

A 3.8 DEL SOLUTION: OOSAD APPROACH

1. Systems Requirement Specification (SRS) for DVD Reservation and Delivery System (DRDS)

For illustrating OOSAD concepts and its application we take a scenario (different from what we selected for SSAD) of reserving a DVD from a remote location and a request for home delivery. For this approach, the problems, needs and solution requirements are same as that of SSAD.

Assumptions: The assumptions here are as follows:

- Member is a registered member holding valid ID and password to access DEL Website (portal).
- Member does not have overdue payment status.

2. SRS: Use Cases

- The use cases (Main business functionalities) in the system are as follows
 - Add new member
 - Update or remove member
 - Add DVD
 - Reserve DVD
 - Return DVD
 - Lend DVD
 - Request home delivery
 - Remove reservation
 - Add DVD title
 - Update or remove DVD Title
 - Remove DVD
 - Raise purchase order for DVD
 - Process bill
 - Pay the bill
- Details of Use Cases (Only some have been detailed for illustration).
- **Lend DVD**
 1. If the member has no reservation:
 - (a) A DVD is identified
 - (b) Availability of the DVD is confirmed
 - (c) The member is identified
 - (d) Issue DVD to the member
 - (e) A new issue is registered
 - (f) If the member has a reservation:
 - (g) A DVD is identified
 - (h) Availability of the DVD is confirmed
 - (i) The member is identified
 - (j) Issue DVD to the member
 - (k) A new issue is registered and the reservation is removed (see use case remove reservation)

• Return DVD

1. The member returns an DVD
2. The title is identified
3. The borrowed DVD of the title is identified
4. The loan is identified through the title and DVD
5. If the DVD is returned after the maximum allowed lending time the fine is calculated and charged
6. The corresponding loan is settled
7. The system informs persons with reservations that an item has become available.

• Make Reservation

1. A title is identified.
2. The member is identified.
3. A reservation is created with the specified title and member
4. Delivery instructions processed.
5. Member informed.

• Add Title

1. Adds a new title with the title and other details into the system.

• Add Item

1. The title of the item is identified. A check is made if the title of the item is already registered in the system. If not, it must be registered before the item can be added.
2. Information about the item is requested (an id that is unique for this item, typically a bar code or a number stamped on to the DVD).
3. The item is added to the system.

• Maintenance

1. The branch manager should be able to add and remove titles and items and members in the system.
2. This use case uses a number of other use cases:
 - (a) Add title
 - (b) Remove or update title, add item
 - (c) Remove item
 - (d) Add member
 - (e) Remove or update member

• Remove Item

1. The title of the item is identified.
2. The ID of the item is requested.
3. The item is found and removed from the system, along with any loans registered on that item.

• Remove or Update Member

1. Name of the member is requested.
2. The member information is removed from the system, along with any loans or reservations that the member has made.
3. Update member:
 - (a) The member to be updated is specified

