

PART B: PROBLEM SOLVING

[50 Marks]

Part B consists of **TWO (2)** essay questions. Answer **all the** questions. Each question carries 25 marks.

Question 1

[25 marks]

- a. Please answer the following questions based on the **Hotel Ayu Villa System Description document**. The following questions describe the additional requirements that require you to apply the suitable design patterns. Each of the following questions does not relate to each other. In your solution (Class Diagram), only draw the modified classes in the existing class diagram. You do not have to include or redraw all Classes from the class diagram)

Based on the description for Hotel Booking class diagram in Figure 4, there are various types of rooms and for every room there are different types of utilities provided for the customer by Hotel Ayu Villa. In order to create a suitable class to represent the rooms for booking, apply Abstract Factory Design Pattern for the creation of different objects for different variants of rooms with its different utilities.

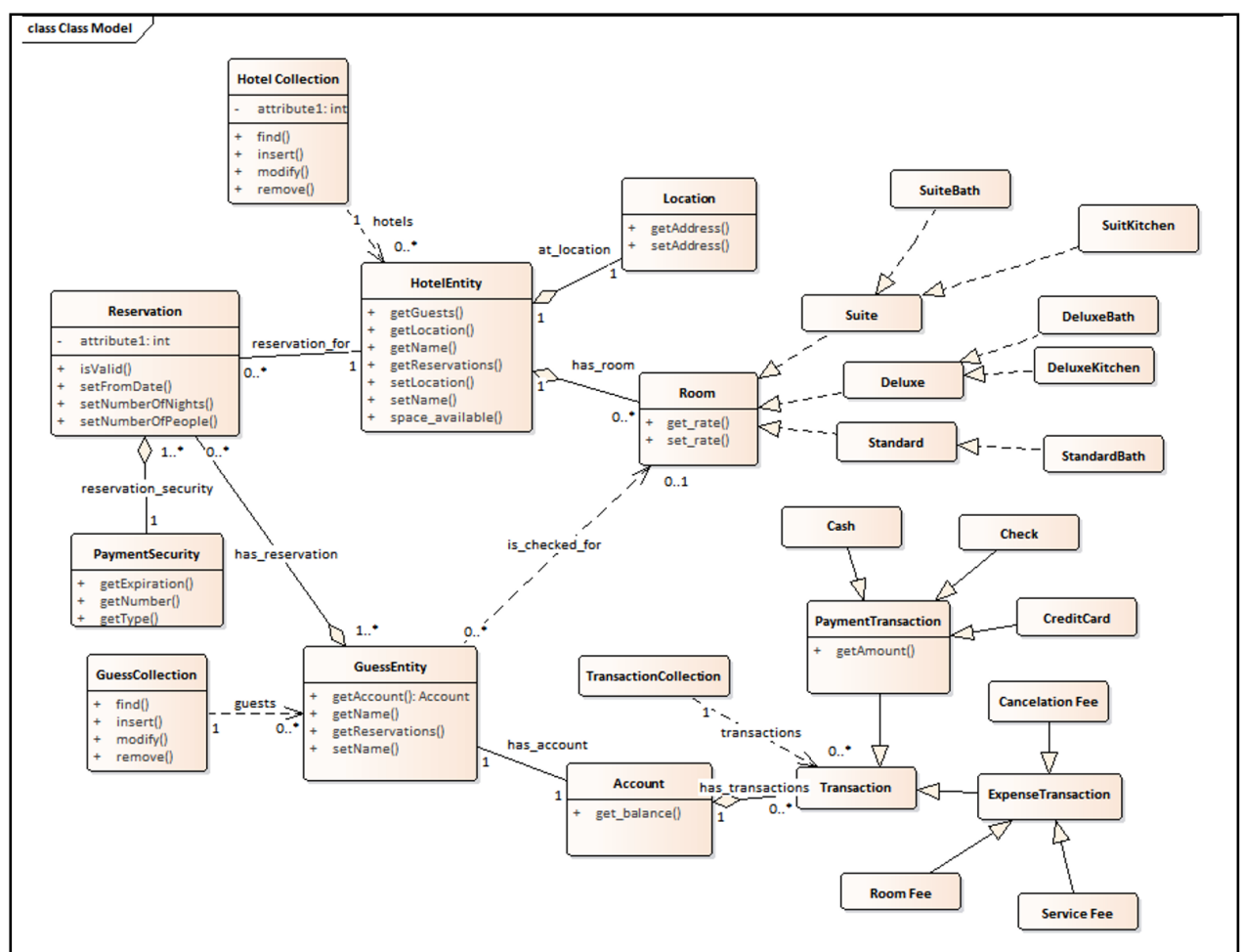


Figure 4

[10 marks]

