Cairo University  
Faculty of Computers and Artificial Intelligent

**CS251**

**Software Engineering I**

Project Name

Software Design

Team Names

|  |  |
| --- | --- |
| 20200284 | Abdelrahman ramadan abulela |
| 20200325 | Ezz eldin ahmed saber |
| 20200033 | Ahmed mabrok Yaseen |
| 20200058 | Ahmed helal ragab |

Month & Year

Contents

[Instructions [To be removed] 3](#_Toc101814919)

[Team 3](#_Toc101814920)

[Document Purpose and Audience 3](#_Toc101814921)

[System Models 3](#_Toc101814922)

[I. Class diagrams 3](#_Toc101814923)

[Important Algorithm 4](#_Toc101814924)

[II. Sequence diagrams 5](#_Toc101814925)

[Class - Sequence Usage Table 6](#_Toc101814926)

[Ownership Report 6](#_Toc101814927)

[Policy Regarding Plagiarism: 7](#_Toc101814928)

# Team

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Name** | **Email** | **Mobile** |
| 20200284 | Abdelrahman ramadan abulela | bodya9936@gmail.com | 01281668851 |
| 20200325 | Ezz eldin ahmed saber | ezzahmef243@gmail.com | 01156288921 |
| 20200033 | Ahmed mabrok Yaseen | ggggahn351@gmail.com | 01114203258 |
| 20200058 | Ahmed helal ragab | ahmedhelalragab@gmail.com | 01010898837 |

# Document Purpose and Audience

This document shows the design of project .class and sequence diagrams.

The audience of this document are the project manager and developers

# System Models

## I. Class diagrams

**Diagram

Description automatically generated**

| **Class ID** | **Class Name** | **Description & Responsibility** |
| --- | --- | --- |
| 1 | garage | The place (main class) |
| 2 | Administrator | Garage owner who select the slot and gate |
| 3 | car owner | The customer |
| 4 | person | The class that car owner and administrator inherit from it |
| 5 | vehicle | Get the car width and height |
| 6 | Map | Show active slots |
| 7 | Total income | Calculate the total money |
| 8 | Parking\_in | Get arrival time |
| 9 | slot | Get length and width and activation of slot |
| 10 | Parking\_out | Get departure time |
| 11 | Coming first | Inherits from parking\_ in method for parking |
| 12 | Best\_fit | Inherits from parking\_ in method for parking |
| 13 | fees | Calculate cost |
| 14 | TotalNumOfVehicles | Calculate number of vehicles |

Question 1 : Does your class diagram respect or violate SOLID principles? justify your answer.

- it respects SOLID principles as :

1- Each class respects the first principle where every class has only 1 single responsibility. For instance : Total income, calculate price and count vehicles in classes : total income, fees and total num of vehicles.

2- Classes respect the Open-Closed principle as they have the ability to add new features without adjusting them. For example if you wanted to make a change for the hourly price of parking, you'd just add the FeesPerHour input in the Fees class. Moreover, if you wanted to add a new system of parking alongside with the best fit and the coming first systems you wouldn't change any of the slots or the parking-in and out classes.

3- The class diagram respects the Interface segregation principle. As the class diagram doesn't show a fat inerface with methods that are not needed. As the car owner just asks to park and doesn't get involved with any of the slot selection methods.

Question 2 : Does your class diagram contain any design pattern(s)? If yes name it and list the names of the classes involved in such pattern.

Yes, the class diagram contains design patterns. for example:

1- strategy design pattern: in the class "parking-in " we have 2 algorithms of selecting a slot. However, ONLY 1 of which shall be used at a time.

2- singleton design pattern: in the classes "Total income" and "Fees" the program takes the value of calculatePrice() and adds it to the same ONE "cost" every time a fee is paid.

### Important Algorithm

## II. Sequence diagrams

Diagram

Description automatically generated

Diagram

Description automatically generated

Diagram

Description automatically generated

Diagram

Description automatically generated

### Class - Sequence Usage Table

| **Class Name** | **Sequence Diagrams** | **Overall used methods** |
| --- | --- | --- |
| adminstrator | 1,2,3,4 | Get order to add customer  Add,remove and check slots  Get time information from system |
| slot | 1,4 | Get information slot is taken or not and and id of slot |
| Total income | 2,3 | Get total fees cost |
| map | 1,4 | Shows active “available “ slots |
| TotalNumOfVehicles | 4 | Counting number of vehicles |
| Parking\_in | 3,1 | Get arrival time |
| Parking\_out | 3,2 | Get departure time |
| fees | 2 | Calculate cost |

# Ownership Report

|  |  |
| --- | --- |
| **Item** | **Owners** |
| Class diagram and class table | *Ahmed mabrok* |
| Sequence diagrams | *Abdelrahman ramadan* |
| For code | *Ezz eldin ahmed* |