

**CE/CZ2002: Object-Oriented Design & Programming**

**Assignment**

**Group 4**

Building an OO Application

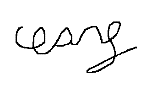
2017/2018 Semester

SCHOOL OF COMPUTER SCIENCE & ENGINEERING NANYANG TECHNOLOGICAL UNIVERSITY

**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 honoured 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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1. Design Consideration and Use of OOP concepts

The very first step we take is identifying important classes for the system and group them into Entity Class, Control Class and Boundary Class.

We want to hide our implementation of methods from users and we do not want them to directly interact with the data files. So, we use Layered Architecture for our system (Refer to the class diagram). There will be total four layers, 1. Presentation layer, Business Layer, Persistent Layer and Database Layer. We put the main application interface class and other interface classes in the presentation layer, control classes in business layer, entity classes in persistent layer and the data text.files in the database layer. We have decided to use this architecture because

1. It increases flexibility and reusability. For example, if we want to update from CLI (Command Line Interface) to GUI (Graphical User Interface), we just need to update the main application interface class in the presentation layer. All other classes from other layers remain the same.
2. It also encourages extensibility and maintainability. Different layers can be independently updated, maintained and deployed.
3. It makes the system loosely coupled since the layers must communicate via top-down approach.
4. Use of OOP Design Principle
   1. Single Responsibility Principle

We make sure that every single class has only single responsibility. For example, Room Controller class has methods relating with rooms only. It cannot manipulate or does not have abilities to manipulate other unrelated classes like reservations and so on.

* 1. Open-Closed Principle

We implement this principle for Room class. Room class have “RoomType” attribute. That “RoomType” attribute is an interface. So, it we want to include more room types in the future, we do not need to change code of the Room class. We just need to add a new room type class realizing “RoomType” interface.

* 1. Interface Segregation Principle

All room type classes realizing the “RoomType” interface required all the methods declared in “RoomType” interface. There are no unnecessary methods inside “RoomType” interface.

1. Consideration for Future Extension (Sending reminder via SMS for a few days before reservation date)

For this extension, we can create a SMS controller class and SMS entity class. In reservation controller, we will add a new method which will compare the date of the reservations with 3 days after local date and if it is true, it will add reservation’s date and contact number to the list and return the list. Then there will be a method inside SMS Controller which creates SMS object with standard message, “Your reservation at Hotel will be expired at dd/mm/yyyy (reservation date)” by getting array list as input. Then SMS controller will have another method which will send out this SMS object to users. The system will make use of these methods every day to check for expired dates and send messages.

In this case, we can clearly see that we are not required to change any existing code inside our system to accommodate this new function.

**Reservation Controller**

+checkSoontobeExpired()

**SMS Controller**

+CreateSMS()

+SendSMS(al:List)

