

## Distributed and Enterprise Software Development (UFCFTR-30-3)

### Case Study: "UWEFlix" Cinema Booking System June 2024

*The entirely fictitious "UWEFlix" cinema on Frenchay Campus, UWE, has a limited "pay-as-you-enter" ticketing system in place currently. However, to enable students to place various advance bookings, UWEFlix are installing an upgraded Cinema Booking System to replace the current system. The following goals and requirements have resulted from initial stakeholder discussions of the likely scenarios of usage that such a system might offer.*

The first goal of the Cinema Booking system is to enable students to purchase cinema tickets in advance of the showing either via Internet while still offering customers the traditional purchase of tickets on entry to the cinema. The second goal of the Cinema Booking system is to enable university clubs to purchase blocks of tickets at discounted prices, again in advance via Internet, and also to allow university clubs to make payments on account.

Discussions with the UWEFlix Management Team and student union stakeholders reveal that it is required that the system-to-be must use the existing Payment Transaction System, which works perfectly adequately at the moment. Other discussions with the UWE student experience team raise the importance of user interface quality with respect to both UK and international students, and students with mild visual impairments, e.g. colour blindness.

Further discussions reveal that the Cinema Manager (or a suitable employee in the role of Cinema Manager) wishes to be able to register details of student clubs and their representatives. Club details include club name, Address details and Contact details. Address details include street number, street, city and post code. Contact details include land-line telephone number, mobile telephone number, and email address. Representative details include representative first name, last name, and date of birth. Thus on registration, a unique Club Representative number and unique password is allocated to the Club Representative.

Discussions with the UWEFlix Sales and Marketing team reveal that the new system must present information about the cinema and its films in an attractive manner

---

over the internet. In order to achieve this, the new system must provide the capability for the Cinema Manager (or suitable employee in the role of Cinema Manager) to add film details include title, age rating, duration, and short trailer description. The new system must also provide the capability to delete details of an obsolete film, although the film can only be deleted if there are no showings allocated to it. In a similar manner, there must be a capability for an employee in the Cinema Manager to add details of a new screen in the cinema, including the capacity of the screen in terms of the numbers of seats. Lastly, films can be shown on many occasions on various days, so the new system must provide a capability to add details of a new showing of a film, including the date and time of the showing.

The UWEFlix Accounts Department have also been involved in discussions, as they wish to manage the student club accounts via the new system. For instance, the Account Manager wishes to be able to add a new account for a previously registered Club. In this scenario, The Account Manager provides Account details including Account Title (both the surname and first initial of the employee, or the name of the university club) and payment card details for the account (card number and expiry date). The Account Manager also provides a discount rate for the account. It is required that a unique account number is generated for the account.

To provide full account management facilities in the new system, the Account Manager must also be able to amend an account. In this situation, the new system is required to supply with a list of all accounts, from which the Account Manager can then select an individual account, for which the details of the account are displayed. The Account Manager then amends the Account details and the amendments are recorded on the system-to-be.

The UWEFlix Accounts Department stated that the new system is required to display account statements, to be provided at the end of every calendar month. In the scenario, the Account Manager requests to view end of month account statements and the new system supplies a list of all possible end of month account statements. The Account Manager selects one account and is provided with a statement of the last month's debit and credit transactions on the account.

Lastly, all the stakeholders are keen to promote both

- a "green" sustainability agenda with respect to energy and resource consumption. The stakeholders are not sure how this may be achieved technically, but state that sustainability is an important system requirement.
- a "trusted system" agenda, where the privacy of all student and customer data can be assured.

Discussions then moved on to how customers and student representatives might use the new system-to-be technology.

It is envisaged that in order to purchase advance tickets, the Customer selects a date and is provided with a list of available showings for that date, including the time of the showings. The Customer then selects a showing and is provided with details of the showing, including film title, age rating, duration, and a short trailer description. The Customer then selects the quantity of tickets required, together with the ticket type. Ticket types may be one of student, child, or adult. The total cost of the booking is supplied to the customer. If the customer is happy, they then confirm their booking request. If there are insufficient seats available at the showing, the booking request is cancelled and the Customer is invited to make a further booking request. However, if there are sufficient seats, the Customer confirms the booking and proceeds. Individual seats are not allocated as customers are free to sit where they wish. The Customer then enters their payment card details, which includes cardholder name, card number and expiry date. Payment cards may be one of two types – credit card or debit card. The payment is transacted via the existing Payment Transaction System.

UWEFlix stress that the scenario for purchase of tickets by Club Representatives is very different. The Club Representative provides their club rep number and password, which are validated. If either the club rep number or the password are incorrect, the club representative re-enters their details for re-validation. Once successfully validated, the Club Representative then nominates a date and is provided with a list of available showings for that date, including the time of the showings. The Club Representative selects a showing and is provided with details of the showing, including film title, age rating, duration, and a short trailer description. The Club Representative then selects the quantity of tickets required, which must be no less than ten. A ticket type of student is applied to the block booking. A club discount is applied to the total cost of the booking, and then the total cost is supplied to the Club Representative. If the Club Representative is happy, they then confirm their club's booking request. If there are insufficient seats available for the block booking at the showing, the block booking request is cancelled and the Club Representative is invited to make a further booking request. However, if there are sufficient seats, the cost of the block booking is then debited from the club's account.

UWEFlix then require the new system-to-be to have the capability for Club Representatives to settle their accounts monthly. Thus as before, the Club Representative provides their club number and password, which are validated. If

either the club number or the password is incorrect, the Club Representative re-enters their details for re-validation. Once successfully validated, the Club Representative provides their unique club account number and all transactions for the current month together with the outstanding balance of their club account is displayed. The Club Representative authorises settlement and payment for the outstanding balance is transacted against the Account via the existing Payment Transaction System. The payment is also credited to the university club account.

Lastly, for efficiency's sake, UWEFlix wish that customers and club representatives be able to collect their own tickets on entry to the cinema auditorium. So on the event of a Customer or Club representative swiping their payment card through an attractive and easy to use swipe / printer device, the system determines if a current booking is associated with the payment card. If a booking currently exists for the payment card, the swipe / printer device prints the appropriate tickets for the booking. If no booking exists, a friendly message is supplied to the Customer or Club Representative.

The required Quality of Service (QoS) measurements for the new system-to-be are as follows:

- The system MUST be capable of supporting up to 300 seat capacity in the cinema
- The system MUST be capable of dealing with up to 2,500 bookings in any day
- The system MUST respond to every mouse click in less than one second for 99% of all mouse click events.
- The system MUST be capable of handling 10 simultaneous requests for advance booking per minute.
- The system MUST be available for 24 hours a day, 365 days of the year.
- The system MUST provide an understandable user interface for a variety of students including UK and international students, and those with mild visual impairments such as colour blindness.
- The system MUST monitor and adapt energy consumption wherever possible to promote a sustainable, carbon-neutral approach to system performance in line with the UWE sustainability strategy.
- The systems MUST comply with GDPR and other legal requirements when dealing with personal data.