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System is used by different entities like customers, security staff and the store.

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selects a store to buy things

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choose where to go shopping

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Customer shows its number to checkpoint controller

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Customer gets access to the application for lining up

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13 **W** **Customer takes a physical ticket for a store**

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+ **Detection time**: the service provider is informed of the fault;

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+ **Response time**: time required by the service provider to respond to the user;
+ **Repair time**: time required to restore the service or the components that caused the fault;
+ **Recovery time**: time required to restore the system;

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+ **MTTR**: mean time to repair. It is the sum of detection time, response time, repair time and recovery time;

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MTTR: mean time to repair.

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Oracle Directory Server Enterprise Edition Deployment Planning Guide: is a document about the operations needed in the process of designing a system [Chapter 12]

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1.
3. https://docs.oracle.com/cd/E20295_01/html/821-1217/fjdch.html#scrolltoc;
4. 29148-2018 - 29148-2018 - ISO/IEC/IEEE International Standard - Systems and software engineering -- Life cycle processes -- Requirements engineering - IEEE Standard: ISO/IEC/IEEE document about the building and designing of a system and RASD definition;

https://gdpr-info.eu/

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1. https://gdpr-info.eu/: contains the official PDF of the Regulation (EU) 2016/679 (General Data Protection Regulation).

https://www.iso.org/isoiec-27001-information-security.html: ISO/IEC 27001 international standard.

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1.1

Each chapter contains an introduction to the chapter explaining what in the chapter is going to be said. It is a recall of this part of the document to keep track easily what is going to be analysed. In this part the definition is more specific and contains all the needed details in order to read the documentation.

Chapter 1

Chapter 1 description

Chapter 2

Chapter 1 description

Chapter 3

Chapter 1 description

Chapter 4

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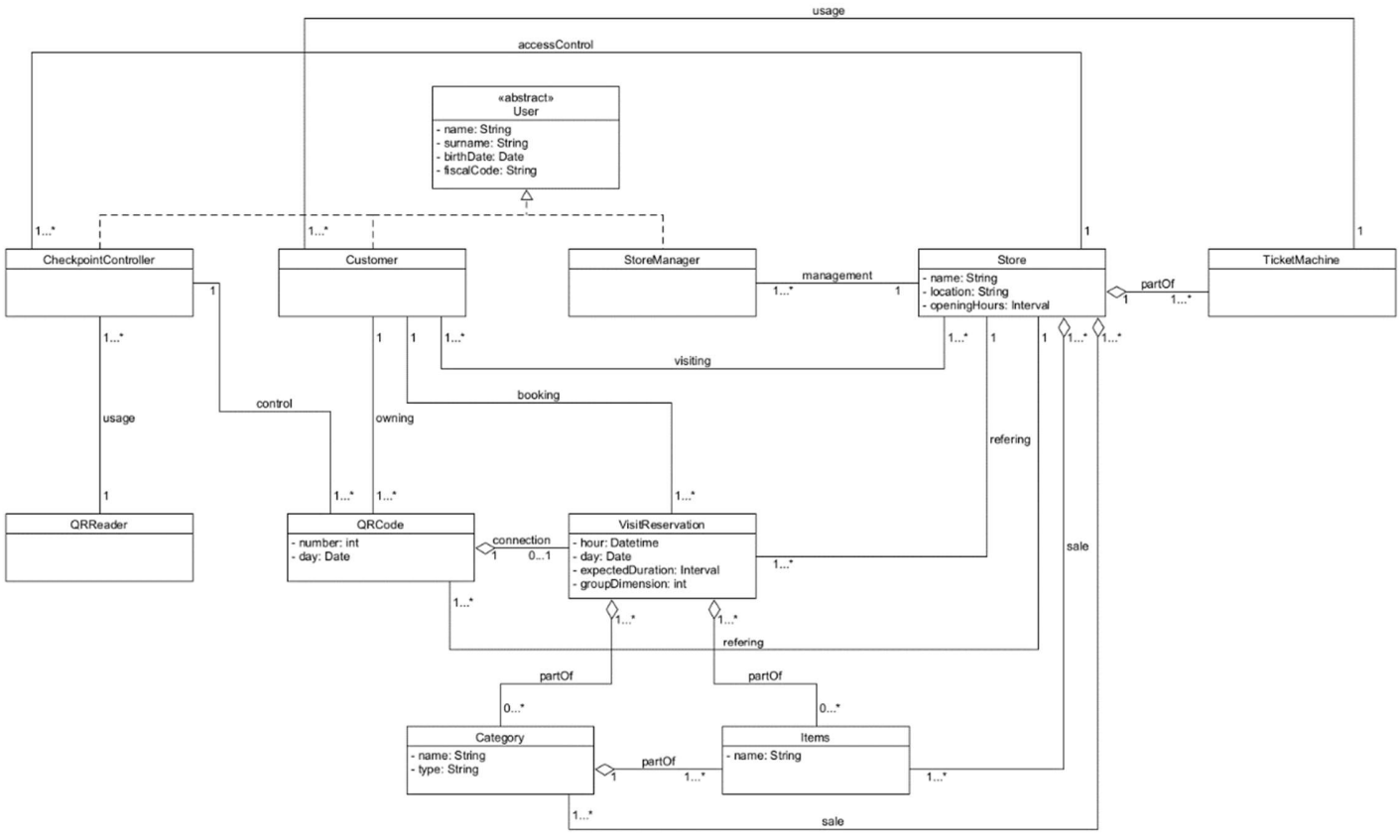

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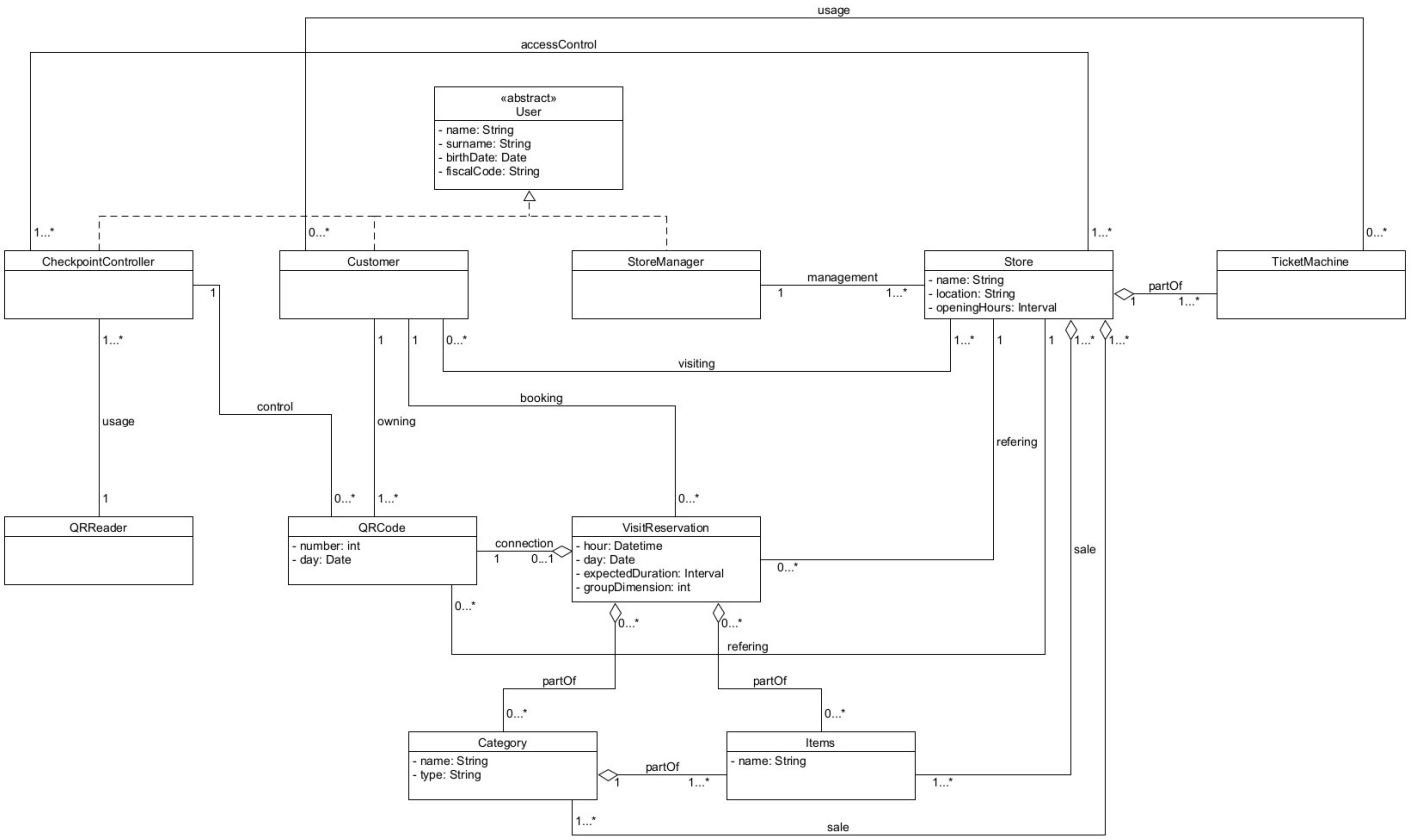

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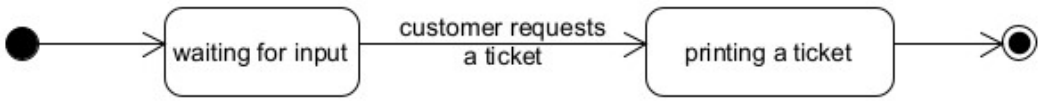

Figure 2.1

When customers are unable use the online application, they can use the ticket machine instead, but for queueing only. The diagram (figure 2.1) describes the evolution of the ticket machine actor during its execution.

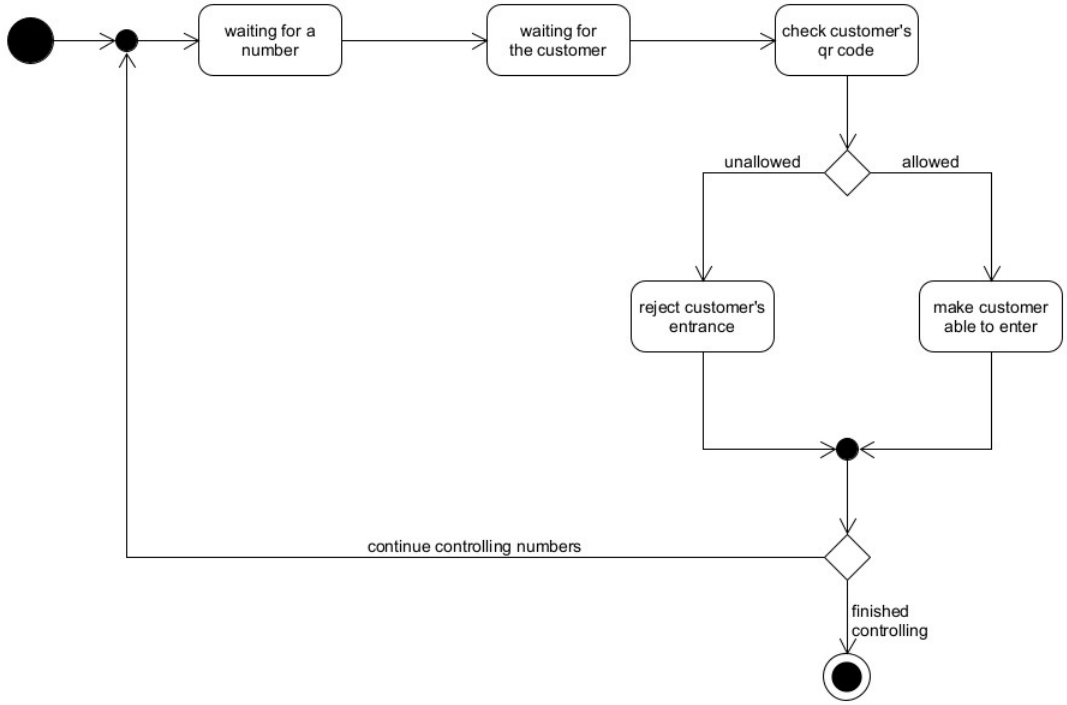

Figure 2.2

Checkpoint controllers have the role of controlling every ticket of the customers which reach the supermarket and want to enter. Their state machine diagram (figure 2.2) expresses how they evolve while doing this specific activity. They control ticket until they must do that.

