

# CS251: Software Engineering I

## 2014-2015

### Project Title : Automated Parking Garage System



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### Problem Statement

The purpose of this project is to track and manage occupancy of a parking garage and allow customers to find and reserve available parking places.

The parking garage will be remodeled so that the parking decks above the ground level will be accessible only using an elevator that will lift the vehicles to different decks. All vehicles will depart the garage by descending down the designated exit pathway to the ground level. The ground level will be reserved for walk-in customers. All other levels will be reserved for registered customers that made advance reservation. Only passenger vehicles can be parked in this parking garage. That is, large trucks, busses, etc., cannot enter this parking garage.

**Garage Access Control:** The garage will have installed two license-plate readers: one at the lift platform and the other at the end of the exit pathway. The reader will use a digital camera and a license-plate recognition system. When a vehicle drives up on to the lift platform, the license-plate reader will read the vehicle reservation number. The other reader will record the reservation number of the departing vehicles.

**Occupancy Monitoring:** Every parking spot has installed a sensor that senses the occupancy of the spot by a vehicle. There will be a digital display installed on the ground floor that will indicate available vacancies for the walk-in customers without reservations. This display will also indicate if the ground-level parking area is full.

There will be a digital display installed in the vehicle elevator to display various messages. Other messages will include information for non-registered customers of a denied access to upper decks, or information for registered customers of changes in their reservation.

**The registration software:** Customers will register at the company website in advance of using the parking garage. At the registration time, the customer will provide demographic information and a valid email and his or her credit card number. 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. The license plate

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numbers is required when **reserving an empty spot** in the garage. Reservation for an empty spot can be done when the registered customer arrives to the garage.

It may also support **guaranteed reservations**, which 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.

A registered customer may edit/cancel their reservation an hour before their reservation time to avoid any penalty charges.

**Administration:** The manager will be able to login into the system to view monthly reports, payroll information, and change prices for the parking garage. The manager will also be able to view the number of reserved cars and the number of walk-ins. 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.

The system shall allow the valet to view customer information via tablet/smartphone if required.