

Requirement Analysis and Specification Document RASD

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Chapter 1

Introduction

1.1 Purpose

This document is Requirement Analysis and Specification Document(RASD). The main purpose of this document is the following points

- Communicates an understanding of the requirements to the audience and explains both the application domain and the system to be developed.
- Contractual: Make this project formal and written so that it has legal effect.
- As the baseline for project planning and estimation. i.e. size, cost, schedule.
- As the baseline for software evaluation

It can support system testing, verification and validation activities

It should contain enough information to verify whether the delivered system meets requirements

- As the baseline for change control, such as requirements change, software evolves.

And this RASD has the following intended audiences

- Costumers & Users : Some user may interest in validating system goals and high-level description of functionalities.
- Systems and Requirements Analysts: The RASD may help them to write various specifications of other systems that inter-relate.

- Developers, Programmers: The RASD may help the to implement the requirements
- Testers: The RASD may help the to determine that the requirements have been met
- Project Managers: The RASD may help them to measure and control the analysis and development processes

1.2 Scope

1.2.1 Description of the given problem

At the end of 2019, a global epidemic broke out and swept almost all countries in the world in just a few months. Starting in 2020, people's life rhythm has been completely disrupted by this epidemic, a lot of cities are blocked, people are allowed to exit their homes only for essential needs, everyone had to wear masks and respect the social-distancing at least 1.5 m. In the public area, the human community has to take measures to avoid the crazy spread of the virus. Restaurants began to use dividers to separate the table, supermarkets and museums began to restrict flow of people, the school also adopted into two classes mode: online and onsite.

In this situation, a new problem arises, how to delay the spread of the virus through technical means?

Since grocery shopping is the most needed activity under the lock-down, so let's narrow the problem to grocery shopping.

In the supermarket, In order to meet these strict rules, many challenges have arisen, so, we can turn to technology, in particular to software applications, to help navigate the challenges created by the imposed restrictions.

So, this project appeared - Customers Line-up(CLup).

Customers Line-up(CLup) is an user-friendly application, it has two main goals.

- First of all, the CLup have to allow store managers to regulate the influx of people in the building.
- And then, it will help people to avoid lining outside of stores for hours.

1.2.2 World Phenomena

WP_1	cell
WP_2	cell
WP_3	cell

1.2.3 Shared Phenomena

SP_1	cell
SP_2	cell
SP_3	cell

1.3 Definitions, acronyms, abbreviations

1.3.1 Definitions

- Click Customer : The customer has the required technology to access the store. I.e a smartphone. They can use the customer terminal software.
- Brick Customer : The customer doesn't have the required technology to access the store, they have to hand out "tickets" on the spot.
- Store Manager : They have to manage the Store System, include the software and hardware.
- Ticket: The ticket is a document which contains three key information: QR Code, the estimated departure time, the queue number. To the click customer, it's E-ticket and to the brick customer, it doesn't contain the estimated departure time.
- QR Code : When customer booked a visit, they will received a QR Code.
- QR Code Scanned Machine : A hardware, the Click Customer can use this machine scan their QR code.
- Tickets Hand-Out Machine : A hardware, the Brick Customer can use it retrieve their Ticket.
- Store Path Map : A store map that includes a finer way which is recommended form Store System.
- Digital Counterpart : A hardware, it with show the queue number.
- Store Back-End System : A software, as the back-end manages all stuffs.
- On-Time Store Data : A dataset that includes the store's on-time date.

- Customer Enter Speed: Dimension: p/h, How many numbers will be called every hour on the digital counterpart
- Total Number of Customers: Real-time total number of customers in the store
- Long-Term Customers : The customers with the high average duration of the visit, we set the threshold value to 1 hour.

1.3.2 Acronyms

- RASD – Requirement Analysis and Specification Document
- CLup - Customers Line-up
- UI - User Interface

1.3.3 Abbreviations

- WP_n : n-th world phenomena
- SP_n : n-th shared phenomena
- G_n : n-th goal
- D_n : n-th domain assumption

1.4 Reference documents

- Specification Document: "R&DD Assignment A.Y. 2020-2021"
- Slides of the "Software Engineering 2" course A.Y. 2020-2021
- IEEE Recommended Practice for Software Requirements Specifications - IEEE Std 830-1998

1.5 Overview

The RASD document consists of five chapters.