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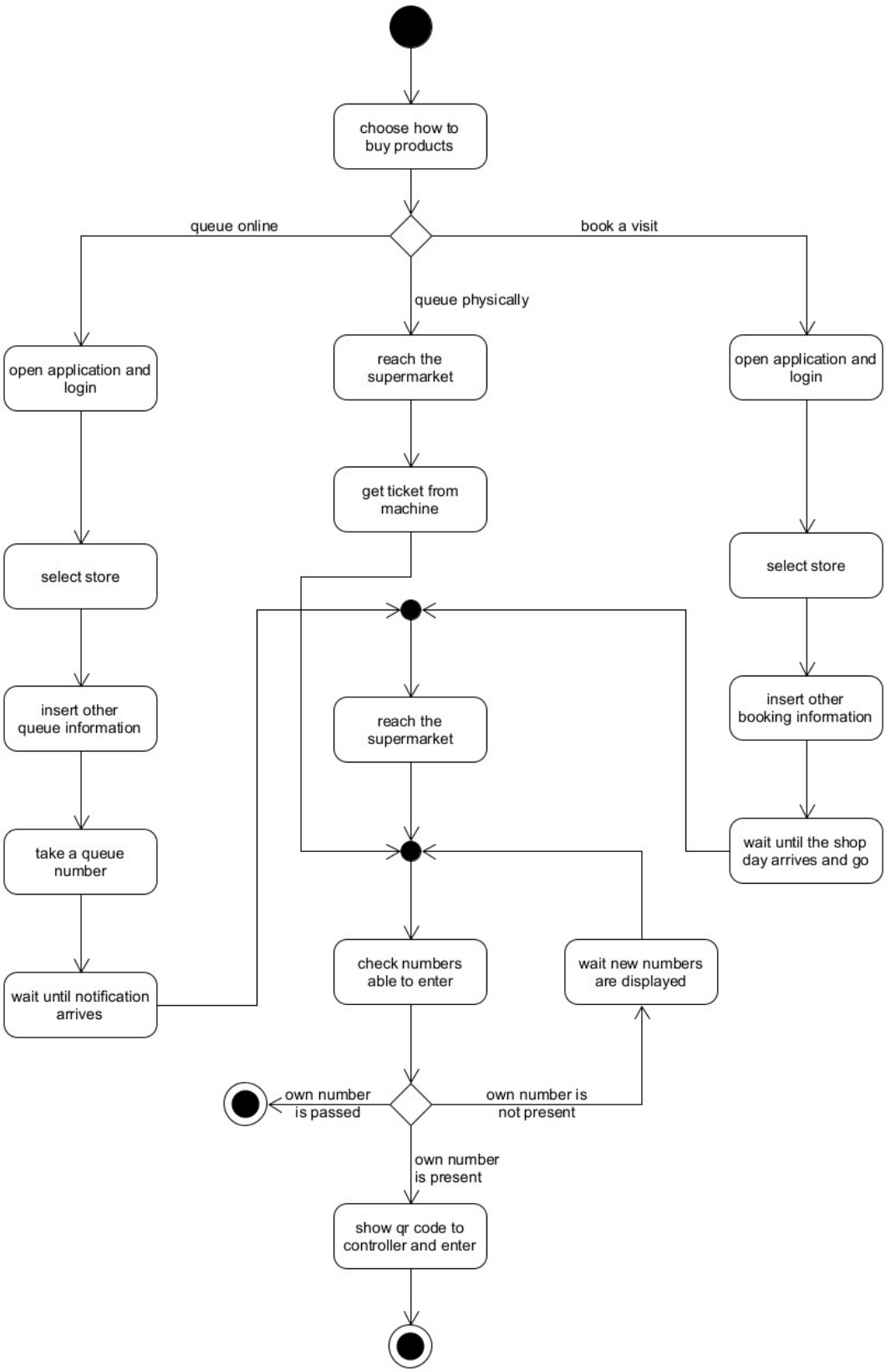
choose how to buy products
queue online
queue physically
book a visit
open application and login
reach the supermarket
open application and login
get ticket from machine
select store
select store
insert other queue information
reach the supermarket
insert other booking information
take a queue number
wait until the shop day arrives and go
check numbers able to enter
wait new numbers are displayed
wait until notification arrives
own number is passed
own number is not present
own number is present
show qr code to controller and enter

Figure 2.3

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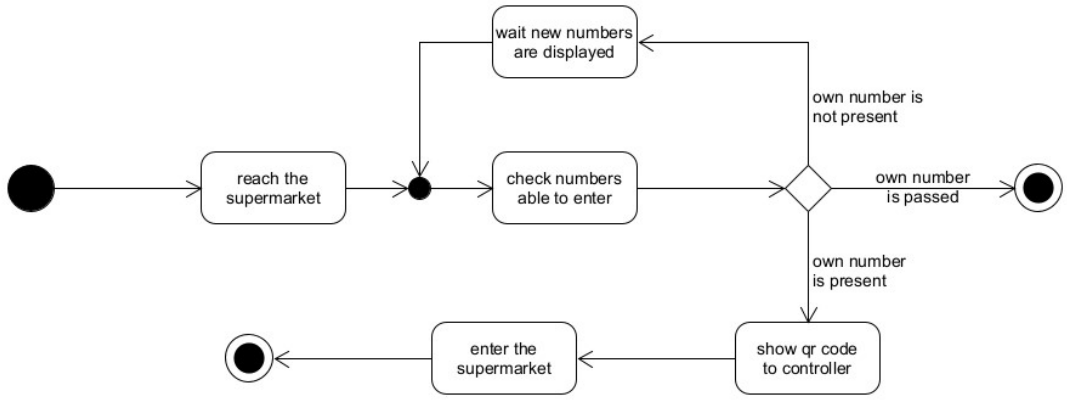

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Figure 2.1

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(figure 2.2)

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while arriving to the supermarket in order to enter it having a booking number or a queue number

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with each possible state for a user interested by the point of view of the system. A user start its flow deciding when and where to buy products and end until it buys the products in the supermarket

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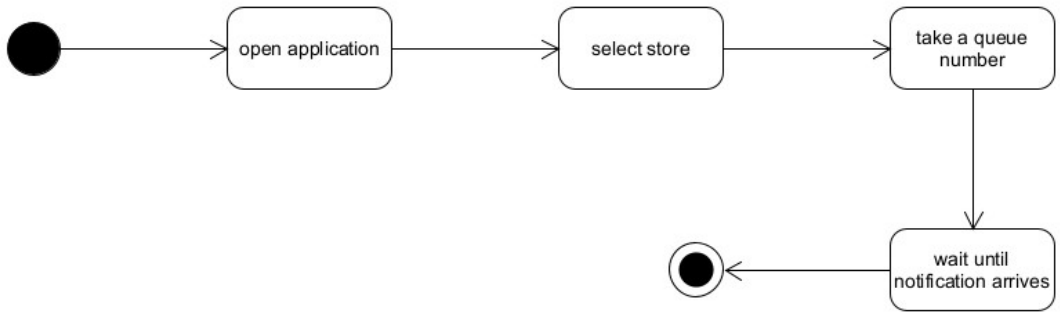

Figure 2.2

Customers can queue online in order to avoid doing a physical line. This customer's state diagram (figure 2.3) represents the customer involved in the activity of taking a number in the digital queue is describe here above.

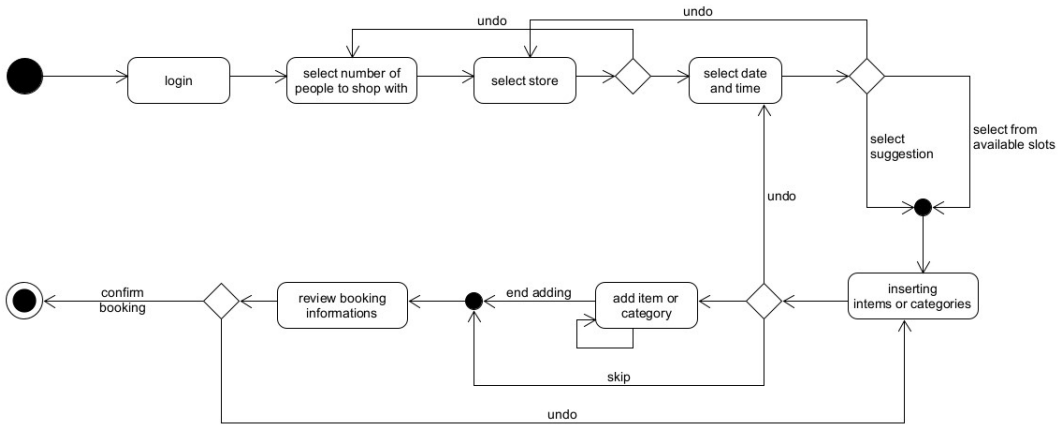

Figure 2.3

Customers can also book a visit instead of queueing. They can do it from the web app and diagram (figure 4) describes this process.

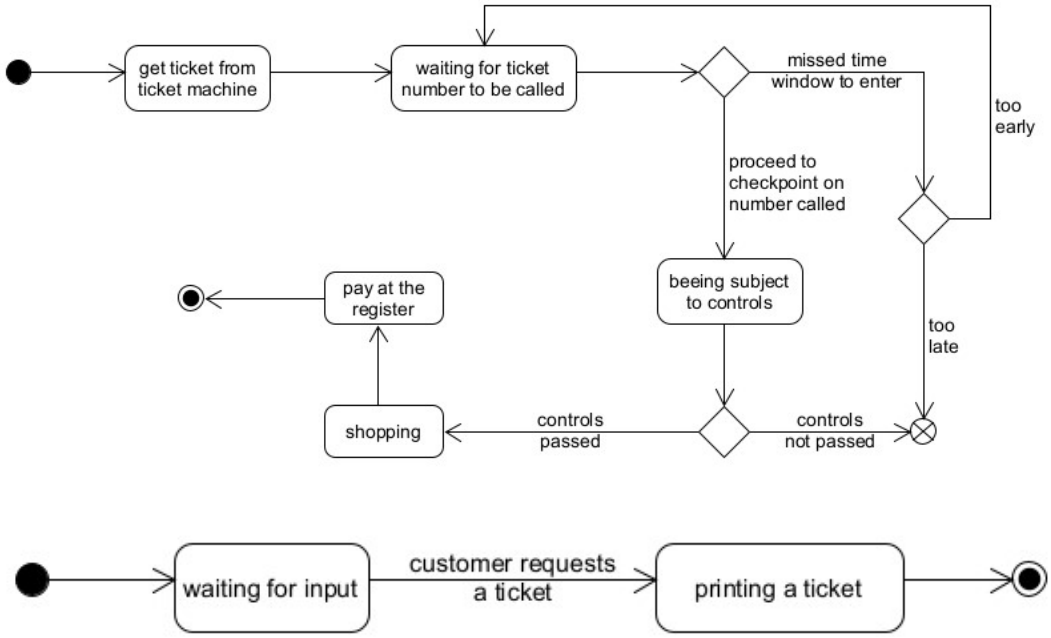

Figure 2.

