RASD.docx

Main document changes and comments

Page 1: Style Definition	**Marco Petri**	**17/11/2020 23:18:00**

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Goal number	Goal description
1	customers can queue online without reaching the store online
2	customers can make a reservation for a store registered in the system
3	customers can choose their preferred store by the all present
4	customers must be safe during their visit at a store
5	customers must be able to buy whatever they need at a store
6	every customer must be allowed to queue aiming to enter in a store
7	no crowds have to be present outside the store
8	customers who queue first are the first to enter the store
9	precise estimation of the waiting time must be accessible to the queuing customers
10	customers receive a notification when they need to get out in order to reach the store
11	customers cannot overload a store's queue
12	system is configurable for the needs of every store
13	customers' access must be supervised
14	customers must be helped through suggestions to choose the safest way of buying their products

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Goal 1: user can wait its turn from home until is called;

Goal 2: user can book a visit to the store;

Goal 3: user can optionally insert the approximate duration of the visit;

Goal 4: user can optionally insert items or the items' category they intend to buy;

Goal 5: system provides a precise estimation of waiting time to the user;

Goal 6: system alerts the user about the time they need to reach the store;

Goal 7: system suggests alternative time slots in case the one requested is full;

Goal 8: system can suggest other stores to the user;

Goal 9: system can give periodic notification of available time slots to the user;

Goal 10: system output a QR to the user to identify its digital queue number and it is unique.

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Here follows lists of phenomena for this system and the world related to it.

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World phenomena

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It follows the list of world (only) phenomena:

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1.1.1

Phenomena	Controller	Description
1	W	Customer selects a store to buy things
2	W	Customer opens the application
3	W	Customer goes to the store
4	W	Customer shows its number to checkpoint controller
5	W	Customer takes its shopping items
6	W	Customer pays

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User select a store to buy things;

User opens the application;

User goes to the store;

User shows its number to security staff;

User takes its shopping items;

User pay.

It follows the list of shared phenomena:

1.1.1

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1.1.1 Shared phenomena

Phenomena	Controller	Description
1	W	The store sets the maximum amount of people for a group
2	W	The store sets the maximum amount of people inside a certain sector
3	W	Customer enters in the (digital) queue
4	W	Customer checks the estimated waiting time
5	W	Customer books a visit
6	W	Customer pays
7	W	Customer inserts the items or items' categories in to-buy list
8	W	Customer inserts the approximate duration of the visit
9	M	Customer receives an alert about the time needed to get to the store
10	M	Customer receives a list of alternative time slots
11	M	Customer receives a notification of a free slot

12	W	Customer shows the QR code representing their number to the checkpoint controller
13	W	Customer shows its QR code
14	W	Checkpoint controllers controls a QR code shown by a Customer

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The store sets the maximum amount of people for a group;

The store sets the maximum amount of people inside a certain sector;

User enters in the (digital) queue;

User checks the estimated waiting time;

User books a visit;

User inserts the items or items' categories in to-buy list;

User inserts the approximate duration of the visit;

User receives an alert about the time needed to get to the store;

User receives a list of alternative time slots;

User receives a list of alternative stores;

User receives a notification of a free slot;

User shows the QR code representing their number to the security staff;
User shows its QR code;
Security staff controls a QR code shown by a user.

It follows the list of machine phenomena:

1.1.1

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1.1.1 Machine phenomena

Phenomena	Controller	Description
1	M	System computes the number of a client
2	M	System calls a number
3	M	System verifies if a number is the number of the customer which should enter
4	M	System computes the estimated waiting time (for each customer)
5	M	System computes mean duration of a visit for a long-term customer
6	M	System evaluates the distance between the customer and the store
7	M	System finds alternative time slots
8	M	System finds other near stores

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System computes the number of a client;
System calls a number;
System verifies if a number is the number of the customer which should enter;
System computes the estimated waiting time (for each customer);
System computes mean duration of a visit for a long-term customer;
System evaluates the distance between the customer and the store;
System finds alternative time slots;
System finds other near stores.

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+ **Detection time**: the service provider is informed of the fault;
+ **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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2. https://docs.oracle.com/cd/E20295_01/html/821-1217/fjdch.html#scrolltoc;

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Once a customer has purchased all the desired items and paid, he or she will have to show their QR code to a checkpoint controller once again. This step does not check for the validity of the token, it just registers that a customer has left the store and thus a new available spot can be occupied by a customer in the store.

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Assumption?

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they have

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if they have booked a visit

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Queuing customers cannot form groups, they can only be single clei

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At the exit of the store, some employee will scan the QR code once again to register that a customer has left the store. This could either be done by a different employee, or even by cashiers after payment.

