	Assignment
	Title: On-line Cinema Information System (OCIS)
	Student Name: Mr Brian O Regan
	Student ID Number: 110707163
	Module: CS4504
Due Date: Wednesday 4th December 2013	

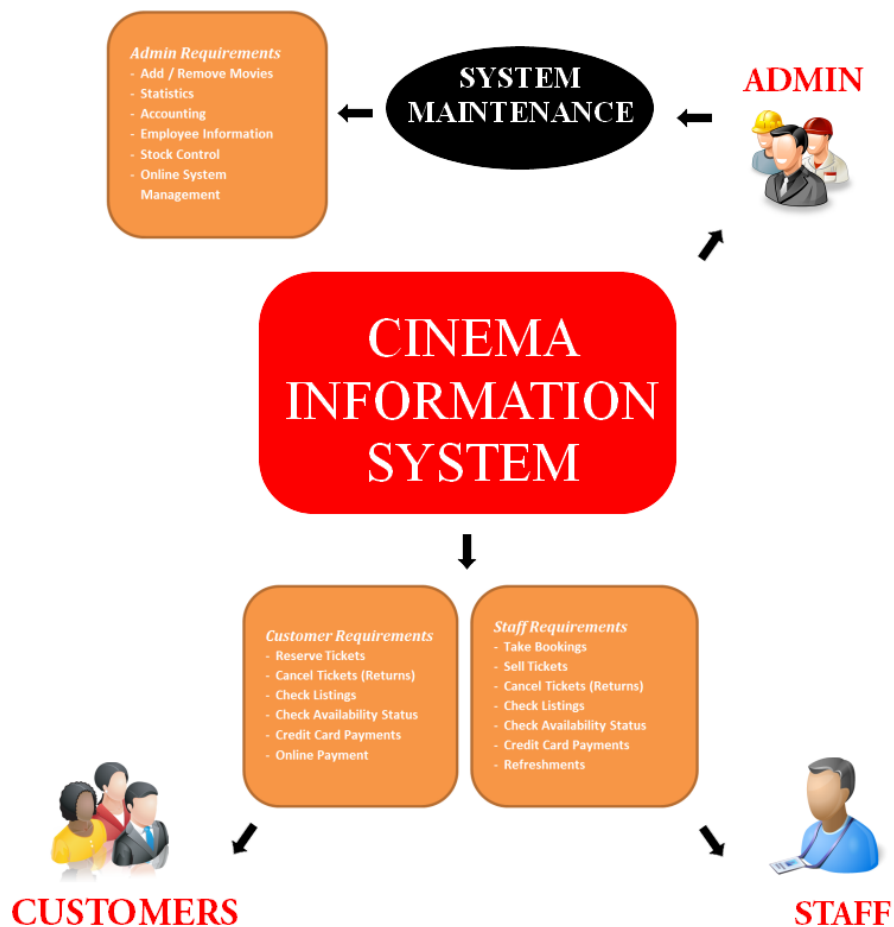
0. Overview


As the main laboratory exercise we will deal with a simple information system for a cinema. An automated cinema system is an information system for a cinema that keeps all information relevant to the showing of films, booking of tickets, etc., and provides various services, such as searching the catalogue, booking, cancelling tickets etc.

The exercise will be built up over a number of labs and then reworked through various iterations and modifications. While the basic system designed can be simple, the design should be general and be capable of elaboration. For example, the system should be capable of being expanded easily and adapted to another kind of application area or a general Event Booking system.

1. Context Model

As part of the initial modelling for the proposed system, define the system boundary, and illustrate with a block diagram context model (e.g. as a diagram in Word).



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2. Requirements

The first part of the exercise is about the requirements engineering. Stakeholders must be identified, their goals and possible conflicts identified. This involves brainstorming and role playing rather than actual requirements gathering as would be done on a "live" project. In addition, relevant information on similar projects should inform you on what the possibilities are.

The initial brainstorming exercise should produce:

- a. A list of the primary stakeholders (and actors) and their goals, described in actor-goal list
- b. Brief discussion of any conflicting stakeholder goals
- c. A summary (in natural language) of the most important (user-level) functional and non-functional requirements for the computer system.

