



# **Project Final Report**

Team 404

## **1.Introduction**

Technology innovation and trends have been influencing the world since the past decade. Industries have been shifting from facilitating practices manually to being reliant on technology, and the hotel industry is no exception. Our client, PetMyPet hotel, is a pet hotel that offers differentiated services and rooms to customers according to their needs and pet species. The hotel has entrusted us for developing their online hotel management system. In the introduction, we will illustrate the system's main features, their business meanings, as well as the objective and our approach to this project.

### **Main features and their business meanings :**

As requested by PetMyPet hotel, the online management system has been divided into two parts : internal and external usage. For internal usage, it contains functions for booking management and only staff from the hotel have access to it. With the system, booking amendments or check-in/out can be done in one click. It also includes a function for staff to help members reset their account password. These features allow staff to use less time in managing bookings and in turn reduce the cost involved in daily operations as staff can allocate their time to perform other work.

In addition, the manager dashboard is a function in the system exclusive to managers. The dashboard displays details of the hotel's customer portfolio, list of top spending customers as well as monthly income of the hotel. These analytics allow the managers to make better data-driven decisions for the hotel's future development and spot any potential trends that are valuable to the hotel.

For external usage, it mainly serves the hotel's customers for room search and booking placement. Within the system, there are guest and member pages which are only accessible to the hotel's members. In the guest page, non-member users can search for rooms and place a booking just as the member users do, but the member exclusive functions such as booking tracking, royalty program, member discount of 5% and member-exclusive reward redemption are not applicable to them. In consequence, guest users will be encouraged to register as members upon their successful booking in order to enjoy the member benefits. In the member page, all member exclusive functions will be displayed and members can facilitate these functions to their likings.

The business values behind the customer system are apparent. First of all, the online booking function greatly reduces the manpower cost involved in transacting bookings manually. It also improves the customer's experiences as it is more convenient to complete a booking all in one page. Also, the membership program allows PetMyPet Hotel to retain customers through continuously offering them discounts and special gifts. This can also differentiate PetMyPet Hotel from its competitors as it shows high desire in building customer loyalty through member offers.

### **Objective of this project**

We aim to support our client in offering its customers the best customer experiences and smoothen the hotel's daily operations. The functions implanted in the system are replacing most of the administrative work that is time consuming and complicated, it is also preventing errors that are frustrative to hotels such as double booking. Most

