Developing Class Diagram

Learning Outcome:

1. Prepare Class Diagrams from a set of Use Cases.

Tasks:

You can do the tasks individually or in a group(discuss with others):

Identify the main classes and any associations that exist between them in this problem domain. Hence, draw an initial class diagram remembering that:

- a class describes the behaviour of a set of objects of the same kind;
- each class takes responsibility for particular parts of the overall system behaviour;
- some classes will have the responsibility for *knowing* something and others for *doing* something;
- objects may collaborate with other objects in order to carry out their responsibilities.

1. Case study: Preston Hotel

Preston Hotel is a large independently-run hotel (i.e. it is not part of a chain) located in the city of Preston. It offers a variety of accommodation (single, twin, double and suites) all of which offer en suite facilities, a telephone with an outside line and a mini-bar. The hotel has a bar and a restaurant, where guests may take refreshment and charge this to their room bill. Room service is also available. Services not offered by the hotel itself (for example, dry cleaning) can be ordered by guests through the hotel receptionist and charged to their room.

The hotel takes both individual and corporate bookings. Companies need to set up an account with the hotel before making a corporate booking and they are billed at the end of each month for bookings that have been completed since the last invoice was sent. A typical corporate client is UCLAN; during months such as February and June when examination boards are taking place as many as 30 or 40 guests may be staying at the hotel on the University account; at other times there may be only a few. A discount is negotiated for each corporate client when their account is set up and is reviewed annually.

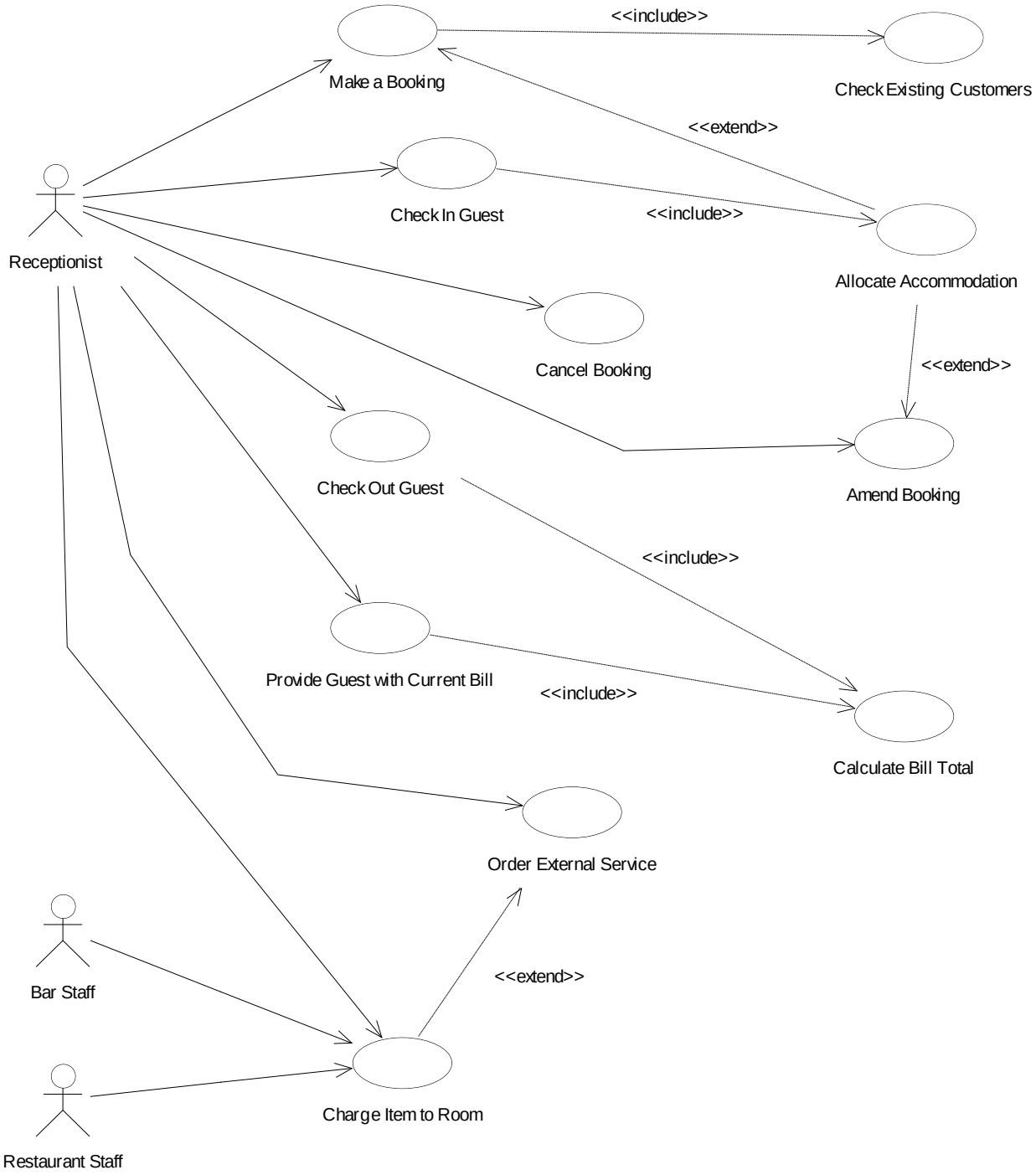
When a booking request is made the receptionist first checks whether there is a suitable room or rooms available on the required dates. For corporate clients, a guaranteed booking is then made. For individual clients, the Hotel requests credit details before the booking can be guaranteed. If these are not provided the booking is considered unguaranteed. In either case, the booking is now considered to be active. At any point up to when the guests check in, the booking can become guaranteed by the customer providing credit card details. A booking can be cancelled at any point up to when the guests check in.

