CLup: Customers Line-up

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Software Requirements Specification Document

Version: (1.0) **Date: (29/11/2020)**

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1. Introduction

1.1 Purpose

This SRS describes the software functional and non-functional requirements for release 1.0 of the CLup: Customers Line-up. This software allows store managers to regulate the influx of people in the building and, on the other side saves people from having to line up and stand outside of stores for hours on end, all requirements specified here are high priority and committed for release 1.0.

1.2 Scope

The Clup: Customers Line-up software consists of following major functions:

(1) To allow the store managers to regulate the influx of people in the building.
(2) Users who intend to visit the store can generate tokens that gives their position in the queue.
(3) To generate QR codes for the user that would be scanned upon entering the store.
(4) The software should display list of available time-slots in a day/time range to the user.
(5) To allow users to book visiting time-slots and expected duration of the visit.
(6) To allow users to indicate list and categories of items to purchase.
(7) The software should be able to suggest users for alternative time-slots(same day or different day), changes to visit other stores(same chain or chain-independent)in case of time-slots clashes with other users or maxing out the pre-defined capacity of the stores.

1.3 Process Requirements

There are no constraints nor requirements on the process to be followed in the application.

1.4 Environmental Constraints

There are no environmental constraints, ither than the fact that the application should be as widely available as possible.

1.5 Project Restrictions

There are no specific restrictions.

1.5 Project License

There are no constraints on the licenses to be used for the developed team. A GPI FLOSS license(or a LGPL license) is recommended.

1.6 References

Score 2021
Project Proposal - CLup(Customers Lineup)
Project Sponsor - Matteo Rossi, Politecnico di Milano

2. The Overall Description

The product described in this document is a software - C-Lup (Customers Line-up) which enables store access to the users in a smart and efficient way.

