

Design Specification

SJSU Online Library System

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Table of Contents

I	INTRODUCTION	3
	SCOPE AND PURPOSE	3
	OVERALL SYSTEM DESIGN OBJECTIVES	3
	PROJECT DESIGN CONSTRAINTS	3
	STRUCTURE OF DESIGN DOCUMENT	3
II	SYSTEM ARCHITECTURE DESIGN	4
	SYSTEM ARCHITECTURE	4
	SERVER ARCHITECTURE	5
	CLIENT ARCHITECTURE	6
III	DATA DESIGN	7
	ENHANCED ENTITY RELATIONSHIP DIAGRAMS	7
	DATA OBJECTS	9
	DATA DICTIONARY	11
IV	FUNCTION DESIGN DESCRIPTION	14
	MULTI-LEVEL DATA FLOW DESIGN FOR FUNCTION PROCESS	14
	FUNCTIONAL PARTITIONING	22
	FUNCTIONAL DESCRIPTION	23
V	SYSTEM INTERFACE DESIGN	26
	GRAPHIC USER INTERFACE DESIGN	26
	EXTERNAL SYSTEM INTERFACE DESIGN	41
VI	BIBLIOGRAPHY	43
VII	APPENDIX	44
	MAJOR FUNCTION SUMMARY	44

I Introduction

Scope and Purpose

The purpose of this Design Document is to present the system design at a level that can be directly traced to the specific system objective along with providing more detailed data, functional, and behavioral requirements. This Design Document will verify that the current design meets all of the explicit requirements contained in the system model as well as the implicit requirements desired by the customer.

Overall System Design Objectives

The overall system design objective is to provide an efficient, modular design that will reduce the system's complexity, facilitate change, and result in an easy implementation. This will be accomplished by designing a strongly cohesion system with minimal coupling. In addition, this document will provide interface design models that are consistent, user friendly, and will provide straightforward transitions through the various system functions.

Project Design Constraints

The Online Library system must be able to handle current and up-and-coming technology. The internet must be able to communicate with a browser client in HTML, ASP as well as JavaScript. The server must be on a Windows 2000 server, or higher. The client must run on Windows 98 and higher, or Windows NT Workstation 4.0 (service Pack 3) or higher.

Structure of Design Document

System Architecture Design

- The System Architecture section has detailed diagrams of the system, server, and client architecture.

Data Design

- Data Design includes an enhanced ERD as well as the Data Object Design and the Data file Design.

Function Design Description

- This section has the Functional Partitioning from the Requirements Specifications document, and goes into great detail to describe each function.

System Interface Design

- This section includes the graphical user interfaces that will be seen by the user when operating the SJSU online library system.

II System Architecture Design

System Architecture

The online Library System is a client-server based system, which contains the following layers: user interface, internet/LAN communication, functional service, and data storage layers.

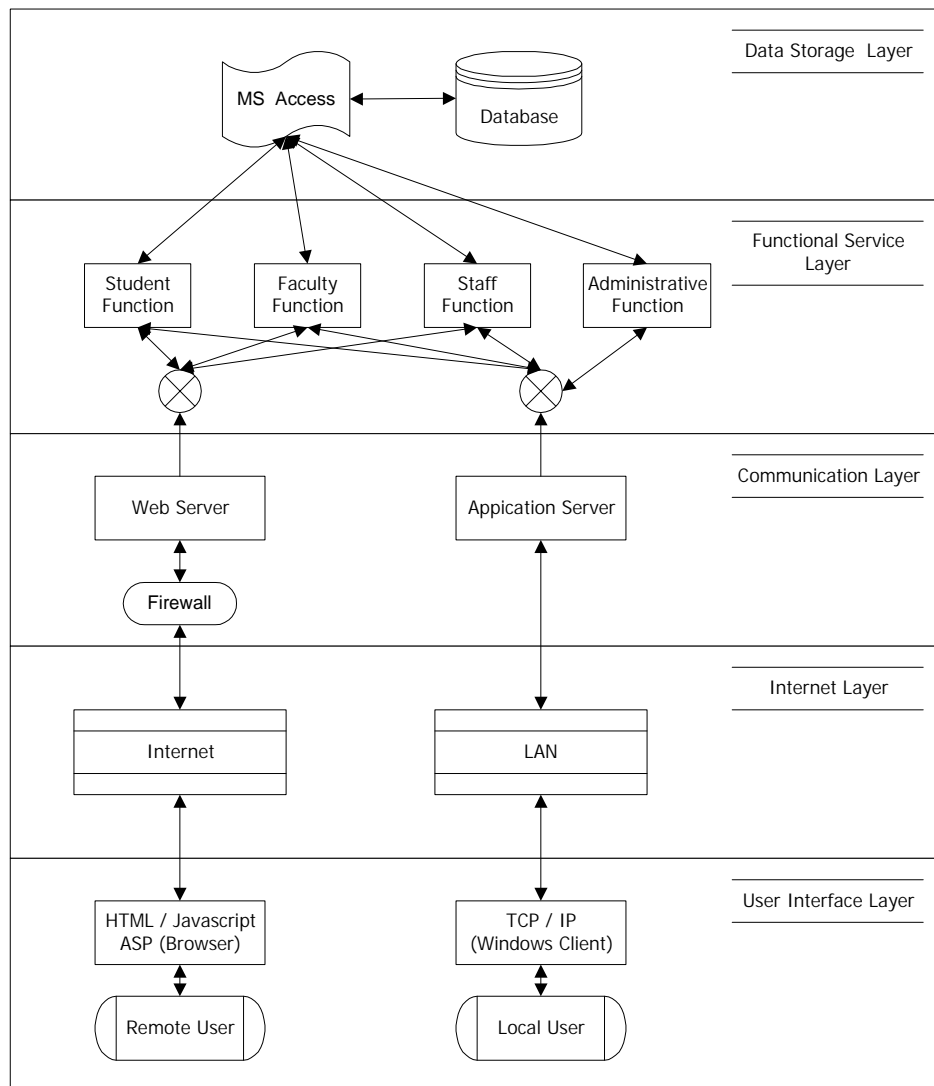


Figure 1: System Architecture

Data transfers occur in both directions in the system. The users input or data request is sent using either an internet browser or through the windows client. This data then connects to the system either through the internet or, in the case of an onsite connection, through the LAN connection. In the case of an internet connection, the data is required to pass through the system's firewall,

for security purposes, prior to connecting to the web server. Local personnel, once validated within the system, will be connected directly to the application server. In the functional services layer, the data input or request is routed to the appropriate functional module in accordance with the users login and account type. Through these modules, the users will interact with the database via the SQL server.