- b. The development team has identified different categories of Staff employed by Hotel Ayu Villa as shown in Figure 5. This information is useful for them to make an Employee Directory Listing for all the types of Employees in the hotel. Based on the figure, add suitable classes to complete the implementation of a composite design pattern for Employee Directory Listing with a suitable attributes and methods for its implementation.

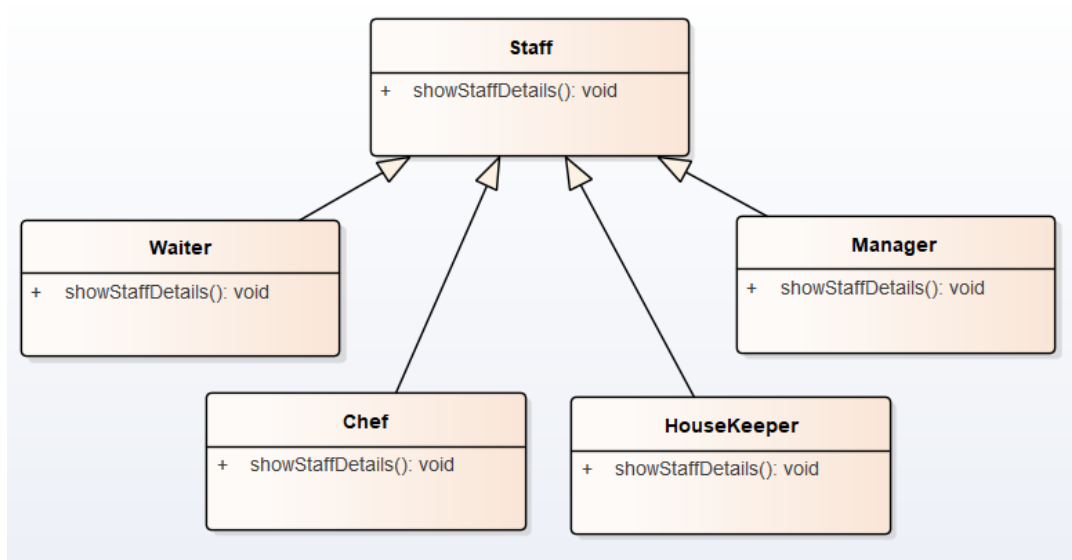


Figure 5

[15 marks]

Question 2

[25 marks]

ABC bank is designing a system for fraud-alert notification that allows bankers, consumers and staff to receive notifications for anomaly money transaction (10 transaction per minute) via SMS, email and voice call. The system is based on anomaly transaction engine that interface with several fraud-alert data sources (debit card, credit card, eWallet, internet banking) where these data will be fused and analyzed and automatically decide whether the consumers are in danger (being fraud). The ABC banking company is interested to develop a decision engine which is responsible to send a notification of fraud to the customers via existing communication channel (SMS, email, voice). The design must be flexible so that other type of communication channels can be added in the near future.

- a. Draw a class diagram of the suitable Design Pattern and give TWO (2) justifications on why the design pattern is selected and describe TWO (2) benefits of using that design pattern.

[15 marks]

- b. The following questions describe the additional requirements that require you to apply the suitable design patterns. Each of the following questions does not relate to each other. In your solution (Class Diagram), only draw the modified classes in the existing Package. You do not have to include or redraw all Classes from the Package.