When customers are unable use the web app, they can use the ticket machine instead, but for queueing only. The diagram (figure 2.5) describes the process that ticket machine users have to go through to be admitted into the store.

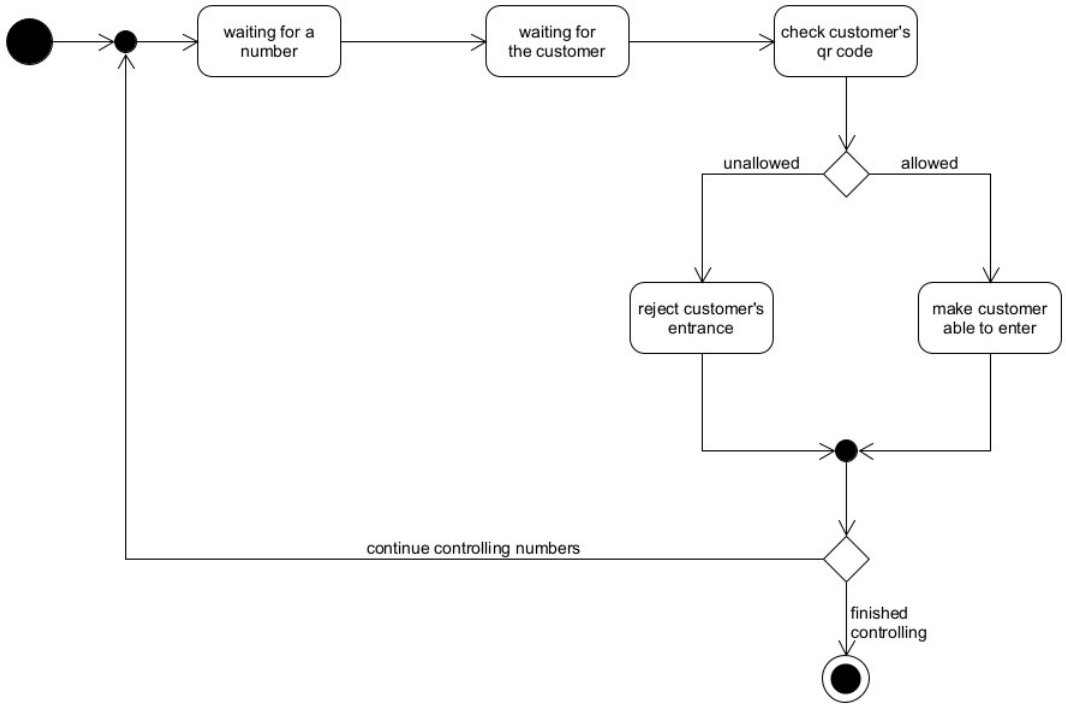

Figure 2.

Checkpoint controllers have the role of controlling every ticket of the customers which reach the supermarket and want to enter. Their state machine diagram (figure 2.6) expresses how they evolve while doing this specific activity. They control ticket until they must do that.

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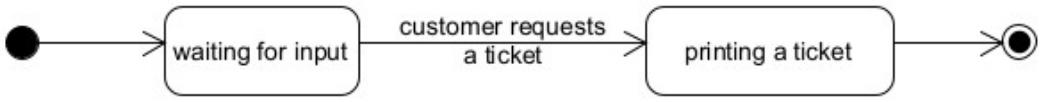

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Figure 2.4

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Figure 2.4

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We assume that customers who retrieve a paper ticket at the machine will not take multiple tickets at a time (this could be enforced by adding an employee who is in charge of checking customers who use the machine).

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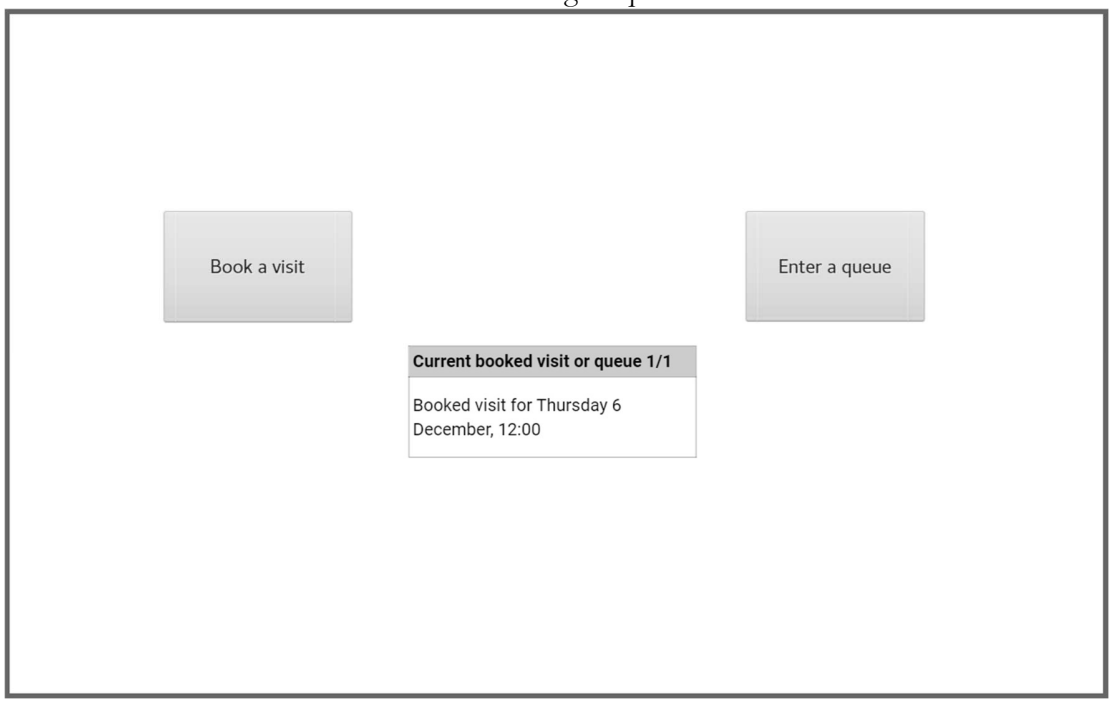
The customer can also see the current booking or queue if he has one.



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like opening hours or sections

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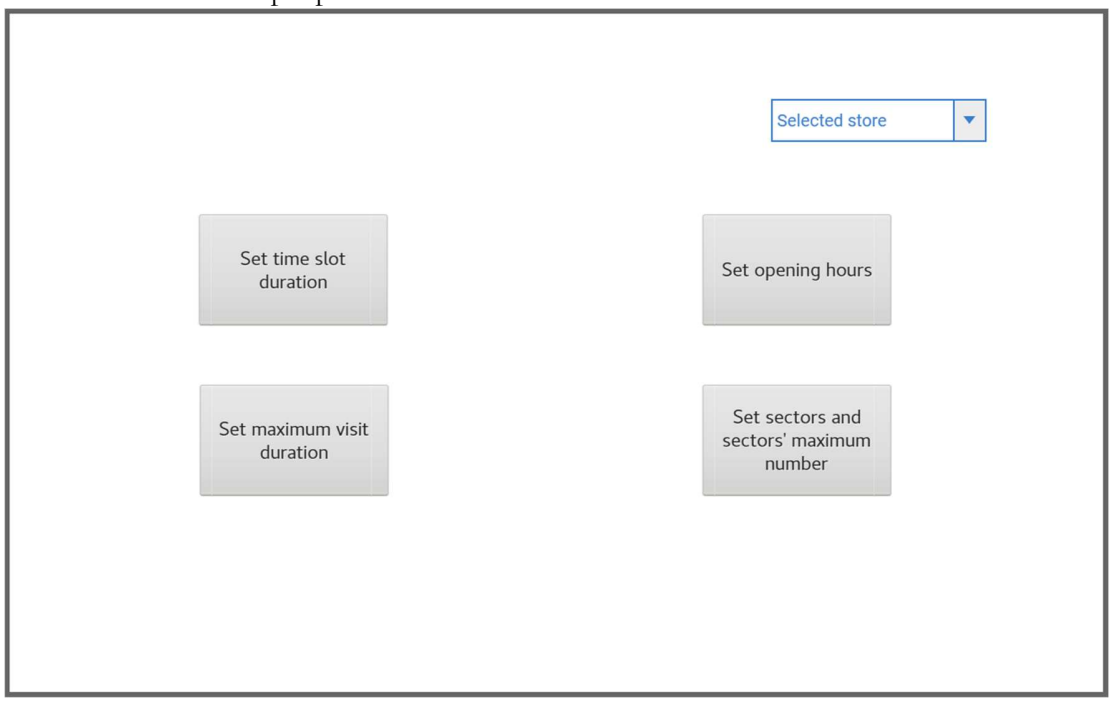
he can set the time slot duration, the maximum visit duration, the opening hours, the sectors and their maximum number of people.



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accesses the user camera and

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. The previous scans remain on screen on the list. The toggle can be used to switch between the validate mode, used to admit costumers into the store, and the check-out mode, used to register the customers exit.

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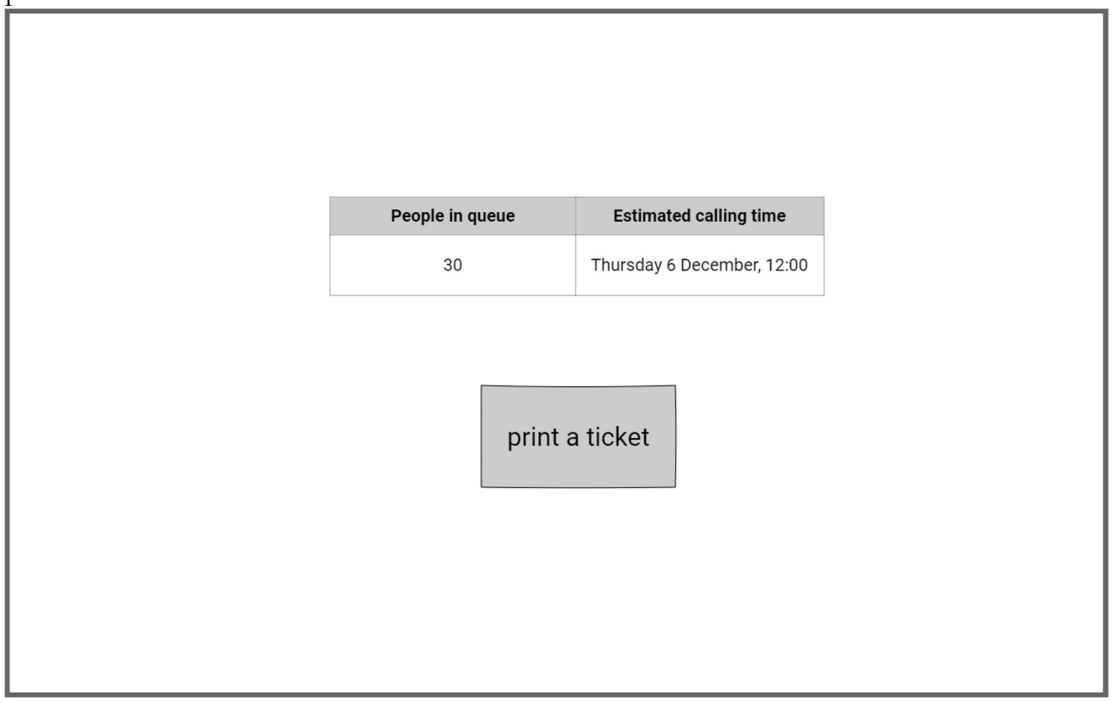
. It shows how many people are already in the queue and how much time will approximately take for the printed ticket to be called.