Server Architecture

The server architecture contains two logical servers. The first of which, the web server, will interface with remote users, while the application server will interface with local users. The web server will communicate using active server pages (ASP) and HTML as shown in the communication interface block within the following diagram. The second logical server, the application server, will communicate with local users via TCP/ IP protocol.

Both logical servers will have common functionality in order to facilitate all users, and will interact with the database via SQL API.

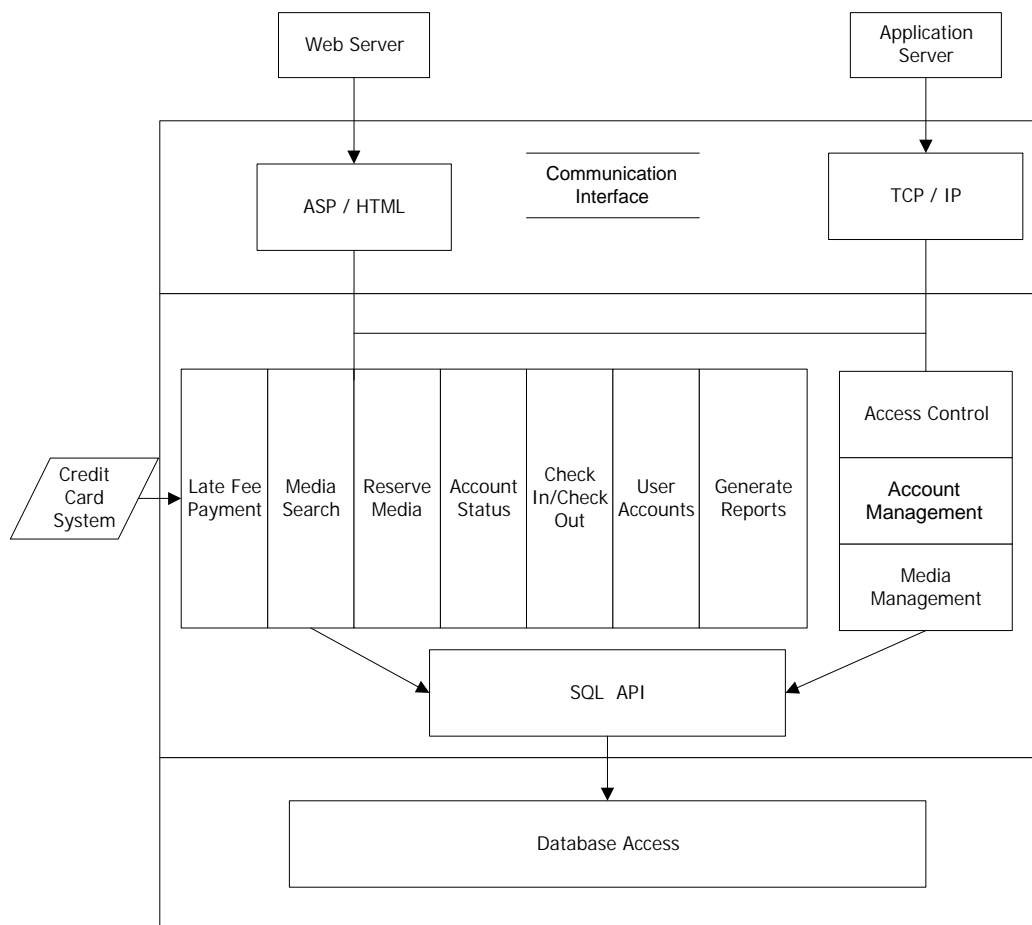


Figure 2: Server Architecture

Client Architecture

The client architecture is available for the windows client only. It will run on a Microsoft Windows 2000 operating system. As a result, the Microsoft Developer Libraries will be utilized during the implementation of the client. This architecture resides above the Windows API layer, which interfaces with the operating system. Utility functions include print, tool bar, and help functions.