Primary Stakeholders

- a. Cinema Company Owners (Admin in Context Model)
- b. Cinema Employees
 - i. General Employees
 - ii. Admin Employees
- c. Customers
 - i. In-Person Customers
 - ii. Online Customers

Secondary Stakeholders

- a. Bank (handles online payments / deposits / withdrawals etc.)
- b. Inland Revenue (VAT on sales, PAYE / PRSI for employees)
- c. Suppliers (Films, refreshments, ticket rolls, employee uniforms etc.)
- d. Health & Safety / Health Inspectors (HSA, Accreditation Awarding Company etc.)
- e. The Irish Film Classification Office (IFCO) (Classify films age ratings)
- f. Service Providers, such as Film Producers / Electricity / Water etc.



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	Actor	Goals
Admin	Management Admin	<ul style="list-style-type: none"> • View All – but mainly statistics relating to the cinema sales, most popular movies etc. • Employee Information – such as rosters, salary etc. • Stock Control – for refreshments provided (drinks, popcorn, sweets etc.)
	IT Admin	<ul style="list-style-type: none"> • Add / Remove movies from listings / catalogue • Rectify any technical issues / helpdesk • Improve functionality of the system (both local and online).
	Accounts Admin	<ul style="list-style-type: none"> • View accounts relating to tickets sold / cancelled and refreshments sold etc.
Employees	General Employees	<ul style="list-style-type: none"> • Take Bookings (this could be over the phone or in-person) • Sell Tickets • Cancel Tickets (Returns) • Check Listings • Check Availability Status • Credit Card Payments • Refreshments
	Admin Employees	
Customers	Customers	<ul style="list-style-type: none"> • Reserve Tickets • Cancel Tickets • Check Listings • Check Availability Status • Credit Card Payments • Online Payments
Secondary Stakeholders	Bank	<ul style="list-style-type: none"> • Provides loans to the Admin • Handles deposits, withdrawals etc. • Employees paid through bank.
	Inland Revenue	<ul style="list-style-type: none"> • “<i>Death and Taxes</i>”, the Admin will need to ensure that the IR receive their dues and that all employees are registered to pay PAYE and PRSI and any other tax they extort from businesses and their staff.
	Suppliers	<ul style="list-style-type: none"> • Refreshments (popcorn, sweets & soft drinks) • Ticket Rolls • Employee Uniforms
	H&S / Health Inspectors	<ul style="list-style-type: none"> • Ensure that Admin comply with industry standards and maintain the overall

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		safety of the employees and customers while on the premises.
	The Irish Film Classification Office (IFCO)	<ul style="list-style-type: none"> Decides what rating a film should get, for example G, 12A, 15 and 18. This can impact on ticket sales.
	Service Providers	<ul style="list-style-type: none"> Film Producers – the purpose of a cinema is to view movies, no movies no customers / business. Electricity and Water Suppliers can also impact on the ability of Admin to provide the service they provide. No water means there are no toilet facilities and no electricity is fairly obvious.

Conflicting Stakeholder Goals

Admin	Employees
<ul style="list-style-type: none"> Admin may want to fill the cinema, but the IFCO ratings may be too high and prevent them from achieving this. Admin wants to ensure the business is profitable but may run into issues with the Inland Revenue and employees on rate-of-pay. Admin may want to expand but the Bank may deem this as a risky move and deny a loan. Bank charges / Additional film charges may be passed onto the customer. Suppliers may be out of stock or are late delivering stock, thus the customer may not be able to purchase refreshments such as popcorn (customers may choose to cancel tickets if this isn't available) H&S / Health Inspectors may deem the cinema unsafe and force the Admin to shut the cinema until repairs are made, thus forcing refunds on tickets already purchased (booked) – this will also impact on the employees who may not be required if the cinema is shut and the accounts staff revising projected sales etc. Film Producers may be late in releasing a movie and force the Admin to cancel bookings and refund customers. 	
Customers	Secondary Stakeholders

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Functional Requirements

Most of these are covered above but the functional requirements of the system are as follows:

Admin


- The Admin should be able to:
 - View statistics relating to the cinema sales, most popular movies etc.
 - Employee Information – such as rosters, salary etc.
 - Stock Control – for refreshments provided (drinks, popcorn, sweets etc.)
 - Add / Remove movies from listings / catalogue
 - Rectify any technical issues / helpdesk
 - Improve functionality of the system (both local and online).
 - View accounts relating to tickets sold / cancelled and refreshments sold etc.