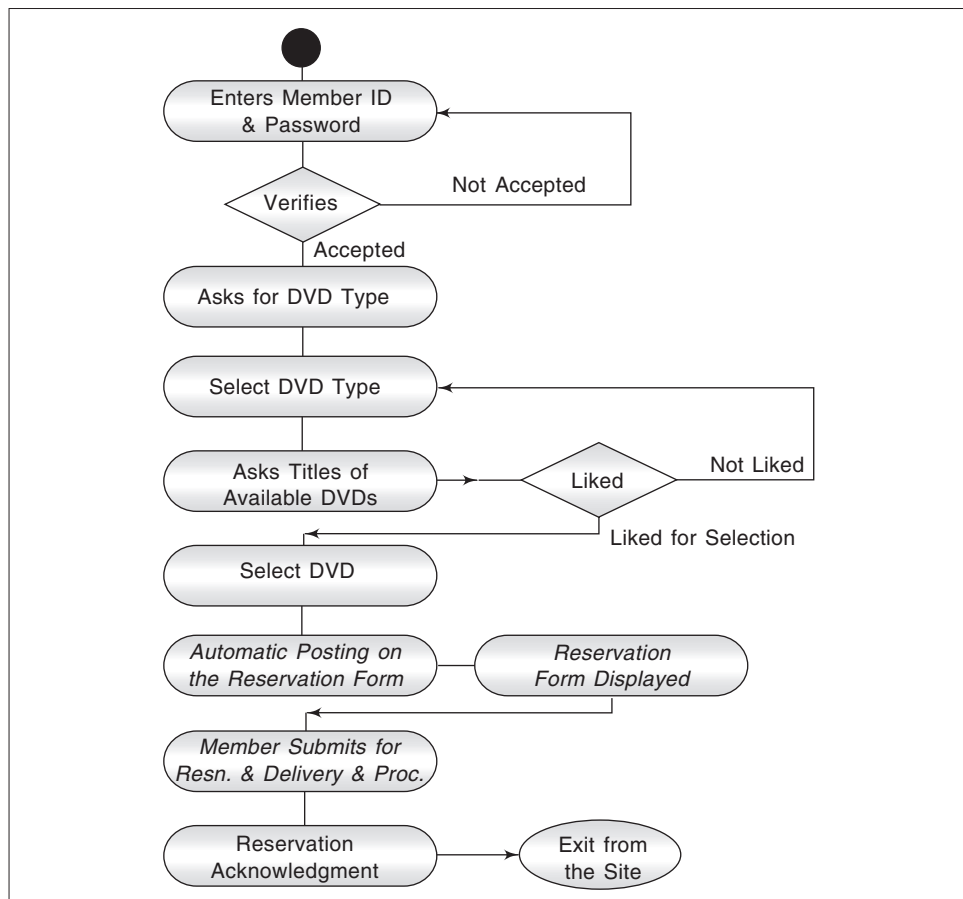
- (b) Information about the member is displayed and the information can be changed.
- (c) Information about the member is updated.

• **Remove Reservation**

1. The member is identified.
2. Identify the reserved title that no longer should be reserved.
3. The reservation is removed.

3. Activity Diagram of DVD Reservation and Delivery System (DRDS)

Member accesses homepage of DEL Website and clicks on DVD reservation button. In response, Member ID and Password Entry window is displayed.

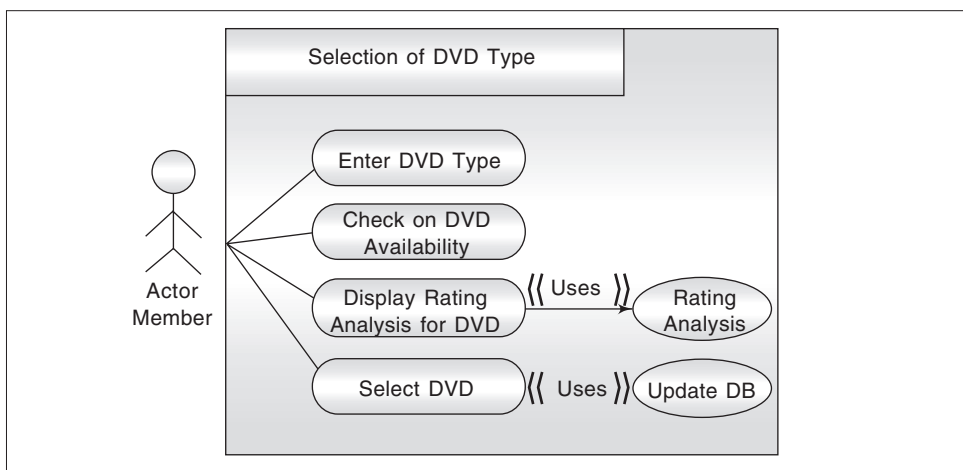
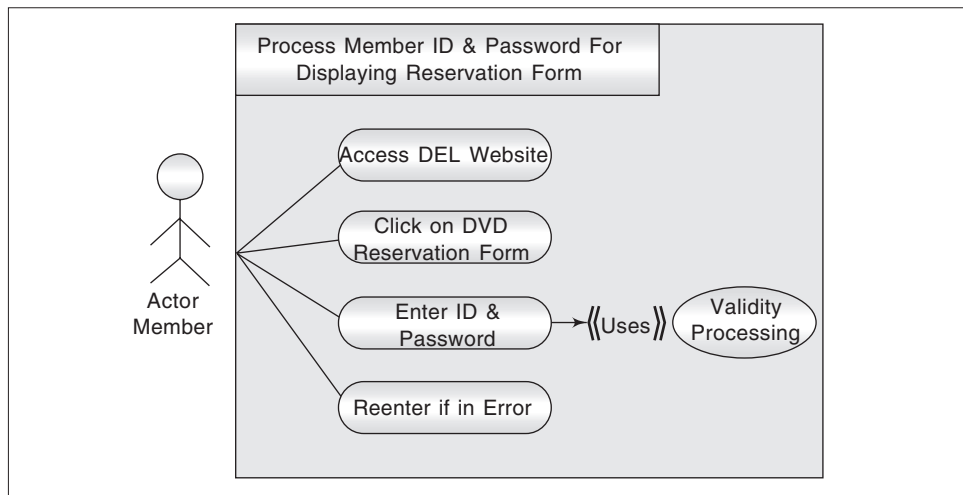