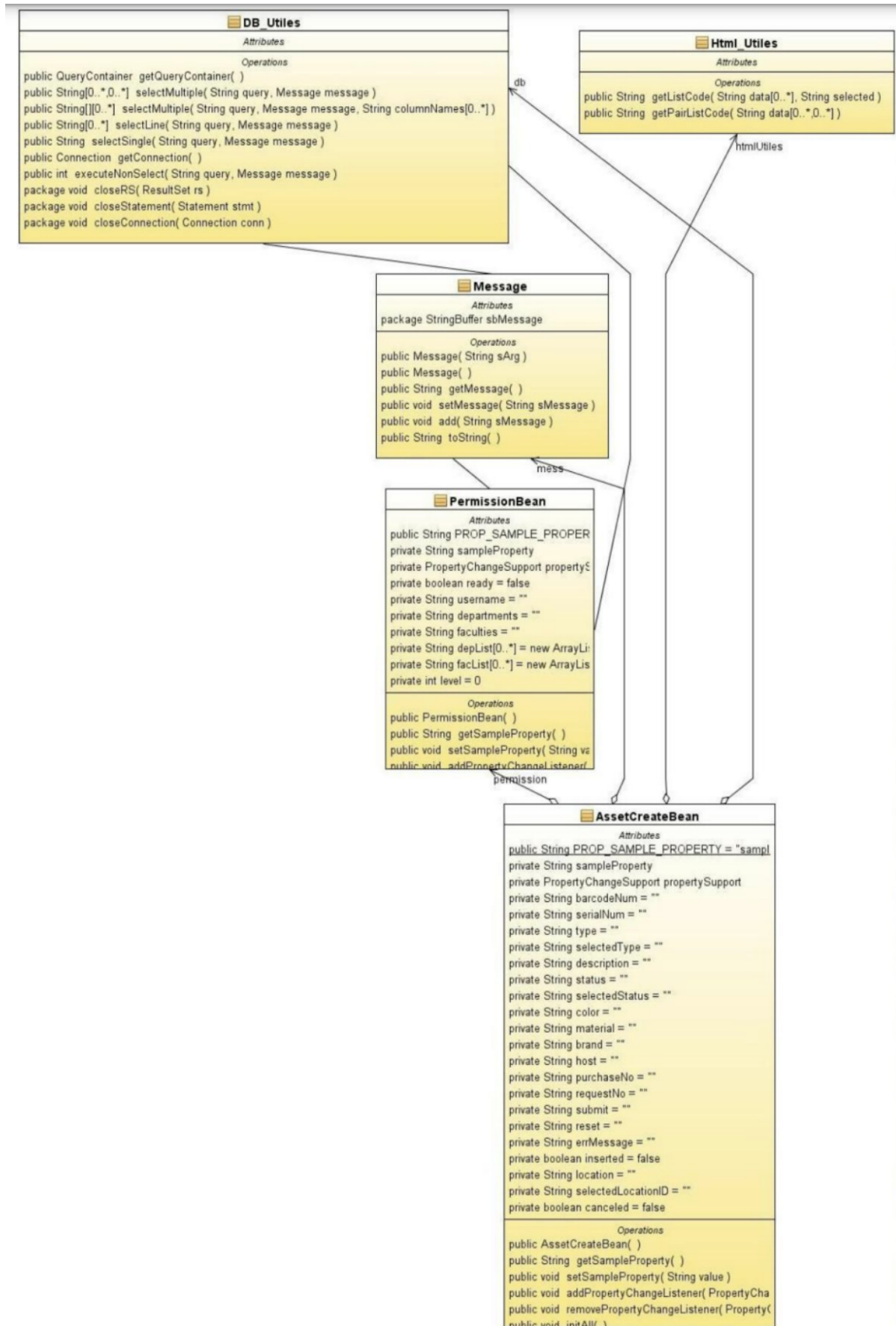


Figure 6

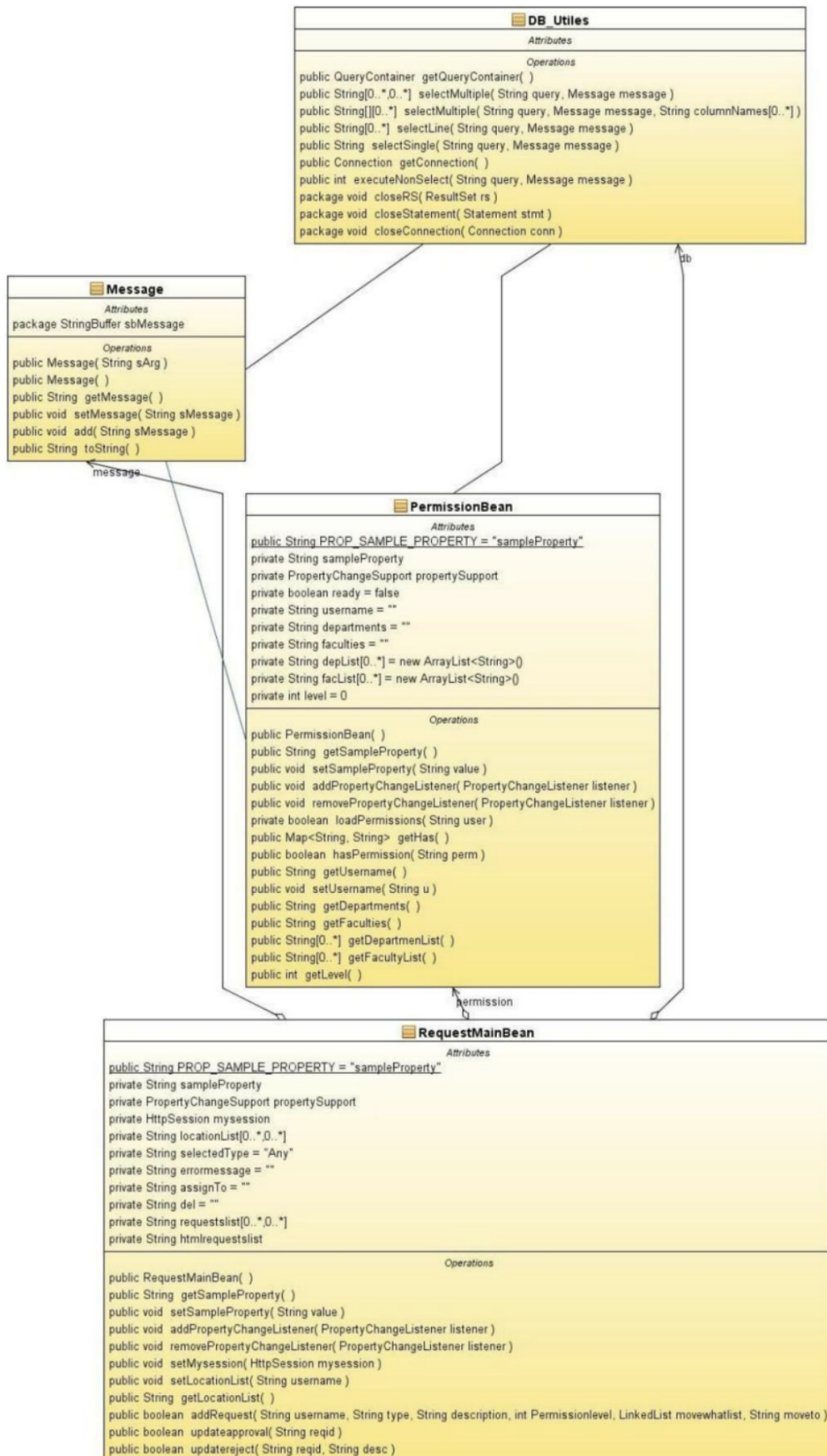


Figure 7

Based on Figure 6 Add new Asset class diagram, PermissionBean class is used by AssetCreateBean

class to set the permission based on the user role in order to access the specific asset info in Database. The Permission class has the responsibilities to authorize the return request result of the assets based on the role type users (Figure 7). Base on Table 2 below refers to the users who are given exemptions or/and users of a particular level.

Table 2:UUIS User roles' permission list

Role	Users	Access Request Permissions
1	Teacher Department Administrator IT group member	Allow to access request department asset database
2	Faculty Administrator	Allow to access request faculty asset database
3	University Administrator	Complete access to asset database

- i. By using Builder pattern, draw suitable classes to restructure Class AccessRequest based on Table 1 user roles' permission to enabled the system to build a return request based on the type of user roles' permissions in Table 2. **[10 marks]**