Employees

- General Employees should be able to:
 - Report any issues with the system, such as an online helpdesk.
 - View the listings of all movies in the catalogue.
 - View the availability status (available seats in the auditorium).
 - Take bookings either in-person or over the phone.
 - Print tickets.
 - Cancel bookings and make refunds.
 - Take payments for refreshments and tickets and combine both into a total price. Payments could be Cash or Credit Card.
- Admin Employees should be able to:
 - View tickets lodged on the helpdesk and respond to issues.
 - Have access to the CMS system, which allows them to update ticket prices, add/remove movies and general information that would appear on both online and in-house interfaces.

Customers

- Online customers should be able to:
 - Report any issues with the system, such as an online helpdesk.
 - View the listings of all movies in the catalogue.
 - View the availability status (available seats in the auditorium).
 - Make bookings online and print out their tickets.
 - Cancel bookings and get a refund.
- In-person customers should be able to:
 - Buy tickets and refreshments from the desk.

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- Pay in cash or with a credit card.
- Return tickets and get a refund.
- Get a receipt for their purchases.
- View listings on a display screen (with age ratings and start times etc.)

Non-Functional Requirements

The functional requirements of the system are as follows:


- The system should be user friendly, not overly complicated.
- The system should be secure, especially where online payments are concerned. It should be tested by an external specialist to ensure it is secure.
- The system should be monitored at all times to ensure that any issues are dealt with quickly and efficiently.
- DoS Attacks may be an issue but the system should be able to handle numerous users simultaneously.

3. Use cases

- a. Produce the textual descriptions for 6 important use cases.
- b. Draw the initial high level use-case diagram of the system. It may be difficult to include all the actors and all top-level use cases in a single diagram; include at least 3 important actors and at least 8 important high-level use cases. Keep it simple, and state briefly anything you have omitted and justify your choice of important representative actors and important use cases.


3 (a)

Use Case ID	Use Case Name	Primary Actor	Complexity	Priority
1	Purchase Ticket	Customer	High	1
2	Cancel Ticket	Customer	High	1
3	View Listings	Customer	High	1
4	In-house Sale	Employee	High	1
5	Stock Control	Admin	Med	2
6	Statistics	Admin	Med	2

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Use Case	Description
Use Case ID	1
App Version	Online
Use Case Name	Purchase Ticket
Use Case Description	Customer goes to the cinema website and purchases a ticket paying online using a credit / debit card.
Precondition	Website live and payment system in place
Trigger	Customer clicking on Purchase Ticket on the website
Basic Flow	<ul style="list-style-type: none"> • Customer visits Cinema Website • They login (or register) • They select a movie from the catalogue • They click Purchase Ticket on the page • Website displays a list of dates & times where tickets are available to be purchased (i.e. Auditorium has not reached full capacity) • Customer selects date & time and clicks Payment Options • Customer selects card type and inserts card information • System verifies payment • If okay, Customer can print tickets or selects Collect at Cinema (if they have no printer). • Sale Complete (they can now logout)
Alternate Flows	<ul style="list-style-type: none"> • The customer can purchase a ticket in the cinema. • They can pay in cash in the cinema.


Use Case	Description
Use Case ID	2
App Version	Online
Use Case Name	Cancel Ticket
Use Case Description	Customer goes to the cinema website and cancels a purchased ticket and obtains a refund (may be partial refund depending on policy)
Precondition	Website live and payment refund system in place
Trigger	Customer clicking on Cancel Ticket on the website
Basic Flow	<ul style="list-style-type: none"> • Customer visits Cinema Website • They login to the website using their registration username and password. • They select Cancel Ticket from the options • They select the Ticket they wish to cancel (they may have more than one ticket purchased) • System verifies with the user • System checks policy in relation to refunds and displays to user what they will be refunded • Customer confirms cancelling and requesting refund • Customer is refunded • Ticket Cancelled Complete (they can now log out)

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Alternate Flows	<ul style="list-style-type: none"> The customer can cancel a ticket in the cinema and receive a refund in cash.
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Use Case	Description
Use Case ID	3
App Version	Online
Use Case Name	View Listings
Use Case Description	Customer goes to the cinema website and views current cinema listings
Precondition	Website live
Trigger	Customer clicking on View Listings on the website
Basic Flow	<ul style="list-style-type: none"> Customer visits Cinema Website They select View Listings from the menu Films are displayed as follows: <ul style="list-style-type: none"> Movie Name Movie Description (short) IFCO Rating Dates movie being showed Times movie being showed
Alternate Flows	<ul style="list-style-type: none"> The customer can visit the cinema and look at a display screen in the lobby / window.