Chapter 1 is the introduction chapter, it's an overview of the RASD and project, it describes the purpose of the CLup.

Chapter 2

Chapter 3

Chapter 2

Overall Description

2.1 Product perspective

Because we consider that going out to pick up the number and wait until the scheduled time to come to the supermarket will significantly increase the number of outings, so we did not set up a booking process on the machine.

2.2 Product functions

2.2.1 Functional Requirements

- Each [Click Customer](#) shall be able to:
 - Sign-up
 - Login
 - Book a visit, to complete it, they have to indicate the following data
 - * Indicate the date and time
 - * Indicate the approximate expected duration of the visit
 - * Indicate the categories of items that they intend to buy
 - * Indicate or give by GPS the place they want to depart to the shop
 - Received the [E-Ticket](#) with QR Code, the estimated departure time and the queue number.
 - Received a [Store Path Map](#).
 - The customer can scan the QR Code at [QR Code scanned machine](#) when they enter **and** leave the store.

- Each **Brick Customer** shall be able to
 - Retrieve the **Ticket** from **Tickets Hand-Out Machine** and wait the **Digital Counterpart** call them.
 - Scan the QR Code at **QR Code Scanned Machine** when they enter **and** leave the store.
- **Store Manager** shall be able to:
 - Login
 - Check out the **On-Time Store Data**
 - Adjust the **Customer Entry Speed**
- The **Store Back-End System** shall be able to:
 - Send the available time/date to the the click customers.
 - Received and schedule the click customers' book, the scheduling have to refer the duration time of each customer.
 - Calculate the time from the click customer's departure place to the store.
 - Send the **E-Ticket** to the click customers.
 - Plan the Store Path Map for each customer.
 - Store the customer's data,include:
 - * Username
 - * Password
 - * Booked data
 - * History visit date and time
 - * Is long-term customers
 - Store the average duration of the personal visit for each customer.
 - Analysis the average duration data and sign the long-term customers.
 - Calculate and store the **On-Time Store Data**.
 - Schedule the query from click customer's book and brick customer's retrieved ticket.
 - Control the **Digital Counterpart** and display the query number.
 - Receive the information from the **QR Code Scanned Machine**.
 - Receive the information from the **Tickets Hand-Out Machine**.

2.2.2 Non-Functional Requirements

- The time from the click customer's departure place to the store that calculate from the [Store Back-End System](#) must enough precise to avoid the customer arriving at the the store too early/late.
- The Store Back-End System must schedule the query reasonably to minimize the wait time.
- The Store Back-End System must mix the book and brick customer's retrieved ticket reasonably to allow the click customers enter the store near the book time, by the way avoid making the brick customers wait too long.
- Cause of everyone needs to do grocery shopping, the software for the click customer should be enough simple to use,.

2.3 User characteristics

2.4 Constraints

2.5 Assumptions, Dependencies

2.5.1 Domain Assumptions

- D_n

2.5.2 Goals

- G_1

Chapter 3

Specific Requirements

3.1 External Interface Requirements

3.1.1 User Interfaces

3.1.2 Hardware Interfaces

3.1.3 Software Interfaces

3.1.4 Communication Interfaces

3.2 Functional Requirements

3.2.1 User Class 1

Functional Requirement 1.1

3.2.2 User Class 2

Functional Requirement 2.1

3.3 Performance Requirements

3.4 Design Constraints

3.4.1 Standards compliance

3.4.2 Hardware limitations

3.5 Software System Attributes

3.5.1 Reliability

3.5.2 Availability

3.5.3 Security

3.5.4 Maintainability

3.5.5 Portability

3.6 Other Requirements

Chapter 4

Formal Analysis Using Alloy

Chapter 5

Effort Spent

- Kong Xiangyi

Date	Task	Hours
2020/10/10	Group discussion project plan	4h
2020/10/31	Modified the purpose and scope of the RASD	2h

- Zhang Yuedong

Date	Task	Hours
2020/10/10	Group discussion project plan	4h
2020/10/19	Added the project's architecture	1h
2020/10/30	Added the purpose and scope of the RASD	2h
2020/11/16	Write the Product functions part	2h

