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| Faculty of ACES. 2nd Year. |
| Software Engineering Methods and Concepts. |
| Course Assignment 2015-2016 |



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## 1 Production Function

The Car Park System will perform the following functions:

* Accept tokens and provide services
* Decrements the number of spaces available in the car park when the car enters
* Accepts payments
* Allow the customer to pay with multiple different types of payment
* Allow customers to reserve spots in the car park
* Admin staff are alerted when a securely parked car attempts to leave without unlocking the spot
* Increments the number of spaces available in the car park when the car leaves
* Allow companies to offer discount schemas (e.g. fixed price per day or cheaper rate per hour)
* Allow users to insert there coin and apply the discount based on the company they work at
* Shows Available spaces on each floor
* Shows Available spaces on a display’s around the city
* Offer secure car park services
* Allow admin staff to activate an emergency mode if one was occurred
* Allow admin staff in maintenance mode to be notified when they
* Allow staff to see the entrance and exits with cameras
* Allow staff to create coins in the event the customer loses there coin
* Allow staff to manually open the entrance and exit’s
* Allow messages to be displayed on the pay machine displays in the event of an emergency
* Allow messages to be displayed on the city display in the event of an emergency
* Allow the number of secure parking spots to be displayed separately to standard parking spots

## 2 General Constraints

The following design constrains are for the Car Park System:

* The customer cannot access the car park when it is full or in case of emergencies
* In case of emergencies all cars cannot leave or enter the car park to allow the smooth entry for emergency vehicle.
* The customer must pay by cash first then the second payment method if they want to pay with multiple payment methods
* In case of emergency all cars parking fees freezes until the emergency situation is over.
* The program will be written in C#
* In case of a lost token the customer must contact the management office with the relevant identification documents to issue a replacement.
* The secure parking requires the driver to be the same driver that drives the car out of the car park.
* The secure parking requires the coin to be inserted into the secure parking spot that has being occupied to activate the security features.
* The secure parking will require the driver’s face to be visible at entrance and exit to the car park.
* The car park staff will have to check the driver if the software detect a different driver is exiting the car park.
* The entry and exit barrier will may not be operational when maintenance mode requiring the staff to manually open the gates

## 3 External Interface Requirements

User Interfaces

The car park system will have the following users:

* The car park user.
* The car park management staff.

Car Park User

**Using the Car Park.**

The customer will enter the car park first and press a button then receives a token. The barrier will the raise to allow the vehicle to enter and decrements the number of spaces available in the car park. The customer will then park into an empty bay and park there if the spot is a secure parking spot the driver will insert there coin to activate the secure parking. The customer can use the discount system in the company that he works for to activate the parking discount scheme on that coin. When he wants to leave he inserts the token and chooses a payment method. The customer can then drive to the exit and insert there coin to leave the car park and the number of available spaces increments.

Car Park Management Staff.

**Using the Car Park.**

The management and staff acting as customers will use the car park system the same way a typical customer would use the system however the staff have the ability to activate different emergency modes.

**Internal Operations.**

The car park management staff will be able to raise / close barriers manually which it could be used in emergency situation to allow the emergency vehicle to enter and exit smoothly. They can also issue a token in case the customer lost his token by tracking his/her car plate no, and prevent overcharge if applicable. They can also issue discount card for certain customer that match certain criteria.

## 4 Performance Requirements

The response time for the menu changes will be no more than (2) seconds.

The customer will have 30 seconds to reply before screen goes to main menu there will be warning message 15 seconds before that happens.

The time to read token should not exceed (3) seconds.

The camera display must be frequently refreshed to allow the displayed image to be accurate.

The displaying of the camera feed will not exceed 3 seconds after the user has clicked enter.

## 5 Design Constraints

* When the user clicks a button the button will animate to show that it has being clicked
* The screen will update when changes have being made.
* the button will animate when hovered over to show that the application responded to the mouse movement
* the text display of the pay machine will display the remaining balance to be payed as coins or notes are inserted
* the city display will update when a parking spot is taken or freed
* the display by floor will update when a parking spot is taken or freed
* the city display will update when a secure parking spot is taken or freed
* the display by floor will update when a secure parking spot is taken or freed
* the admin panel will update as customers enter and exit the car park
* the entrance and exit status will update as the barriers are open or closed
* the admin panel will display notifications when an emergency has being activated
* the images of cars entering and exiting will be securely stored
* the details of reservations will be securely stored
* the car park can be updated to add floors or exits if the physical carpark is updated
* in the event of a power failure the customer details will be saved and the time will be saved to the disk allowing the application to resume from the saved data after power is restored
* the button’s will have clearly readable text on them to make it easier for customer to understand what to do
* the pay machine will display all possible payment options on the screen
* The discount device will beep when a coin has a discount applied to confirm that the coin had a discount applied.
* The city display and display by floor will be displayed in a clear and readable font

## 6 quality Attributes

The user interface is design to be easily understandable and to allow user to know what to do without having to read the user guide. The user interface will be easy to navigate by hiding admin only operation from the user. The application will display messages when there is a problem with the action they have performed.

Security attributes

The admin will be required to login to perform admin operations. The admin login will timeout after 15 minutes of inactivity.

Maintainability attributes

The application will be easily maintainable by allowing newer versions to be easily installed over the top of the application.

The application will also display notifications when a new version is available.