Use Case	Description
Use Case ID	4
App Version	In-House Interface
Use Case Name	In-house Sale
Use Case Description	Customer requests to purchase a ticket or ticket / refreshments
Precondition	System Functional
Trigger	Customer presenting themselves at the desk and requesting items
Basic Flow	<ul style="list-style-type: none"> Customer visits Cinema and goes to the desk They request a ticket or ticket/refreshments Employee does as follows: <ul style="list-style-type: none"> Checks whether tickets are available (auditorium has seats available) If okay, clicks number of requested tickets for showing If refreshments are included, enters the items on the system Total cost displayed to Employee & Customer Customer presents cash / card for payment Employee processes sale (System verifies card payment) and if cash, the change is displayed for the Employee & Customer. Ticket(s) and Receipt are printed Sale Complete
Alternate Flows	<ul style="list-style-type: none"> The customer can purchase tickets online (but not refreshments)

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Use Case	Description
Use Case ID	5
App Version	In-House Interface
Use Case Name	Stock Control
Use Case Description	Admin want to ensure adequate stock for the cinema
Precondition	System Functional
Trigger	Admin selects Stock Control from the menu
Basic Flow	<ul style="list-style-type: none"> • Admin logs in to the system • They select Stock Control from the menu • System displays a list of all items currently in stock and stock awaiting arrival including delivery date (already ordered) • Admin looks over the cinema listings and can decide whether additional stock is required (depending on past experiences – for example certain films may have huge sales – Harry Potter, Batman or Star Trek franchise for example). • Use Case Complete
Alternate Flows	<ul style="list-style-type: none"> • Employees notify Admin they are running low on stock for a particular item.

Use Case	Description
Use Case ID	6
App Version	In-House Interface
Use Case Name	Statistics
Use Case Description	Admin wish to view statistics for the cinema, such as sales or number of tickets sold for certain movies, dates or times
Precondition	System Functional
Trigger	Admin selects Statistics from the menu
Basic Flow	<ul style="list-style-type: none"> • Admin logs in to the system • They select Statistics from the menu • System displays a series of statistics relating to a variety of sub-items such as ticket sales (hourly, daily, weekly etc.), most or least popular movies and most or least popular refreshments. This enables Admin to decide what prices to charge and what movies customers like and dislike for example. • Use Case Complete
Alternate Flows	<ul style="list-style-type: none"> • None



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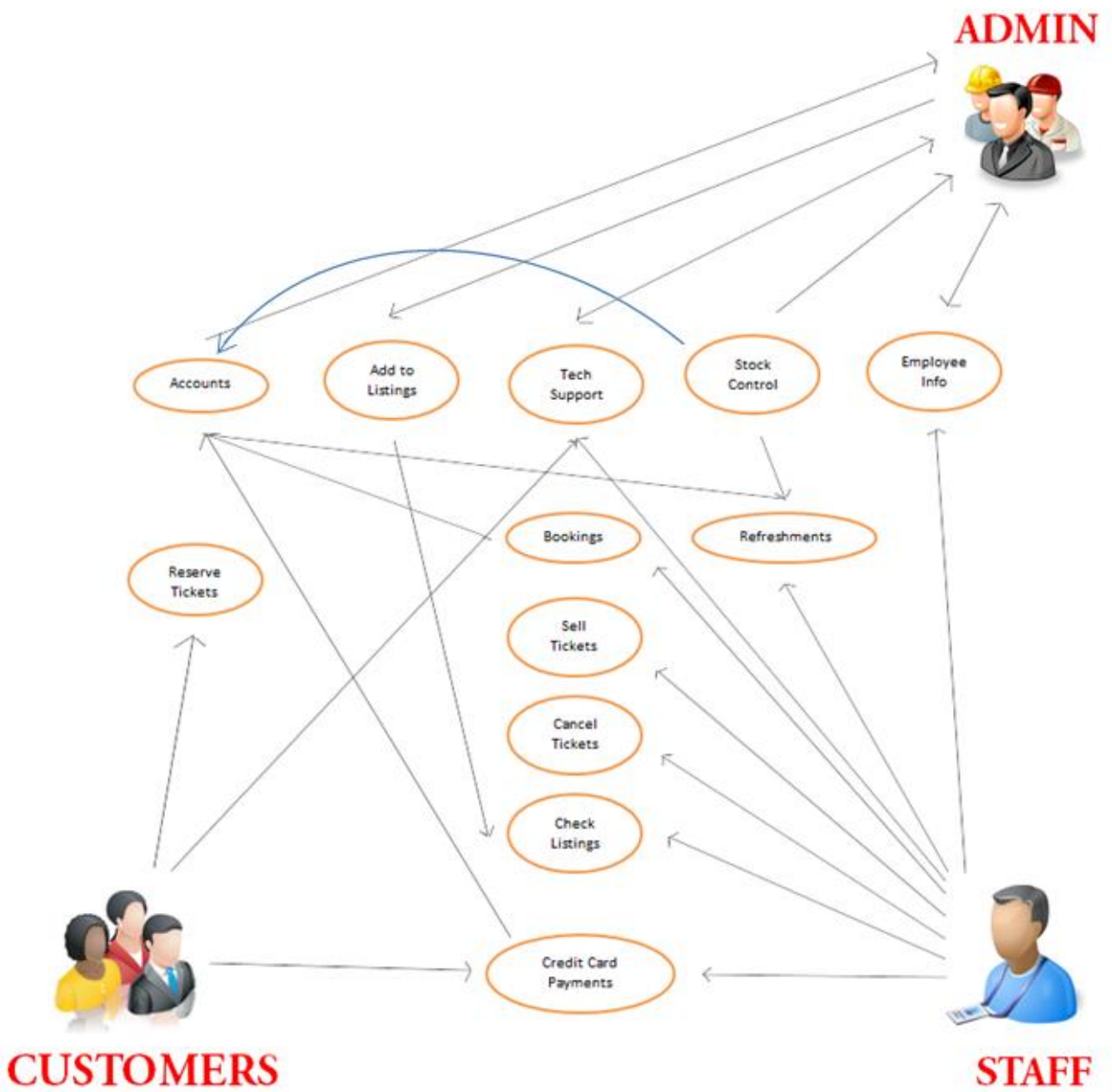
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3 (b)

