





**Declaration of Original Work for CE/CZ2002 Assignment**

We hereby declare that the attached group assignment has been researched, undertaken, completed and submitted as a collective effort by the group members listed below.

We have honored the principles of academic integrity and have upheld Student Code of Academic Conduct in the completion of this work.

We understand that if plagiarism is found in the assignment, then lower marks or no marks will be awarded for the assessed work. In addition, disciplinary actions may be taken.

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Important notes:

1. Name must EXACTLY MATCH the one printed on your Matriculation Card.

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<b>Link to Github Repository:</b> <a href="https://github.com/pravindkk/sc2002">https://github.com/pravindkk/sc2002</a>	

## 1. System Overview

The **Hotel Reservation and Payment System (HRPS)** computerizes the process of the following:

- Making Hotel Reservations
- Recording of Orders
- Displaying of Records

This system will only be used by the hotel staff.

## 2. Assumptions

Stated here are the assumptions that were made by the team when developing the system, excluding those that were already mentioned in the assignment brief.

- Room Rate is the base room rate (not including service charge or GST)
- Room Rate is per 24 hours
- Service Charge and GST is 10% and 7% respectively
- Each Guest can only have 1 Reservation
- Check-in time is at 1500 and if by 1600 the Guests do not check-in, the Reservation is considered expired
- Rooms can only have 1 Reservation at any point of time
- Empty Rooms will not be able to order room service
- Guests' credit card numbers are unique
- Room Service Orders will be DELIVERED before the guests check out
- Guests will always check-out at the stated check-out date

## 3. Design Considerations

Mentioned below are some of the design considerations that we have implemented in the development of the HRPS application.

### 3.1. SOLID Design Principles

#### 3.1.1. S - Single-responsibility Principle

The Single-Responsibility Principle (SRP) states that each class should only hold one responsibility. In other words, it should be programmed to only do one thing.

Hence, we have split the classes into entities, controllers, UIs and databases. For example, our Guest class is simply just an entity, it will manage guest objects in our system. The GuestController class will

implement the possible use cases that a Guest object can do. While the GuestUI class can only be interacted with by the actor, holding the functions that the actor is able to execute.

### 3.1.2. O - Open-closed Principle

Bertrand Meyer in his book, Object-Oriented Software Construction, explained that the Open-Closed Principle (OCP) indicated that the entities created, including classes, functions and modules, should be unmodifiable but extendable. The code should be written in a way that allows new functions to be added but in the process, the existing code should not be changed.

In our system, we have used the database interface to allow for the extension of the existing methods and variables of the class. If there were to be an extension of the system, say now if there was a possibility for guests to book function halls, the system would have to store the function hall information. There would simply be another class entity (DBFunctionHall) that would be connected to the interface.

## 3.2. Object-Oriented Principles

The HRPS was implemented with various object-oriented (OO) concepts to enhance the reusability and maintainability of the application.

### 3.2.1. Abstraction

Abstracting all the details that the user does not need to interact with, provides a clean and simple to understand interface. It's not important for the user to know how the program books the reservation and updates the database, what matters is that they can.

UpdateReservationDetailsDisplayUI
+ UpdateReservationDetailsDisplayUI() + updateCheckInDate(): Date + updateCheckOutDate(): Date + updateRoomID(): String + updateGuestID(): String + updateNumberOfAdults(): Integer + updateNumberOfChildren(): Integer

### 3.2.2. Encapsulation

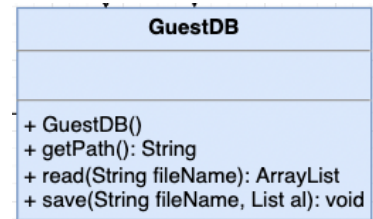
In Java, encapsulation helps in data protection, safeguarding the internal contents of a class. We have restricted direct access to data fields of a class by setting them to public or private. Additionally, for every class

CreditCard
- guestID: String - Name: String - CardNo: String - expiry: String - CVV: String + cardType: CreditCardType
+ CreditCard(guestID, Name, CardNo, expiry, CVV, cardType) + getName(): String + setName(String Name): void + getCardNo(): String + setCardNo(String CardNo): void + getExpiry(): String + setExpiry(String expiry): void + getCVV(): String + setCVV(String CVV): void + getCardType(): CreditCardType + setCardType(CreditCardType cardType): void + getGuestID(): String + setGuestID(String guestID): void

variable, we implement a getter and setter method to aid in obtaining and changing the variable's value.