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Web browser: it is necessary to run the web app (descrivere)

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Windows

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Ticket machine

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It is chosen over the other OS because it is the most popular among ticket machines

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Furthermore, if a customer is in the queue for store S they cannot book a ticket for queuing for another store $S_1 \neq S$.

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Suggested time slots always have a total duration between 15 and 20 minutes.

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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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0.0.0 Requirements to goal mapping

Requirements must be mapped in the goals of the application. Goals must be granted given the domain assumptions and the requirements. Here there is a list of the mappings between the requirements and the goals of the application. We adopt the convention to identify the requirements with the format RN where N is the requirement number and GN is the goal number N:

Req.	Goals	Mapping reason
R1	G1, G2, G3, G10	
R2	G4, G12	
R3	G1, G2, G10, G12	
R4	G1, G2, G3	
R5	G1, G6, G8, G11	
R6	G1, G4, G7, G8	
R7	G4, G7, G9	
R8	G4, G7, G9, G10	
R9	G4, G6	
R10	G6, G8	
R11	G7, G13	
R12	G4, G13	
R13	G2, G4, G7	
R14	G2, G14	
R15	G2, G12	
R16	G4, G14	
R17	G9, G10	
R18	G9, G10	
R19	G4, G13	
R20	G13	
R21	G4, G12	
R22	G14	
R23	G9	

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The system must have a high rejection of errors and should be extremely reliable. In such a situation, errors cannot happen in the queue management. If an error happens it may make people's life at risk, especially for weak categories like elderly people which are weaker to the virus. Specifically: the system must not have errors in the queue management independently by the number of people waiting in the queue and booking. The approach should be conservative, an error must let less people be in the store and not more people than how many are allowed to be. In the reliability expression the most important factors which have to be reduced are the detection time and the response time, which are the most critical. Indeed, recovery time and repair time, also if important, are less critical. This means that on MTTR components, the major contributors should be the repair time and recovery time.

Page 28: Formatted	Marco Petri	10/11/2020 16:48:00

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The system is normally expected to run 24/7, except for short interruptions (4 hours maximum) due to maintenance. To minimize the damage caused by the temporary lack of the service, these interruptions need to happen when hardly any store is open, and hardly anyone will shop. As an example they could happen during the middle of the night. Moreover they will need to be notified at least 48 hours in advance to allow stores and customers to adapt. Overall the system will at least be available 99.9% of the time, corresponding to roughly 9 hours of downtime every year.
(mitigare i guasti) e aggiungo reference

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1.1.1

The security measures are mainly aimed at preventing data leaks and system overloading.
The first goal is achieved by using a secure hash function to store passwords in the Database, as well as a reliable data encryption algorithm for secure communication.
The second goal is instead achieved by appropriately limiting the user's freedom of action. While customers can freely register, store managers and employees will have their accounts manually created by a sys-admin, thus preventing malicious users from creating fake accounts for a non-existent store. Also, the system automatically sets a limit to the maximum amount of time slots that a customer can book and queuing tickets that they can get. Each customer can only have one active ticket at a time, and cannot be in two queues at the same time. These measures will prevent malicious users from overloading a queue or from booking an excessive number of time slots, so that legitimate customers can regularly use the system.

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Page 28: Inserted	Marco Petri	10/11/2020 16:48:00

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1.1.1

The system will be monitored on a weekly basis, by collecting data about performance and anomalies/faults during its execution. Such data will be used to build useful statistics that will be used by a dedicated team in charge of maintenance. They will have to investigate deeper and possibly find parts in the code that jeopardize performance or cause faults. Once such parts were individuated, they will be appropriately modified by the team, so that the system can improve and evolve adequately. If necessary, the maintenance team can cooperate with the development section in order to ask for elucidations regarding the code and agree on possible solutions.
However, it is also desirable that our system does not require frequent maintenance. For this reason the development team (or a dedicated testing team) should extensively test the source code and achieve coverage of 80% or above.

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The system is developed to be run on all modern mobile . User data can be accessed on multiple devices, by authenticating as the same user. The ticket machine app will be developed for Linux, Android, and Windows to offer high compatibility, such that hardly any smart ticket machine will not be compatible.(puo girare su ogni dispositivo)

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All

Meetings 9.5hrs

Header and footer changes

Page 1: Inserted	Marco Petri	17/11/2020 23:19:00

Purpose

Page 1: Inserted	Marco Petri	17/11/2020 23:19:00

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Text Box changes

Header and footer text box changes

Footnote changes

Endnote changes