Politecnico di Milano

Department of Computer Science and Engineering

Software Engineering 2

CLup – Customers Line-up Requirements Analysis and Specification Document

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Contents

Chapter 1

Introduction

1.1 Purpose

1.1.1 Description of the Given Problem

1.1.2 Goals

Bla bla bla...

Goals:

- **[G1]**: Keep customers in safe condition w.r.t the *"decreto del Presidente del Consiglio dei ministri"* (d.P.C.m) in force inside the store.
- **[G2]**: Allow customers to line up from a remote device.
- **[G3]**: Allow store manager to monitor entrances.
- **[G4]**: Provide estimation of the waiting time.
- **[G5]**: Notify customers that their turn is coming.
- **[G6]**: Allow customers to line up from a physical spot.
- **[G7]**: Allow customers to book a visit from a remote device.
- **[G8]**: Infer customers visits duration.

1.2 Scope

1.3 Definitions, Acronyms, Abbreviations

1.4 Revision History

1.5 Reference Documents

1.6 Documents Structure

Chapter 2

Overall Description

2.1 Product Perspective

2.2 Product Functions

2.3 User Characteristics

2.4 Assumptions, Dependencies and Constraints

In the scenario we are taking into consideration, we assume the following domain assumptions:

- [D1]: Customers respect the d.P.C.m impositions.
- [D2]: If customers have lined up from remote, they shall approach to the store with the smartphone.
- [D3]: If customers indicate the category of products they would buy, they won't buy other things.
- [D4]: Customers lining up remotely shall have a Global Positioning System (GPS) module inside the smartphone.
- [D5]: Customers lining up remotely shall accept GPS localization permissions.
- [D6]: Customers lining up remotely shall keep Internet connection active.
- [D7]: Customers lining up remotely shall keep notification option active.
- [D8]: Customers enter in the store only if the system authorized them.

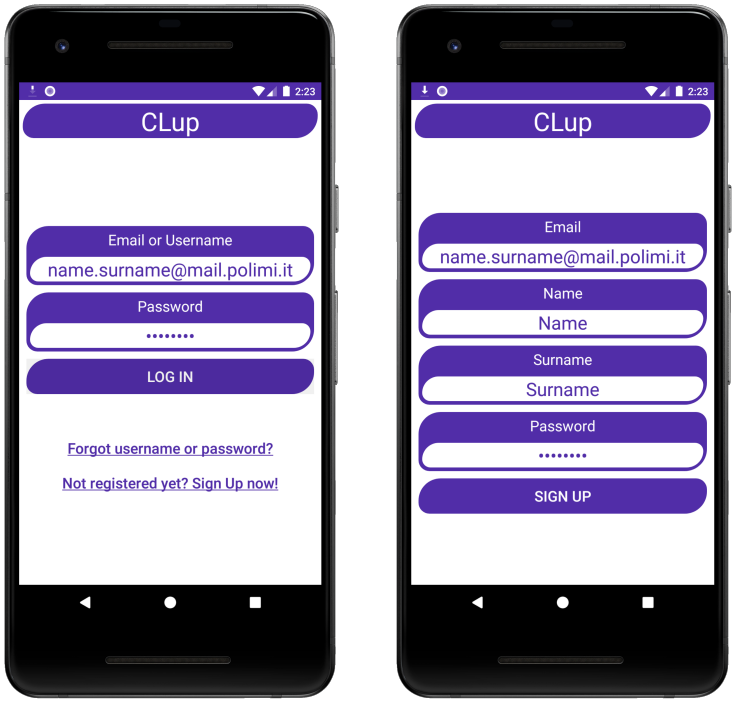
- [D9]: Customers go away from the store after they have done their shopping.
- [D10]: Customers lining up from the physical spot take care about the printed QR code.
- [D11]: Customers show the QR code to the scanner to be accepted by the system.

Chapter 3

Specific Requirements

3.1 External Interface Requirements

3.1.1 User Interfaces



(a) Log In page.

(b) Sign Up page.

Figure 3.1: Example of Log In and Sign Up pages.