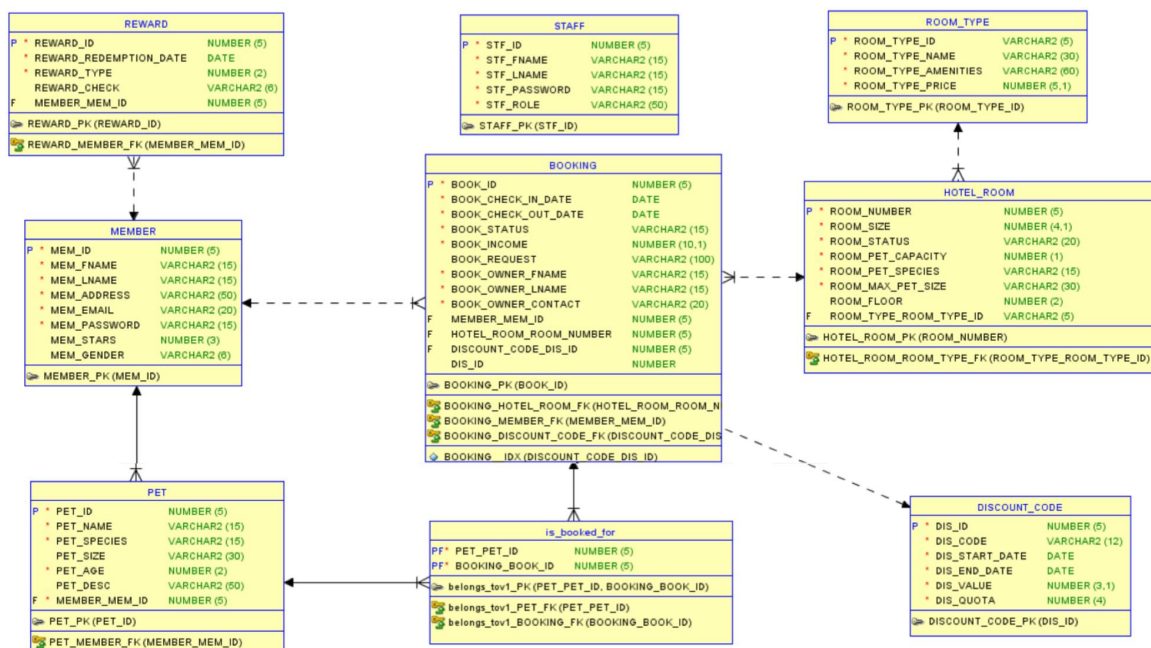
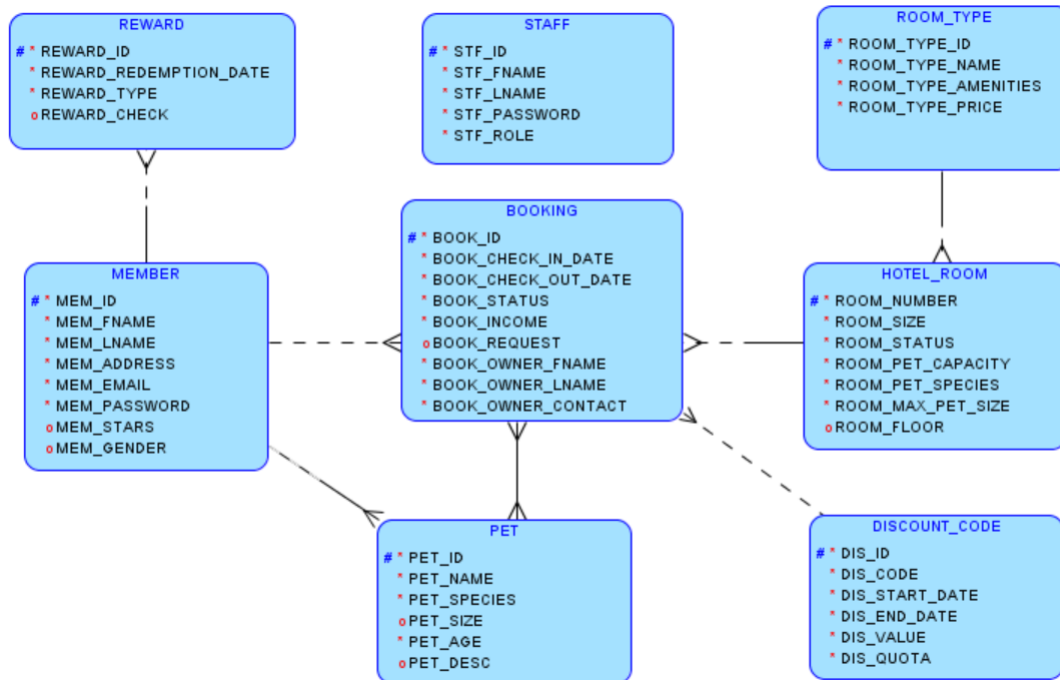
importantly, we developed a system that includes more user-friendly functions such as booking tracking and star-count display, so that we can fulfill our client's needs with reference to real life scenarios.

### **Our approach to this project**

For the coding part, our team had decided to separate into two groups: the customer and staff groups to better allocate the workload and be more time-efficient. Workload had been broken into smaller parts within each group to ensure that everyone was involved in the coding. Throughout the system development process, we held constant meetings to keep all members updated regarding each other's progress and difficulties encountered.

For the progress demonstration, we had reached an agreement of sending one representative from each group to present features in our system in order to avoid confusion and constant transaction. All members are well-aware of their role and responsibilities within the system development process.

## 2. Conceptual data model



Business rules and assumptions:

-Member to Reward is a "mandatory-one to optional-many" relationship

Each record in Reward must belong to a member, a member may or may not redeem rewards

-Member to Pet is a "optional-one to mandatory-many" relationship

Pet(s) in each booking may or may not belong to members, a member can have several bookings which include their pet(s)

-Member to Booking is a "optional-one to optional-many" relationship

Each booking may or may not be made by member, and one member can have several bookings

-Booking to Pet is a "mandatory-many to mandatory-many" relationship

Each pet may be booked for several times, and each booking involves 1-2 pet(s)

-Booking to Hotel\_room is a "optional-many to mandatory-one relationship"