2.1 Product Perspective

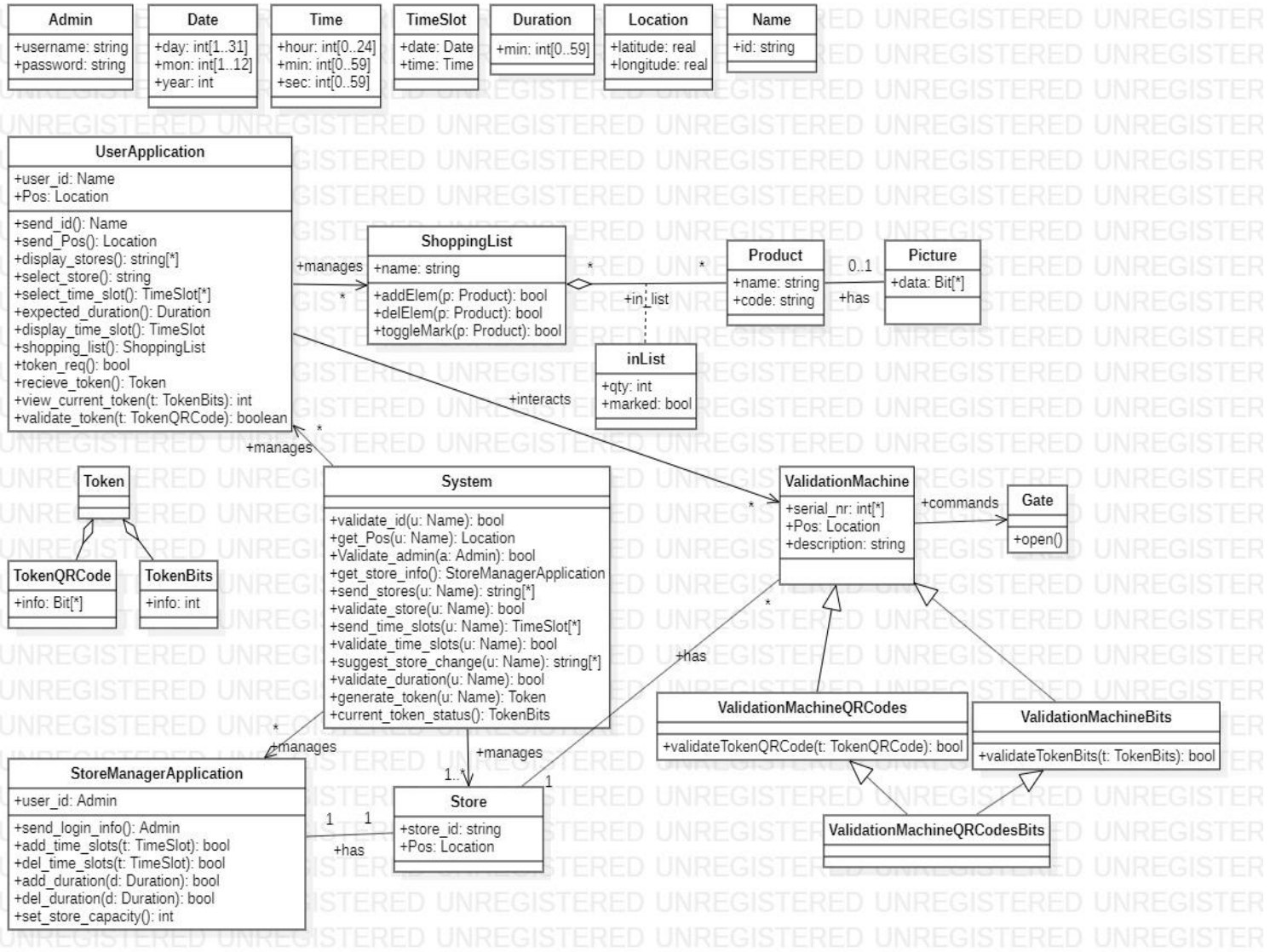

Figure 1. UML diagram - CLup(Customers Line-up) software

2.1.1 Product Functions

The set of functionalities that are supported by the CLup are documented below-

Generate Tokens
The user uses the user application to send request to the system to generate tokens that gives their position in the queue. The generated token is a integer number displaying the user's queue position. Based on the queue position, the user can wait near the vicinity of the store and wait until their number is called(or closed to being called).

Generate QR Codes
The user uses the user application to send request to the system to generate QR code to be scanned upon entering the store through the validation machine.

Display Time Slots
The user application uses the loction of the user to dislay a list of nearby stores and upon selecting the preferred store, it display a list of available time-slots through the user application and the user can then select a time-slot, expected visit duration based on their convenience.

ShoppingList
The users can add a list of items/products based on their categories and modify them.

System
The system manages the following list of functions –

- *It validates the store manager(Admin) Login credentials.*
- *It receives the store info(store id, store location, time-slots, expected visit duration and store capacity) from the store manager(Admin) through store manager application.*
- *It saves the store info in the systems database.*
- *It validates the user identification.*
- *It send a list of stores to the user based on their mobile device gps location coordinates or manual location of the user.*
- *It validates the users preferred store selection, time-slots and expected duration of visit by comparing the store info which was received from the store through store manager application.*
- *Based on the validation results, the systems suggests the user to change the preferred store, time-slots and duration or suggests to change the store itself giving search results of other stores in the users vicinity.*
- *It generates token(a numerical number based on the sequence of the queue for the store) and a unique Token QR code – sent ot the user application which is scanned by the user through the validation machine upon his entry at the store.*

Validation Machine
The Validation machine interacts with user application of the user and validates the Token and QR codes. Upon successful authentication, it commands the gate to open allowing the user to enter the store.

Gates
The gates interacts with the validation machine for entry of users in the store. The gate opens when the users successfully scans the unique QR code saved in the user's application through the validation machine. The gate doesn't open when the QR code is invalid or when it violates the current queue position.