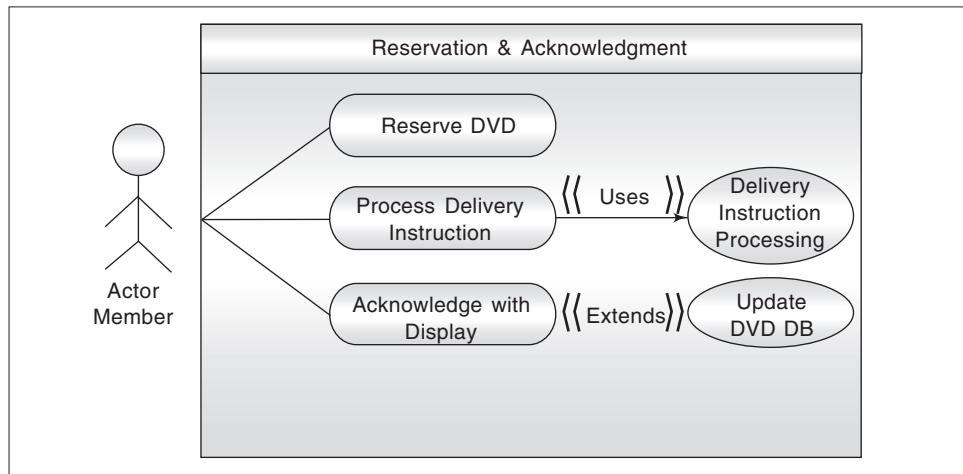
4. UML Use Case Model: (DRDS)

The DRDS has 3 subsystem packages containing several use cases

1. Process ID and password for access to reservation form.
 - Click on reservation form.
 - Enter ID and password.
2. Selection of DVD.
 - DVD analysis.
 - DVD selection.
 - Automatic posting of reservation.
 - Checking member payment history and status.
3. Reservation acknowledgement
 - Processing reservation and delivery instruction.
 - Acknowledging the reservation number to member with expected delivery date.

Following figures show use case models for access, selection and reservation and acknowledgement.





5. Description of Actors and Use Cases

Finding actors in the system is an iterative process. You may find more actors as you learn more about the system.

The actor in the DRDS is 'Member' of DEL.