Each booking must include one room, and rooms may or may not involve in booking

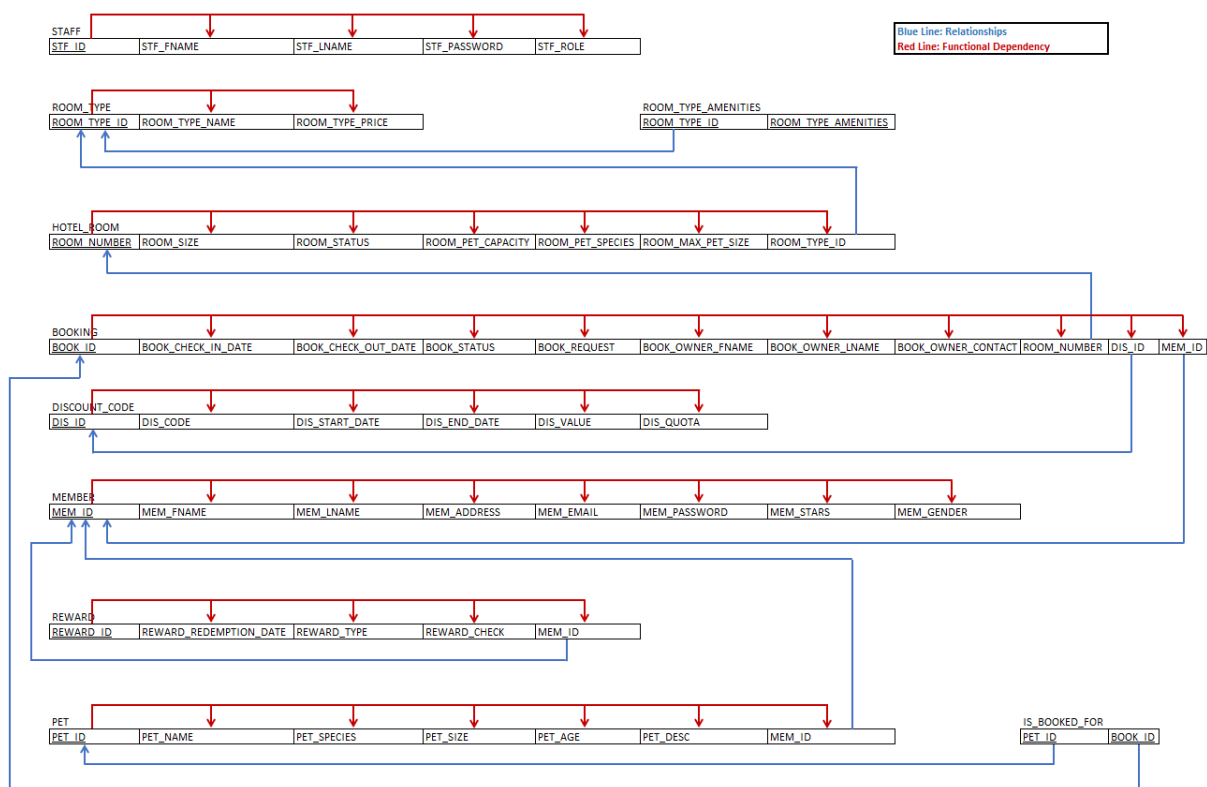
-Hotel\_Room to Room\_type is a "optional-many to mandatory-one" relationship

Room types are fixed and imported by staff. Each room belongs to one type, and one room type can be added to the system although it is not physically built up

-Discount\_code to Booking is "optional-one to optional-many" relationship

Discount codes are created by staff beforehand, each discount code may or may not be used in booking, and can be used several times until the quota decreases to zero. A booking can optionally choose to use only one discount code

### 3.Logical data model



Referential integrity is met as either each of the foreign key values match an according primary key value in another relation or the foreign key value is null

First Normal Form is met as all attribute values are atomic. There are no multi-valued attributes.

