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## INTRODUCTION

### Purpose

- G.1 Allows store managers to regulate the influx of people in the building.
- G.2 Customers are saved from having to line up and wait outside of stores for hours and possibly by means of a reservation from home.
- G.3 Crowding are avoided in all forms, both outside and inside the grocery.
- G.4 Reservations are accessible by everyone, even for people who do not have access to the required technology.
- G.5 The customer should arrive to the store when his/her number is near to be called.

The goal of this project is to develop an easy-to-use application that, on the one side, The application should be very simple to use, as the range of users include all demographics (everyone needs to do grocery shopping). ??????????????????

it would allow customers to “line up” (i.e., retrieve a number) from their home, and then wait until their number is called (or is close to being called) to approach the store.

In addition, the application could be used to generate QR codes that would be scanned upon entering the store, thus allowing store managers to monitor entrances.

For the application to effectively work in practice, all customers should use it to access the store, which has a number of consequences, including the following ones:

The lining up mechanism should be effective. There is a real risk that the approach does not work in the case the customer arrives to the grocery store after his/her number is called, or too early, as in this case we would get back into a physical line situation. This implies that the system should provide customers with a reasonably precise estimation of the waiting time and should alert them taking into account the time they need to get to the shop from the place they currently are.

Fallback options should be available for people who do not have access to the required technology; for example, stores should also have the possibility to hand out “tickets” on the spot, thus acting as proxies for the customers.

In addition to managing lines in real-time, the application could also allow customers to “book” a visit to the supermarket.

In particular, whereas one can expect that the time that it takes to visit a museum is fairly uniform (and people would typically want to visit the whole museum/exhibition), the same is not true for visits to the supermarket.

Hence, upon booking a visit, a customer might indicate also the approximate expected duration of the visit. ??? (even a domain assumption?)

Alternatively, for longterm customers, this time could be inferred by the system based on an analysis of the previous visits.

The application might also allow users to indicate, if not the exact list of items that they intend to purchase, the categories of items that they intend to buy.

This would allow the application to plan visits in a finer way, for example allowing more people in the store, if it knows that they are going to buy different things, hence they will occupy different spaces in the store when they visit (thus respecting the requirement that people keep enough distance between them).

Other features that the application might have include a suggestion of alternative slots (in the same day, or in different days) for visiting the store,

to balance out the number of people in the store, the suggestion of different stores of the same chain (or even of different chains, if the application is chainindependent) if the preferred one is not available, or the periodic notification of available slots in a day/time range.

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Any other constraint

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## FORMAL ANALYSIS USING ALLOY

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