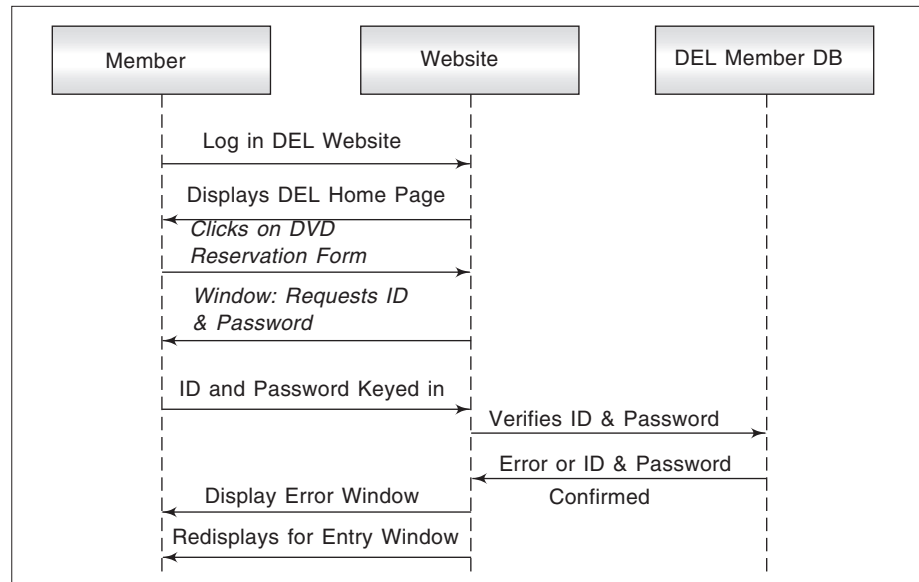
- Actor name: Member of DEL.
Description: Member has a valid registration number, member ID and password to interact with the system. The interaction is for viewing, reserving DVD, know payment dues and communication to DEL. Non members can only access to DEL Website.
- Use case name: Access DEL Website to call for DVD reservation form
Description: Calls for reservation form to enter the details. System displays the window asking for member ID and password. If member is a valid member, reservation form is displayed.
- Use case name: Enter member ID and password.
Description: Member enters member ID and password. If there is an error in entry due to invalid structure, error message is displayed.
- Use case name: Submit for processing validity of ID and password.
Description: On submission, the system internally checks whether ID and password are valid. If valid, system displays DVD reservation F form. If incorrect and invalid, system displays error message displaying the error. Member then is expected to re-enter correct ID and password.

- Use case name: Enter data in DVD reservation form
Description: On display of the form, member enters data on type of DVD and submits for processing. On submission system displays the DVD details of the said type for selection.
- Use case name: Enter DVD type choice
Description: User/member clicks on type of DVD available for selection displayed in 'DVD Type' window
- Use case name: Checks on available DVDs
Description: To selecting a DVD, user is able to see all available DVD titles under selected type.
- Use case name: Check DVD rating (optional).
Description: User selects DVD from the display and asks for DVD rating.
- Use case name: Select DVD.
Description: User, on satisfaction, submits the DVD title for processing and delivery execution.
- Use case name: Checks payment position.
Description: On selection of DVD, system checks payment position for communication to member.
- Use case name: Reserve DVD for the member.
Description: System reserves DVD for the member for the date chosen.
- Use case name: Process delivery instruction.
Description: System processes Delivery Instruction (DI) for execution of the delivery of DVD.
- Use case name: Display reservation number and DI number as acknowledgement.
Description: System displays reservation number and DI number and details for member to capture.

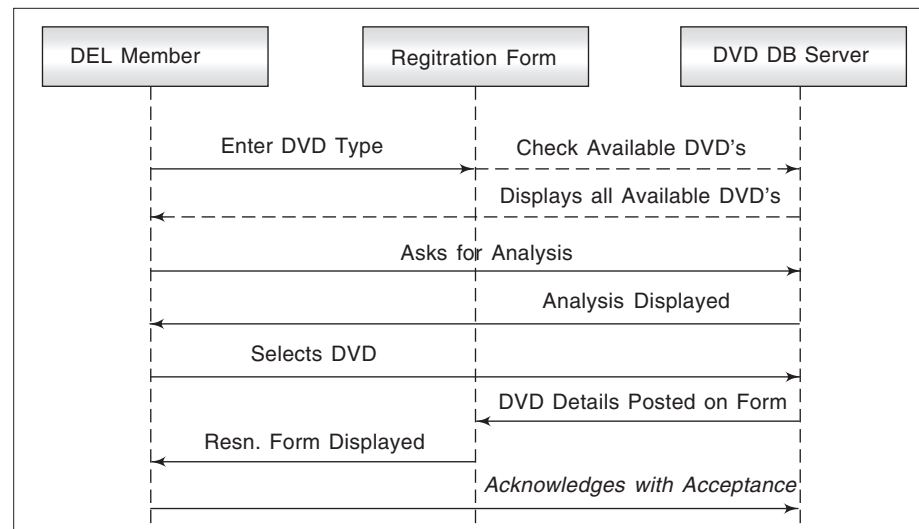
6. UML: Interaction Diagrams, Sequence and Collaboration

The following figures show the interaction diagrams for some use cases.