**SMS**

-message:String

-number:String

-date:String

+getMessge():String

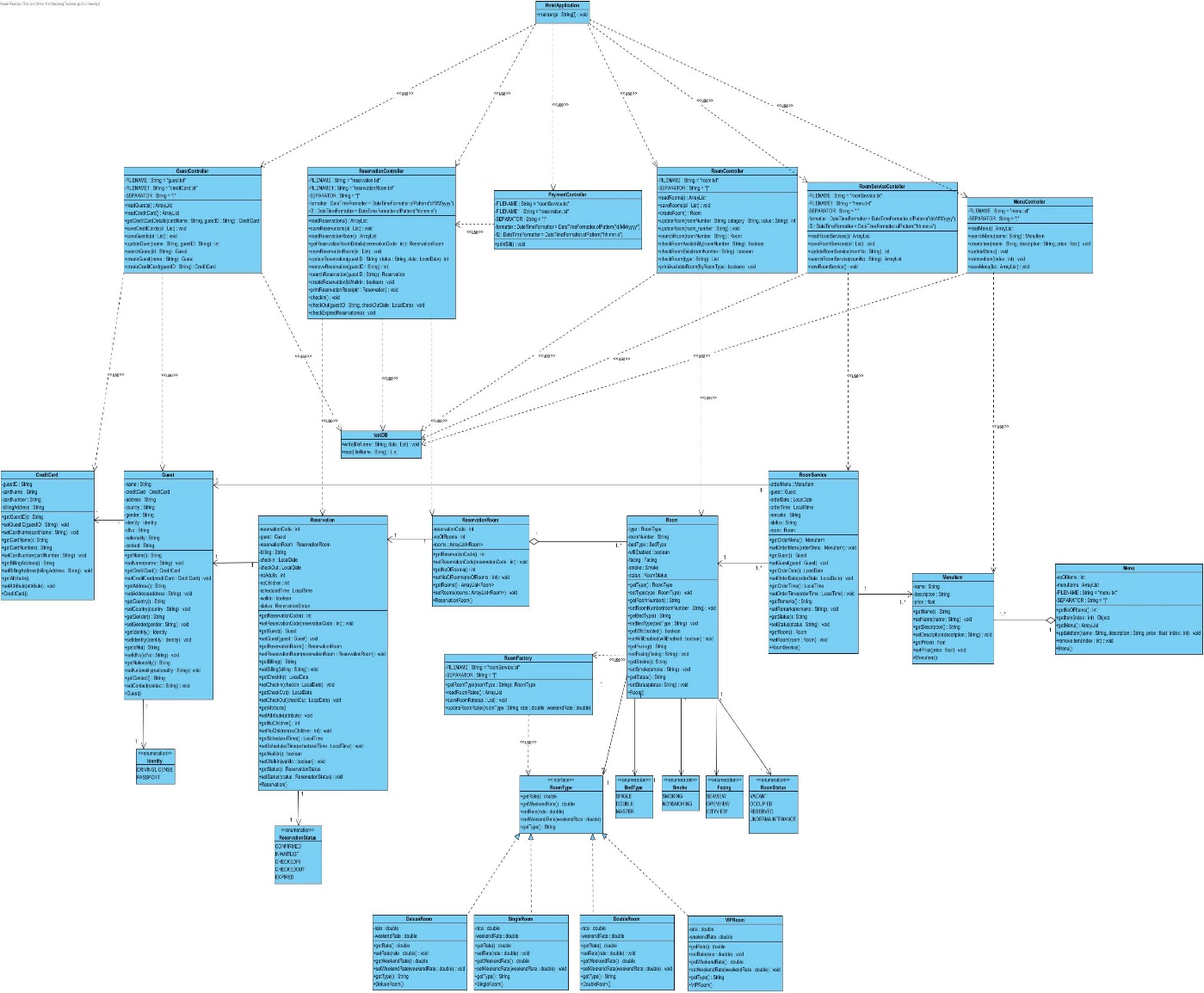
+setMessage(s:String):void

+getNumber():String

+setNumber(n:String):void

+getDate():String

+setDate(d:Date):void

1. Class Diagram of Hotel Reservation and Payment System (HRPS) 

Notes: Constructors of Entity Classes are omitted in the diagram because they are too long. So, you can refer them in Info section below.

Info

public CreditCard(String guestID,String cardName, String cardNumber, String billingAddress)

public Guest(String name, CreditCard, String address, String country, String gender, String identity, String idNo,String nationality, String contact)

public MenuItem(String name, String description, float price)