2.1.2 Software Interfaces

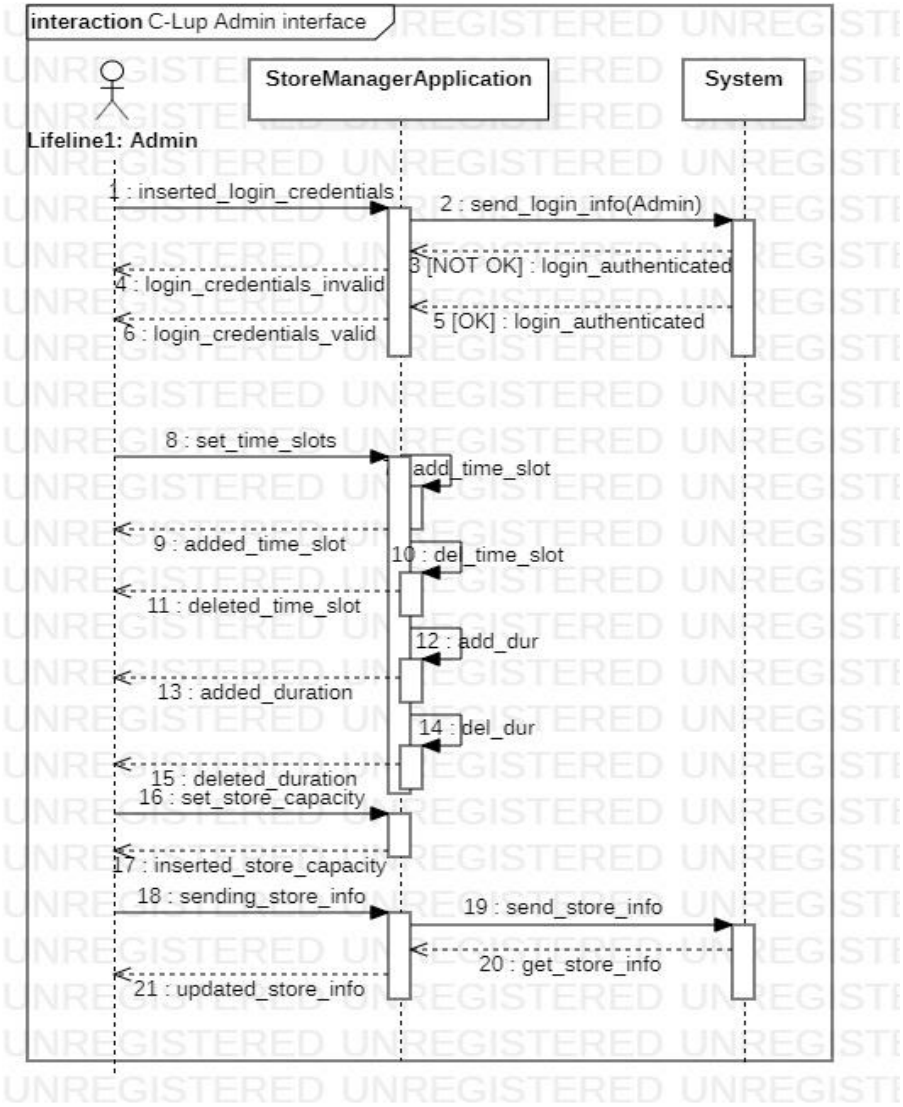

Figure 2. Store Manager(Admin) interface with the System

The store manager inserts the login credentials into the store manager application.The login credentials are unique username and password given to the store manager by the system administrator and is unique to each store. The store manager applications sends the admin login credentials to the system for authentication. If the login credentials are invalid, the admin is prompted a message stating that the login credentials are invalid and suggest for re-entry of login credentials. Upon successful authentication through the system, the admin receives a message from the system to the store manager application stating that the login credentials are valid. The admin can now add time-slots, add expected visit duration or modify them. The admin finally enters the store capacity into the application and send the entire store info(store id, store location, time-slots, expected visit duration and store capacity) to the system and receives a reply message from the system when the details are updated.