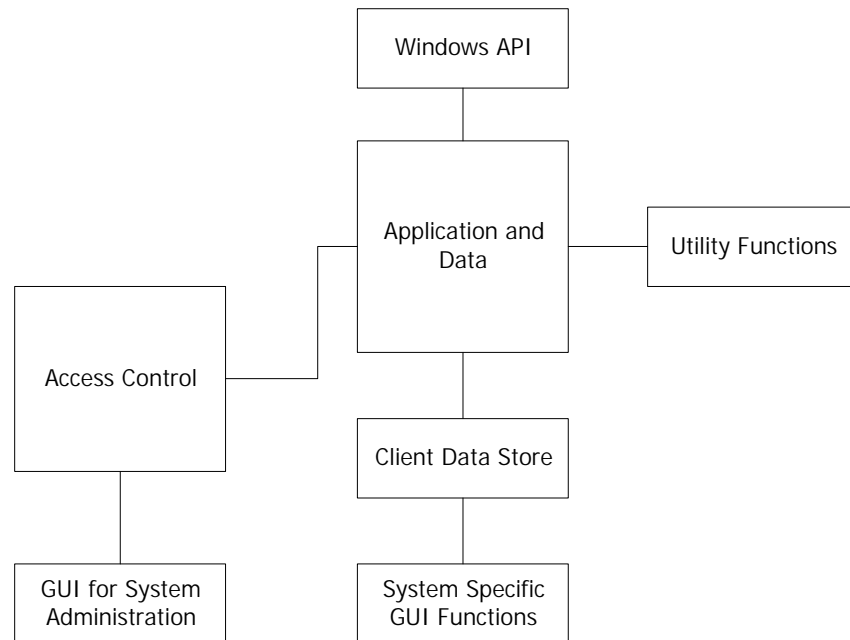


Figure 3: Client Architecture

III Data Design

Enhanced Entity Relationship Diagrams

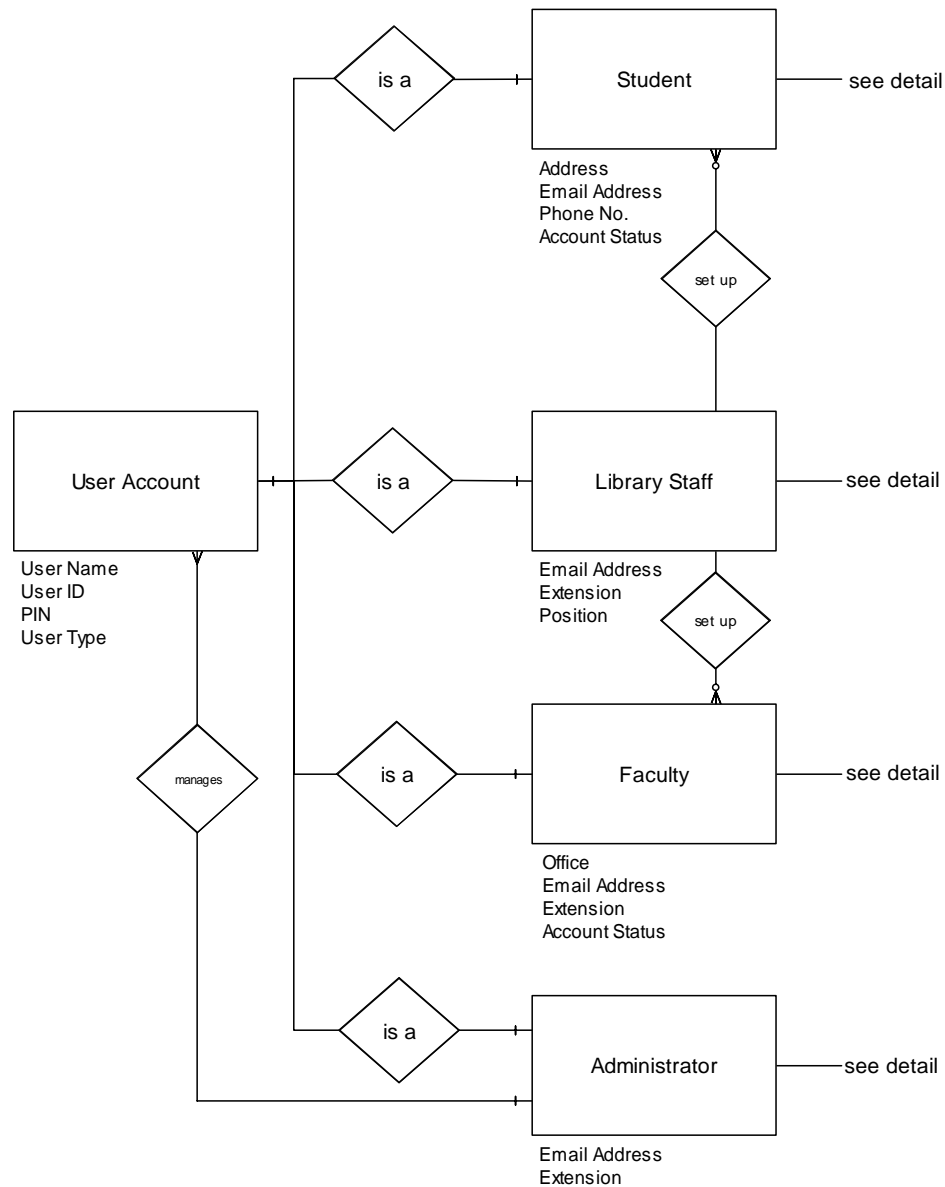


Figure 4: Entity Relationship Diagram – User Accounts

The data object USER ACCOUNT contains four types of users: STUDENT, FACULTY, LIBRARY STAFF, and ADMINISTRATOR. All of these accounts type have an inheritance relationship with the USER ACCOUNT data object.