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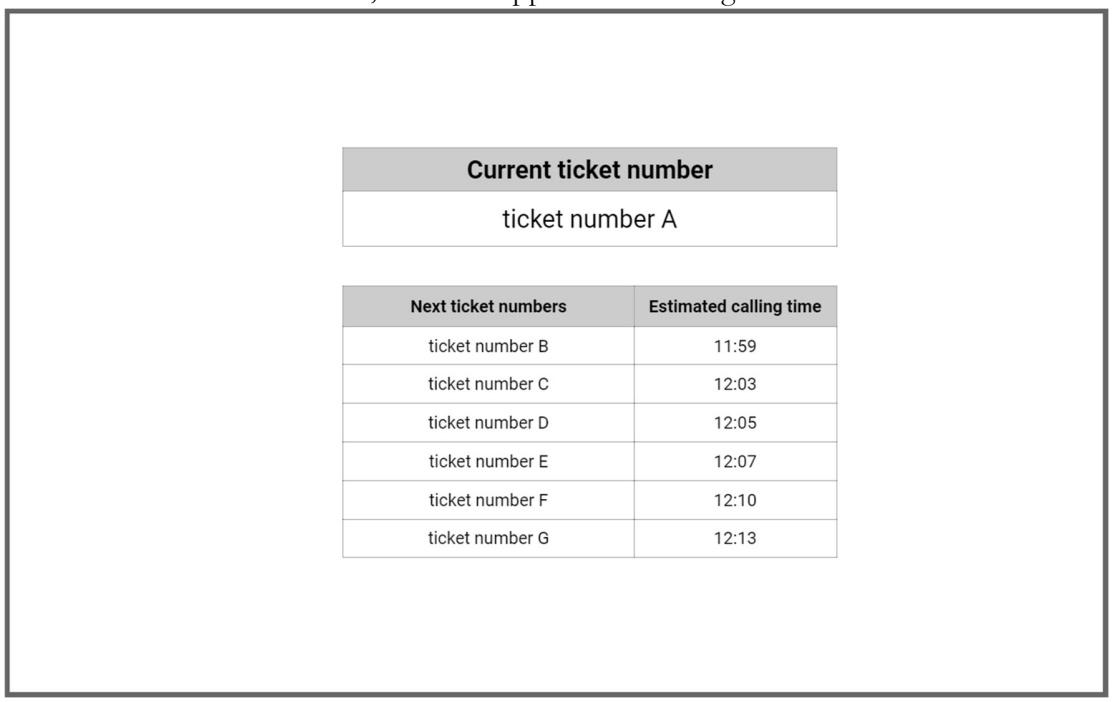
it shows the current ticket number, whose owner is supposed to be welcomed into the store, the next tickets numbers that will be called, and their approximate calling time.



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web browser, that then interacts with

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DBMS

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Storage service

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- **QR code reader software:** it is used read the QR code

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Ticket machine OS: it is necessary to run the ticket machine app.

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OS: it is necessary to run the ticket machine app.

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- **User app OS:** it is necessary to run the user's app.

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- **Wi-Fi:** the ticket machines might use it to communicate with the system, depending on the store's preference.

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1.1

Requirement	Definition
R1	A user who wants to use the system online as a customer must register for free. Further uses require customers to login with valid credentials
R2	Store managers and checkpoint controllers need to log in as well, but their accounts are created by a sys-admin. Thus they do not need to register as store managers or controllers
R3	After logging in, a user can only access the functionalities that are specific of their role
R4	The system will display a digital map with all the available stores in their area. Customers can select a store where they intend to make a purchase, among the displayed ones
R5	If a store was previously selected, customers can join a digital FIFO queue. In order to join such queue, they also need to specify how they intend to reach the store. After joining a queue, the system will send the user a digital ticket. A user can have at most one valid ticket for a given

	store at any time, i.e. it is not allowed to get another ticket for a store S while being in the digital queue for S. Furthermore, if a customer is in the queue for store S they cannot book a ticket for queuing for another store $S_1 \neq S$
R6	A digital ticket consists of a number representing the position in the queue and a QR code. For any two customers waiting in the same queue, their waiting numbers are not equal
R7	If a customer A is in a digital queue, the system will display an estimated waiting time t. Such time is such that the difference between t and the real time T should not exceed 5 minutes
R8	When the estimated time calculated at point 7 is less or equal than the estimated travel time for a customer A, they will receive a notification telling them to reach the store
R9	Customers can retrieve a paper printed ticket at the store. Such ticket is identical to a digital ticket for what concerns its validity constraints
R10	The system will "call" waiting numbers by displaying them on a monitor at the entrance of the store
R11	Assuming that at most N people are allowed to be in the store at the same time, and M people are currently in the store, the system will call N-M numbers sequentially. If N-M > 1, then the calls will have a temporal distance of two minutes
R12	A non-scanned ticket for a queue is valid for store S if and only if it was issued for S and its number has not been called by S yet or if the call happened no longer than 2 minutes before. In any other case, the ticket is marked as invalid, and the next waiting number will be called
R13	A customer may also ignore the digital queue and book a visit for a store instead
R14	If the functionality specified at point 13 was selected, the system will display a time table on the customer's device, plus a set of pre-calculated suggested visits. Each day is divided in time slots of equal length. The customer may either select a finite number of contiguous and free time slots for their visit, or one of the suggested visits
R15	In case the customer chooses to specify their own time interval, the total time they specify must not exceed a time limit established by the store manager. Furthermore, customers can only choose time slots that start and end after the opening time and before the closing time of the selected store

R16	While booking the user may input a list of items and categories of items that they intend to buy. Their app will show a list of categories and items that they can choose
R17	After booking a visit, the system will send the user a QR code that certifies their booking
R18	The system will send a notification to the user who has successfully booked a visit T minutes before their due visit time. T is the expected travel time, and is set to the average travel time for the type of option that the user has selected as specified in the previous point
R19	A non-scanned QR code for a visit is valid for store S if and only if it was issued for S and either the selected time of arrival has not arrived yet or no more than 5 minutes have passed since the selected time of arrival
R20	Checkpoint controllers can scan a customer's QR code upon letting them into the store. The system will check the validity of the code, and will display an error message if the token has lost its validity. After being scanned and approved, the token is marked as invalid, and thus cannot be reused for entrance
R21	A store manager who has previously logged in may set parameters for their store only. Such parameters are: the maximum number of people allowed in a store sector at the same time, the length of each time slot, the maximum permitted duration of a visit, opening and closing time of the store
R22	If a customer has used their app for longer than one month, the system will send them a notification once every two days. Such notification contains a list of 3 stores that are within their area and that have free time slots. The stores whose data is sent are always the 3 stores for which the sum of free time intervals at the time of sending is maximum
R23	A checkpoint controller can also scan the customer's QR code when they are exiting the store. However, this time the system will not check the validity of the token

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A user who wants to use the system online as a customer must register for free. Further uses require customers to login with valid credentials. Registration requires submitting a user name, a password, name, surname and birth date. However only the username and password couple is required in order to log in.
Store managers and checkpoint controllers need to log in as well, but their accounts are created by a sys-admin. Thus they do not need to register as store managers or controllers. (mapping)
After logging in, a user can only access the functionalities that are specific of their role.
The system will display a digital map with all the available stores in their area. Customers can select a store where they intend to make a purchase, among the displayed ones.
If a store was previously selected, customers can join a digital FIFO queue. In order to join such queue, they also need to specify how they intend to reach the store. After joining a queue, the system will send the user a digital ticket. A user can have at most one valid ticket for a given store at any time, i.e. it is not allowed to get another ticket for a store S while being in the digital queue for S. Furthermore, if a customer is in the queue for store S they cannot book a ticket for queuing for another store $S_1 \neq S$. (mapping)
A digital ticket consists of a number representing the position in the queue and a QR code. For any two customers waiting in the same queue, their waiting numbers are not equal.

If a customer A is in a digital queue, the system will display an estimated waiting time t. Such time is such that the difference between t and the real time T should not exceed 5 minutes. (pensiamoci in seguito, formalizzare meglio)
When the estimated time calculated at point 7 is less or equal than the estimated travel time for a customer A, they will receive a notification telling them to reach the store.
If a customer wishes so, they can retrieve a paper printed ticket at the store. Such ticket is identical to a digital ticket for what concerns its validity constraints.
The system will "call" waiting numbers by displaying them on a monitor at the entrance of the store. Assuming that at most N people are allowed to be in the store at the same time, and M people are currently in the store, the system will call N-M numbers sequentially. If N-M > 1, then the calls will have a temporal distance of two minutes in order to avoid the formation of crowds while entering the store. (aggiungere che la coda è solo per client singoli)
A non-scanned ticket is valid for store S if and only if it was issued for S and its number has not been called by S yet or if the call happened no longer than 2 minutes before. In any other case, the ticket is marked as invalid, and the next waiting number will be called.
A customer may also ignore the digital queue and book a visit for a store instead.
If the functionality specified at point 13 was selected, the system will display a time table on the customer's device, plus a set of pre-calculated suggested visits. Each day is divided in time slots of equal length. The customer may either select a finite number of contiguous and free time slots for their visit, or one of the suggested visits.
In case the customer chooses to specify their own time interval, the total time they specify must not exceed a time limit established by the store manager. Furthermore, customers can only choose time slots that start and end after the opening time and before the closing time of the selected store.
While booking the user may input a list of items and categories of items that they intend to buy. Their app will show a list of categories and items that they can choose.
Finally, in order to validate the booking of a visit, the user must submit how they intend to reach the store, choosing from a fixed list of options. After doing thatAfter booking a visit, the system will send the user a QR code that certifies their booking.
The system will send a notification to the user who has successfully booked a visit T minutes before their due visit time. T is the expected travel time, and is set to the average travel time for the type of option that the user has selected as specified in the previous point.
A non-scanned QR code for a visit is valid for store S if and only if it was issued for S and either the selected time of arrival has not arrived yet or no more than 5 minutes have passed since the selected time of arrival.
Checkpoint controllers can scan a customer's QR code upon letting them into the store. The system will check the validity of the code, and will display an error message if the token has lost its validity. After being scanned and approved, the token is marked as invalid, and thus cannot be reused for entrance.
A store manager who has previously logged in may set parameters for their store only. Such parameters are: the maximum number of people allowed in a store sector at the same time, the length of each time slot, the maximum permitted duration of a visit, opening and closing time of the store.
If a customer has used their app for longer than one month, the system will send them a notification once every two days. Such notification contains a list of 3 stores that are within their area and that have free time slots. The stores whose data is sent are always the 3 stores for which the sum of free time intervals at the time of sending is maximum.