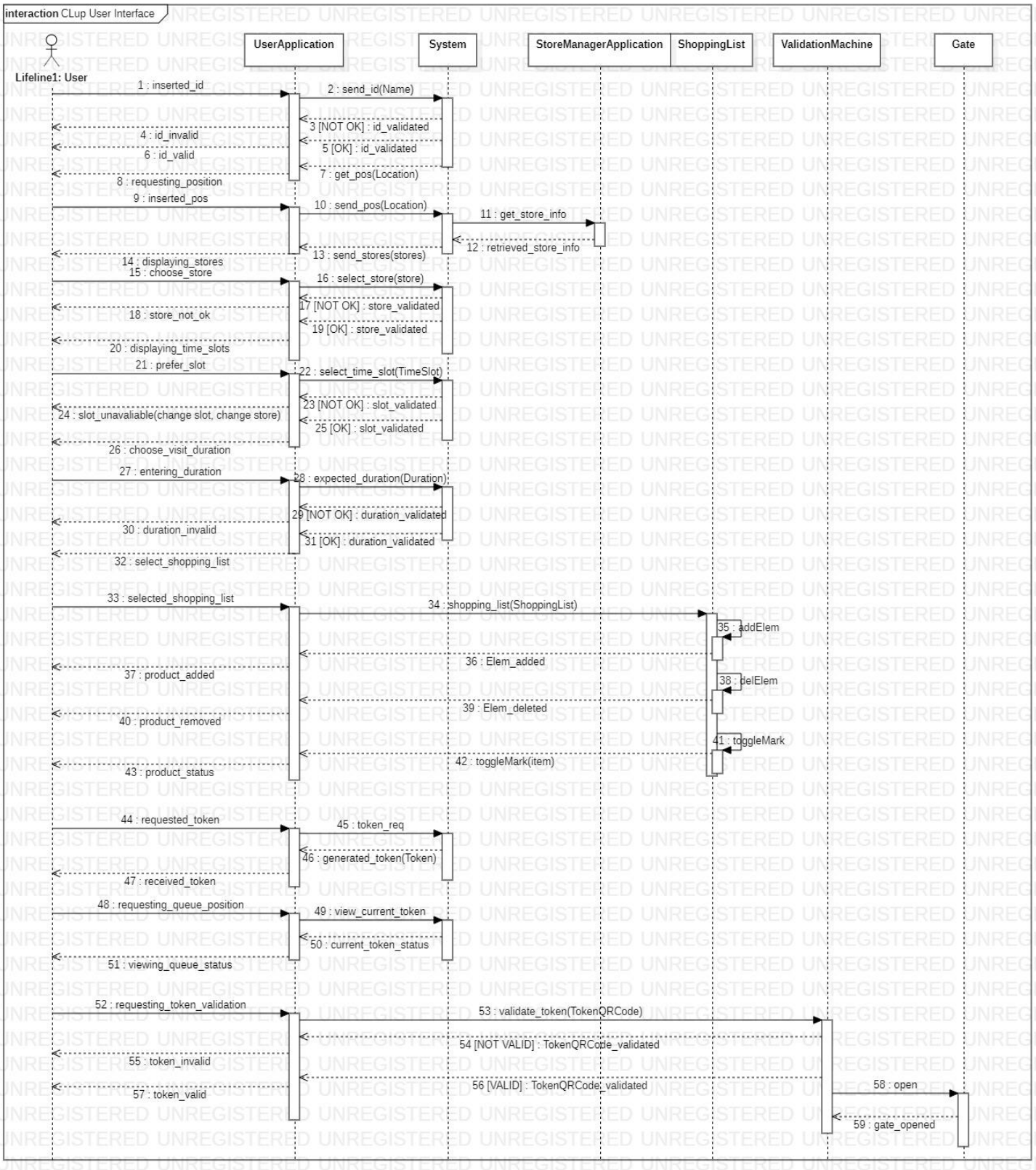

Figure 3. User's interface with the System

The user enters the user id(a unique name/guest name) into the user application. The user id is sent to the system for validation(Example of admissible id's – andrea21, george672, Example of incorrect id's -

%4@$-+) If a user enters name Andrea, it may or may not be accepted by the system because the system accepts a unique name different than the other user's name stored in the database. Similary if the user enters symbols in the name, it gets flagged automatically as invalid name in the system. If the user id is invalid, the user is propted to re-enter a new name id until the conditions of a valid name id are satisfied. If the user id is valid, the user is requested to provide his location by manually entering it or by access grant through the user's device gps coordinates. After receiving the user's location, the systems scans the store info in the database which was received from the store manager previously. The system compares the user location with the stores location and send a list of stores for selection by the user in the user's location perimeter. The user enters the preferred store, time-slots and expected duration through the user application. The application send the user inputs to the system, the system check the user inputs and matches it with the store info in the database, validates the choices and sends the store confirmation to the user. If the user's inputs doesn't match with those of the store info in the database , the system suggests for changing the store or changing the preferred slots and visit duration. Once the store is confirmed, the user selects the ShoppingList interface through the user application and can add list of products and mark their quantities based on their categories. The user can also modify his preferences through the same shopping list interface by adding or deleting products. The user uses the user application to request the system to generate the Token(a numerical number corresponding to the current queue position for that particular store) and a unique Token QR code. The user requests the current queue position through the user application and the request is passed to the system. The system then replies to the user regarding the current queue position to the user through the user application. The user scans the QR code through the user application at store's validation machine for entering the store. If the user violates the current queue position by scanning the QR code before the current queue position, the validation machine will notify the user to wait until his/her position in the queue. If the QR code is valid, the validation machine interacts with the gates to open for entering the store. Alternatively, if the user doesn't posses a mobile device or the mobile application – they can manually collect the printed token from the store's validation machine. The store's validation machine will issue a token based on the last tokens generated by the system(For example – if the current queue position is 5 and there are 5 more users which have a token generated by the system and are waiting in a virtual queue, the validation machine issues a token with 11 printed on it)*