CASE STUDY

GoodView Lodge (GVL)

Goodview Lodge provides short and long term budget accommodation for overseas students and their visiting parents in Singapore. The Lodge has 30 rooms where the guests can stay for anything from one day to six months period. To keep the costs low Goodview Lodge maintains low staff overheads and employs two receptionists and three cleaning staff. Daily breakfast is bundled with the Accommodation price.

Goodview offers following types of Accommodation:

- Deluxe Room (Max 2 persons)
- Standard Room (Max 2 persons)
- Dormitory Room (Loft Beds – Max 6 persons)

Goodview Lodge has a manual booking system for its room bookings. The system is used to manage reservations and record allocation of guests to rooms.

Initial investigations have produced the following requirements:

Goodview Lodge needs to keep a record of their guests, their home address, Passport Details and emergency contact information.

The 'guest' normally phones or sends an email to make a reservation. He / She will be asked the number of guests, the type of accommodation he / she wants; and the start and end date for the stay. The reservation staff deals with all reservation bookings. Walk-in Reservation is also done daily during 9:00 AM to 6:00 PM. As soon as a reservation is made, a room number is allocated to the reservation based on the number of occupants and type of room required. This room allocation can be changed later, in which case a new room number is assigned.

The reservation is confirmed only upon the payment of the deposit. The deposit fee for daily guest is S$100 and Monthly / Long term guests have to pay half a month deposit for room confirmation. Once the deposit is paid then guests can still cancel a reservation up to 7 days before the start date of the stay but 50% of the deposit is forfeited. If the guest wishes to change the reservation date then it can be changed but depends on the availability of rooms.

The Receptionists and cleaning staff need a daily list of all the guests due to arrive and due to leave on each day, with the relevant room numbers.

Upon arrival, the Goodview Lodge staff verifies the guest details (particularly the passport information) and the reservation is updated to an 'arrived' status. All Guests are charged a refundable key card deposit of S$50. Long term guests (Staying for more than one month) are charged one time non-refundable registration fee of S$80.

At Check-in, an Invoice ‘expense’ is generated to reflect the room charges for the number of days that the guest is staying.

When the guest checks out, the Receptionist will print an invoice detailing the room charges and any other expenses incurred during the stay. This invoice needs to be retained in the system for future reference and accounting. Key deposit is refunded upon the return of key access card(s) by the guests.

After the guests have completed the payment, the status is changed to ‘completed’.

ANSWER ANY TWO QUESTIONS

All Questions are based on the *Goodview Lodge* (GVL) case study attached to this paper. Students will be given the case study to read 1 day before the examination. But they are required to leave the case study at home, and will be given a fresh one during the examination.

QUESTION 1

Analyse *GVL* case study and provide the answers to the following questions:

(a) Identify the use cases of the system described in *GVL* case study and draw the use case diagram. Clearly indicate the actors and the links – labelling whether the link should be <<extend>> or <<include>>. Provide the reason for choice of the link <<extend>> and/or <<include>>.

[26 marks]

[Marks will be allocated as follows:
26 marks for a complete use case diagram showing excellent understanding of the process.
Allocate
8 marks for the identification of use cases,
12 marks for use case diagram, and
6 marks for reasons.]

(b) Write a Detailed Description for the use case "**Book a room**" providing

- The characteristics information (such as primary actor, level and goal of the use case, precondition and the trigger for the use case),
- All the actions steps required to be performed for the use case,
- Extensions including the recovery steps, and
- Variations in the Technology and Data Variation List.

Provide at least **ONE** variation and **TWO** extensions.

[15 marks]

[Marks will be allocated as follows:
15 marks for a complete detailed use case description showing excellent understanding of the process.
Allocate
4 marks for characteristic information,
5 marks for typical course of events section,
4 marks for extensions, and
2 marks for the variations.]

(c) You have told GVL that they should do a Feasibility study. Give guidance to GVL Management on how to conduct a Feasibility Study, what it should contain and who should review it and why it is so important.

[9 marks]

[TOTAL FOR QUESTION 1: 50 MARKS]

QUESTION 2

(a) Draw a class diagram for *GVL* system using the UML notation. Show the entity classes along with their attributes, methods and the relationships among these entity classes. (If you believe that you have to make additional assumptions, state them clearly).

Note: You should include **TWO** Gen-Spec, any / all Whole-Part and association links amongst your relationships, and Whole-Part and associations **MUST** be shown with the appropriate cardinality.

