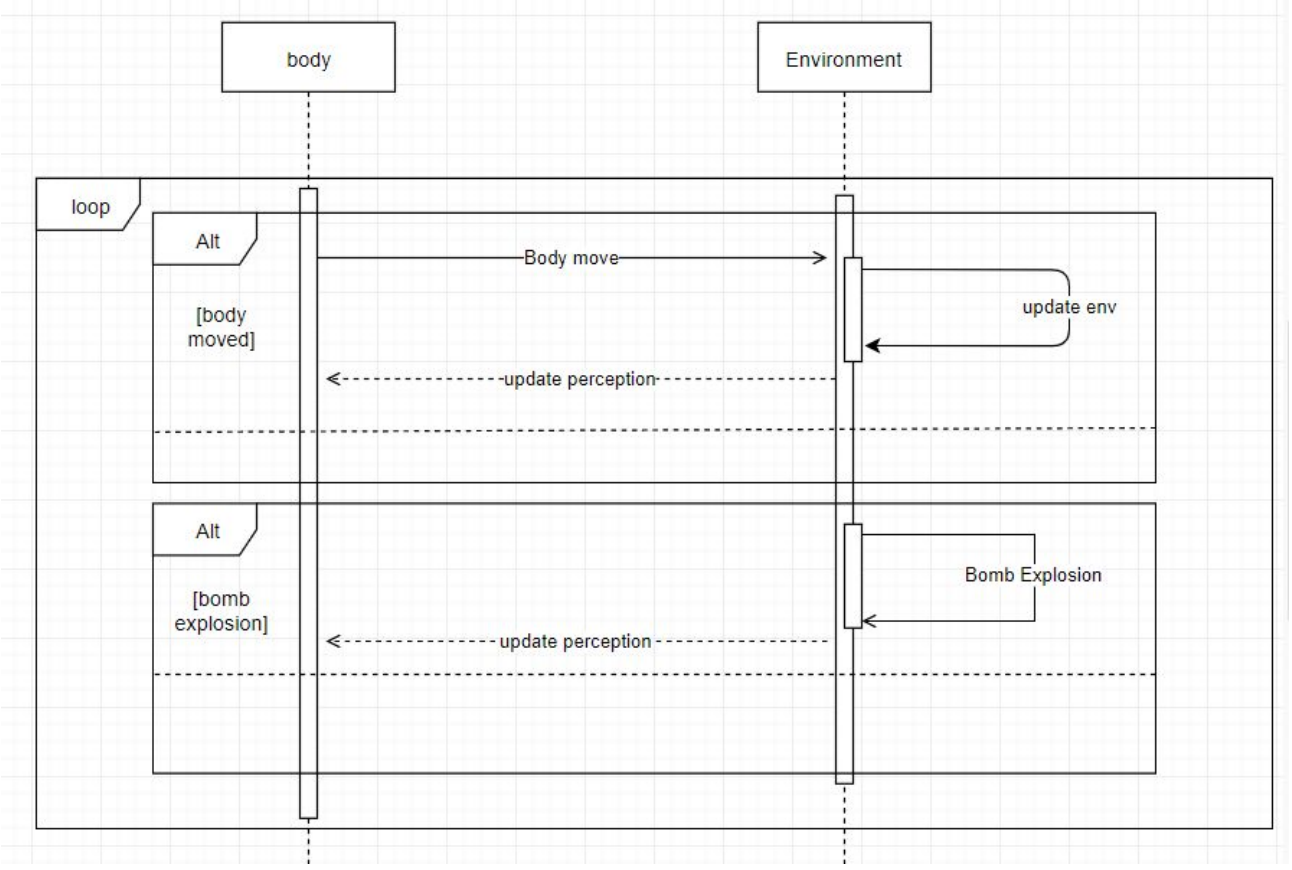
Organisation – Simulation Environment

1.Bomb Explode



Another behavior happens as the image previous. In the real life, as the bomb explodes in a building, the building will be destroyed. For this rule, the building will disappear when the explosion happens in it in the simulation.