A checkpoint controller can also scan the customer's QR code when they are exiting the store. However, this time the system will not check the validity of the token.

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In order to join such queue, they also need to specify how they intend to reach the store.

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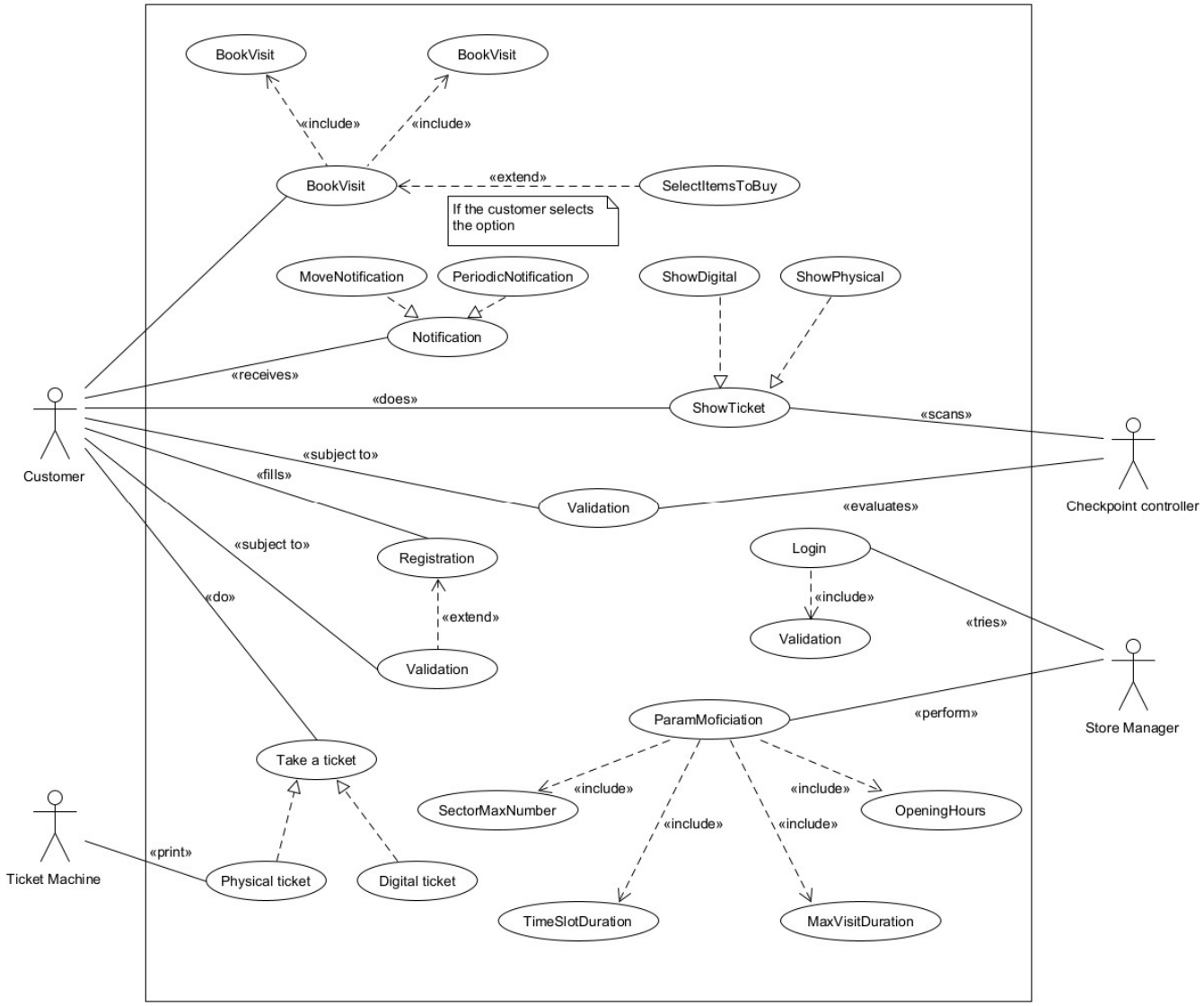

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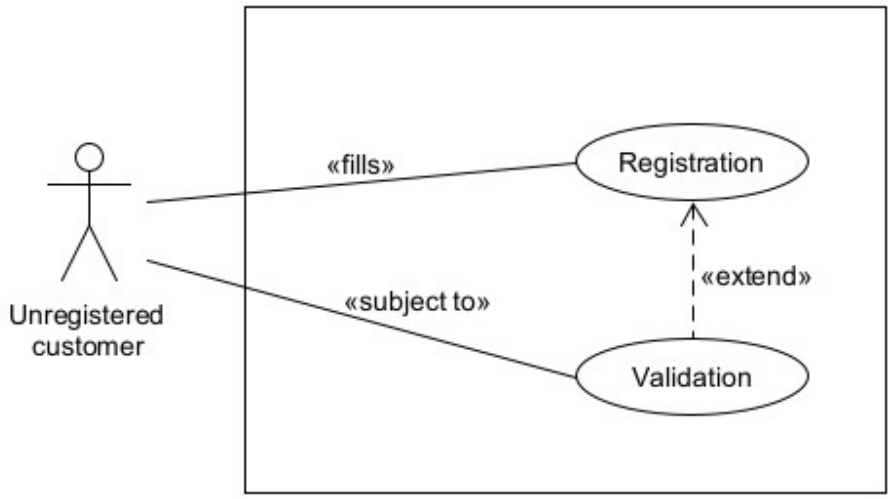

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Use case	Customer Registration
Actor	Nonregistered customer
Entry condition	A non-registered customer has accessed their app
Basic Flow	1. In the homepage, the non-registered customer clicks the "Register" button. 2. The non-registered customer inserts their data: full name, birth date, username and a password. 3. The non-registered customer submits their data and completes registration
Exit condition	Non-registered customer owns an active Customer account.
Exception	The user inputs invalid data. An error message is displayed. The user already owns an account with the inputted credentials. An error message is displayed.

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1.1.1.2 User login

Actions on the system performed by users may be of different type depending on the different category. Every user must log in.

Use case	User Login
Actor	User
Entry condition	A non-logged user opens the app

Basic Flow	1. In the homepage, User clicks the "Login" button. 2. User enters their username and password 3. User clicks the "Log me in" button.
Exit condition	User has successfully logged in and has access to the functionalities of their role.
Exception	One between the username and password fields is invalid. An error message is displayed.

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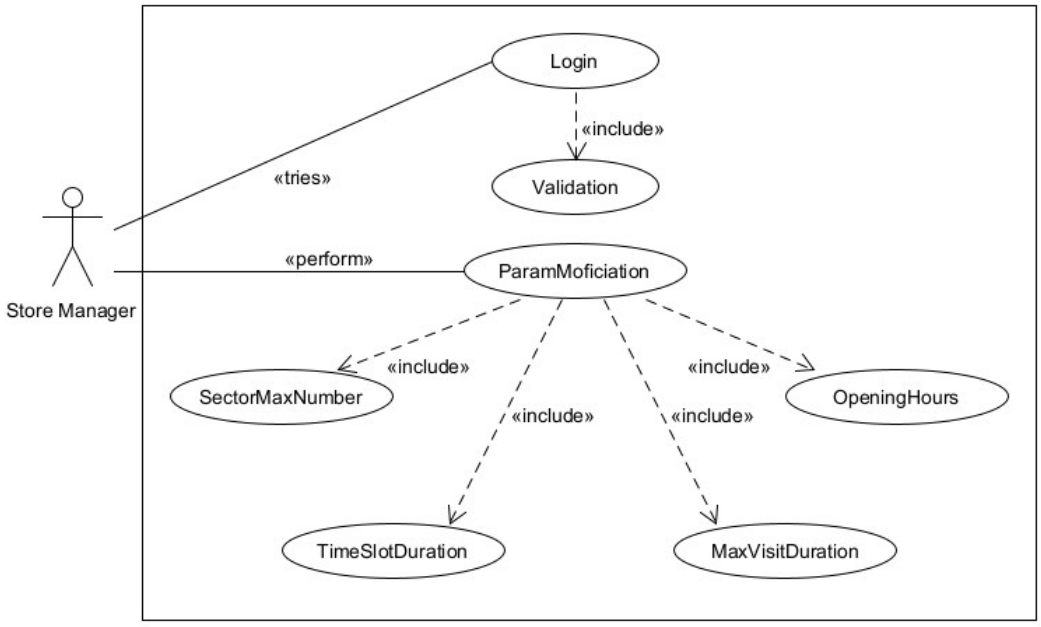

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Use case	User Login
Actor	User
Entry condition	A non-logged user opens the app
Basic Flow	In the homepage, User clicks the "Login" button. User enters their username and password User clicks the "Log me in" button.
Exit condition	User has successfully logged in and has access to the functionalities of their role.
Exception	One between the username and password fields is invalid. An error message is displayed.

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Use case	User Login
Actor	User
Entry condition	A non-logged user opens the app
Basic Flow	In the homepage, User clicks the "Login" button. User enters their username and password User clicks the "Log me in" button.
Exit condition	User has successfully logged in and has access to the functionalities of their role.
Exception	One between the username and password fields is invalid. An error message is displayed.

Use case	Store Manager Configuration
Actor	Store Manager
Entry condition	A user is logged in as a Store Manager
Basic Flow	1. In the homepage, the Store Manager enters the Configuration section of the app. 2. Store Manager selects the store whose parameters he wishes to change. 3. The Store Manager selects and modifies the following parameters: maximum number of people allowed in a sector, maximum duration of a visit, length of time slots and opening/closing hours. 4. The Store Manager confirms their submission.
Exit condition	The value of the parameters selected by the Store Manager are set to the values that were chosen.

Exception	The Store Manager inputs invalid data. An error message is displayed.

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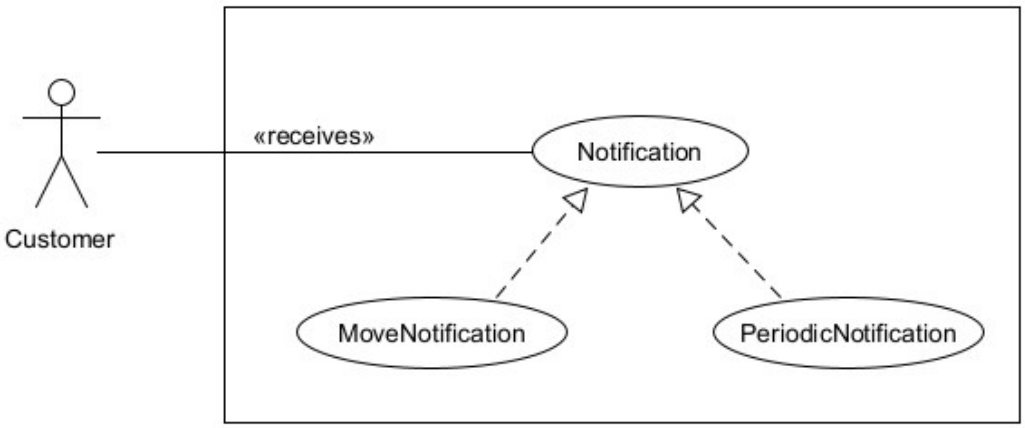

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Use case	Receive Move Notification
Actor	Customer
Entry condition	Customer has a valid digital ticket for a store and is queuing
Basic Flow	1. Customer receives a notification telling them that it is time to go to the store. 2. Customer clicks ok and starts travelling to the store.
Exit condition	Customer knows that it is time to get to the store.
Exception	

Use case	Receive Periodic Notification
Actor	Customer
Entry condition	Customer has logged in their account
Basic Flow	1. Customer receives a notification with a list of some available stores in their area. 2. Customer clicks on the notification.
Exit condition	Customer is redirected to the Book a Visit use case
Exception	Customer deletes the notification.