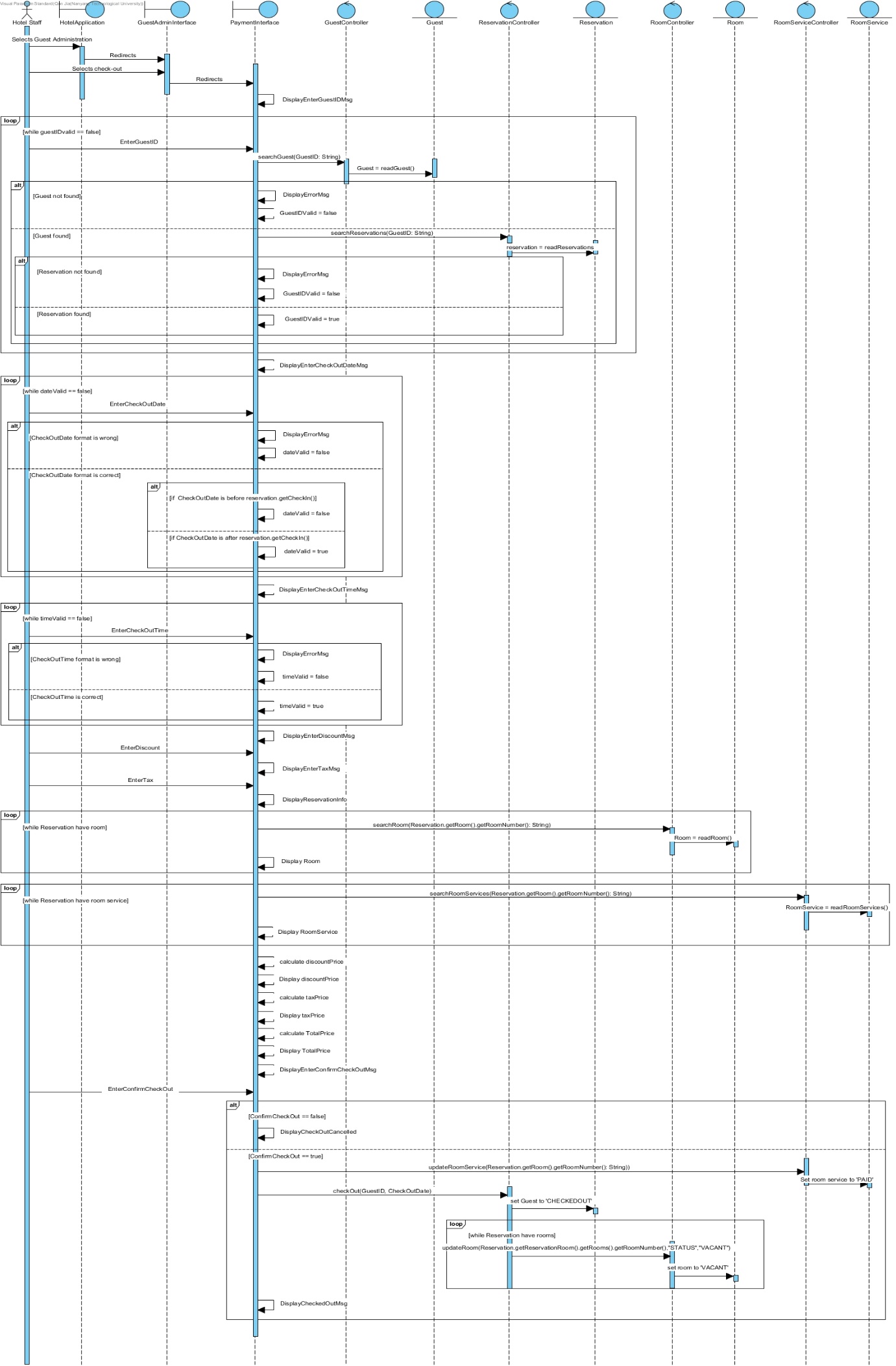
public Reservation(int reservationCode, Guest guestName, ReservationRoom, String billing, LocalDate checkIn, LocalDate checkOut, int noAdults,int noChildren, LocalTime scheduledTime,boolean walkIn,String reservationStatus)

public ReservationRoom(int reservationCode,int noOfRooms,ArrayList<Room> rooms)

public Room(RoomType type, String roomNumber, String bedType, boolean wifiEnabled, String facing, String smoke, String status)

public RoomService(MenuItem orderedMenu,Room roomNumber,LocalDate orderDate, LocalTime orderTime, String remarks,String paid, String status)

1. Sequence Diagram of “Check out and print bill invoice” function



1. Test Cases and Result