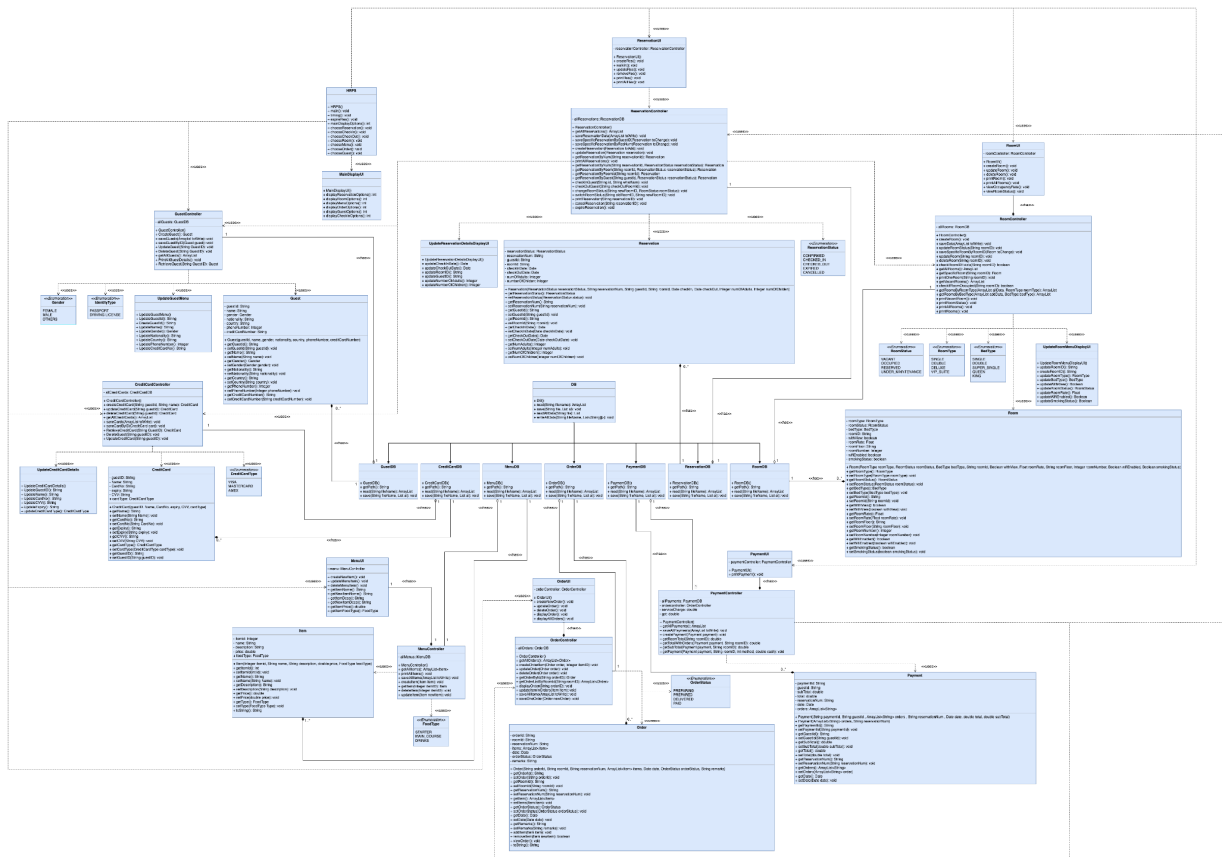
### 3.2.3. Polymorphism

For our database, every classes' read and save functions are overloaded in order to obtain the accurate fields from the database.