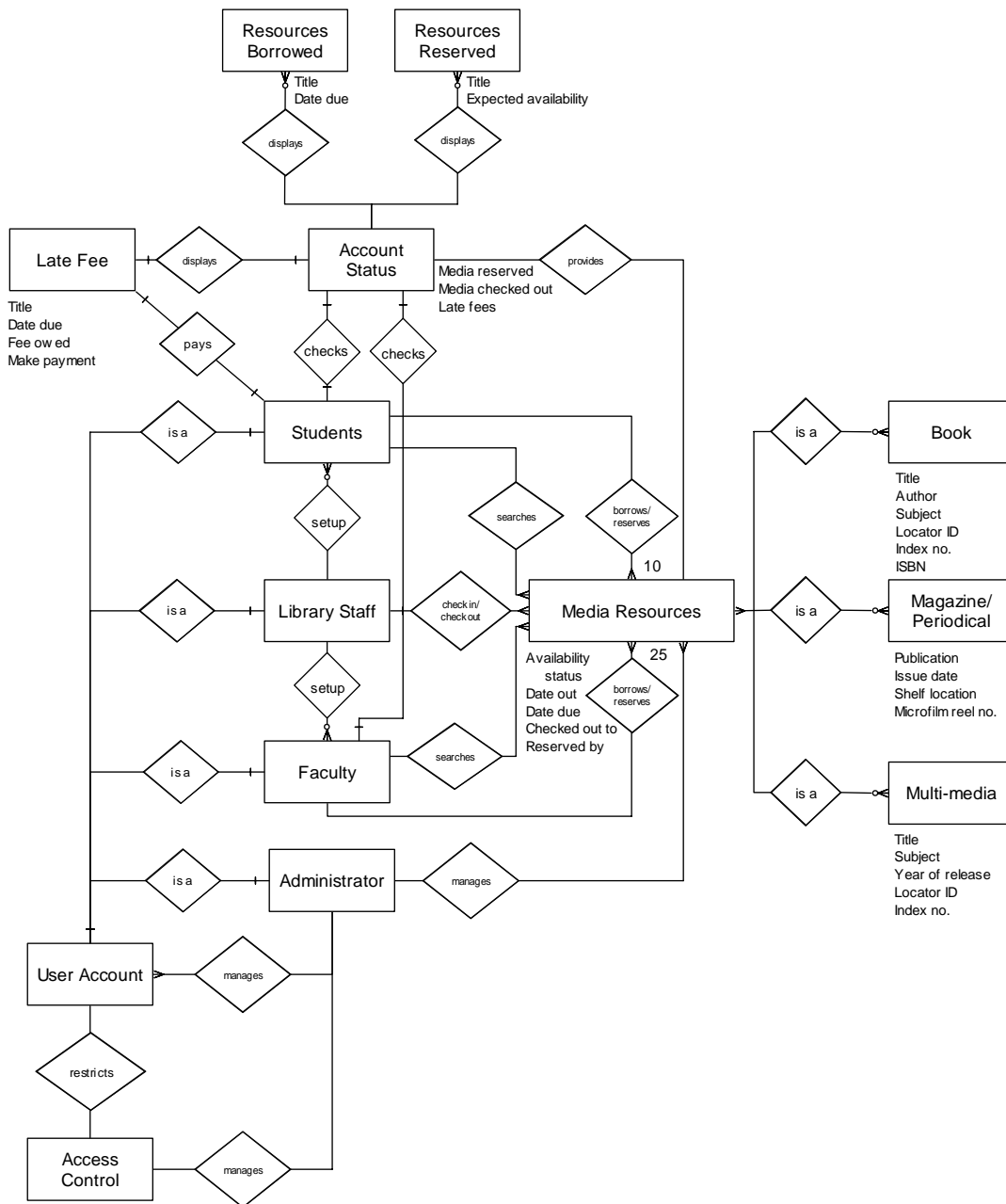


Figure 5: Entity Relationship Diagram – Complete System

MEDIA RESOURCES is the central data object and has objects related by both inheritance and association. The data objects BOOKS, MAGAZINES/PERIODICALS, and MULTI-MEDIA are all types of MEDIA RESOURCES (inheritance). All other data objects are related to MEDIA RESOURCES by association.

Data Objects

Provide below is a summary of the various data objects that make up the online library system. Included in each table are the attributes of each object, the data type for each attribute, the number of characters allowed for each field, the default value, and any other information that defines the field (i.e., calculation for overdue fees).

<i>Student Object</i>	<i>TYPE: class</i>			
MEMBER NAME	TYPE	LENGTH	DEFAULT VALUE	COMMENT
Name	String	40	Null	
Address	String	57	Null	
Phone Number	String	12	Null	
Email Address	String	40	Null	
SSN	Long	9	Null	
PIN	Long	10	Null	
Overdue Balance	Long	8	0.00	Calculated field (days past due x \$.10)
Media Borrowed	Status array[]	10	Null	Array of type Status (10 elements)
Media Reserved	Status array[]	10	Null	Array of type Status (10 elements)

<i>Faculty Object</i>	<i>TYPE: class</i>			
MEMBER NAME	TYPE	LENGTH	DEFAULT VALUE	COMMENT
Name	String	40	Null	
Office Number	String	15	Null	
Extension	String	7	Null	
Email Address	String	40	Null	
SSN	Long	9	Null	
PIN	Long	10	Null	
Media Borrowed	Status array[]	25	Null	Array of type Status (25 elements)
Media Reserved	Status array[]	25	Null	Array of type Status (25 elements)

<i>Staff Object</i>	<i>TYPE: class</i>			
MEMBER NAME	TYPE	LENGTH	DEFAULT VALUE	COMMENT
Name	String	40	Null	
Position	String	15	Null	
Extension	String	7	Null	
Email Address	String	40	Null	
SSN	Long	9	Null	
PIN	Long	10	Null	

<i>Administrator Object</i>	<i>TYPE: class</i>			
MEMBER NAME	TYPE	LENGTH	DEFAULT VALUE	COMMENT
Name	String	40	Null	
Extension	String	7	Null	
Email Address	String	40	Null	
SSN	Long	9	Null	
PIN	Long	10	Null	

<i>Book Object</i>	<i>TYPE: class</i>			
MEMBER NAME	TYPE	LENGTH	DEFAULT VALUE	COMMENT
Index No.	Long	10	Unique ID	
Title	String	40	Null	
Author	String	40	Null	
Subject	String	40	Null	
Locator ID	Long	12	Null	
ISBN	Long	15	Null	
Checkout Status	String	2	N	Flag – Y or N
Reserve Status	String	2	N	Flag – Y or N

<i>Multi-media Object</i>	<i>TYPE: class</i>			
MEMBER NAME	TYPE	LENGTH	DEFAULT VALUE	COMMENT
Index No.	Long	10	Unique ID	
Title	String	40	Null	
Subject	String	40	Null	
Year of Release	Long	5	Null	
Locator ID	Long	12	Null	
Checkout Status	String	2	N	Flag – Y or N
Reserve Status	String	2	N	Flag – Y or N

<i>Magazine Object</i>	<i>TYPE: class</i>			
MEMBER NAME	TYPE	LENGTH	DEFAULT VALUE	COMMENT
Index No.	Long	10	Unique ID	
Publication	String	40	Null	
Issue Date	String	20	Null	
Shelf Location	Long	12	Null	
Microfilm Reel No.	Long	12	Null	