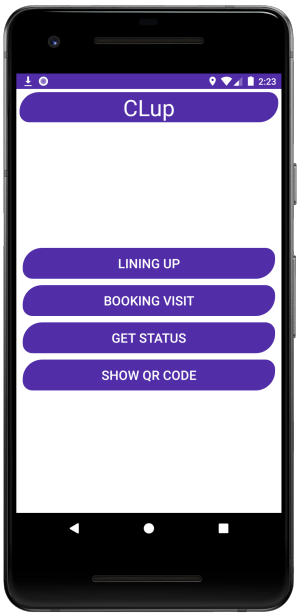
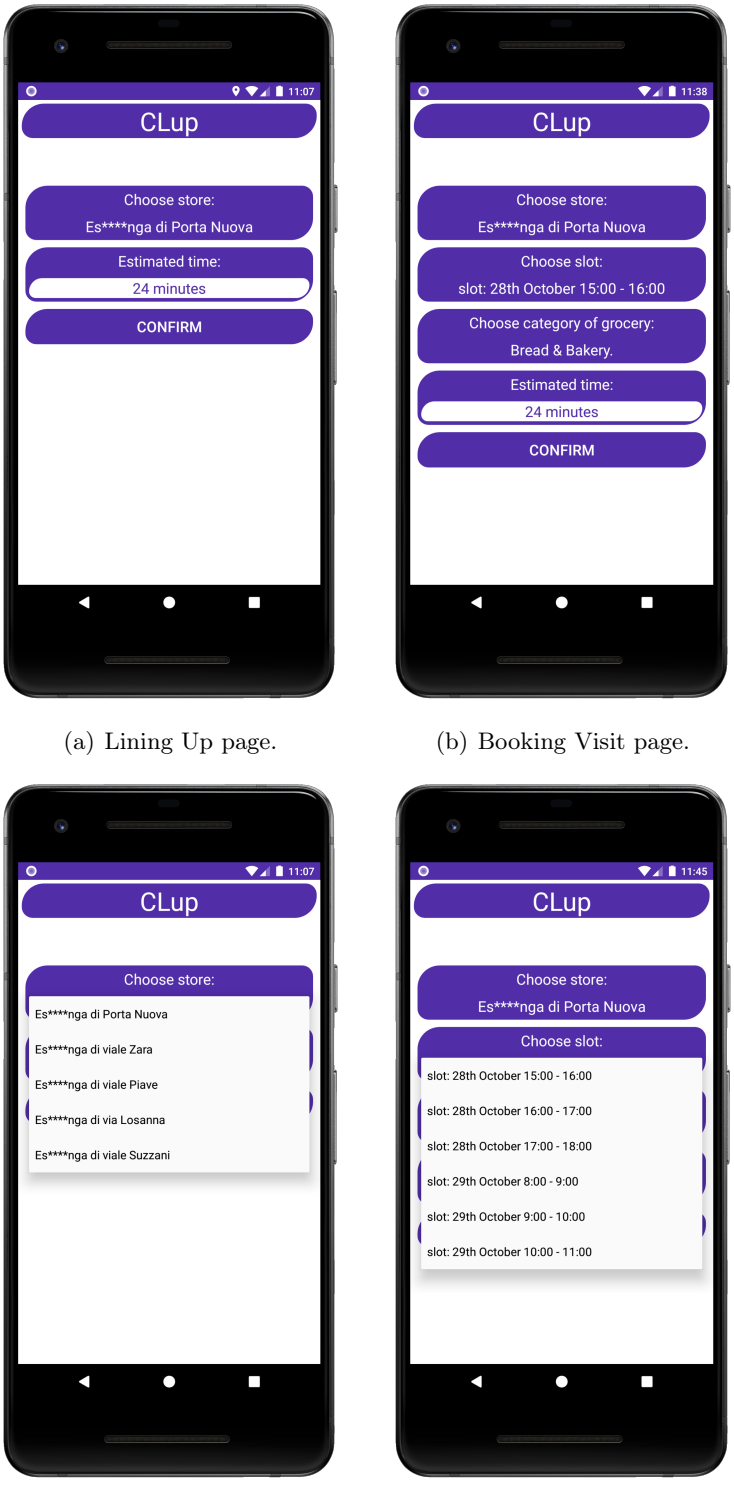


Figure 3.2: Home page.



(a) Lining Up page.

(b) Booking Visit page.

(c) Lining Up page with expanded spinner.

(d) Booking Visit page with expanded spinner.

Figure 3.3: Example of Lining Up and Booking Visit pages.

(a) Get Status page. (b) Show QR code page.

Figure 3.4: Example of Get Status and Show QR code pages.

3.1.2 Hardware Interfaces

3.1.3 Software interfaces

3.1.4 Communications Interfaces

3.2 Functional Requirements

3.2.1 Requirements

Bla bla bla...

G1: Keep customers in safe condition w.r.t the d.P.C.m in force inside the store.

- *Requirements:*
  - **[R]**: The system has to
- *Domain assumptions:*
  - **[D]**: Customers follow the rules imposed by the d.P.C.m in force.
  - **[D]**: Customers enter in the store only if the system, or the store manager, authorizes them.