Second Normal Form is met as every non-key attribute is fully functionally dependent on the entire primary key

Third Normal Form is met as there is no transition dependency identified in the model

#### **4.Data dictionary**

<b>MEMBER</b>						
Attribute	Data Type	PK	FK	Length	NULL	Description
MEM_ID	Number	X		(5,0)	False	Unique attribute for member
MEM_FNAME	Varchar2			15	False	First name of member
MEM_LNAME	Varchar2			15	False	Last name of member
MEM_ADDRESS	Varchar2			50	False	Address of member
MEM_EMAIL	Varchar2			20	False	Email of member
MEM_PASSWORD	Varchar2			15	False	Member password for login
MEM_STARS	Number			(3,0)	False	Stars would be rewarded after check out and used to redeem rewards
MEM_GENDER	Varchar 2			6	True	Record member's gender

<b>REWARD</b>						
Attribute	Data Type	PK	FK	Length	NULL	Description
REWARD_ID	Number	X		(5,0)	False	Unique attribute for member reward
REWARD_REDEMPTION_DATE	Date				False	The date of redemption for member's reward
REWARD_TYPE	Number			(2,0)	False	The type of reward member has chosen to redeem
REWARD_CHECK	Varchar2			(6,0)	False	Check whether the reward is delivered to the customer; Allowable values: True, False
MEM_ID	Number		X	(5,0)	False	Refer to member ID

						from Member
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PET						
Attribute	Data Type	PK	FK	Length	NULL	Description
PET_ID	Number	X		(5,0)	False	Unique attribute for pet
PET_NAME	Varchar2			15	False	Name of pet
PET_SPECIES	Varchar2			10	False	Indicate the species of the pet; Allowable values: Dogs, Cats, Small mammals, Reptiles
PET_SIZE	Varchar2			(4,1)	False	Size of pet
PET_AGE	Number			(2,0)	False	Age of pet
PET_DESC	Varchar2			50	True	Optional description (e.g. special care needed)
MEM_ID	Number		X	(5,0)	True	Refer to the owner if the owner is a member

BOOKING						
Attribute	Data Type	PK	FK	Length	NULL	Description
BOOK_ID	Number	X		(5,0)	False	Unique attribute for Booking
BOOK_CHECK_IN_DATE	Date			/	False	Booking's check in date
BOOK_CHECK_OUT_DATE	Date			/	False	Booking's check out date
BOOK_STATUS	Varchar2			15	False	Booking status; Allowable Values: Booked, Checked in, Checked out



BOOK_INCOME	Number			(10,1)	False	Income/Revenue received from the booking (Non-members : price of room type per night * no of nights ; Members : (price of room type per night *0.95) * no of nights )
BOOK_REQUEST	Varchar2			100	True	Optional special request from customer
BOOK_OWNER_FNAME	Varchar2			15	False	Owner's first name
BOOK_OWNER_LNAME	Varchar2			15	False	Owner's last name
BOOK_OWNER_CONTACT	Varchar2			20	False	Owner's contact number
MEMBER_MEM_ID	Number		X	(5,0)	True	Refer to member ID if the customer is a member
HOTEL_ROOM_ROOM_NUMBER	Number		X	(5,0)	False	Refer to hotel room room number
DISCOUNT_CODE_DIS_ID	Number		X	(5,0)	True	Refer to discount code ID if the customer uses a discount code

HOTEL_ROOM						
Attribute	Data Type	PK	FK	Length	NULL	Description

ROOM_NUMBER	Number	X		(5,0)	False	Unique attribute for hotel room
ROOM_FLOOR	Number			(2,0)	False	Room floor
ROOM_SIZE	Number			(4,1)	False	Room's size
ROOM_STATUS	Varchar2			20	False	Room's status; Allowable Values: Available/Unavailable
ROOM_PET_CAPACITY	Number			(1,0)	False	Maximum number of pets the room can accomodate
ROOM_PET_SPECIES	Varchar2			15	False	Pet species the room is designed for; Allowable values: Dogs, Cats, Reptiles, Birds, Small mammals, Any
ROOM_MAX_PET_SIZE	Varchar2			30	False	Maximum pet size the room can accomodate; Allowable values: Mini, Small, Medium, Large
ROOM_TYPE_ID	Varchar2		X	5	False	Refer to hotel room room type

Room Type						
Attribute	Data Type	PK	FK	Length	NULL	Description
ROOM_TYPE_ID	Varchar2	X		5	False	Unique attribute for room type
ROOM_TYPE_NAME	Varchar2			30	False	Name of room type
ROOM_TYPE_AMENITIES	Varchar2			80	False	Fixed amenities that the room type has