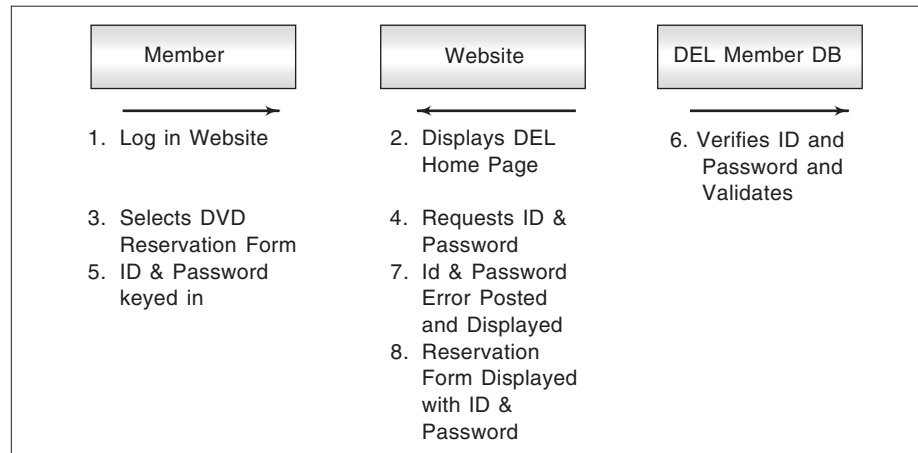
- Sequence diagram for access to Web site, enter ID and password for reservation form display.



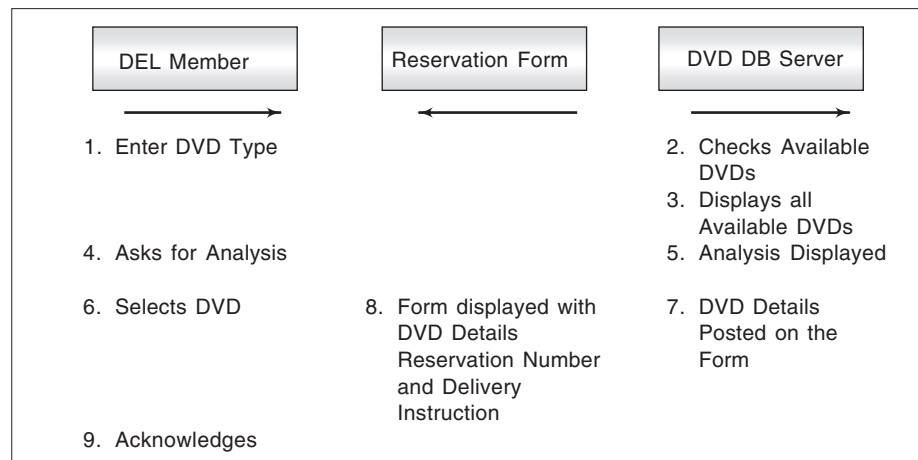
- Sequence diagram for DVD selection



- Collaboration diagram for access to Website and entering ID and password for reservation form display.



- Collaboration diagram for DVD selection.



7. List of Business, Access and View Layer Classes

- Business layer class
 - DEL – DEL Website – Registered member, DVD
 - Reservation form, member account
 - Processing transaction, delivery instruction, DVD analysis
- Access layer classes
 - DVD DB, member DB

- View layer classes
 - Main UI, DEL Web UI
 - Reservation form UI, registration process UI
 - Delivery Instruction (DI) UI
 - DVD analysis UI.
- Description of business layer class

The business layer contains all the objects that represent the business process and the manner of their interaction with other objects to execute a business process. They are designed to be independent of any particular interface. We now describe them in terms of purpose, super class, sub class, hierarchy etc.

DEL class: Purpose:
members, DVDs belong to DEL. It is a repository for DVD, members, suppliers. It processes DVD purchase/sale, member registration/cancellation, supplier (purchase) ordering/delivery, and such other transactions.

DEL Website: Purpose:
DEL Website provides access to Web enabled DEL business system.

Registered member: Purpose:
registered member has ID and password to access DEL business system to reserve DVD, check availability of DVD, make payments and so on. Member has an account and is an authorised member of DEL.

Member account: Purpose:
It defines the behaviour of a member in operating the transactions related to DVD reservation, viewing status, returning DVD shows payment status, etc.