2.Get perception



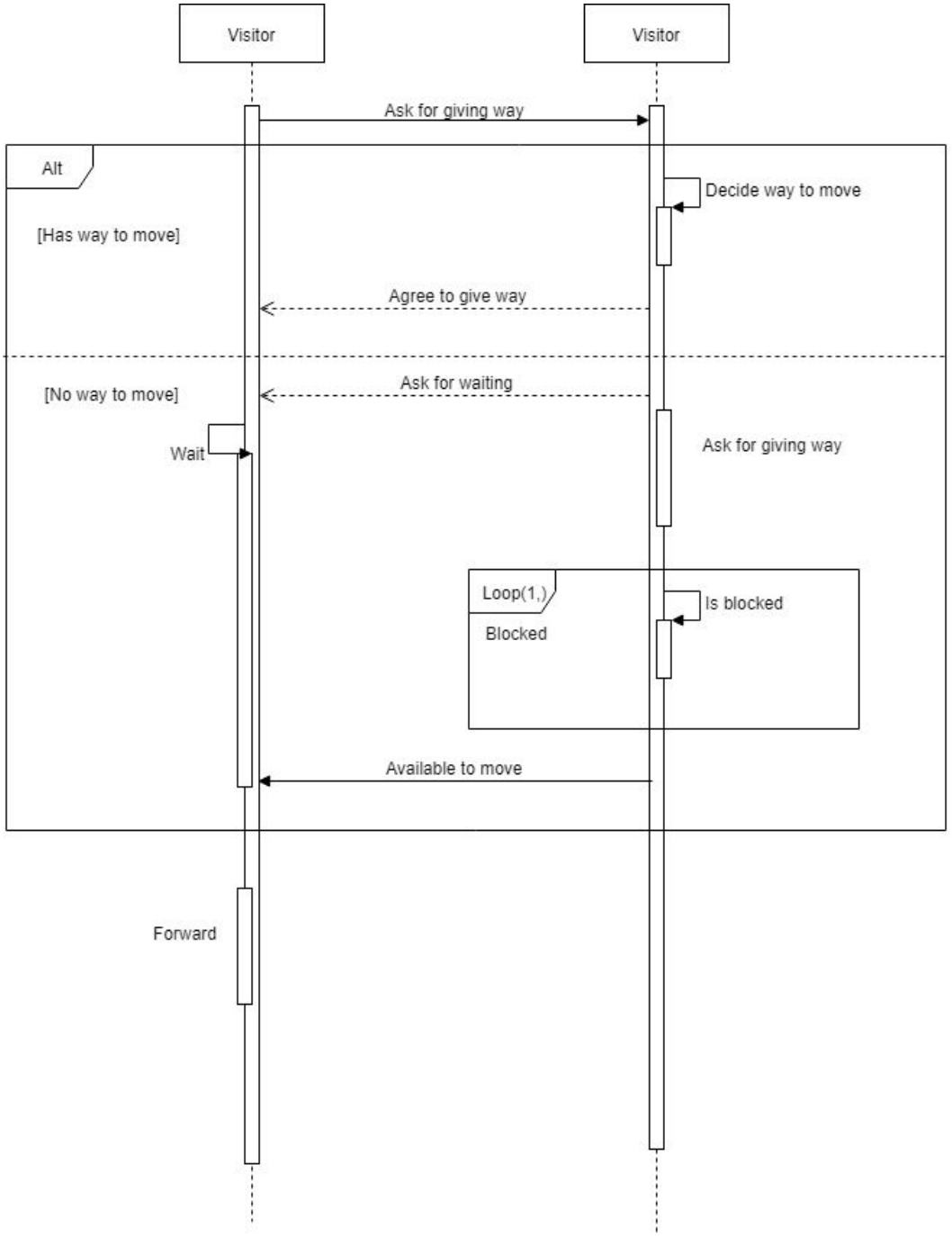
Body perception will be synchronized with the environment. When there is body movements or situation changes, the new perception will send to everybody.

Organisation - Simulation Crowded

In this part, the whole project has 2 important interaction between different roles. These interactions can describe as:

-Interaction of communication between two Visitors
-Interaction of giving way between two Visitors

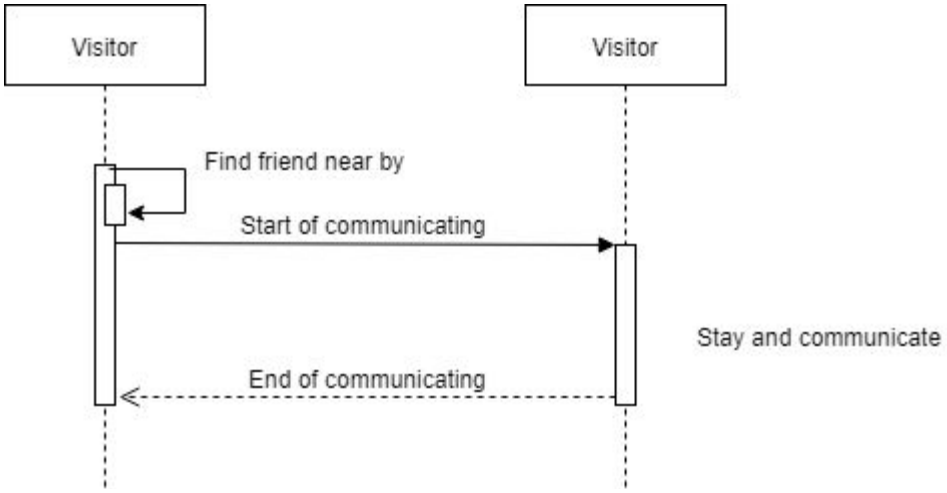
1.Interaction of giving way between two Visitors



The interaction of giving way is a interaction a little more complex. In this situation, if a visitor is blocked by someone, he can send a message of giving way. But the answers of the other visitor will be different, which depends on his real situation. If he is available to move, he can return a agree message, then the two visitors can move in their own ways. Otherwise, if the visitor who is asked to give way is also blocked, the other visitor need to stay and wait for a message of moving. For the visitor who is asked, he will go into another interaction with the visitor who blocked his way. That means that there will have a wait list if there are too many people blocked. If most of people in the

map is described trapped in the crowd, we can call it a congestion. A congestion is a situation we want to simulate in the project but also a situation this project wants to improve in the real environment. That will be a great part of this project.