<i>Status Object</i>		<i>TYPE: class</i>		
MEMBER NAME	TYPE	LENGTH	DEFAULT VALUE	COMMENT
Media Index No.	Media *	10	Unique ID	Pointer to media resources
Checked out to	User *	40	Null	Pointer to user ID
Reserved for	User *	40	Null	Pointer to user ID
Date Out	Long	20	Null	
Date Due	Long	20	Null	

<i>User Database Object</i>		<i>TYPE: class</i>		
MEMBER NAME	TYPE	LENGTH	DEFAULT VALUE	COMMENT
Student	Student *	2	Null	Multiple pointers
Faculty	Faculty *	2	Null	Multiple pointers
Library Staff	Staff *	2	Null	Multiple pointers
Administrator	Admin *	2	Null	Multiple pointers

<i>Media Database Object</i>		<i>TYPE: class</i>		
MEMBER NAME	TYPE	LENGTH	DEFAULT VALUE	COMMENT
Book	Book *	2	Null	Multiple pointers
Multi-media	Multi-media *	2	Null	Multiple pointers
Magazine	Magazine *	2	Null	Multiple pointers

Data Dictionary

Student Object:

Description: This object contains information such as the student's full name, social security number, PIN number, email address, etc. The social security number serves as a primary key in the database. The status object has pointers to the student object, which associates reserved and checked out media with the appropriate student.

Usage: This object is used to associate with book and multi-media object when items are checked out or reserved.

Faculty Object:

Description: This object contains information such as the faculty's full name, social security number, PIN number, email address, etc. The social security number serves as a primary key in the database. The status object has

pointers to the faculty object, which associates reserved and checked out media with the appropriate faculty member.

Usage: This object is used to associate with book and multi-media object when items are checked out or reserved.

Library Staff Object:

Description: This object contains information such as the staff member's full name, social security number, PIN number, email address, etc. The social security number serves as a primary key in the database.

Usage: This object is used to represent a staff member in the user database object.

Administrator Object:

Description: This object contains information such as the administrator's full name, Extension, and email address. The social security number serves as a primary key in the database.

Usage: This object is used to represent an administrator in the user database object.

Book Object:

Description: This object contains information about a book including title, author, and subject and provides a unique index number, which serves as a primary key in the database.

Usage: This object is used to represent a book in the media database. This object is updated when a book is checked out, checked in, or reserved.

Multi-media Object:

Description: This object contains information about a multi-media item including title and subject and provides a unique index number, which serves as a primary key in the database.

Usage: This object is used to represent multi-media in the media database. This object is updated when a multi-media item is checked out, checked in, or reserved.

Magazine Object:

Description: This object contains information about a magazine including publication and issue date.

Usage: This object is used to represent a magazine in the media database.

Status Object:

Description: This object contains pointers to the media and user and includes media status information.

Usage: This object is used to associate the media and user objects.

User Database Object:

Description: This object contains pointers to student, faculty, library staff, and administrator type objects.

Usage: This object will house all user types in the database.

Media Database Object:

Description: This object contains pointers to book, multi-media, and magazine type objects.

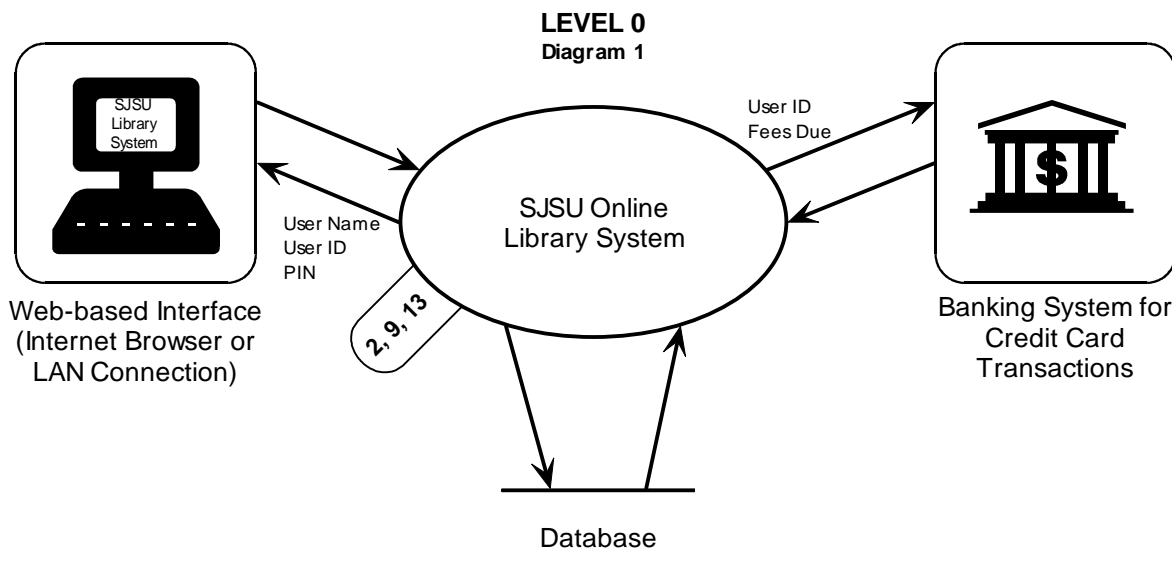
Usage: This object will house all media types in the database.