Process transaction class: Purpose:
To keep track of transactions—time, date, type, amount: balance, overdue. It may be related to Member or DVD.

Reservation form: Purpose:
To capture data about member and DVD selected by the member for processing DVD analysis, reservation processing and raising delivery instruction.

DVD: Purpose:
DVD Class is used for updating the record of DVD usage for processing frequency, type of members and so on. DVD has a unique item code.

Delivery instruction: Purpose:
Based on reservation of DVD by date, delivery instruction is processed for delivery to the member.

DVD analysis:	Purpose: On selection of DVD type, system checks all available DVDs in stock and shows its rating for member to analyse and make a choice of reservation.
DVD DB:	Purpose: Stores data on DVD demand performance, purchases, inventory etc.
Member DB:	Purpose: Stores member personal data, registration data, ID and password, category of member and so on.
Super class:	Member is a super class of individual member class and family member class.
Sub-class:	Individual member, family member are sub-classes of super class member.
Association:	Member class and DVD Class are associated. Member class and process transaction class are associated. DEL and DEL Website are associated.

8. Description of the Access Layer Classes

The access layer contains objects that know 'how to reach the place' where data actually reside. The data residence could be a relational database, mainframe, Internet or a file.

- Member DB class
This class stores data about member of DEL. It is used to fetch information from database and to store it as desired.
It has no super class or sub class.
- DVD DB class
This class stores data about DVD of DEL. It is used to fetch information from database and store it as desired.
It has no super class or sub class.
Member DB class and DVD DB class are a part of the reservation form class, DVD analysis class and delivery instruction class.
- Association: There is no association with any other class.

9. Description of the User Interface (View layer classes)

The user interface layer objects execute an action by the user such as clicking on a button or selecting from a menu to seek the appropriate response. The response may open another interface, or close another interface, or send a message to the business layer to activate some other process.

- DEL Web access UI: This interface enables user to reach welcome page of DEL.
- Reservation form access UI: User clicks on Reservation, which opens another UI asking for member ID and password for validity checking. This window is displayed for all buttons on welcome page of DEL.
- Registration process UI: The 'prospective member' clicks on the Registration buttons, which opens to member registration form for entry and processing through submission.

- DVD analysis UI: This UI triggers capturing the ratings of DVD and putting them in a format.
- Main UI: This class provides the main control interface for DEL business system.
- Delivery Instruction (DI) UI: This class provides DI processing to decide on delivery instruction.
- Super classes: none
- Sub classes: none
- A part of structures and aggregation: see packages diagram as shown in 'UML Class diagram for DRDS.
- Snapshots of screen

DVD Entertainment Ltd. DEL

WELCOME

Make your Choice by Pressing on the Desired Button.

DEL
Web
Access
UI

Your Suggestions EXIT New Arrival

Home Registration Reservation Member Status DVD Query

DVD Entertainment Ltd. S. No. _____
Branch: _____ Date: _____

DVD Reservation Slip

Name/Type

DVD ID DVD Name

Required Date

Duration: From Date To Date

Member Name

Contact Ph. No.

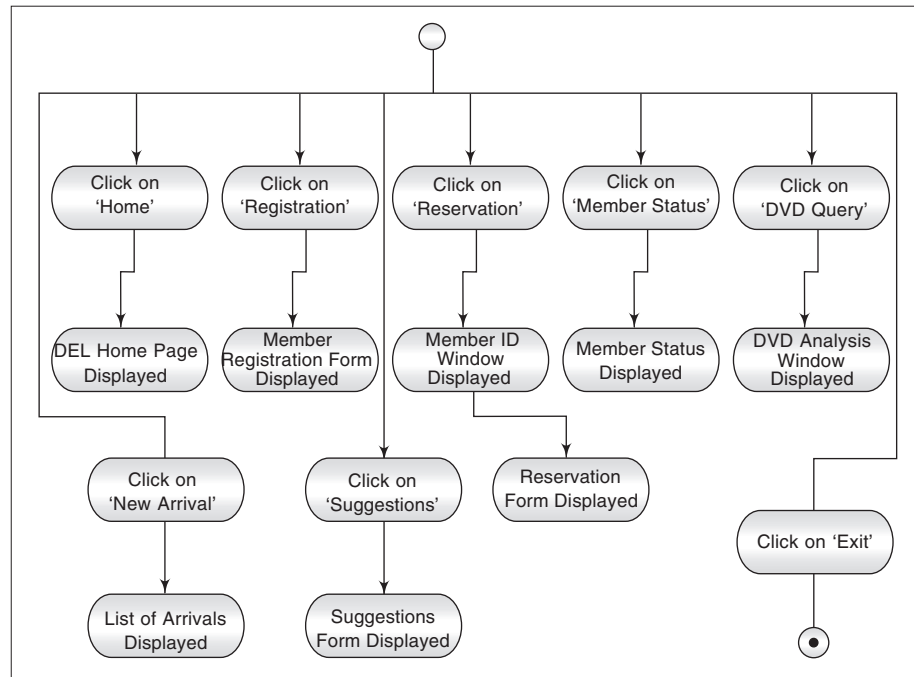
Choice of Delivery Home Delivery Collection by Self