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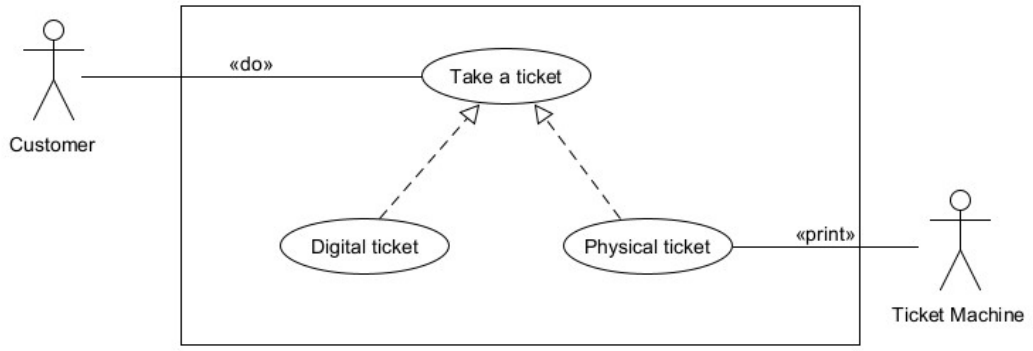

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Use case	Physical ticket
Actor	Customer
Entry condition	Customer is physically at the store and can use the ticket machine.
Basic Flow	1. Customer clicks "Print ticket" on the machine. 2. The machine prints a valid ticket containing a waiting number and a QR code to be shown.
Exit condition	The Customer can now use their ticket to enter the store when their turn arrives.
Exception	Machine ran out of paper. An error message is displayed and checkpoint controllers are notified.

Use case	Digital ticket
Actor	Logged Customer
Entry condition	Customer has successfully logged in their account
Basic Flow	1. Logged Customer clicks the "Queue for a store" button. 2. The system displays a map containing all the stores in their area. 3. Logged Customer selects a store from the map and specifies how they intend to reach it. 4. Logged Customer is added to the queue for the selected store and receives a digital ticket with a waiting number and a QR code.
Exit condition	Logged Customer can use the digital ticket to enter the store when the waiting number is called. They can also see the state of the queue, and the estimated waiting time.
Exception	Logged Customer already has a valid ticket. The operation is deleted and an error message to remind the user that they are already queuing is displayed.

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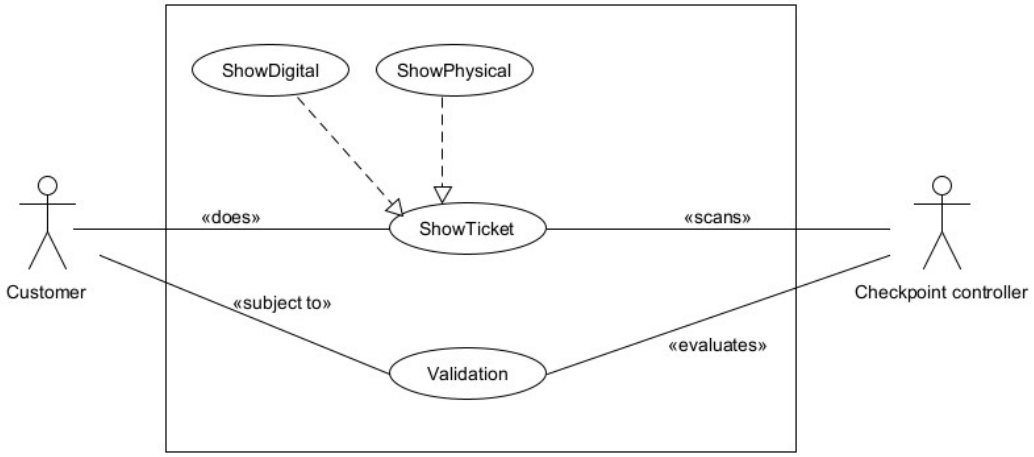

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Use case	QR Code Validation
Actor	Customer, Checkpoint controller
Entry condition	A Customer has approached the Checkpoint controller to show their ticket. The Checkpoint controller has previously accessed the app and successfully logged in.
Basic Flow	1. Checkpoint controller scans the QR code provided by the Customer. 2. After being scanned, the QR code is examined and validated. 3. Access to the store is granted to Customer.
Exit condition	Customer can enter the store, but their ticket is marked as invalid. Thus it can no longer be used.
Exception	The ticket is invalid (for any reason). An error message with a brief description of the reason for invalidity is displayed on the Checkpoint controller 's device. The Customer is not allowed to enter.

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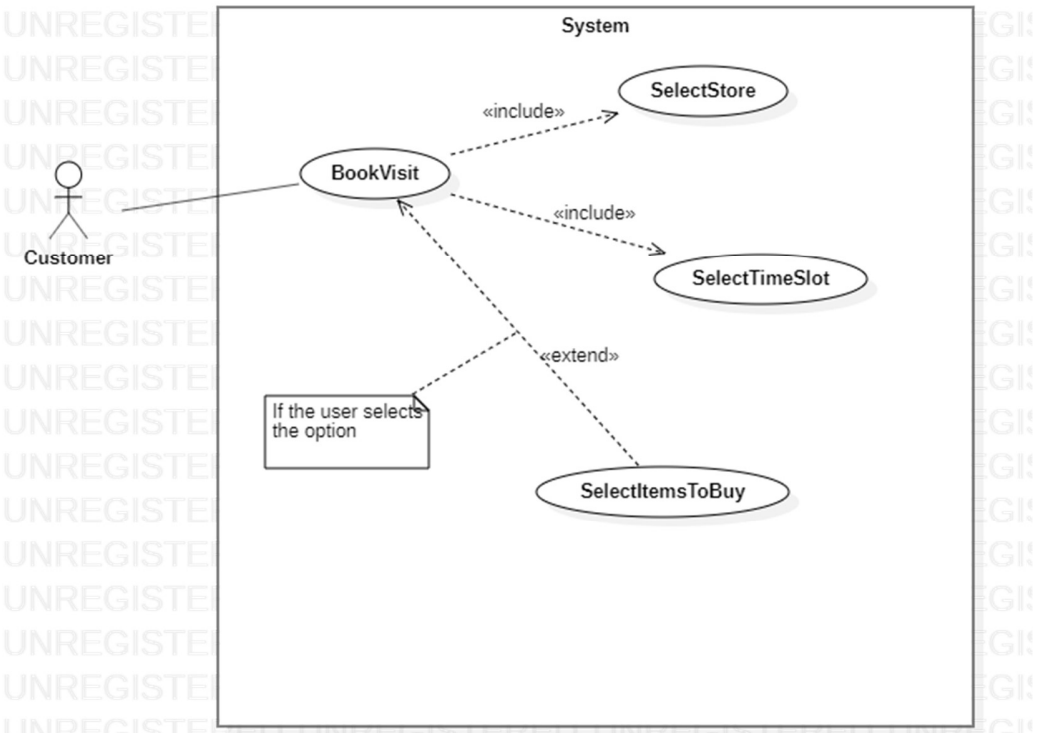

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Use case	Book a Visit
Actor	Customer
Entry condition	Customer has accessed the app and successfully logged in
Basic Flow	1. Customer selects a store from a digital map. 2. After selecting the store, Customer clicks the "Book a visit" button. 3. The app displays a time table with some free time slots. Some suggested time slots (either for that store or other stores) are displayed as well. 4. Customer selects the time slots that they need and clicks "Next".

	5. Optionally, Customer can open a list of items and select some items that they intend to buy from the store. 6. Customer confirms their booking and click "Submit". 7. The app displays message with a QR code and the day and time at which the visit starts.
Exit condition	The visit is successfully registered and the Customer can use their QR code to enter the store.
Exception	

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and activity diagrams

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Here the behaviour of the actors of the systems is specified over different types of actions at high level terms. Some cases of high-level functions have been identified and are described in terms of UML Sequence diagrams and Activity diagrams.

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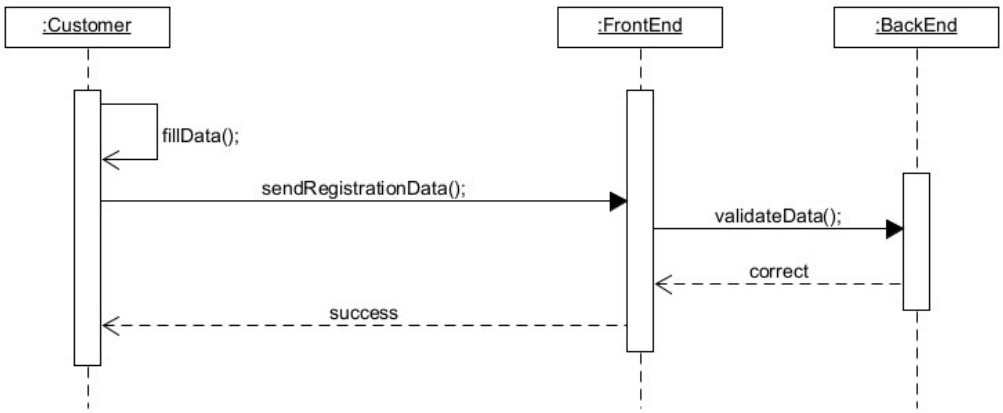
1.1.1.1 Successful registration

In the registration process, the only external actor present is the Customer who is intended to subscribe to the system to be able to access to online services like: online queuing and visit booking. Here is the sequence diagram regarding the associated registration use case:



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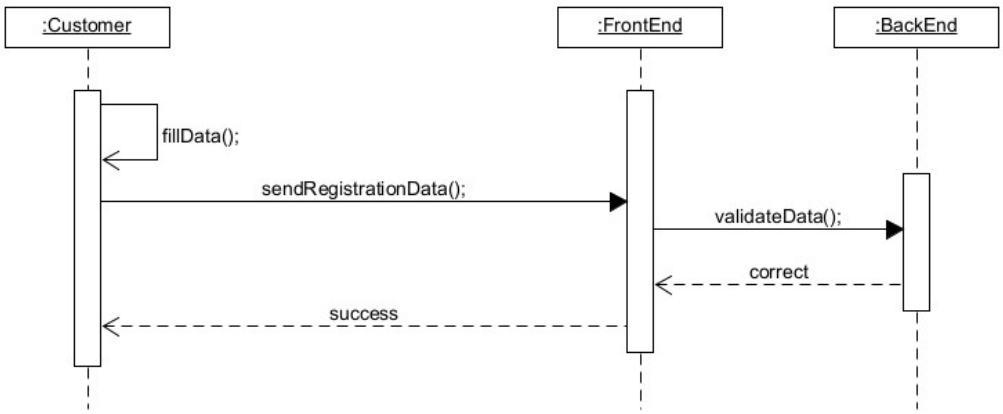