When the guest checks in, the booking becomes registered. At the end of their stay the guest checks out and their booking is completed. If they are an individual guest they must at this point pay their bill in full, and it becomes paid. Corporate guests must check out and their booking becomes completed, but is only paid when the monthly invoice is sent to the corporate client. Booking records are kept on the system for six months before those that are cancelled or paid are archived.

Further details will be found in the Use Cases documented on the following pages; these are part of the Analysis Model prepared in the early stages of a project to build a computer system for the Preston Hotel.

Preston Hotel

Use Case Diagram



Preston Hotel

Use Case Specifications

Allocate Accommodation
A specific room is allocated to each guest.

Amend Booking
An unguaranteed booking may become guaranteed on provision of credit card details. Other changes (for example to the composition of the party or to the dates booked) may be made on the customer's request.

Calculate Bill Total
The total bill for a room comprises the cost of the room plus any items charged to it (for example, from the minibar, hotel bar or restaurant and any additional services provided) plus the appropriate rate of VAT.

Cancel Booking
A customer may cancel a booking any time before checking in. The booked accommodation is de-allocated.

Charge Item to Room
A guest may use items from the minibar in the room, make external telephone calls, make purchases from the hotel bar or restaurant or order additional services such as laundry. These items are charged to the guest's room. An external service ordered by the guest may also be charged to their room (although some services, such as taxis, will be paid for directly by the guest).

Check Existing Customers
Before making a booking, the receptionist checks the records of existing customers. Corporate customers need to have an existing account with no overdue debts; individual customers already on file need to have no outstanding debts.

Check In Guest
When a party (one or more guests) arrives at the hotel each guest is checked in and the booking becomes registered. Details of all the guests are confirmed, or if they have not been given at the time of booking they are recorded. The method of payment (by which guest(s) or whether to be charged to a corporate account) is confirmed. Accommodation is allocated if not already done at the time of booking and special requests are recorded.

Check Out Guest
Before the guest leaves the hotel they need to check out and the booking becomes completed. The receptionist provides them with the total room bill, which an individual customer must pay. If the bill is to be charged to a corporate customer the guest is asked to check and sign the bill, it is then added to the appropriate corporate account.