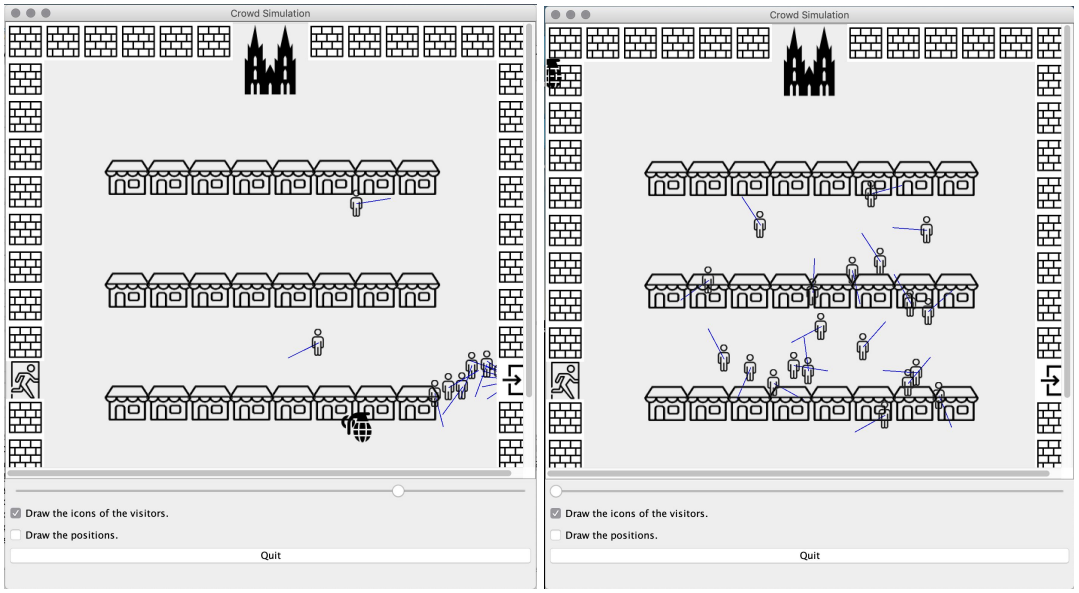
2.Interaction of communication between two Visitors



The interaction of communication is a interaction between two friends. The visitor can find the ,,friend nearby from the body perception and send a message of communicating. In the environment of simulation, this situation represents as a moment of staying. For instant, the visitor who is asked to communicating is obligatory to stop and start a communication, maybe we will develop it after. And the time of communicating is also a part we need to decide.

3 Realized functions

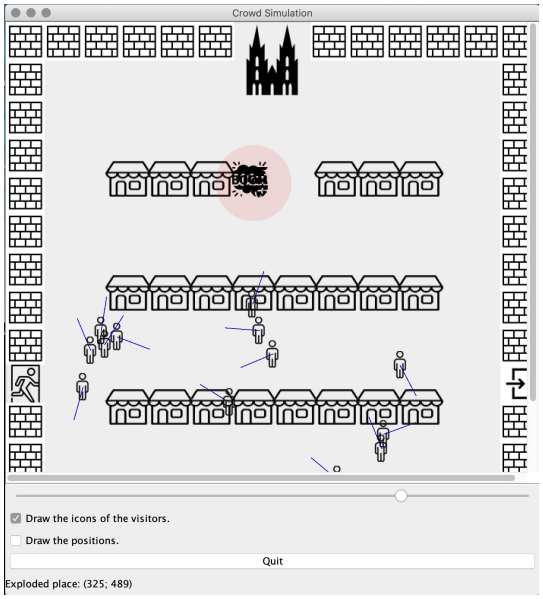
3.1 Interface and movement of the crowded



In the final version, we have an interface with all the objects we need in the simulation. For example, we have the objects immobile: booths, walls, church, exits and entrances. We can control the number of booths and exits by ourselves. And in the same time, wo use the mouse for representing a bomb which we will explain it in the next part.
In the normal situation, visitors walk into the square one by one with different speed. They can move to thee booth they like.
When they have visited all the booths, they will find an exit by random and leave the square.

3.1 Explosion

Except the normal situation, there is another special situation: Explosion.



As we expected in the planning, the project can simulate a situation of explosion. When there is an explosion, visitors will receive the informations from perceptions and decide to leave the square.
In the same time, if the bomb explodes in a booths or in the church, which means the buildings will be destroyed, the icons corresponding will disappear.

4 User Guide

0. Expand .zip
1. SARL IDE → file → Open project from files
2. Run MainProgram.sarl as SARL Agent
3. Chose a behavior and Have fun
4. You can also use .jar file