

**ICT340**  
**Application Analysis and Design**

---

**Tutor-Marked Assignment**

**January 2022 Presentation**

---

***TUTOR-MARKED ASSIGNMENT (TMA)***

This assignment is worth 18 % of the final mark for [ICT340 Application Analysis and Design](#).

The cut-off date for this assignment is **Sunday, 17 April 2022, 2355hrs.**

**Note to Students:**

You are to include the following particulars in your submission: Course Code, Title of the TMA, SUSS PI No., Your Name, and Submission Date.

---

Read the following negotiated statement of requirements (NSR) and answer the questions that follow.

The Relax Golf Club offers its members a perfect getaway at its Resort Hotel with breathtaking panoramic views of the golf course and the Johor Straits.

Currently, guests call up the Resort Hotel to book individual rooms or hotel promotion packages available all year round. The Club wishes to extend its website to handle the hotel booking. Every online booking should be associated with an account. The website should check available room types for particular check-in and check-out dates. The website should also use encryption to avoid bots from booking. In addition, appropriate help should be available for users to fill in mandatory fields, in case of invalid input. The website should accept payments using the all-in-one payment gateway, Stripe. The hotel envisions the booking website to be easy to use and responsive to the user.

Users are required to register with the booking website by providing: a name, personal identification (either golf membership number or NRIC number), contact number and an email address. The registered user is then assigned a user id, password and an identification type (either Member or Guest).

There are different types of rooms in the hotel such as Deluxe Golf View, Standard Golf View, Executive Straits View and President Suite. There is a fixed number of rooms for each room type. Additional information of each room type include the type of bed, whether breakfast is served, the maximum number of guests staying and the cost for a night's stay. Vouchers issued by the Club may also be used to offset the cost of the stay.

The hotel also offers packages such as 24-hour Stay Package, Home Relocation Package, Home Improvement Package, Cyclist Package, etc. Each package has a unique identification, specific details, a fixed number of days, the room type and price. Guests/Members are to specify a check-in date and booking is guaranteed with a non-refundable payment prior to arrival. Guests/Members may book only one package at a time.

Guests/Members may book only one room at a time by browsing room types and choosing a check-in date and a check-out date. The website captures the date the booking was made and updates the number of rooms of the chosen room type booked so that no overbooking occurs. No payment is required at the time of booking. However, credit card information (such as name, number and expiry date) is required to hold the booking, identified by its booking id. Guests/Members may cancel the booking at least 1 day before the check-in date with no

charges. However, the guest will be charged the total amount of the booking if there is no-show. Guests/Members can check-in any time after 2pm and check-out before 12pm for their booking. Upon arrival, he/she will be assigned a room (identified by its room number) of the room type specified in his/her booking. Payment will also be done then.

Vouchers that are issued by the Club to its members may be used when making payment. As long as the voucher has not expired, the voucher amount may be used to offset the payment for the booking.

### Question 1

Analyse the NSR and select FIVE (5) requirements, each of which fall under ONE (1) of the following classification:

- Functional requirement
- Non-functional requirement
- Design directive
- Implementation directive
- Platitude

Justify your classification.

State clearly if no requirement is found for a particular classification.

(10 marks)

### Question 2

- (a) Develop a structural model for the system design, by submitting the class description for the application.

Your answer should identify the classes, their attributes and any hierarchical relationship(s), omitting any foreign key associations.

(20 marks)

- (b) Complete the structural model for the system design, by appraising the associations among the set of classes in your solution to Question 2(a).

Construct the class association diagram in UML as your answer. Any derived association should be labelled, but you need not give the derivation.

(20 marks)

### Question 3

#### Special note:

The information provided here are not necessarily applicable to the previous questions.

For the booking website, the following additional requirement is given:

- On the last day of the month, Club members who had stayed at the hotel will be allocated points. For every \$1 paid, 10 points will be credited to the member's account. The check-out date will be used to determine the month where the points are to be allocated.

Note: These points may be converted to specific vouchers eg. for Hotel, for Driving Range, etc. at the end of each calendar year.

From this, we extract the following information:

- Given a month, all members that have made bookings and checked-out for that month shall have points added to the member's account.

From this, we can identify the use case: Allocate Points, with the following specification:

Given: A month

Goal: For each member that has made booking(s) and checked out in that month:

- calculate the points
- add the points calculated to the member's account.

Figure Q3 shows a fragment of the class-association diagram which is relevant to this case:

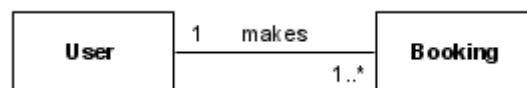


Figure Q3: class association diagram

You may assume that the User class has an attribute, `points`, the total points belonging to the user.

- (a) Using the ICT340 convention, add an `OrchestratingClass` to the class association diagram in Figure Q3 and show the navigation required to locate the required object(s) at the start of the walk-through.

Your solution should show the `OrchestratingClass`, the association name, navigation arrow with multiplicities clearly.

(3 marks)

- (b) Construct a dynamic model of the system, by writing the complete walkthrough for the use case, Allocate Points, using the following template:

Objective: To allocate points to members who had stayed in the hotel in a given month.

Given: ...

1. Locate ...

1.1 For each such instance, ...

1.1.1 Locate ...

1.1.1 For each such instance, ...

1.1.1.1 Retrieve ...

1.1.1.2 ...

(Result: For the given month, points have been added to the member's account based on the hotel stay.)

(8 marks)

- (c) Appraise the associations among the set of classes, by using the tabular format in Table Q3(c) below:

Class being modified	
Association being implemented	<b>makes</b>
Direction of navigation	
Multiplicity	
Instance variable added	
Value of instance variable	
Justification	

Table Q3(c)

(9 marks)

- (d) Develop a dynamic model of the system, by constructing a sequence diagram based on the walkthrough depicted in Question 3(b).

(20 marks)

- (e) Consider the following messages as depicted in the sequence diagram in Question 3(d):

- (i) the message sent to the orchestrating object;
- (ii) the message sent by the orchestrating object to the `aUser` object.

Implement the dynamic model, by coding the methods corresponding to these **TWO (2)** messages. Name the classes that should own the respective methods.

(10 marks)

---- END OF ASSIGNMENT ----