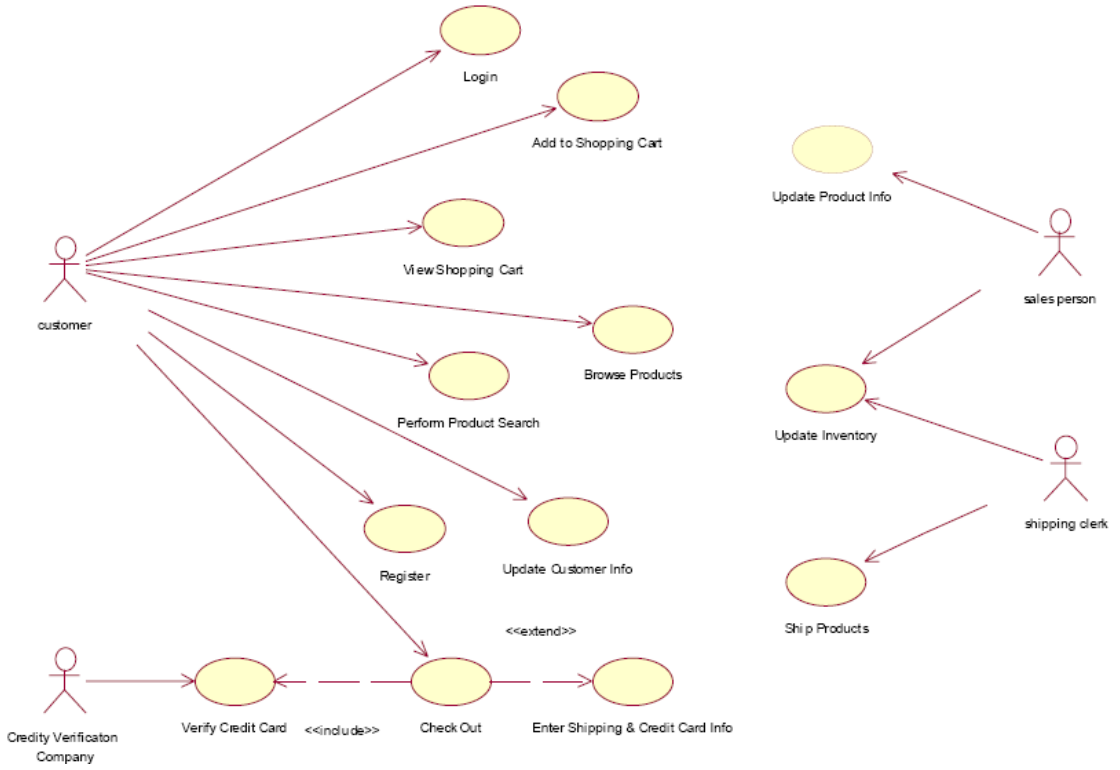
Make a Booking
When a customer contacts the receptionist with a booking request the receptionist checks the room occupancy for the required period and if the customer's needs can be met, makes a booking.
A guaranteed booking is only made for corporate customers or for individual customers who supply credit card details.
Accommodation may be allocated at this stage; alternatively where it is a group booking (for example, for 6 twin-bedded rooms) the allocation of each guest in the party to a specific room may be done on checking in. Either way, occupancy records are updated to avoid double booking.

Order External Service
Services not offered by the hotel itself can be ordered, once their availability has been checked. The guest name, room number and details of the service required are taken when the service is ordered.

Provide Guest with Current Bill
On request a guest may be provided with the current total of their bill.

2. Case study: e-commerce system

The following is the use case diagram and its use cases descriptions for a e-commerce system, please proceed class design and then draw a class diagram (including some important attributes and operations)



Use Cases Description

Login

The customer can login to the e-Commerce shopping system by enter his user name and password. The system will verify that the login name matches the login password. If they do not match, error message will be indicated to the customer.

Add to Shopping Cart

When the customer finds the products he wants, he adds them to the shopping carts. The system will store and keep track the information of the products that have been added into shopping cart.

View Shopping Cart

The customer can request to view the contents of the shopping cart. The system will return the contents of the shopping cart to the customer; the unit price and total price will be shown as well.

Update Customer Info

The customer can request to update their customer info. The system will display the current customer info to the customer. The customer updates the customer information and the

system will stored the updated customer info.

Register

If the customer is a new user, he can request to register with the system. The system displays a registration page and asks the customer to choose a login name (email address of the customer) and password. The customer is also required to enter their name and address. Shipping information and credit card information are optional entries at this point.

Enter Shipping & Credit Card Info

When the customer requests to checkout and he does not have credit card information stored at this point (system can not find his payment information), the system will prompt credit card information page. The customer will be given a choice on whether he wants the item shipped to his stored address or to an alternative address. The input payment information will be save into the order form.

Verify Credit Card

When the customer checks out, his credit information will be checked for verification. If the response shows that the credit card is invalid, the customer will be asked to re-input his payment information.

Update Product Info

The sales clerk requests to update products information. This includes the products price, description, brand, title, or number. The system will save the updated product information in the database.

Update Inventory

The dales clerk or shipping clerk requests to update inventory. The system will update the product information in the database.

Ship Products

After getting the order request, the sales clerk ships the order products to the customer with three to five workday.

Checkout

When the customer finishes shopping, he requests to checkout. If the payment information of this customer has already existed, the system prompts to customer to review or input a new one. The system then forwards the credit card information to credit Verification Company. If the credit card is invalid, the customer is given the option to use another credit

card or just cancel the order. If the credit card is valid, the order form will be processed by the system and checkout is complete.

Browse Products

The customer requests to view the products in a product category. The system will return the products information of the selected category to the customer.

Perform Products Search

The customer enters product search parameters and requests a product search. The system will search through the products category in its database and return the matches to the customer. If there are no matches, the system will display a fail message.