[28 marks]

[Marks will be allocated as follows:
28 marks for a complete class diagram showing excellent understanding of the process.
Allocate

- **8 marks for the identification of classes,**
- **4 marks for the attributes,**
- **4 marks for the methods,**
- **6 marks for identifying and representing the relationships and cardinality that demonstrate understanding of the problem,**
- **4 marks for the two Gen-Spec relationships (2 marks for each Gen-Spec relationship showing excellent understanding of the process),**
- **2 marks for the correct usage of UML notation.]**

(b) Discuss the purpose of drawing an Interaction Diagram. Include in your discussion the different types of Interaction Diagrams, when is Interaction Diagram drawn during analysis and design of a software system.

[6 marks]

(c) To produce a good software product one needs both good analysis and design. Provide and briefly discuss **TWO** features of good analysis and **TWO** features of good design.

[8 marks]

(d) The relationships between use cases in a use case diagram can be <<extend>> and / or <<include>>. Describe the differences between these two relationships while linking use cases in a use case diagram.

[8 marks]

[TOTAL FOR QUESTION 2: 50 MARKS]

QUESTION 3

(a) A system has both functional as well as non-functional requirements. Explain these two types of requirements. Illustrate your answer with examples from the GVL case study.

[10 marks]

[Marks will be allocated as follows:
6 marks for explaining the two types of requirements – 3 marks for each.
4 marks for illustrating the answer with examples from GVL case study for each of the two types of requirements.]

(b) During the development of *GVL* system, there are two approaches to requirements definition. These two approaches are SSM (Soft Systems Methodology) and purely hard systems. Differentiate between the **TWO** approaches to requirements definition explaining **ONE** advantage and **ONE** disadvantage of each.

[10 marks]

[Marks will be allocated as follows:
6 marks for differentiating between the two approaches (Soft Systems Methodology and purely hard systems),
4 marks for explaining one advantage and one disadvantage of each approach.]

(c) Object-oriented concept of message passing helps to encapsulate the implementation of an object, including its data. Explain how this is achieved.

[4 marks]

(d) Differentiate among association, aggregation and composition, relationships that may exist between the classes / objects of a system. Support your answer with examples (from the *GVL* case study) for each of the above three relationships.

[12 marks]

[Marks will be allocated as follows:
6 marks for differentiating among association, aggregation and composition,
6 marks for the example (from *GVL* case study) of each of the three relationships.]

(e) The *GVL* wants to proceed with the use of prototyping method to achieve a "speedy, but low risk" systems development, but knows very little about the approach. Discuss the prototyping approach proposing the three options for prototyping that the Project Manager could use in the development of the *GVL* system. Give your recommendation with justification for the option that can be used for *GVL* system.

[14 marks]

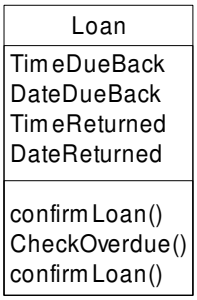
[TOTAL FOR QUESTION 3: 50 MARKS]

- END OF PAPER -

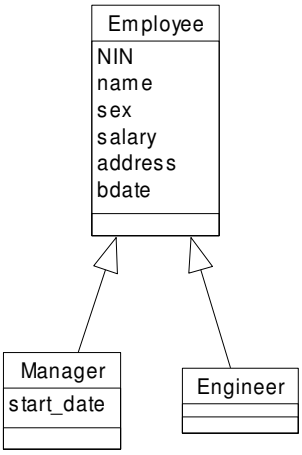
Appendix 1

Summary of UML Notation

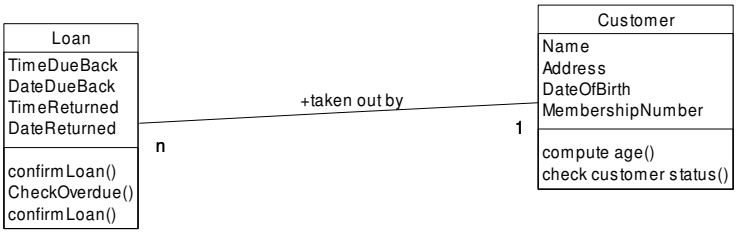
Class with attributes and operations.



Gen-Spec

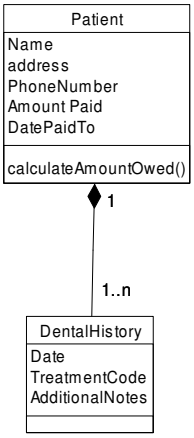


Association with cardinalities



Whole-Part (with cardinalities)

(a) Composition (Strongly-owned)



(b) Aggregation (non-strongly owned)