  - **[D]**: Customers don't stay in the shop longer than necessary.
  - **[D]**: If customers booked a visit to the store and they specify the category of grocery, they won't buy other things.
  - **[D]**:

G2: Limit the physical line situation in the proximity of the store

- *Requirements:*
  - **[R]**: The system has to estimate the residence time, of a customer, in the store.
  - **[R]**: The system has to estimate the time needed to arrive, to the store, from the position of the customer.
  - **[R]**: The system has to monitor the global position of the customers.
  - **[R]**: The system has to limit the number of releasable QR code if imposed by the store manager.
- *Domain assumptions:*
  - **[D]**: Customers line up physically only if they have a valid (non expired) QR code.
  - **[D]**: Customers go away from the store after they have done their shopping.
  - **[D]**:

G3: Allow customers to line up from a remote device.

- *Requirements:*
  - **[R]**: Customers must be registered and logged in the application.
  - **[R]**: The application has to implement the possibility to line up remotely.
  - **[R]**: The application has to store locally the QR code.
  - **[R]**: The application has to implement the possibility to delete a lining up operation.
  - **[R]**:
- *Domain assumptions:*
  - **[D]**: The customers have a smartphone.
  - **[D]**: The customers have installed the Customers Line-up (CLup) application.

- **[D]**: The customers have a GPS module inside the smartphone.
- **[D]**: The customers allow the permissions requested by the application.
- **[D]**: The customers keep Internet connection active.
- **[D]**: The customers keep notification option active.
- **[D]**:

G4: Allow store manager to monitor entrances.

- *Requirements:*
  - **[R]**: The application has to show, to the store manager, analytical data concerning the influx of people to the store.
  - **[R]**: The system has to allow, to the store manager, the possibility to limit the number of QR code released.
  - **[R]**: The application shall allow the store manager to scan the QR codes.
  - **[R]**:
- *Domain assumptions:*
  - **[D]**: There is always a store manager present in the store.
  - **[D]**: The store manager has a digital device.
  - **[D]**:
  - **[D]**:
  - **[D]**:

G5: Allow customers to line up from a physical spot.

- *Requirements:*
  - **[R]**:
- *Domain assumptions:*
  - **[D]**:

G6: Allow customers to book a visit from a remote device.

- *Requirements:*
  - **[R]**:
- *Domain assumptions:*
  - **[D]**:

G7: Infer customers visits duration.

- *Requirements:*
  - **[R]**:
- *Domain assumptions:*
  - **[D]**:

3.2.2 Definition of Use Case Diagrams

Bla bla bla...

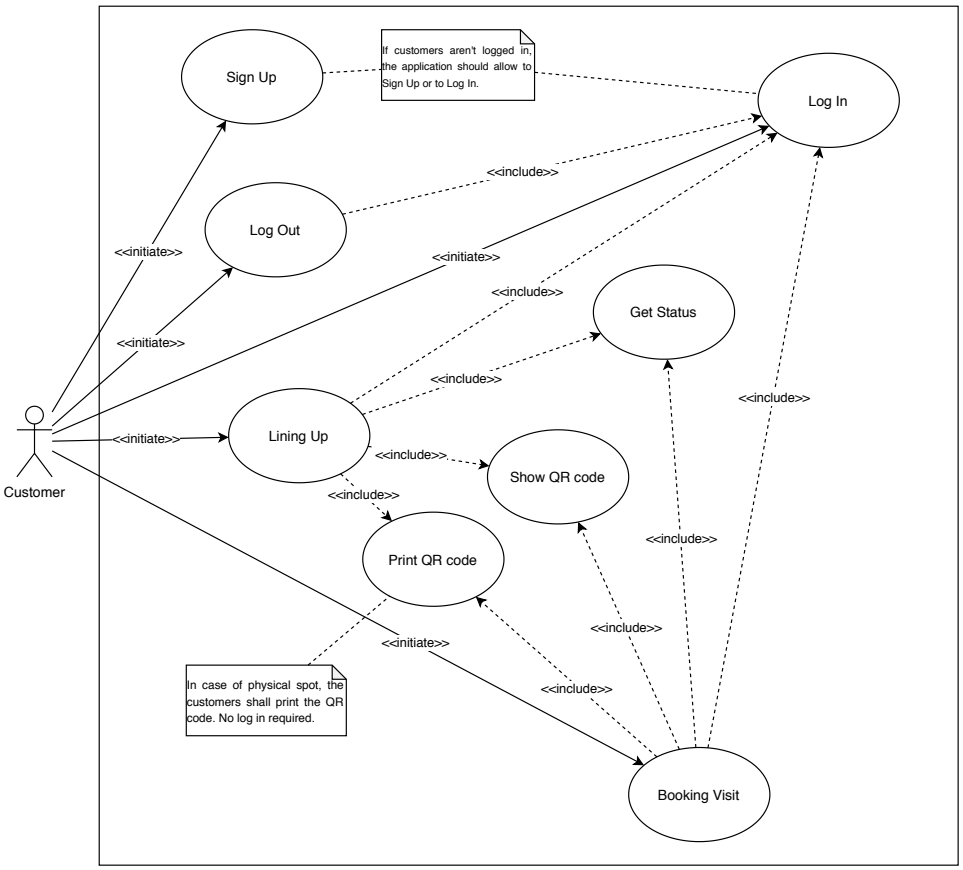


Figure 3.5: Customers use cases diagram.