ROOM_TYPE_PRICE	Number			(5,1)	False	Price per night of the room type
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STAFF						
Attribute	Data Type	PK	FK	Length	NULL	Description
STF_ID	Number	X		(5,0)	False	Unique attribute of staff; also login ID
STF_FNAME	Varchar2			30	False	Staff's first name
STF_LNAME	Varchar2			30	False	Staff's last name
STF_PASSWORD	Varchar2			15	False	Staff login password
STF_ROLE	Varchar2			50	False	Staff position/role; Allowable values: Front Desk, Housekeeping, Manager

DISCOUNT_CODE						
Attribute	Data Type	PK	FK	Length	NULL	Description
DIS_ID	Number	X		(5,0)	False	Unique attribute of discount code
DIS_CODE	Varchar2			12	False	The discount code
DIS_START_DATE	Date			/	False	The starting date for discount code to be redeemable
DIS_END_DATE	Date			/	False	End date of the discount campaign, code will not be valid after this day
DIS_VALUE	Number			(4,0)	False	Amount of discount (in %) align with the code
DIS_QUOTA	Number			4	False	Maximum amount of codes redeemable

## **5.Functional Requirements**

The deliverable of this project is to develop an online hotel management system for PetMyPet Hotel. The following are the functional requirements from our client, with extra functions for final report labeled with \*\*.

### **Staff and Manager's Login**

- Allow staff and managers to login with their own ID and password
  - Different staff roles will see different interfaces, showing just the functions they need

### **Front Desk's Data Insertion, Updates and Retrieval**

- Allow staff to insert new hotel room type and room information
- Allow staff to update hotel room information
- Allow staff to update status for hotel rooms

### **Front Desk's Customer Service Provision**

#### **Bookings Managment**

- Allow staff to assess and search room bookings of customers
- Allow staff to view booking details of customers
- Allow staff to process check-in for customers
- Allow staff to process check-out for customers

#### **Members Managment**

- \*\*Allow staff to search for members and view members' information
- Allow staff to help reset the login password for members in case members have forgotten
- \*\*Allow staff to update reward record when members process reward redemption

#### **Discount Code Management (Extra Functional Requirement Set A)**

- \*\* Allow staff to input discount codes, valid periods, usage quota and discount rates into the system

### **Staff's Housekeeping**

- Allow staff to update status for hotel rooms

### **Manager's Performance Tracking**

- Allow managers to display "Manager Dashboard" for strategic decision making

#### **Income Management**

- Show total amount of daily income and monthly income of the hotel with a chosen date
- Show the three most popular room types and the corresponding number of bookings
- Show the top 5 members and the income earned from individual members

#### **Hotel Room Performance**

- Show all room bookings of today and the details of each of them

- Show the total income of a particular room type
- Show the number of rooms of different statuses

### **Manager's Staff Management**

- \*\*Allow managers to setting up new accounts for new staff, and provide them with login ID and password

### **Guest Customer Page : Room Reservation**

- Allow members to login to the member page
- Allow customers (members & non-members) to search available hotel rooms and view room details based on their preferred characteristics
- Allow customers to make bookings for one night or multiple nights
- Allow customers to add their special requests
- \*\*Allow customers to enter discount codes within specified periods to enjoy further discounts (Extra Functional Requirement Set A)
- \*\*Allow member users to login at guest's 'search room' page and make a booking as member
- \*\*Allow customers to book a room for up to 2 pets with the same species within 30 days
- \*\*Allow guest customers to receive a booking ID upon successful booking
- \*\*Allow guest to receive discount by booking with validated discount code set by staff

### **Guest Customer Page : Membership Registration**

- Allow customers to register as members
- \*\*Allow new members to receive their unique member ID after submitting the registration form
- \*\*Allow guest customers to review the benefits of the royalty program before registration
- \*\*Allow new members to login instantly upon registration

### **Member Page : Rewards Earning and Redemption**

- Allow members to earn 1 star at pet's check-out time (for each booking)
- Allow members to redeem rewards they prefer after collecting a certain number of stars
- \*\*Allow members to track their unused reward with details of reward shown (including redemption date, reward type, reward status)

### **Member Page : Booking Placement and Tracking**

- \*\*Allow members to track their upcoming booking, with details of booking shown (including room type, status, check in and check out date)
- \*\*Allow members to search and book a room just as the guest customers do
- \*\*Allow members to log out
- \*\*Allow members to receive a booking ID upon successful booking

- \*\*Allow members to receive extra discount apart from the member discount (5%) by booking with validated discount code set by staff

## **6.Brief conclusion**

To conclude, our team believes that this project experience is fruitful and rewarding. We have come up with some suggestions for PetMyPet Hotel and concluded some self-reflections upon discussion. They are as follows :

