**Assignment**

***Case Study Information***

**Movie/Game DVD Rental System**

A new movie/game DVD rental store asks you to develop a movie/game DVD rental system for improvement of its DVD rental services with their customers.

The system will initially record about 1,500 movie/game DVDs that have already been ordered from a number of different suppliers. The suppliers also will supply new DVDs for the store in future. They will send an electronic copy of their updated DVD catalogues to the store monthly via email so that the store can select and order new DVDs based on the updated catalogue. This requires the system to record suppliers’ details including their name, address, telephone number and email address for the store manager to order new DVDs in future.

When the store needs to buy new DVDs from a supplier, the store manager will find the supplier record from the system, use the system to create an electronic order form, and then send the order form to the supplier via email. The order form has an order number, order date, video store name, address, telephone number and email address on the top of the form. To order multiple DVDs using one order form, the store manager needs to add multiple order lines to the middle of the order form. Each order line presents a DVD item filled with the DVD title, release year, copy price, the number of copies to be ordered, and the subtotal cost of the item. The subtotal cost of each item is also added to the total cost of the order on the bottom of the order form. Suppliers usually deliver ordered DVDs to the store within a week from the order date.

The store needs the new system to be connected with a scanning machine as part of the system. So that the store clerk can use the machine to scan DVDs when processing DVD rentals and returns. To support this facility, new arrived DVDs will be barcoded using the system before being put on the store shelves. The system stores a record of each of DVDs with its barcode, title, producer, selling price, rental price and the number of its copies in a data store. A DVD can have multiple copies held in the store so that different customers can rent the same DVD in the same period. The system records each copy of the same DVD with a copy number and its current status that is either ‘out’ or ‘in’.

A customer card will be issued for the new customer by the store clerk in terms of the system. The card has a unique card number that is used to link the card to the card holder (customer) in the system. The system keeps a record of individual customers with the customer’s name, home address, telephone number and email address. The store can notify customers new arrived DVDs or remind to return overdue DVDs using their record information.

When a customer gets in the store, the customer either picks up DVDs from the store shelves and take them to a store clerk, or gets reserved DVDs from a store clerk. The clerk gets the customer card from the customer and uses the scanning machine to scan the customer card. If the system accepts the card, the clerk clicks the RENTAL button to get an online rental form from the system to fill for the customer. The clerk fills the form with a form number, issue date and return date (30 days from the issue date) and the customer card number. Then the clerk uses the scanning machine to scan DVDs one by one. For each scan, the system validates the scanned barcode against the barcodes stored in the system. If the scanned barcode does not match any stored barcode, the system rejects the DVD. Otherwise, the system will add a new rental line to the middle of the rental form with its barcode, title and rental price. The rental price is also added to the total rental cost on the bottom of the rental form. If the customer rents multiple DVDs, this scanning process is repeated till all of DVDs have been scanned. Then the clerk tells the customer the total rental cost to be paid.

The customer can pay the total rental cost by either cash or a bank card. If the bank card is used in the first time, the clerk clicks the Bank Card button to record the bank card with the card number, bank name and expire date and sets up a link between the bank card and the customer card in the system. This helps the customer to use the same bank card for future rentals. The clerk then processes the payment manually without the system. If the payment is invalid, the clerk rejects the rental and clicks the Cancel Button to cancel the rental form. Otherwise, the clerk clicks the COMPLETE button to save it in the system. Then the system changes the status of each of rented DVDs from “in” to “out”, and shows the message “This rental is completed successfully”. The clerk inputs his/her staff number in the system so that the system can link the clerk record to the rental form for an auditing purpose.

Rented DVDs are usually returned to the store before the return date. When a clerk gets returned DVDs from a customer, the clerk clicks the RETURN button and scans returned DVDs one by one. For each scan, the system validates the scanned barcode against stored barcodes. If the scanned barcode does not match any stored barcode, the system rejects the DVD. Otherwise, the system changes the status of the DVD from “out” to “in”. The system searches for overdue DVDs every day and notifies the store to contact the customers who must return DVDs immediately.

The store allows customers to reserve a DVD that either has not been returned or are on order. They have to pay a deposit for each reservation. But they are allowed to cancel the reservation and get the refund of the deposit. The store needs the system to record reservations with reservation date, customer card number, DVD barcode and title. When a reserved DVD is returned by a customer or is delivered by a supplier, the store will get the customer information from the system and use the information to contact the customer that is on the top of the reservation list.

The store expects a lot of enquiries from its customers as well as its staff, e.g. availability of a DVD (in stock or on order) and how many copies of a DVD are currently available for rental. The system needs to response to such enquiries interactively with customers and staff.

***End of Case Study Information***

**WHAT YOU MUST DO FOR THE Assignments**

You must write a coursework report in the word format. The report must include

* A front page featuring:
  + Module title, lecturer name, your name and banner ID, submission date
* Declaration of originality (i.e. I declare that this is an original study based on my own work)
* A content page

and the pages presenting your answers to the following questions:

1. Create a UML use case diagram for the Movie/Game DVD Rental system including use cases, actors, interactions between actors and use cases, relationships between use cases.
2. Use Structured English to describe a scenario of the “Rent DVD”use case in sequence, selection and iteration statements.
3. Create a UML class diagram for the Movie/Game DVD Rental system including a system control class, entity classes, attributes and operations of classes, and relationships between classes.

4. Create a UML sequence diagram showing object interactions for the “Rent DVD” use case based on the used case description written for Q2 and the class diagram created for Q3 in the above.

**HOW YOU SUBMIT YOUR REPORT**

**TURNITIN Software:** When you upload your work to the Aula site, this anti-plagiarism software will check your work against all of documents stored and then shows its similarity rate.