### 3.3. UML Class Diagram

The separate file is included outside of the report.



## 4. Feature Enhancement

Our system has been designed with the simplicity of extension for future features to be implemented, such as the following.

### 4.1. Function Room Booking System

The booking system could be extended to include the booking of the function rooms for large events like weddings and celebrations.

Our system would be able to handle an additional type of booking simply by adding an entirely new set of entities, while not requiring any changes to be done to the existing code. This adheres to the Open-Closed Principle.

#### 4.2. Staff Authorisation

There could be many roles that staff can hold, Manager, Supervisor, CEO, FrontDesk or just an Employee. Having an additional feature like this would give rise to more reason for the Staff to be split up into further smaller roles. Each role would have its own set of responsibilities that could be allocated respective rights with the help of the system. Hence, this idea follows the Single Responsibility Principle.

### 5. Test Cases

#### 5.1. Guest Creation

	Test Scenario	Expected Results	Actual Outcome
1.	Staff inputs guest details, with all correct values into the fields.	Guest is successfully created Staff will be shown a success message Guest details will be added to database	<pre> Please Enter Exp (MM/YY): 08/23 Please enter your type of Credit Card: (1) Amex (2) Visa (3) MasterCard 1 Credit Card successfully updated! Guests successfully updated! </pre>
2.	Staff inputs guest details, with invalid choices	Staff will be shown an error. Staff will be prompted to re-enter the respective value.	<pre> Please Choose Identity Type (1) Driving License (2) Passport 3 Enter a valid option!! </pre>
3.	Staff inputs guest details, with duplicate identity number	Staff will be shown an error. Staff will be prompted to retrieve existing guest records	<pre> Please Choose Identity Type (1) Driving License (2) Passport 1 Enter Driving License Number:T1234567A ERROR!!User with the same ID exists!! </pre>
4.	Staff inputs guest details, with invalid	Staff will be shown an error Staff will be prompted to re-enter identity number	<pre> Please Choose Identity Type (1) Driving License (2) Passport 1 Enter Driving License Number:T1234A ERROR!! The format for the license is 5XXXXXXA. (It has 7 digits) </pre>

	identity number		
5.	Staff inputs guest details, with an expired credit card	Staff will be shown error Staff will be prompted to re-enter credit card information	<pre> Enter Nationality: Singaporean Enter the country you are from: Singapore Enter a contact number: 91234567 Please Enter Card No: 1234123412341234 Please Enter CVV: 123 Please Enter Exp (MM/YY): 08/19 Please enter a valid Credit Card Expiration Date. </pre>

## 5.2. Reservation System

	Test Scenario	Expected Results	Actual Outcome
1.	Staff inputs reservation details, with all correct values into the fields.	Reservation is successfully created Staff will be shown a success message Reservation details will be added to database	<pre> RoomID    Room Type    Bed Type 0201      SINGLE      SINGLE  Guest Id: T1234567A Number of adults: 2 Number of children: 0 Confirm Reservation? (Y/N)  y Room successfully updated! Reservation successfully updated! </pre>
2.	Checking for expired reservations upon <b>runtime</b>	Expired reservations will be removed	Expired reservations are removed
3.	Staff updates a reservation room	Staff will be shown a success message Reservation details will be updated to database	<pre> *Floor number from 02 - 07 *Room number from 01 - 08 Please enter Room ID(E.g 0204): 0202  Room successfully updated! Room successfully updated! Reservation successfully updated! </pre>
4.	Staff removes a reservation	Staff will be shown a success message Reservation details will be updated from CONFIRMED to CANCELLED	<pre> ===== ALL RESERVATIONS ===== Reservation No.  Guest ID  Room ID  Status    Check-In Date  Check-Out Date T-14102022-020111  T1234567A  0202    CONFIRMED  14/10/2022    15/10/2022 T-14102022-020181  T1234567A  0201    CANCELLED  14/10/2022    15/10/2022 </pre>

