



**Topic : Automated Parking System**

**Group no : MET\_WE\_03\_02**

**Campus : Metro**

**Submission Date : 5/20/2022**

- We declare that this is our own work and this Assignment does not incorporate without acknowledgment any material previously submitted by anyone else in SLIIT or any other university/Institute. And we declare that each one of us equally contributed to the completion of this Assignment.

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## **System Requirements**

1. System Administrator divides the parking area into slots and assigns area ID to each slot.
2. System administrator has allocated level 1 and level 2 for online reservations by the customers, and level 3 and level 4 for the customers who wish to acquire a parking space upon the arrival.
3. System administrator decides the rate for unregistered customers and registered customers.
4. Unregistered customers can view the availability of slots in the parking area and park only upon the arrival.
5. Unregistered customers should provide their name, National ID number, address, contact number, email address and vehicle number when acquiring a slot every time.
6. Unregistered customers are charged Rs.550/- per hour. They can only make payments by paying in cash or using credit or debit cards.
7. Registered customers can view the availability of slots in the parking system through their customer accounts prior to their arrival and can make reservations for a slot for a specific period.
8. They are able to change their slots based on the availability and if they are to cancel the reservation, they should do so 30 mins prior to the time of arrival.
9. If the registered customers are making online reservations they must make payments by paying through EFTs, credit cards and debit cards.
10. A Rs.300/- per hour rate is charged for online reservations.
11. For reservations made (reserved) online the system will charge the full amount if the customer doesn't cancel the reservation 30 mins prior to the reservation time.
12. For reservations cancelled prior to 30 mins the system will only return 80% of the reservation fee.
13. System need to be capable of Auto-cancel reservation if the customer fails to come for the reservation within 3/4th of the window period and the system will charge the full amount.

14. If the customer hasn't taken away the vehicle within the allocated time the system will notify the customer and for every 15 mins of extra time they will be charged a Rs.100/- fee. The maximum extra time granted would be 45 mins.
15. The Registered customers can also view the availability of slots in the parking area and park upon their arrival.
16. If registered customers wish to acquire a space only upon their arrival they will have to pay Rs.400/- per hour and they can only make payments by cash or using credit or debit cards.
17. Parking Area Supervisor is able to view the availability of slots that are updated real time.
18. Parking area supervisor is able to view the reservations made.
19. Once a registered customer who has made a reservation checks in parking area supervisor must verify the reservation and direct them to the relevant parking spot on the 1<sup>st</sup> or the 2<sup>nd</sup> levels.
20. If a registered customer wishes to acquire a slot upon arrival the parking area supervisor should ask for the registered customer's user id and verify the identity and charge only Rs.400/- per hour from the customer and direct them to the 3<sup>rd</sup> or the 4<sup>th</sup> floor.
21. If an unregistered customer wishes to acquire a slot upon arrival the the parking area supervisor should ask for the name, National ID number, address, contact number ,email address and vehicle number and charge only Rs.550/- per hour from the customer and direct them to the 3<sup>rd</sup> and the 4th floors.

## Noun Verb Analysis (nouns – Blue verbs – yellow)

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## **Identified classes ( Coloured in yellow )**

- System Administrator - out of scope
- parking area - class
- slots– attribute (of parking area)
- parking space/parking spot – redundant (for slots)
- area ID – attribute (of parking area)
- level – attribute (of parking area)
- online reservations/ reservation- class
- customer – meta language (for registered and unregistered customers)
- parking system– out of scope
- system – redundant (for parking system)
- the rate - attributed (payment)
- reservation time– attribute (of online reservation)
- window period – redundant (for reservation time)
- unregistered customers – class
- registered customers– class
- customer accounts – redundant (for registered customer)
- availability of slots - attribute (of parking area)
- name – attribute (of unregistered customer)
- National ID number - attribute (of unregistered customer)
- Address - attribute (of unregistered customer)
- contact number - attribute (of unregistered customer)
- email address - attribute (of unregistered customer)
- vehicle number/ vehicle - attribute (of unregistered customer)
- payments – class
- reservation fee - attribute (of online registration)
- Parking Area Supervisor – out of scope
- user id – attribute (of registered customer)
- identity- redundant (user id)