### **Suggestions for further development**

- ***App for hotel management and member system*** : PetMyPet Hotel shall develop apps for their management and customer booking system respectively. By doing so, customers can enjoy a more comprehensive customer experience with higher convenience. PetMyPet hotel's exposure to customer's sights will definitely increase as the hotel is reachable through more channels. From the staff's perspective, the app undoubtedly reduces their workload and time required to reach other employees. The app breaks the constraint of which staff can only update the system when they are in front of a computer, updates can be done at any location. The app can also serve as a communication platform between the employees, as a result this highly functional feature is definitely one of the key development directions for the hotel in the future.
- ***Further features for the loyalty program***: After the implementation of the customer online system, PetMyPet Hotel shall consider continuously updating the system by adding further benefits for the members. Although the current membership program is adequate to satisfy member's expectations towards the royalty program at this stage, it can only be sustainable with constant updates. We suggest introducing a loyalty level to the membership program where members who accumulate certain spendings can be promoted to a higher loyalty level. With a higher loyalty level, members can enjoy more discounts and earn more stars with every booking. By doing so, it can further assist PetMyPet in building customer allegiance and keep members attached to the hotel with new benefits.
- ***Introducing AI assistants*** : Artificial intelligence assistants can be introduced to assist customers during their booking processes and settle their basic enquiries instantly. This function is also well adopted in real life scenarios. By doing so, it can reduce the time required for customers to place a booking and prevent customers from switching to competitors during their wait for an answer of their enquiries. Higher staff time utilization can be achieved as only queries that require manual answers will reach the human staff. PetMyPet Hotel's image can also be improved by being technology driven and responsive to customers' needs.

### **Reflection and lessons learnt:**

In general, our team has performed excellent time management and constructive communications throughout the entire project. The key to this rewarding experience is effective communication, as it helps our team to avoid a lot of misunderstandings and

logical flaws within our system, since there are interconnections between the internal and external systems. Proper time management is also crucial, our group has learnt to plan ahead and set up a schedule to align with, so that the progress will always be within control. All of these elements contribute to this meaningful project experience.

## **7.Assumptions**

After discussion, we have agreed to make the following assumptions for different situations during the system's implementation:

- Booking tracking is expected by members to clarify the bookings that they have placed but not check in yet
- Reward record is expected by members to keep track of any unused rewards
- Members can gain 1 star for every booking upon check out
- Members and guest customers are aware of the booking ID and will present it to staff upon check-in/out
- Users are expected to notice that member ID instead of username is used to log into the member page
- The available amenities and price are fixed in each room type
- Members will remember their unused reward and raise it to staff upon check in (staffs will not take initiative to ask members if they want to use their award or not)
- Members may not be aware of the most updated star count and may need a check function in the member page
- Member is allowed to use his/her member account to book a hotel room for somebody else using that person's name and contacts.
- Discount code will only be promoted to customers during the specified period that the code could be used
- There is a usage quota for enjoying discounts with the discount code, which is first-come-first-serve.
- Contact numbers and email input by customers are valid upon submission of member registration form
- Customers can only book 1 room at a time
- If the owner wants to make booking for two pets of different species, two separate bookings are needed
- New password will be sent to the members' email by system (as listed in the member registration form) once the staff reset the password
- Members will enjoy a 5% discount in any booking, if they use a discount code, the discount will be counted based on the original price (i.e: 10% discount code, then member will enjoy a total 15% discount of the original price)
- Contact number for customers shall be within the range of 7 to 15 digits, given that in reality the shortest phone number in use currently is 7 digits, and 15 digits for longest<sup>1</sup>

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<sup>1</sup> Oreilly blog, Validate International Phone Numbers. Retrieved from:  
<https://www.oreilly.com/library/view/regular-expressions-cookbook/9781449327453/ch04s03.html>

### **8.Work assignment among the team**

	Coding for Staff Part	Coding for Customer part	Debugging and UI Design	Concept ual data	Logical data	Functional requirement	Data dictionary
CHEN, Moxuan		v	v	v			
CHIU, Seen Yung	v		v			v	v
CHOW, Lily		v	v			v	v
KIM, Taeyeon	v		v				
NG, Cheuk Him Kendrick	v		v		v	v	
WONG, Cheuk Wah		v	v			v	

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