5.	Staff enters in a check-out date before check-in	Staff will be shown an error Staff will be prompted to re-enter check-out date	What is your choice (1-6)?: 1 Enter Check-In Date (DD/MM/YYYY): 14/10/2022 Enter Check-Out Date (DD/MM/YYYY): 13/10/2022 Please a date after check-in date
6.	Staff tries to reserve a reserved room	Staff will be shown an error Staff will be prompted to re-enter room no.	*Format xx-yy where xx is Floor Number and yy is Room Number. *Floor number from 02 - 07 *Room number from 01 - 08 Please enter Room ID(E.g 0204): 0202 Choose a empty room!!
7.	Staff tries to create a reservation for a new guest	Staff will be shown that the guest is not found. Then continues with guest creation.	*Room number from 01 - 08 Please enter Room ID(E.g 0204): 0204  Is this a new Guest(Y/N)?: Y Enter Name Meliss

### 5.3. Room Management

	Test Scenario	Expected Results	Actual Outcome
1.	Staff creates a room	Staff will be shown a success message Room details will be updated to database	40.00 Does it have wifi?: (1) Yes (2) No 1 Is smoking allowed in the room?: (1) Yes (2) No 1 Room successfully updated!
2.	Staff removes a reserved room	Staff will be shown an error Staff will be prompted to re-enter room no.	What is your choice (1-8)?: 3 *Format xx-yy where xx is Floor Number and yy is Room Number. *Floor number from 02 - 07 *Room number from 01 - 08 Please enter Room ID(E.g 0204): 0202 CANNOT DELETE!! There is a reservation booked in the room!!!
3.	Staff updates a room status	Room details will be updated from VACANT to UNDER_MAINTENANCE	Please enter Room Status: (1) Vacant (2) Reserved (3) Occupied (4) Under Maintenance 4 Room successfully updated!
4.	Staff prints all available rooms	Staff will be shown the list	List shown
5.	Staff prints all available rooms by room status	Staff will be shown the list	List shown



6.	Staff enters an invalid room rate	Staff will be shown an error Staff will be prompted to re-enter room rate	Please enter Room Rate(E.g. 154.40): *Enter amount in 2 decimal places. 400.002 ERROR!! Please enter 2 decimal places!!
7.	Staff enters an existing room id	Staff will be shown an error Staff will be prompted to re-enter room id	What is your choice (1-8)? 1 *Format xx-yy where xx is Floor Number and yy is Room Number. *Floor number from 02 - 07 *Room number from 01 - 88 Please enter Room ID(E.g 0204): 0201 The Room Id you have entered is invalid. Please enter another Room Id.