## CRC Cards

| Parking Area  |              |
|---|--------------|
| Responsibility  | Collaborator |
| For online reservations assign slots from lvl 1 and lvl 2.  | Availability |
| For on spot acquisitions assign slots from lvl 3 and lvl 4. | Availability |
| Update slot   | Availability |
| Cancel Allocated slot                                       |              |

| Reservation               |              |
|---------------------------|--------------|
| Responsibility            | Collaborator |
| Place the reservation     |              |
| Status of the Reservation |              |
| Confirm reservation       | Payment      |
|                           |              |

| Customer                       |              |
|--------------------------------|--------------|
| Responsibility                 | Collaborator |
| view the availability of slots | Availability |
| provide personal details       |              |
| do payments                    | Payment      |
|                                |              |

| Users  |              |
|--|--------------|
| Responsibility   | Collaborator |
| view the availability of slots to do the reservations online | Reservation  |
| changing of the slots  |              |
| do payments  | Payment      |
| reservation checks   |              |
|  |              |

| Payments              |              |
|-----------------------|--------------|
| Responsibility        | Collaborator |
| Store payment details |              |
| Validate payment      |              |
| Process payment       |              |
|                       |              |

| Availabitiy                   |                            |
|-------------------------------|----------------------------|
| Responsibility                | Collaborator               |
| Display availability of slots | Reservations, parking area |
|                               |                            |
|                               |                            |
|                               |                            |



## **Class Booking**

#Pragma once

```
class Booking {  
    private:  
        Customer* cus;  
        string bookingID;  
        string branchName;  
        string date;  
    public:  
        Booking();//default constructor  
        Booking(string pbookingID, string pbranchName, string pdate, Customer* pcustomer  
        );//overloaded constructor
```

## **Class Reservation**

#Pragma once

```
class Booking {  
    private:  
        Customer* cus;  
        string bookingID;  
        string branchName;  
        string date;  
    public:  
        Booking();//default constructor  
        Booking(string pbookingID, string pbranchName, string pdate, Customer* pcustomer  
        );//overloaded constructor
```

## **Class Payment**

```
#pragma once

class Payment{

private :

    double amount;

    string status;

    int payment_id;

    string payment_type;


public :

    Payment(); //default constructor

    Payment (double amt, char sts [], int pid, char ptype[]); //overloaded constructor

    void getPaymentType ();

    void calcFine ();

    void displayPayDetails ();

    ~Payment(); //destructor

};
```

## **Class Parking area**

```
#pragma once

class ParkingArea

{

private :

    string Type;

    int Level;

    int Slot_ID;


public :
```

```

ParkingArea();

ParkingArea (char TYPE, int LEVEL, int SLOT_ID);

void getType ();

void assignLevel();

void assignSlot();

void updateSlot();

~ParkingArea();

};

```

## **Class Customer**

```

#pragma once

class Customer :public User {

    private:

        Booking* booking;

        string CustomerId;

    public:

        Customer();//default constructor

        Customer(string pname, string pphoneNo, string pemail, int page, string paddress,
        string pCustomerId, int serno, int feedno);//overloaded constructor

        //void addbooking(Booking* cusb);

        ~Customer() {}//destructor called

};

class Customer;

```

```

        Booking::Booking() {}

        Booking::Booking(string pbookingID, string pbranchName, string pdate, Customer*
pcustomer) {

            bookingID = pbookingID;

            branchName = pbranchName;

            date = pdate;

            cus = pcustomer;

};

```

## **Class Booking**

```

#pragma once

class Booking {

    private:

        Customer* cus;

        string bookingID;

        string branchName;

        string date;

    public:

        Booking();//default constructor

        Booking(string pbookingID, string pbranchName, string pdate, Customer* pcustomer
); //overloaded constructor

```

## **Class Availability**

```

#pragma once

class Availability

{

```

private :

ParkingArea \*slotId;

public :

Availability(ParkingArea \* aSlotId);

void displayAvailability ();

~Availability();

};

## **Main Programme**

```
#include <iostream>
```

```
#include <cstring>
```

```
#include "Customer.h"
```

```
#include "User.h"
```

```
#include "Reservation.h"
```

```
#include "ParkingArea.h"
```

```
#include "Availability.h"
```

```
#include "Payment.h"
```

```
#include "Booking.h"
```

```
using namespace std;
```

```
int main() {
```

```
    Customer* c1 = new Customer("kamali werasooriya", "0770154044", "nishani.a@gmail.com", 30, "colombo, wattala ", "CUS01", 01, 55);;
```

```
    User u1 ("kamali werasooriya", "0770154044", "nishani.a@gmail.com", 30, "colombo, wattala ");
```

```
    Reservation r1 (170111, "August 18 2022", "4.30pm");
```

```
    ParkingArea p1 ("Cart Type", 2, 207);
```

```
    Availability a1;
```

```
Payment p1 (1100, "Pending", 265352, "EFT");
```

```
Booking* b1 = new Booking("BK01", "negombo", "2022/05/24", C1);
```

```
Delete c1;
```

```
Delete b1;
```

```
}
```

## Class Diagram

