Cairo University  
Faculty of Computers and Artificial Intelligent

**CS251 - Software Engineering I**

Parking Garage System

Software Requirements Specifications (SRS)

5/2022

# Team

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## Software Purpose

* **This program is made to make vehicle park in the garage by giving it unique id and know the vehicle information (model name, Model year and vehicle dimensions (vehicle width and depth)) to parking the vehicle in the suitable slot.**
* **When the customer wants to get out the garage operator calculate the fees and take the money.**

## Software Scope

* **The program support payment with cash and system calculates the time from parking in to parking out and system need some screens one for garage owner and two for park in and park out.**

# Requirements

## Functional Requirements

## the garage owner can change the hourly rate of fees by making in greater than 5 EGP or less than it.

## the garage owner could enter slots info that include (vehicles width and depth).

## The system should not allow more vehicles than the maximum capacity of the parking garage. If the parking is full, the system should be able to show a message that there is no empty slot.

## the garage operator can login the system using name and password and enter his car's info.

## the system should be able to mark the arrival and departure time and then calculate the parking fees.

## the system should be able to generate reports based on the total income and the total numbers of vehicles that used the parking garage at any given point in time.

## the garage owner can select one of the two active slot configuration, the first come approach and the best fit approach.

## the system should be able to update the status of the slot between active or inactive.

## the garage operator pays money after calculating the parking fees.

## Non Functional Requirements

* 1. **The parking garage should have multiple entry and exit points.**
  2. **The system should support parking for different types of vehicles like car, truck, van, motorcycle, etc.**
  3. **The system must be able to handle multiple vehicles simultaneously.**
  4. **The system should serve customers 24 hours a day.**
  5. **The system could pear up to 500 simultaneous users (250park in, 250 park out).**

# System Models

## Use Case ModelDiagram Description automatically generated

## Use Case Tables

|  |  |  |
| --- | --- | --- |
| Use Case ID: | UC001 | |
| Use Case Name: | Enter slots info | |
| Actors: | initiated by the garage owner | |
| Pre-conditions: | the garage owner wants to set up the slots of the garage. | |
| Post-conditions: | 1.the slots of the garage are set up.  2.A successful massage will be displayed. | |
| Flow of events: | **User Action** | **System Action** |
| 1- the garage owner enters his id. |  |
|  | 2- System verify the id |
|  | 3- System display a list of options |
| 4- the garage owner select enter slots info option from the list. |  |
|  | 5.System asks the garage owner to enter the number of slots. |
| 6.the garage owner enter the number of slots. |  |
|  | 7.System will generate a unique id for each slot and ask the garage owner to enter the dimensions of the slot. |
| 8.the garage owner enter the dimensions of each slot. |  |
|  | 9.(step 7 and 8 will be repeated for each slot) System will display a message that the slots have been set up. |
| Exceptions: | **User Action** | **System Action** |
| **in step 8: if the width or the length of the slot is more than 10 meters or less than 1 meter:** | |
|  | 1.System will display an error message. (Then return to step 7) |
| Includes: | None | |
| Notes and Issues: | 1.the width and Hight of the slot should be between 1 and 10 meters.  2.the slots information will be set up once at the beginning and can't be changed later. | |

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| Use Case ID: | UC002 | |
| Use Case Name: | **choose configuration** | |
| Actors: | initiated by garage owner | |
| Pre-conditions: | 1.the garage owner has already set up the slots with its information. | |
| Post-conditions: | the garage owner chooses the active the slot configuration. | |
| Flow of events: | **User Action** | **System Action** |
| 1.the garage owner enter his id. |  |
|  | 2.System verify the id. |
|  | 3.System display a list of options. |
| 4.the garage owner select choose configuration option from the list. |  |
|  | 5.System display another list with the two configuration types (best-fit approach, first come approach). |
| 6.the garage owner select the configuration he wants. |  |
|  | 7.System display a message that the chosen configuration will be applied. |
| Exceptions: | **None** | |
| Includes: | **None** | |
| Notes and Issues: | the configuration can be changed at any time, but it must be chosen before setting up the garage. | |