IV Function Design Description

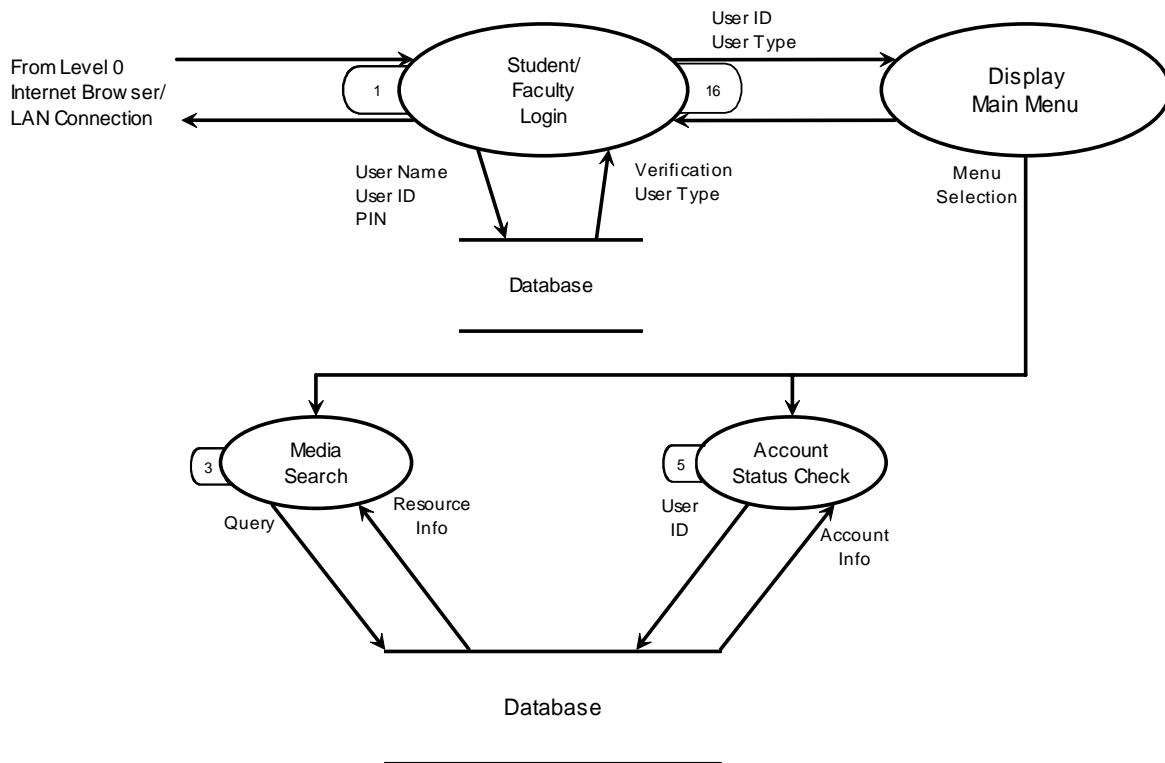
Multi-Level Data Flow Design for Function Process

When examining an existing information system or analyzing the information that is going to be designed, it is important to recognize what the data is, where the data comes from, how it passes from one point to another within the information system, and how it will be used by the intended audience or user. The following data flow diagrams (DFDs) represent the movement of data within the system. They concentrate less on the actual functions and data constructs of programmers and more on the general processes inherent to the overall system. We started at the top of the system and moved deeper into the processes to the underlying database tables. The amount of detail specified in this document will include a level two representation for most functions and a level three where necessary.

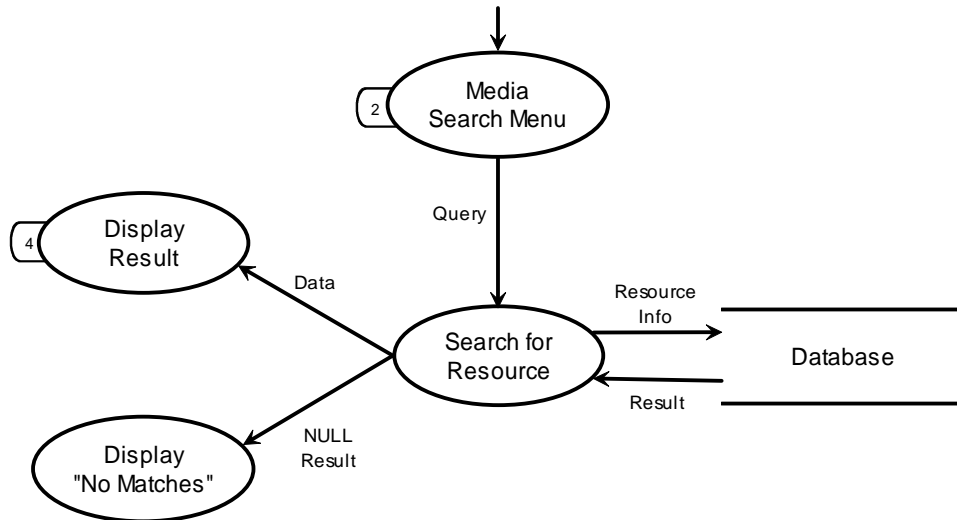
All diagrams include references to additional levels when applicable. Expanded functions are referenced using numbered tabs, which provide the corresponding diagram number.

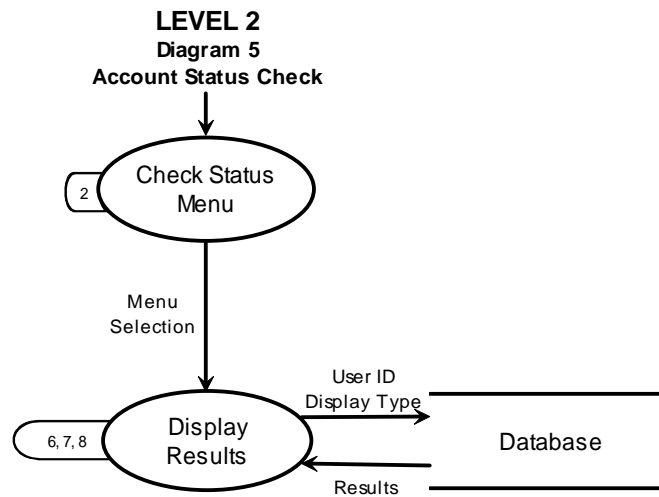
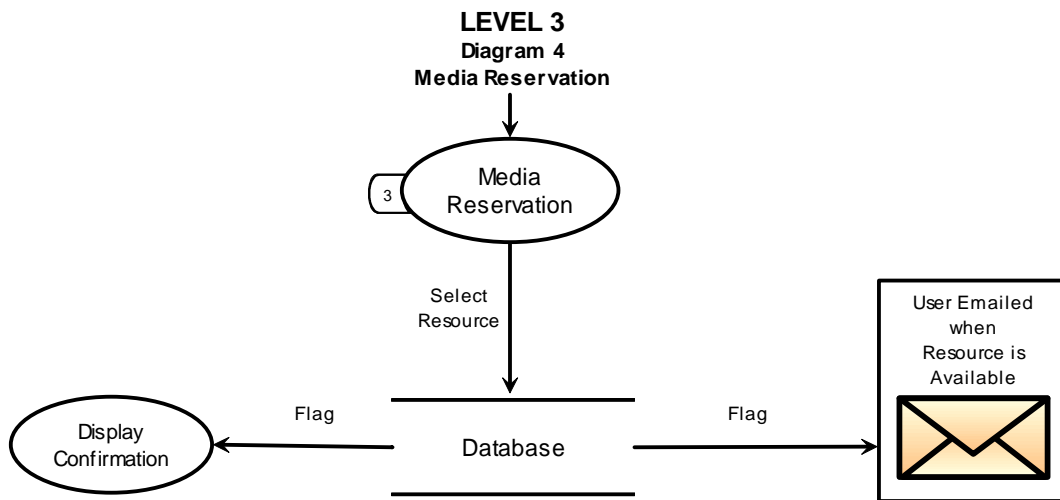