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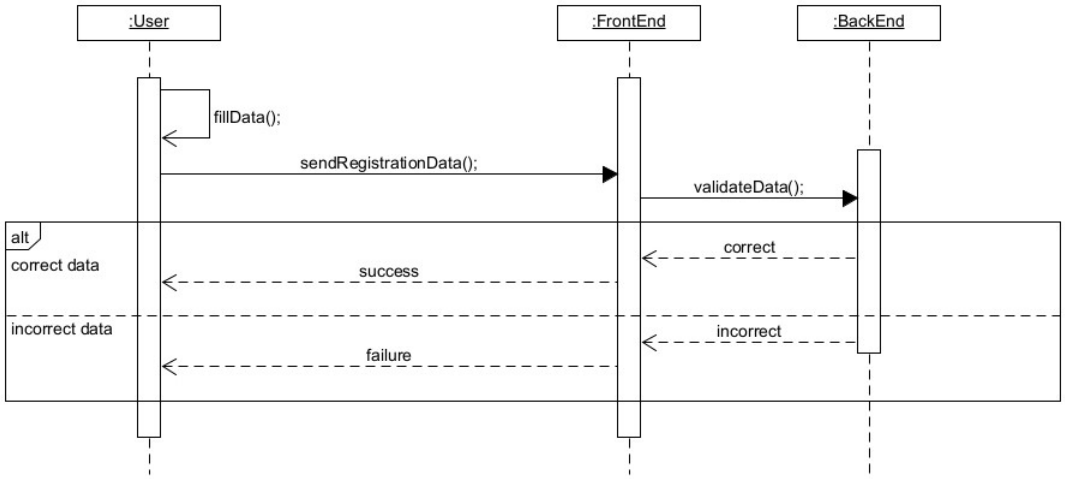

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1.1.1.1 Login

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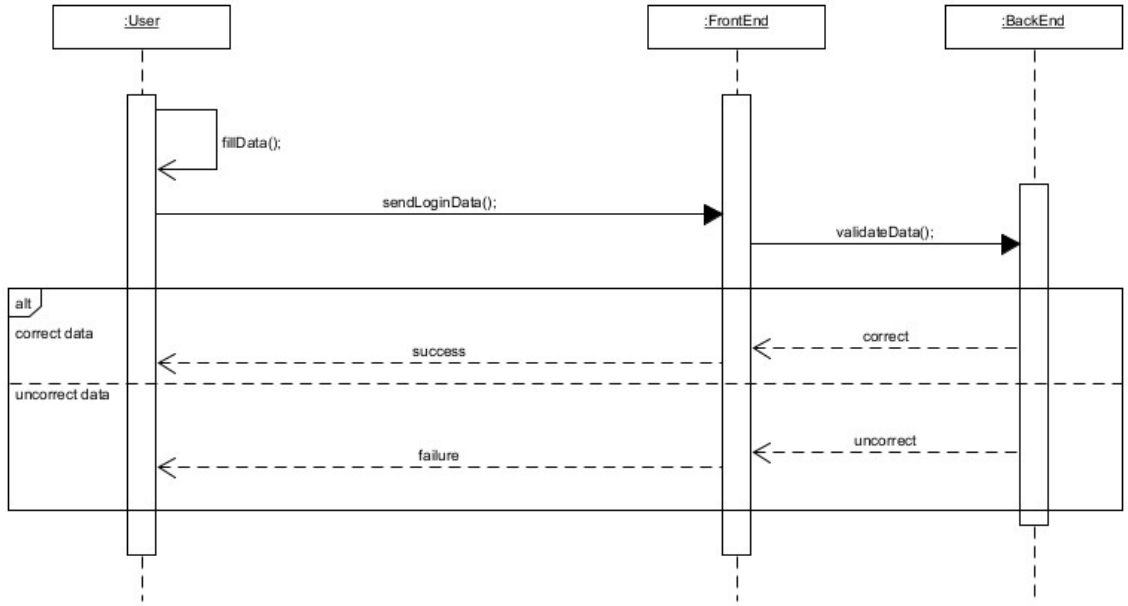

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1.1.1.1 Store manager's parameters' modification

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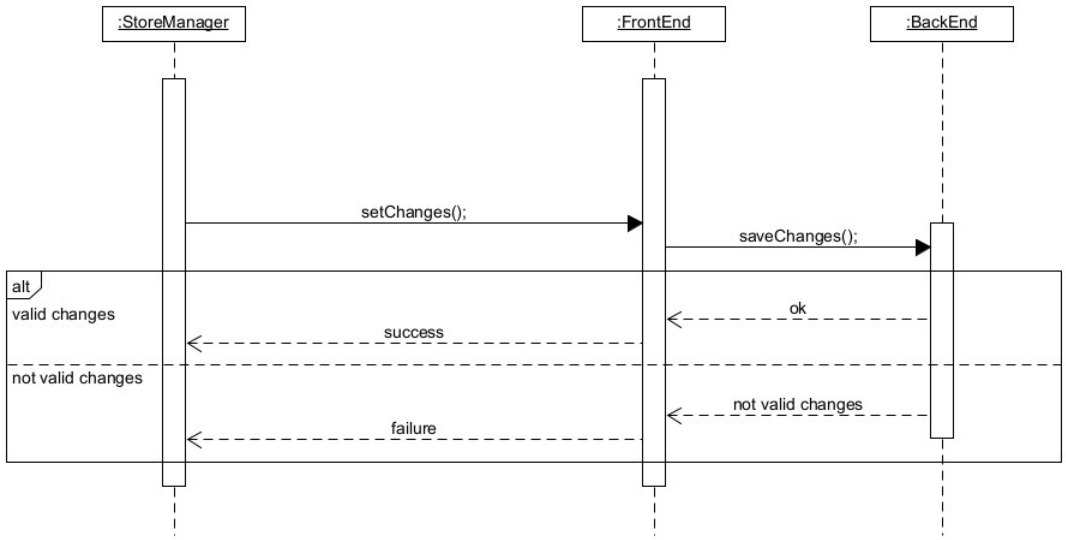

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1.1.1.1 Online queue with notification

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The online queue allows customers to get a ticket for the store they selected. It also sends a notification when it is time for them to head to the store.

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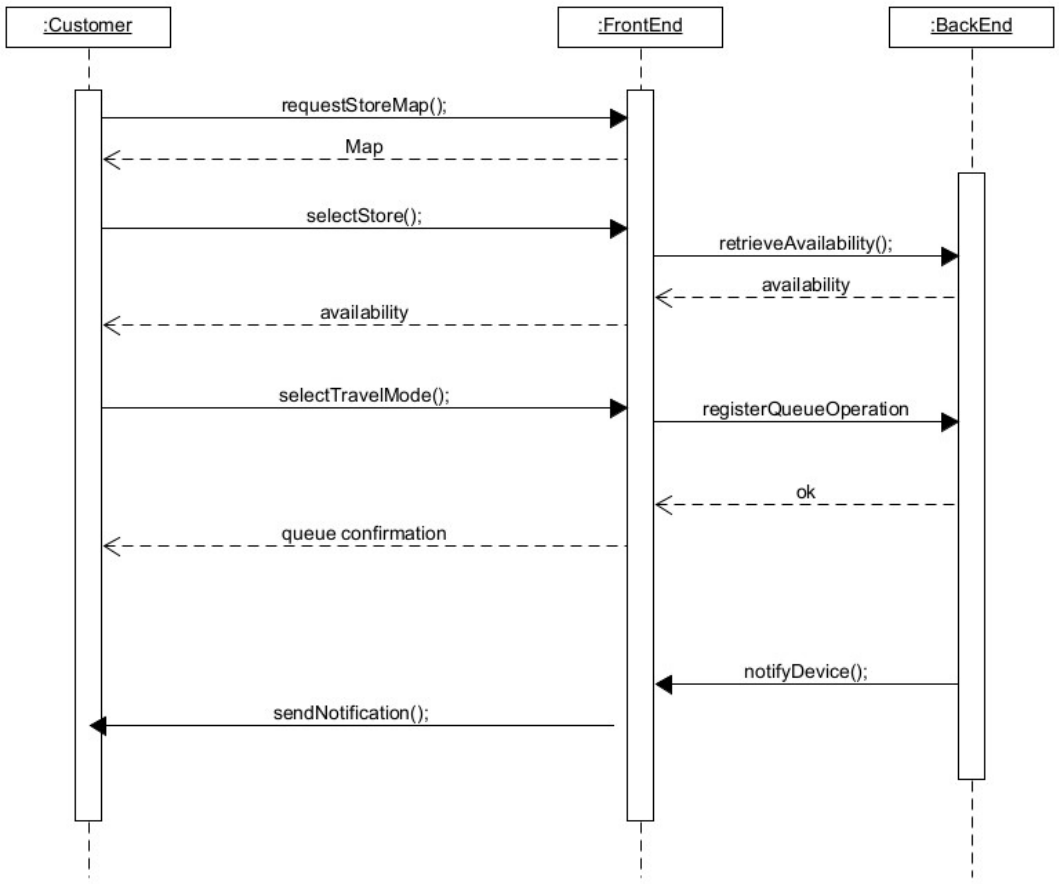

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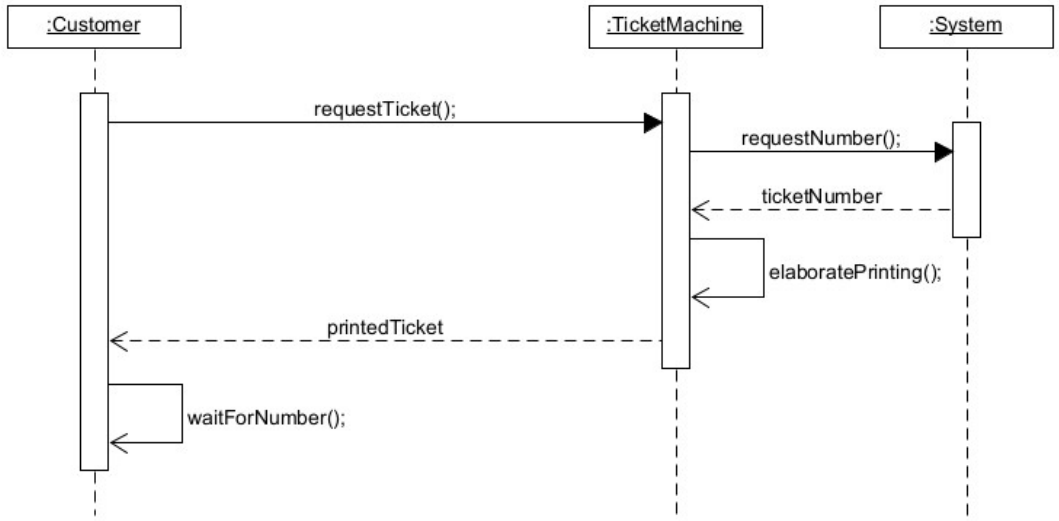
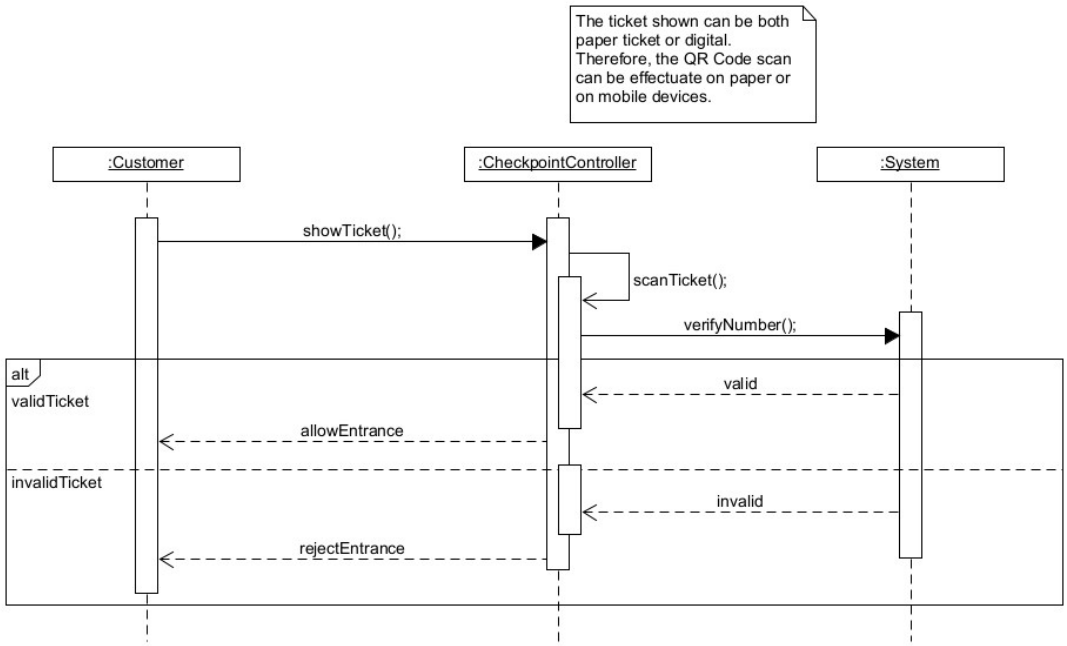
1.1.1.1 Physical queue