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| Use Case ID: | UC003 | |
| Use Case Name: | **generate reports** | |
| Actors: | initiated by the garage owner | |
| Pre-conditions: | the garage owner wants to generate a report. | |
| Post-conditions: | the garage owner gets the report he wanted. | |
| Flow of events: | **User Action** | **System Action** |
| 1.the garage owner enter his id. |  |
|  | 2.System verify the id. |
|  | 3.System display a list of options. |
| 4.the garage owner select generate reports option from the list. |  |
|  | 5.System calculates the total income as well as the total number of vehicles that used the parking garage. |
|  | 6.System display the information on the screen. |
| 7.the garage owner get the report he wanted. |  |
| Exceptions: | **User Action** | **System Action** |
| **if the entered id is invalid:** | |
| 1.the garage owner enter his id. |  |
|  | 2.System verify the id.  3.System will display an error massage that the id is invalid and terminate. |
| Includes: | **None** | |
| Notes and Issues: | the total number of vehicles that used the garage should include also the vehicles that are still parked in the garage. | |

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| Use Case ID: | UC004 | |
| Use Case Name: | **park in the garage** | |
| Actors: | initiated by the garage operator. | |
| Pre-conditions: | A new vehicle needs to park in the garage. | |
| Post-conditions: | the vehicle will be parked in the garage. | |
| Flow of events: | **User Action** | **System Action** |
| 1.the garage operator enters his id. |  |
|  | 2.System verify the id. |
|  | 3.System display a list of two options (park in, park out). |
| 4.the garage operator select the park in option. |  |
|  | 5.System asks the garage operator to enter the vehicle's info. |
| 6.the garage operator enter the vehicle's info (model name, Model year and vehicle dimensions). |  |
|  | 7.System display the available slots for the vehicle based on the slot configuration of the garage. |
| 8.the garage owner assign a slot for the vehicle. |  |
|  | 9.System assign a unique id for the vehicle and marks the arrival time. |
| Exceptions: | **User Action** | **System Action** |
| **in step 7 : if there is no available slots for the vehicle:** | |
|  | 1.System will display a message that there is no available slot.  2.System terminates. |
| Includes: | 1.enter vehicle info.  2.display available slots.  3.assign a slot for the vehicle.  4.assign unique id. | |
| Notes and Issues: | the arrival time should be marked when the garage operator assign a slot for the vehicle. | |

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| Use Case ID: | UC005 | |
| Use Case Name: | **park out of the garage** | |
| Actors: | initiated by the garage operator | |
| Pre-conditions: | 1.the vehicle is parked in the garage.  2.the vehicle needs to park out of the garage. | |
| Post-conditions: | the garage operator get the payment and the vehicle leave the garage. | |
| Flow of events: | **User Action** | **System Action** |
| 1.the garage operator enters his id. |  |
|  | 2.System verify the id. |
|  | 3.System display a list of two options (park in, park out). |
| 4.the garage operator select the park out option. |  |
|  | 5.System asks the garage operator to enter the vehicle's id. |
| 6.the garage operator enters the vehicle's id. |  |
|  | 7.System verify the vehicle's id. |
|  | 8.System marks the departure time and calculate the fees. |
| 9.the garage operator get payment. |  |
| Exceptions: | **User Action** | **System Action** |
| **in step 7: if the vehicle's id is invalid** | |
|  | 1.System will display a message that the there is no such vehicle with this id.  2.System will terminate. |
| Includes: | 1.enter unique id.  2.calculate fees.  3.get payment. | |
| Notes and Issues: | 1.the departure time will be marked once the vehicle id has been verified.  2.if the parked span is less than an hour it will be considered an hour. | |

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# Ownership Report

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| --- | --- |
| **Item** | **Owners** |
| **Functional and nonfunctional requirements** | **All Team** |
| **Use case diagram** | **Abdelrahman Fawzy** |
| **Use case discerption (table)** | **Abdelrahman Fawzy,** **Mohamed Abd Elghaffar** |