LEVEL 1
Diagram 2
Student/Faculty Login

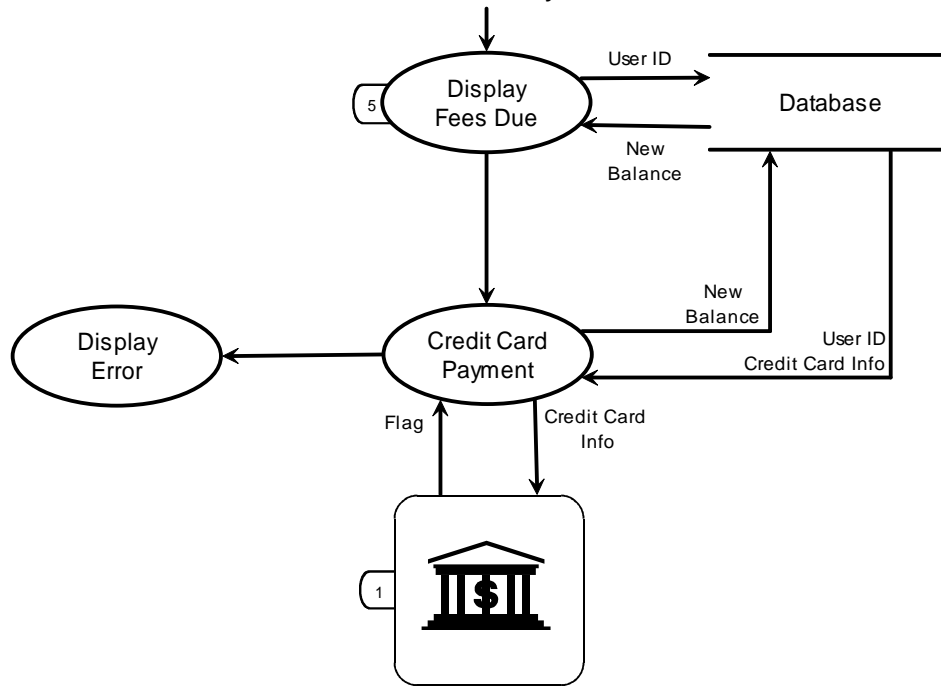


LEVEL 2
Diagram 3
Media Search

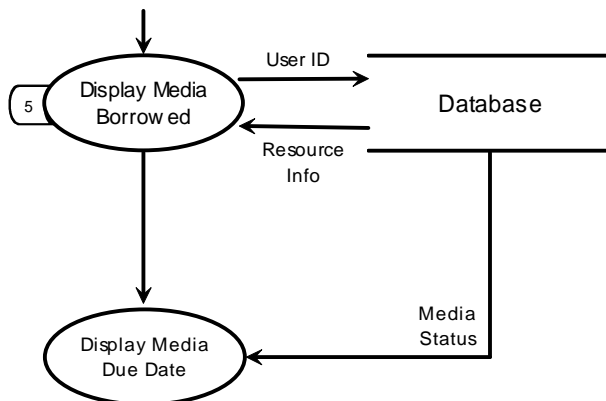




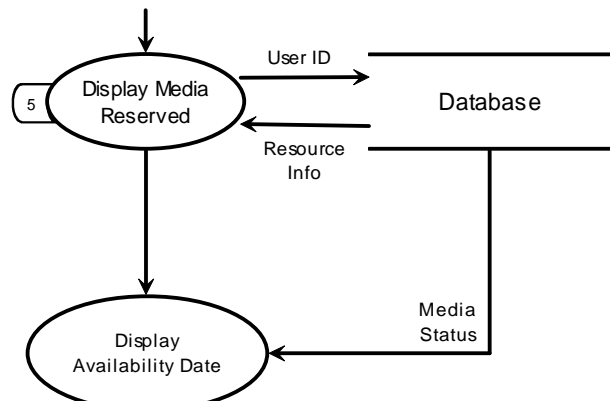
LEVEL 3
Diagram 6
Late Fees Due/Payment



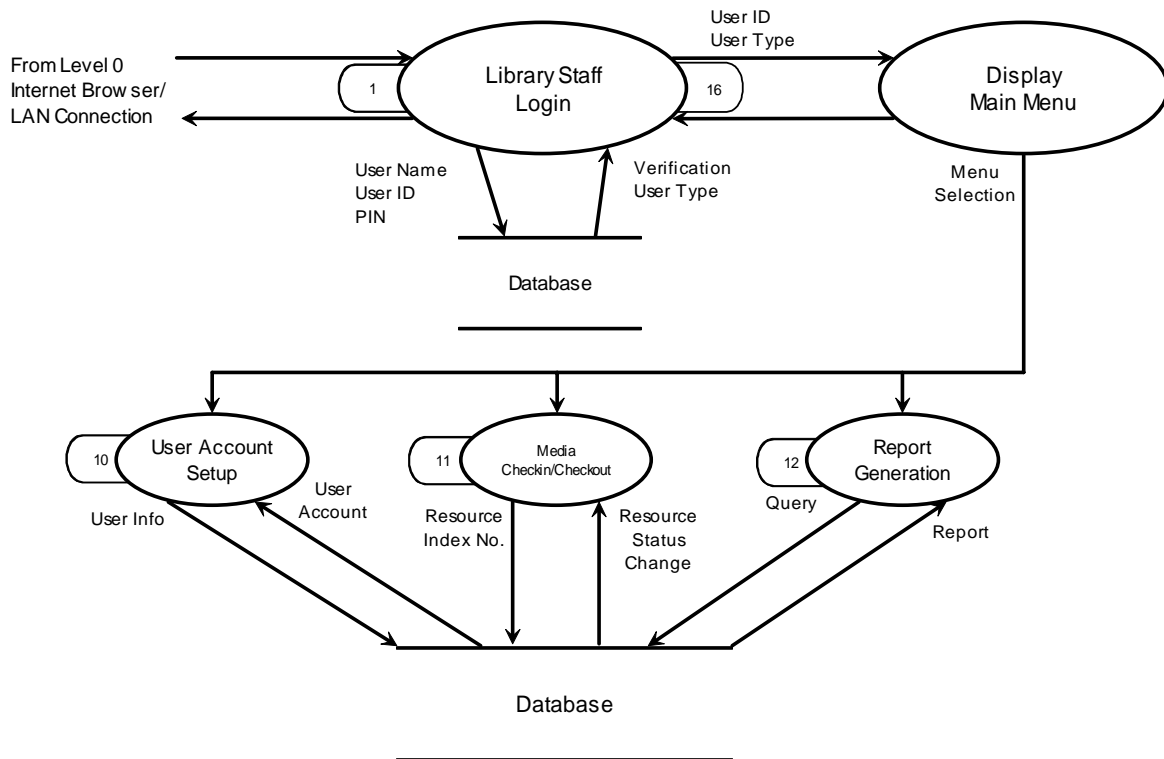