High Level Use-Case Diagram of the System

The three main actors (primary) actors of the system are, Admin, Employee & Customer.





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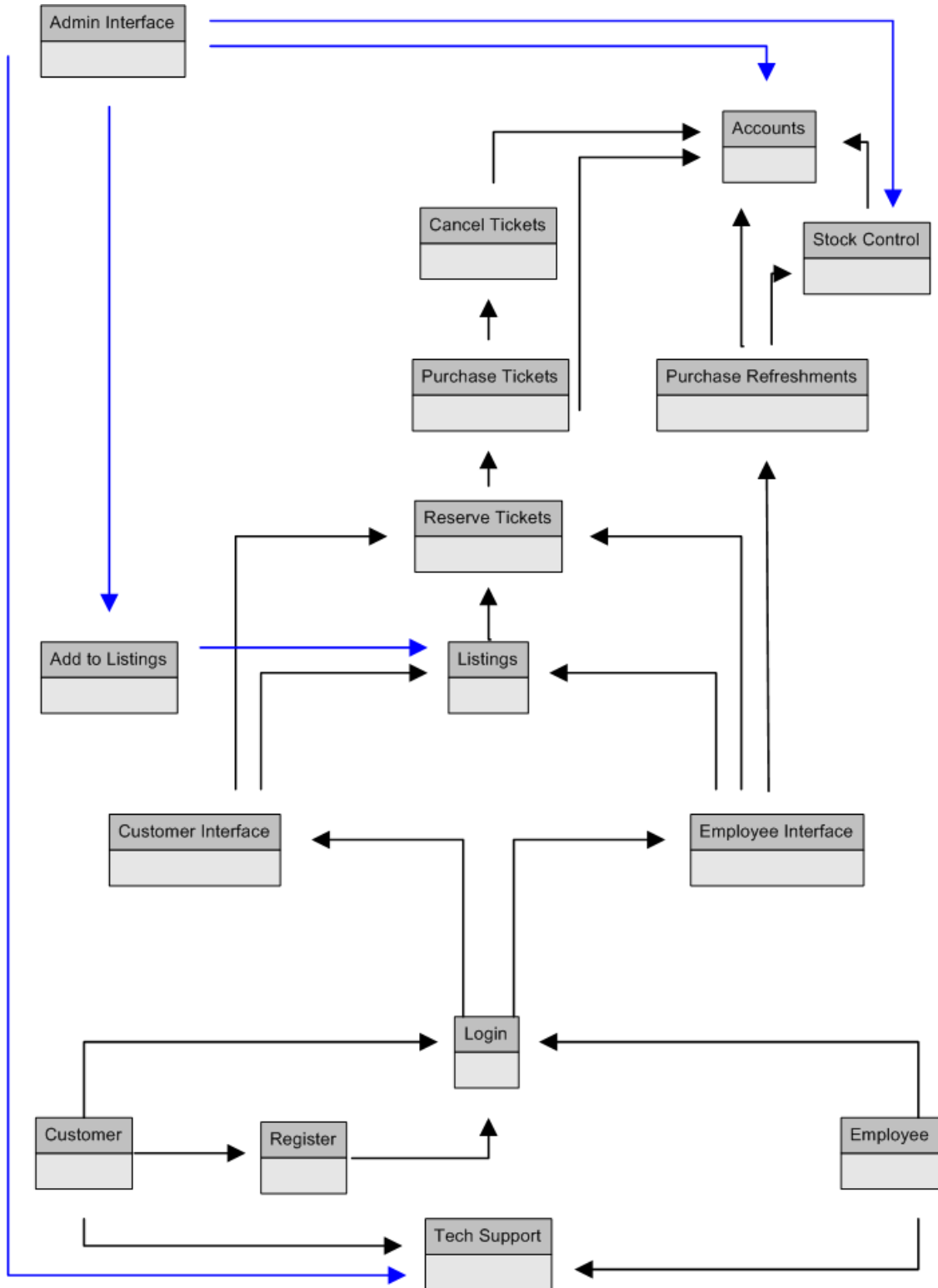
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4. Domain Model (class diagram of problem domain concepts/conceptual model)