#### 5.4. Room Service Ordering System

	Test Scenario	Expected Results	Actual Outcome																		
1.	Staff creates an order	Staff will be shown a success message  Order details will be saved to database	<table><tr><td>ID</td><td>Room</td><td>Date</td><td>Remarks</td><td>Status</td></tr><tr><td>2-T-16042022-0205166-1420205</td><td></td><td>16/04/2022</td><td>nil</td><td>PREPARING</td></tr></table> <table><tr><td>ID</td><td>Name</td><td>Description</td><td>Price(\$)</td></tr><tr><td>11</td><td>French Fries</td><td>Simple salted fries</td><td>10.00</td></tr></table>	ID	Room	Date	Remarks	Status	2-T-16042022-0205166-1420205		16/04/2022	nil	PREPARING	ID	Name	Description	Price(\$)	11	French Fries	Simple salted fries	10.00
ID	Room	Date	Remarks	Status																	
2-T-16042022-0205166-1420205		16/04/2022	nil	PREPARING																	
ID	Name	Description	Price(\$)																		
11	French Fries	Simple salted fries	10.00																		
2.	Staff updates an order status	Staff will be shown a success message  Order details will be updated to database	<table><tr><td>ID</td><td>Room</td><td>Date</td><td>Remarks</td><td>Status</td></tr><tr><td>2-T-16042022-0205166-1420205</td><td></td><td>16/04/2022</td><td>nil</td><td>DELIVERED</td></tr></table> <table><tr><td>ID</td><td>Name</td><td>Description</td><td>Price(\$)</td></tr><tr><td>11</td><td>French Fries</td><td>Simple salted fries</td><td>10.00</td></tr></table>	ID	Room	Date	Remarks	Status	2-T-16042022-0205166-1420205		16/04/2022	nil	DELIVERED	ID	Name	Description	Price(\$)	11	French Fries	Simple salted fries	10.00
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ID	Name	Description	Price(\$)																		
11	French Fries	Simple salted fries	10.00																		
3.	Staff views an invalid order id	Staff will be shown an error  Staff will be prompted to re-enter order id	<pre>What is your choice (1-6)? 4 What is the orderId?: 1 ERROR!! order doesnt exist!!</pre>																		
4.	Staff views all orders	Only those not delivered will show	Only PREPARING / PREPARED orders were shown																		
5.	Staff tries to make changes to a DELIVERED order	Staff will be shown an error.	<pre>What is your choice (1-6)? 2 Enter the orderId to be updated?: 2-T-16042022-0205166-142 Unable to make changes to Order</pre>																		

### 5.5. Check-In Process

	Test Scenario	Expected Results	Actual Outcome
1.	Staff checks-in a walk-in guest	Staff will be shown a success message Details will be saved to database	<pre> Guest Id: T1234567a Number of adults: 1 Number of children: 1 Confirm Reservation? (y/n) y Room successfully updated! Reservation successfully updated! </pre>
2.	Staff checks-in a reserved guest	Staff will be shown a success message Details will be saved to database	<pre> Guest Id: T1234567A Number of adults: 4 Number of children: 4 Confirm Reservation? (Y/N) Y Room successfully updated! Reservation successfully updated! </pre>
3.	Staff enters invalid check-out date	Staff will be shown an error Staff will be prompted to re-enter check-out date.	<pre> What is your choice (1-4)? 3 Enter Check-Out Date (DD/MM/YYYY): 15/02/2022 Please a date after check-in date </pre>
4.	Staff creates a Reservation & Guest through Check-In function	Staff will be shown a success message Guest & Reservation details will be saved to database	<pre> Please enter your type of Credit Ca (1) Amex (2) Visa (3) MasterCard 3 Credit Card successfully updated! Guests successfully updated! </pre>
5.	Staff enters too many adults staying	Staff will be shown an error Staff will be prompted to re-enter number	<pre> Guests successfully updated! Enter total Number of Adults: 5 Too many people </pre>
6.	Staff checks in Guest before reserved check-in date	Staff will be shown an error	<pre> What is your choice (1-4)? 1 What is the Guest Id?: T1234567A Please check in on 14/10/2022 </pre>