Reservation Form Access UI

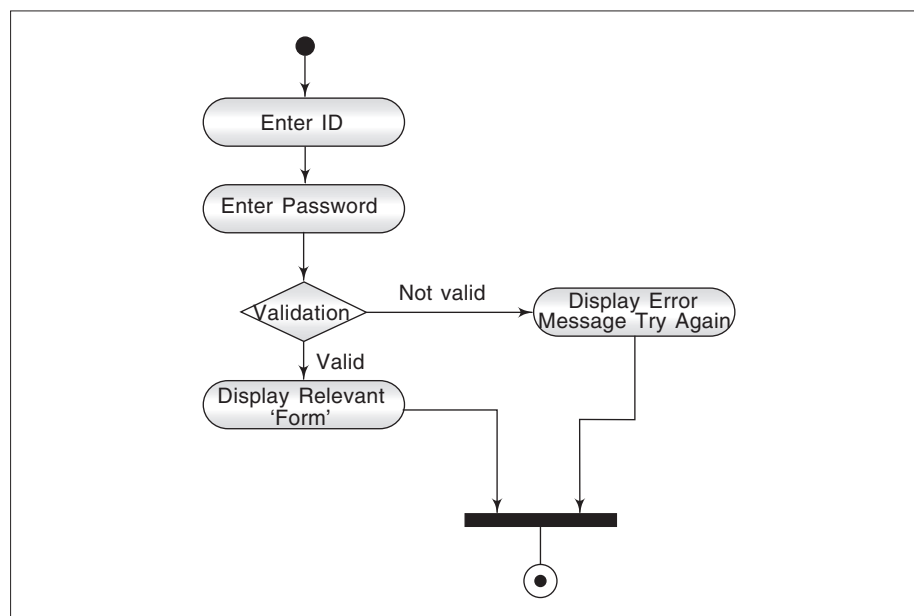
DVD Entertainment Ltd.		S. No. _____ Date _____
Membership Registration Form		
Name:	<input type="text"/>	Pin Code: <input type="text"/>
Address:	<input type="text"/> <input type="text"/> <input type="text"/>	Landmark: <input type="text"/>
Phone No.	<input type="text"/>	E-mail: <input type="text"/>
Members in the family by age	<input type="checkbox"/> 5 to 10 <input type="checkbox"/> 21 to 30	<input type="checkbox"/> 11 to 20 <input type="checkbox"/> 45 and above
Choice of DVD	<input type="checkbox"/> Comedy <input type="checkbox"/> Family Drama <input type="checkbox"/> Documentary	<input type="checkbox"/> Fiction <input type="checkbox"/> War Movies <input type="checkbox"/> Cartoons
	<input type="checkbox"/> Horror <input type="checkbox"/> Science & Culture <input type="checkbox"/> Other	
Membership Type	<input type="checkbox"/> Individual	<input type="checkbox"/> Family
Individual Membership Period & Fee	<input type="checkbox"/> Rs 5,000 1 year	<input type="checkbox"/> Rs 9,000 2 years <input type="checkbox"/> Rs 12,000 3 years
Family* Membership Period & Fee	<input type="checkbox"/> Rs 6,000 1 year	<input type="checkbox"/> Rs 8,000 2 years <input type="checkbox"/> Rs 16,000 Whole life
*Fill Registration Form for each Member of the Family under one address.		
Payment Details: Cheque/DD No. _____ Bank _____ Branch _____		
		<input type="button" value="Submit"/>