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5. System Sequence Diagrams

The main areas selected are as follows:

Purchase Ticket Online (if a registered user)

Customer visits Cinema Website and selects Cinema Listings from the menu

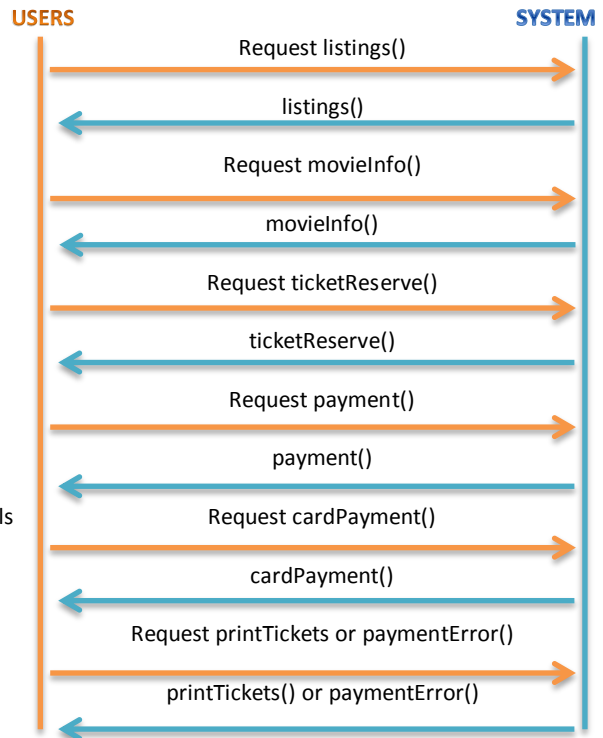
Customer selects the movie they would like to see

Customer selects Reserve Tickets

Customer selects Date & Time

Customer selects payment card type and enters the card details (name, card number, expiry date etc.)

If payment was accepted (i.e. verified), then the user can print tickets. If not accepted then the error page will be shown.



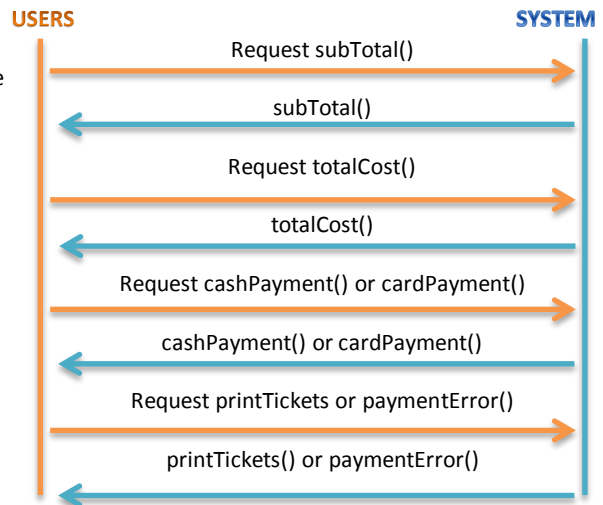
Pay for Tickets / Refreshments


Customer visits Cinema and requests tickets / refreshments from the employee. Employee enters items requested and the sub-total is updated.

