Course: Software Engineering I

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Project Name: Automated Garage System

Software Requirements Specifications

Initial Phase 1-(SRS)

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CS251: Phase 1 – Garage Automated System

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Document Purpose and Audience

- **The purpose of this SRS software requirements specification (SRS) is to determine the scope of this project and clarify any definitions, acronyms or abbreviations. It also establishes the major requirements necessary to develop an automated garage system.**
- **This document is intended to be reviewed by client, developers, designers and project manager.**

Introduction

Software Purpose

- **The purpose of this project is to track and manage occupancy of a parking garage automatically using software systems and devices that allow customers to find and reserve available parking places.**

Software Scope

This software is composed of the following components:

- **Garage Access Control: Detects and controls vehicles that drives up on to the lift and those that leaves the garage.**
- **Occupancy Monitoring: Monitors the parking spots availability in the different parking decks.**
- **The registration software: Manage customers' registration and reservations.**
- **Administration: allows manager to view monthly reports and information.**

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Definitions, acronyms, and abbreviations

Term	Definition
License-plate readers	uses digital cameras and a license-plate recognition system to identify license-plates.
Passenger vehicles	are those who can be parked in this parking garage. That is, large trucks, busses, etc., cannot enter this parking garage.
A Lift Platform/ Vehicle elevator	is used to lift passenger vehicles between decks levels.
Parking spot	is a place where a vehicle can be parked.
Sensor	is a smart device that is capable sense the occupancy of the spot by a vehicle.
Registered/Non-Registered Customers	Registered customers have access to the upper decks whereas the non-registers have access to the ground level only.
Guaranteed reservations	allow customers to make a (monthly) contract with the parking garage for a parking spot. Such customers are desirable because they can provide predictable and steady income.
Cancelled Reservation	Is a reservation that's cancelled by the customer at least 1 hour prior to his reservation.
Penalty charges	Is an amount of money paid by a customer when he cancels a reservation within the unacceptable time (less than 1 hour to the reservation time).
Back up	Is to save a copy of daily reports at least once a day, to prepare for any natural or human-induced disasters that may occur.

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Requirements

Functional Requirements

- **1. Garage Access Control**
  - **1.1. A license-plate reader at the lift platform should read the vehicle reservation number when a vehicle drives up on to the lift platform.[complexity 4]**
  - **1.2. A license-plate reader at the exit pathway records the reservation number of the departing vehicles. [complexity 4]**

- **2. Occupancy Monitoring**
  - **2.1. Installing sensors to parking spots that sense the occupancy of a spot by a vehicle. [complexity 3]**
  - **2.2. Ground-level digital display that indicates available vacancies for the walk-in customers without reservations and it also indicates whether the ground level is empty. [complexity 3]**
  - **2.3. Vehicle-elevator digital display that shows messages like: denied access to upper decks or information for registered customers of changes in their reservation. [complexity 4]**

- **3. The registration software**
  - **3.1. For registration, The customer may provide the license plate numbers for his or her vehicle(s), but this is not required to allow registration of customers who do not own vehicles, but will use a borrowed or rented vehicle. [complexity 2]**
  - **3.2. The license-plate number is required when reserving an empty spot in the garage. N.B: Reservation for an empty spot can be done when the registered customer arrives to the garage. [complexity 2]**
  - **3.3. Guaranteed reservations allow customers to make a monthly contract with the garage for a parking slot. [complexity 2]**
  - **3.4. A registered customer can edit/cancel his reservation at least an hour prior to the reservation time to avoid penalty charges. [complexity 2]**

- **4. Administration system**
  - **4.1. A manager logs into the system and views monthly reports, payroll information, and changes prices for the parking garage. The manager will also be able to view the number of reserved cars and the number of walk-ins. [complexity 2]**

- 4.2. Account Information, Parking data and daily reports shall be backed up once a day to prepare for any natural or human-induced disasters that may occur. [complexity 2]
- 4.3. The system shall allow the valet to view customer information via tablet/smartphone if required. [complexity 5]

Non Functional Requirements

This section specifies the non-functional requirements required for the Automated Parking Garage System.

1. **Performance:**
   - **The parking system would be able to update parking schedule for every 30 seconds. This involves designing an optimized schedule.**
   - **The parking system can support 100 passengers and 1500 reservations.**
   - **The parking system can provide the user with information about the empty spaces in the garage with the most recent update.**
   - **The parking system can send a SMS or an email to remind the registered customer with his reservation.**

2. **Reliability**
   - **A registered customer may edit or cancel his reservation an hour before their reservation time to avoid any penalty charges.**
   - **The parking system send an activation code to mobile using SMS to check if a customer inputs valid phone number into a reservation request form or not.**
   - **The system save reservations information on a persistent storage and on an online server to make sure it couldn't be lost.**

3. **Security**
   - **The parking system must prevent other customers or unauthorized users to access or be able to edit a customer's account details or reservations.**

4. **Effectiveness**
   - **The parking system provide customers to reserve a place with the fewest number of mouse clicks and keystrokes.**

5. **Accuracy**
   - **The license-plate reader must use digital camera and license-plate recognition system that are qualified enough to get 100% accurate numbers.**

6. **Maintainability**

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- **The Parking system mustn't need more than 3 hours of weekly maintenance.**

7. **Environmental**
   - **The Parking system mustn't cause physical harm to users and non-users for example: the system shouldn't tell a user to park in an already occupied spot or park in somewhere in the main garage's pathway.**