### 5.6. Check-Out & Payment System

	Test Scenario	Expected Results	Actual Outcome
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1.	Staff checks-out a guest	Staff will be shown a success message  Room status is VACANT  Details will be updated to database	<div> <div> Payment #T-16042022-0205166 </div> <div> GUEST: Melissa  ROOM CHARGE 4800.00  SUBTOTAL 4800.00  18% SVC CHG 480.00  7% GST 369.60  TOTAL 5649.60  CARD TYPE AMEX  CARD NUMBER 123412341234  CARD EXPIRY 08/23 </div> </div> <p>Bill is also shown</p>
2.	Staff checks-out a guest	Reservation status is changed to CHECKED_OUT	<div> Room ID Status Check-In Date Check-Out Date No  7A 0202 CONFIRMED 14/10/2022 15/10/2022  7A 0201 CANCELLED 14/10/2022 15/10/2022  67A 0205 CHECKED_OUT 16/04/2022 14/08/2022  72A 0204 CONFIRMED 14/08/2022 15/08/2022  7a 0203 CHECKED_OUT 16/04/2022 15/10/2022  67A 0505 CONFIRMED 16/04/2022 17/04/2022  89B 0205 CHECKED_OUT 16/04/2022 15/10/2022  7A 0206 CHECKED_OUT 16/04/2022 18/10/2022 </div>
3.	Staff checks-out guest with room service orders	Staff will be shown a success message  Bill is updated with additional order items	<div> <div> Payment #T-16042022-0205166 </div> <div> GUEST: Melissa  ROOM CHARGE 4800.00  Room Service #1  ID Room Date 16/04/2022 Remarks nil Status PAID  2-T-16042022-0205166-1420205  ID Name Description Price(\$)  11 French Fries Simple salted fries 10.00  SUBTOTAL 4810.00  18% SVC CHG 481.00  7% GST 370.37  TOTAL 5661.37  CASH 6000.00  CHANGE 338.63 </div> </div>
4.	Staff checks-out guest, pays by cash	Staff will be shown a success message	<div> Room successfully updated!  Reservation successfully updated!  Enter payment method  (0 - Cash, 1 - Credit Card):  0  Please pay: 5661.37  Please enter cash amount:  6000  CHANGE 338.63 </div>
5.	Staff checks out an unoccupied room	Staff will be shown an error that the room is not occupied	<div> Room number from 01 - 00  Please enter Room ID(E.g 0204): 0705  Reservation is not checked in  ERROR!! The room is not checked in / room has already been checked out </div>

## 5.7. Menu Management

	Test Scenario	Expected Results	Actual Outcome
1.	Staff creates a menu item	Staff will be shown a success message  New item will be added to menu	<div> Enter the name of the item :  Chicken Chop  Enter the price of the item (e.g 26.50):  14/40  Enter the price of the item (e.g 26.50):  14.33  Enter the description of the item :  Noice  (1) Starter  (2) Main Course  (3) Drinks  Enter the FoodType of the item: </div>

2.	Staff updates menu item price then guest orders it	Guest bill will reflect the updated price	<pre> ID  Name      Description      Price(\$\$) 12  Cheese Fries  Fries with cheese sauce  12.10 ----- ID      Room      Date      Remarks      Status 2-T-16842022-020614-870206  16/04/2022  nil  PREPARING ----- ID  Name      Description      Price(\$\$) 12  Cheese Fries  Fries with cheese sauce  20.00 </pre>
3.	Staff removes a menu item	Item is removed from the database as well	<pre> 3  Enter the id of the item: 11 ID  Name      Description      Price(\$\$) 12  Cheese Fries  Fries with cheese sauce  12.10 13  Truffle Fries  Premium Truffle Sauce on fries  17.00 17  Chicken Chop  Noice  14.33 ----- Main Courses </pre>
4.	Staff views menu list	Menu list shows	Menu list is shown
5.	Staff removes menu item after guest orders it	Guest bill will still reflect the ordered item Menu is deleted from the menu	<pre> ID      Room      Date      Remarks      Status 6-T-16842022-0606135-1400606  16/04/2022  1  PREPARING ----- ID  Name      Description      Price(\$\$) 12  Cheese Fries  Fries with cheese sauce  20.00 </pre>

## 6. Reflection

### Importance of planning

In order to have a structured way of coding, a lot of time and effort has to be put into designing for the use cases and process flow first. We realised that instead of jumping straight into the class diagram, we had to re-read the assignment brief a few times and break down the entities before we started working on it.

### Keeping the big picture in mind

Having to think ahead and see if it made sense in the codes. Otherwise, if there was a change to be made when coding, the same change would have to be reflected in the class diagram. That is not good practice, the process flow should not go backwards like that.

### Boundaries need to be set

The assignment brief is not extremely detailed to guide the teams on everything we should think of. Leaving us to experiment and realise for ourselves what makes sense and what doesn't. We realise that because the different entities are so interconnected, there need to be assumptions set to draw the bounds of our system functionalities.