Name	Sign Up
Actor	Customer
Entry Conditions	Customer is on the Sign Up page.
Event Flows	• Customer inserts the requested information in the form. • Customer clicks on the Sign Up button.
Exit Conditions	Sign Up completed successfully and customer is logged in, then the application shows the Home page.
Exceptions	• Customer's username already in use. • Empty form field. • Policy agreement rejected. • Lost Internet connection.

Table 3.1: Customer - use case: **Sign Up**.

Name	Log In
Actor	Customer
Entry Conditions	Customer is on the Log In page.
Event Flows	• Customer inserts the requested information in the form. • Customer clicks on the Log In button.
Exit Conditions	Log In completed successfully and customer redirected to Home page.
Exceptions	• Customer's username or password incorrect. • Empty form field. • Lost Internet connection.

Table 3.2: Customer - use case: **Log In**.

Name	Log Out
Actor	Customer
Entry Conditions	Customer is on the Log Out page.
Event Flows	• Customer clicks on the Log Out button.
Exit Conditions	Log Out completed successfully and customer redirected to the Log In page.
Exceptions	• Customer already logged out. • Lost Internet connection.

Table 3.3: Customer - use case: **Log Out**.

Name	Lining Up
Actor	Customer
Entry Conditions	Customer is on the Home page
Event Flows	• Customer clicks on the Lining Up button. • Customer inserts the requested data in the form. • Customer clicks on the confirmation button.
Exit Conditions	Lining Up completed successfully, the application returns, to the customer, the Status page and saves the QR code in the main memory.
Exceptions	• Previous Lining Up action was not expired. • Previous Booking Visit action was not expired. • Customer wasn't logged. • QR code cannot be saved correctly on the main memory. • Lost Internet connection.

Table 3.4: Customer - use case: **Lining Up**.

Name	Booking Visit
Actor	Customer
Entry Conditions	Customer is on the Home page
Event Flows	• Customer clicks on the Booking Visit button. • Customer fills the form with the requested data. • Customer clicks on the Submit button.
Exit Conditions	Booking Visit completed successfully and the application returns, to the customer, the Status page.
Exceptions	• Previous Lining Up action was not expired. • Previous Booking Visit action was not expired. • Customer wasn't logged. • QR code cannot be saved correctly on the main memory. • Lost Internet connection.

Table 3.5: Customer - use case: **Booking Visit**.

Name	Show QR code
Actor	Customer
Entry Conditions	Customer is on the Home page
Event Flows	• Customer clicks on the Show QR code button.
Exit Conditions	The application shows the QR code associated to the last Lining Up, or Booking Visit, operation.
Exceptions	• QR code hasn't be saved on the application correctly. • No Lining Up, or Booking Visit, action performed. • Customer wasn't logged.

Table 3.6: Customer - use case: **Show QR code**.

Name	Get Status
Actor	Customer
Entry Conditions	Customer is on the Home page.
Event Flows	• Customer clicks on the Get Status button.
Exit Conditions	The application returns the Get Status page showing information about the last Lining Up, or Booking Visit, operation.
Exceptions	• No operation previously performed, therefore there is no data to show. • Customer wasn't logged. • Lost Internet connection.

Table 3.7: Customer - use case: **Get Status**.

Name	Print QR code
Actor	Customer
Entry Conditions	Customer is acting on the physical spot and he is on the Print QR code page.
Event Flows	• Customer clicks on the Print QR code button.
Exit Conditions	The spot prints the ticket with the QR code.
Exceptions	• Spot finished the paper. • Spot finished the ink. • No more empty slots for the Lining Up in the current day.

Table 3.8: Customer - use case: **Print QR code**.

3.2.3 Use Cases and Sequence/Activity Diagrams

3.2.4 Mapping on Requirements

3.3 Performance Requirements

3.4 Design Constraints

3.4.1 Standard Compliance

3.4.2 Hardware limitations

3.4.3 Any Other Constraint

3.5 Software System Attributes

3.5.1 Reliability

3.5.2 Availability

Chapter 4

Formal Analysis Using Alloy

Chapter 5

Effort Spent

Chapter 6

References

Glossary

CLup	Customers Line-up
d.P.C.m	*"decreto del Presidente del Consiglio dei ministri"*
GPS	Global Positioning System