When the employee has entered all items, the total is requested.

Employee asks customer how they would like to pay. If cash then cashPayment() is selected or if credit card then cardPayment()

If payment was accepted (i.e. verified), then the user can print tickets. If not accepted then the error page will be shown.



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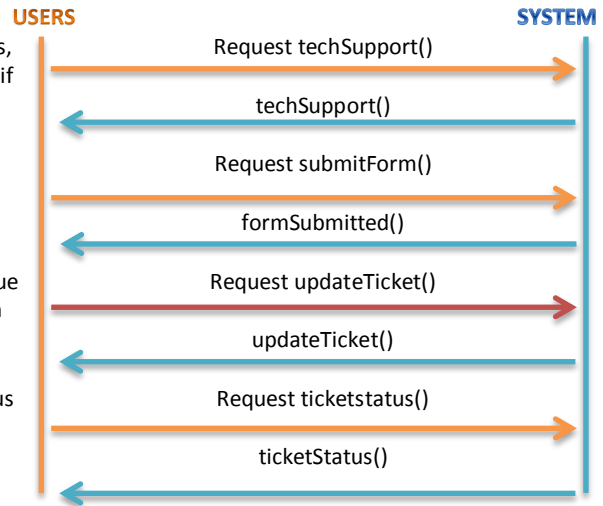
Technical Issues / Tech Support

Customer or employee (User) are experiencing technical issues, they select Tech Support from the Menu or call Tech Support (if they cannot access the system).

User enters the problems they are having using the form displayed, for example can't login or listings not available and submit the form. This is referred to as a ticket.

Tech Support looks at the submitted form and rectifies the issue and updates the ticket, so the user is aware the issue has been rectified.

User can check the status of the ticket by selecting Ticket Status from the menu (if logged in).




6. Operation Contracts

Contract	Get the total cost for items selected by customer
Operation	totalCost()
Pre-conditions	That the items have been entered in the subtotal() and the Total Cost is selected by the employee.
Post-Conditions	The total cost of the sale is displayed for the user and the employee can request payment method from the customer.
Output	The total cost of the items is displayed to the customer & employee. The payment screen is displayed to the employee.

Contract	Display cinema listings
Operation	displayListings()
Pre-conditions	That all movies have been entered in the database using insertListing().
Post-Conditions	All cinema listings are displayed for both customers (online) and employees (in-house).
Output	Display Cinema Listings with start times, dates the movie is showing, what is the age rating of the film, the cost of tickets and what auditorium the movie is being shown in.

Contract	Make a payment for tickets using a Credit Card
Operation	cardPayment()
Pre-conditions	That the movie has been selected using ticketReserve() and the payment type selected is cardPayment()
Post-Conditions	The card details were entered (or swiped in-house enters their

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	PIN) and the user has entered all required information. The payment is either made (printTickets()) or rejected / error (paymentError()).
Output	Print Tickets if payment was made or error page if there was an error with the payment.

Contract	Maintain Stock Levels
Operation	orderStock()
Pre-conditions	selectRefreshment() is entered by the employee when a sale is being made, so Stock Control have an accurate account of what is in stock.
Post-Conditions	Stock is ordered and when it arrives it is entered into the system.
Output	Current Stock Levels, Ordered Stock = Total Stock Level when new stock is entered.

7. Interaction diagrams

Develop sequence or communication (collaboration) diagrams following Larman's guidelines: Take each system operation, and produce an interaction diagram for the internal operations/messages that follow from the system operation; this involves deciding on which internal classes/objects are involved in the interaction to achieve the required behaviour. The domain class diagram (conceptual model) provides a starting point for these internal classes but these classes are altered, added to, deleted to get a better set of design classes. Doing the interaction diagram involves assigning responsibility:

- Which class has responsibility for handling the initial operation?
- Which classes are responsible for subsequent operations?

Draw 4 interaction diagrams describing sets of interacting objects to fulfill previously identified 4 important system operations. In the diagrams identify one example of Larman's basic GRASP patterns for assigning responsibility.



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8. Implement the design class diagram