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">DVD Entertainment Ltd.</td> <td style="text-align: right;"><input type="button" value="DEL"/></td> </tr> <tr> <td><input type="button" value="Member ID"/> <input type="text"/></td> <td></td> </tr> <tr> <td><input type="button" value="Password"/> <input type="text"/></td> <td></td> </tr> </table>	DVD Entertainment Ltd.	<input type="button" value="DEL"/>	<input type="button" value="Member ID"/> <input type="text"/>		<input type="button" value="Password"/> <input type="text"/>		<p>Member Check Window Display After Click on 'Reservation'</p>
DVD Entertainment Ltd.	<input type="button" value="DEL"/>						
<input type="button" value="Member ID"/> <input type="text"/>							
<input type="button" value="Password"/> <input type="text"/>							

- Activity diagram for main UI

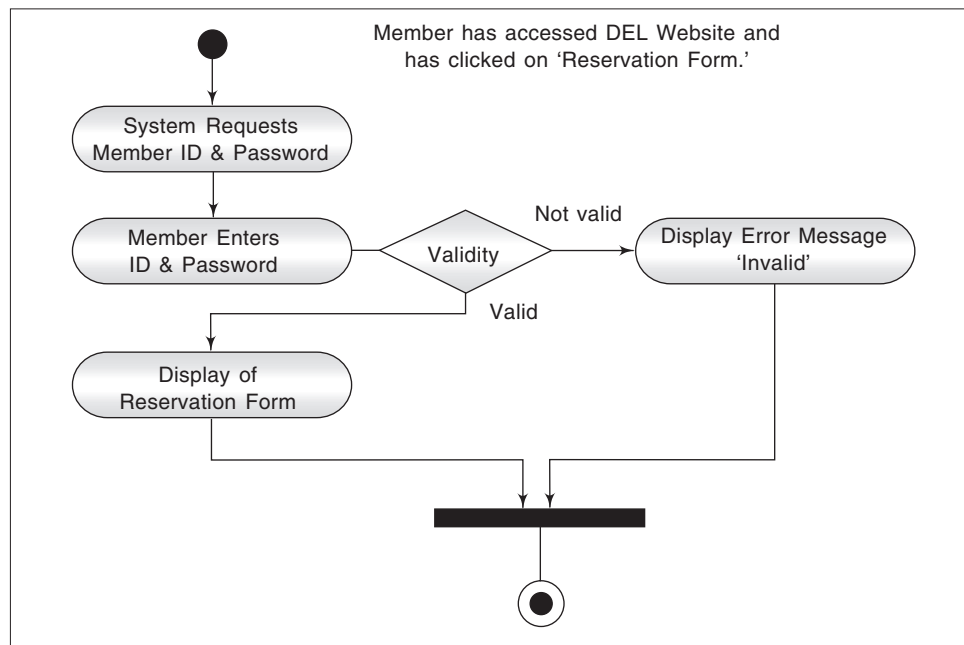


- Activity diagram for member validity check



10. Methods

Methods are described through activity diagrams. The activity diagram below illustrates 'Methods' in 'Access to Website, enter ID and password for form display.'



- Activity diagram below illustrates reservation of DVD after selection and analysis.

Packaging Class of DRDS

Business layer classes, access layer classes and view layer classes are packaged into UML class diagram for DRDS.

11. Testing

Test Cases

1. On click of each button on 'Welcome' page member check window is displayed.
2. If ID and/or password is correct respective relevant form/table is displayed.
3. If ID and/or password is found incorrect error message 'Try Again' is displayed.
4. If person is a non-member on click in box 'New Member' registration form is displayed.

5. After entry, member registration form is submitted for processing
 - Error message: ‘Mandatory Field missing’.
 - ‘Form Entry Incomplete’.
6. If found correct
 - Acknowledgement and welcome Window appears with advice on payment of fees and display on form asking for payment details.

12.**Usability Testing Cases**

1. Reservation of DVD and DI processing.
2. DVD analysis on choice of DVD.
3. New arrivals.
4. New member registration.