The case of a physical queue happens when a person does not have the possibility to queue online due to technology gap or because simply does not want to use the application. In each case the system must provide a ticket and continue to call numbers.



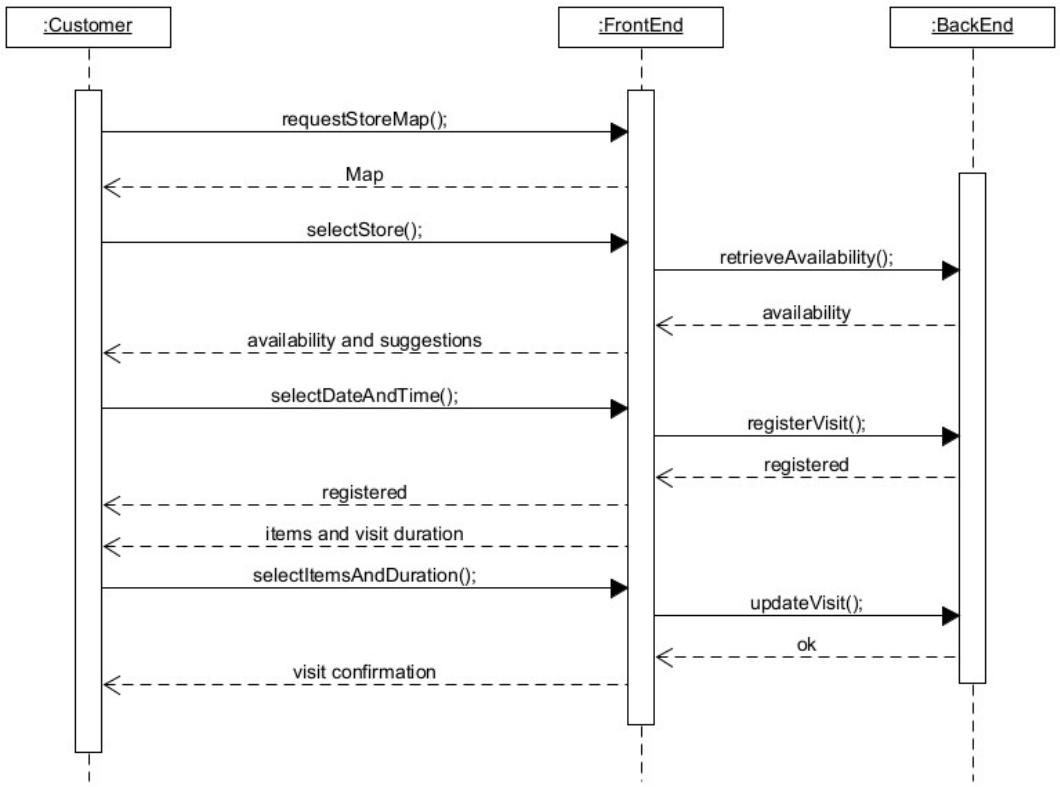
1.1.1.1 Verification of digital or physical ticket

A person approaches the checkpoint controller at the entrance of the store. The external actors involved are the customer and the checkpoint controller. In this sequence diagram are represented both the cases of acceptance and rejection of a ticket from a certain customer.



1.1.1.1 Visit booking

Visit booking involves only the customer as external actor. All the interactions happen between the customer who wants to book a visit and the system.



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In order to avoid misleading the user, the system should provide quick responses when it comes to real time queue management. The expected waiting time should be re-calculated once every minute, and should be sent to the user no later than 10 seconds after every calculation. For the same reason, whenever a QR code is scanned and approved, the system should register the event at most 5 seconds after it received its notification.

Visit booking is instead not affected by the same type of constraints, since due to its very nature a visit is booked with reasonable anticipation. The only constraint is that the booking should be registered by the system before a new booking is made for the same store.

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The software is realized using some hardware pieces and software pieces. The software is constrained by three main categories: standards, hardware and other. Standard constraints are those limitation of the software regarding standards. Standard constraints regard the utilization of well-known standards in the system's realization. Hardware constraints are boundaries for the system's realization. Hardware constraints are those constraints regarding the architecture and the components type. Other constraints are a set of constraints more general and domain specific. The other constraints are those constraints specific for the S2B.

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The system must be compliant to the General Data Protection Regulation

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(GDPR) [4], as it is mandatory by law in the European Union and will ensure proper handling of users' data. Moreover the system must be compliant to the ISO/IEC 27001 international standard[5]. This would ensure that the best security practices are followed to develop the system.

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S2B must be able to communicate with each possible ticket machine through an appropriate design parent and the usage of an appropriate communication method. The choice of the ticket machine must be independent by the system's implementation and must constrain as less as possible the store's choices.

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In the registration process, users must be asked to accept the privacy contract in order to complete the registration. The privacy contract must be compliant with the current legislation and more specifically it must be compliant with Italian and European law. If the user does not accept privacy agreement, it will not be able to complete the registration.

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In the registration process, users must be asked to accept the privacy contract in order to complete the registration. The privacy contract must be compliant with the current legislation and more specifically it must be compliant with Italian and European law. If the user does not accept privacy agreement, it will not be able to complete the registration.

Actions like queuing online, booking a visit and receive notifications are all tracked permanently on a storage system and are accessible if needed. Data must be secured by replicating it frequently. All the visits saved on the storage system are never deleted before a month.
S2B must be able to communicate with each possible ticket machine through an appropriate design parent and the usage of an appropriate communication method. The choice of the ticket machine must be independent by the system's implementation and must constrain as less as possible the store's choices.

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S2B must be able to communicate with each possible ticket machine through an appropriate design parent and the usage of an appropriate communication method. The choice of the ticket machine must be independent by the system's implementation and must constrain as less as possible the store's choices.

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arantee such high availability, possible failures need to be mitigated by introducing redundancy into the system infrastructure. In this way, a failure to a component will not cause the system to stop working, as there will be more components of the same type to redistribute the workload.

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storage system

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The system will have a modular structure that makes adding new features pretty simple. An appropriate design pattern should be chosen in order to achieve that. Furthermore the modular structure will both allow to modify an existing component and/or add new modules that implement further functionalities.

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Portability is a major concern for the system. All the user applications will therefore

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The system is

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be

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to

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modern desktop and mobile devices.

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lication

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be developed

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be compatible with most smart ticket machines on the market

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for Linux, Android, and Windows to offer high compatibility

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stores will be able to freely choose which ticket machine model to use.

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hardly any smart ticket machine will not be compatible.

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```
abstract sig Person {}

/*	Here there are the humans entities composing the system: customers,
	store managers and checkpoint controllers. They have been defined
	using only what characterize them. */
sig Customer extends Person {
	customerTickets: set Ticket,
	customerBookings: set Booking,
	customerVisits: set Store
} {
	// if a customer has visited at least one store, it must have at least one ticket
	#customerTickets >= #customerVisits
}
sig CheckpointController extends Person {
	controllerStore: one Store,
	controllerControls: set Ticket
}
sig StoreManager extends Person {
	managerStores: some Store
}

/*	In this part there are the definitions of physical objects of the
	system and some abstract concepts related to the stores. Objects
	contains the stores, tickets, reservations (done by customers) and
	the abstract concept of the visit. Which is strictly related
	to the presence of a ticket and a customer. */
```

```
sig Store {
	storeAllowedTimeToGetIn: some Time,
	storeAllowedTimeToGetOut: some Time,
	storeManager: some StoreManager,
	storeControllers: some CheckpointController,
	storeTicketMachines: some TicketMachine,
	storeTickets: set Ticket,
	storeProducts: some Item
} {
	// there must be at least one time at which you can get in and get out by the store
	#(storeAllowedTimeToGetIn&storeAllowedTimeToGetOut) >= 1
	// tickets printed by the ticket machines must be a subset of all tickets for the store
	storeTicketMachines.machinePrintedTickets in storeTickets
	storeControllers.controllerControls in storeTickets
}
sig TicketMachine {
	machineStore: one Store,
	machinePrintedTickets: set Ticket
}
sig Category {}
sig Item {
	itemCategory: one Category
}
sig Booking {
	bookingOwner: one Customer,
	bookingTicket: one Ticket,
	bookingDate: one Date,
	bookingEndTime: one Time,
	bookingItems: set Item,
	bookingCategories: set Category
}
sig TicketNumber {}
sig Ticket {
	ticketNumber: one TicketNumber,
	ticketOwner: one Customer,
	ticketStoreRef: one Store,
	ticketBooking: lone Booking,
	ticketQueue: lone Queue,
	ticketDate: one Date
} {
	// a ticket is for a queue or for a booking, not both
	#ticketBooking = 1 => #ticketQueue = 0
	#ticketQueue = 1 => #ticketBooking = 0
}
sig Queue {
	queueStore: one Store,
	queueTickets: set Ticket,
	queueNextCall: one Ticket
}

/*	In Alloy the base type int has a very restricted domain and can't
	be used like in programming languages. As Daniel Jackson says, with
```

```
	Alloy and FOL there is no need to use integers to describe the
	system. Reference: Software Abstractions - DJ: pp. 134-135 */
sig Year {}
sig Month {}
sig Day {}
sig Time {}
sig Date {
	year: one Year,
	month: one Month,
	day: one Day,
	time: one Time
}
```

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Header and footer changes

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Purpose

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Purpose

Text Box changes

Header and footer text box changes

Footnote changes

Endnote changes