LEVEL 3
Diagram 7
Media Checked Out



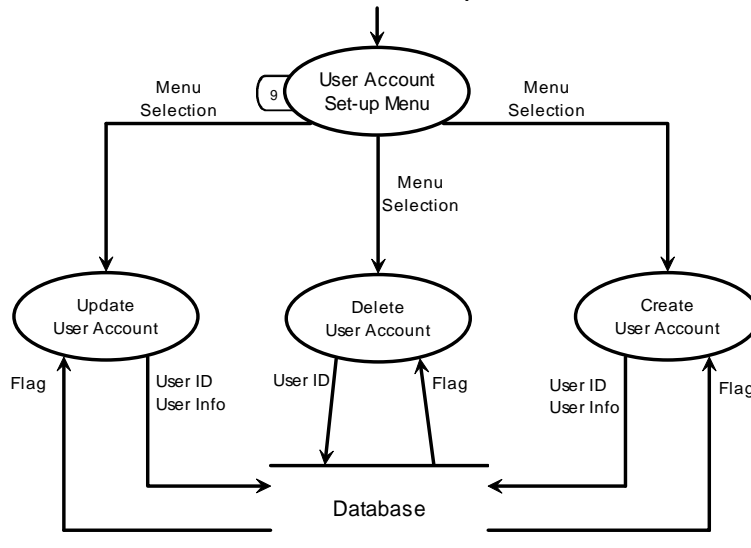
LEVEL 3
Diagram 8
Media Reserved



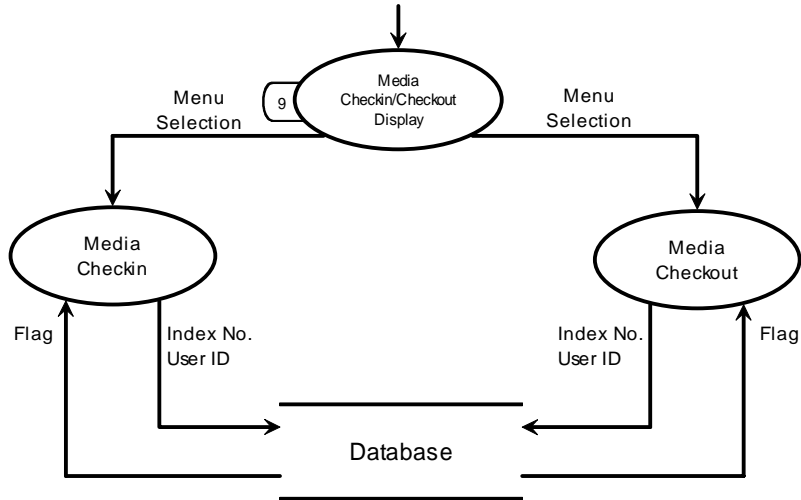
LEVEL 1
Diagram 9
Library Staff Login



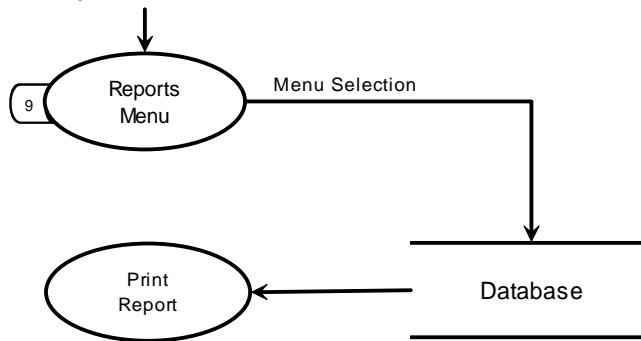
LEVEL 2
Diagram 10
User Account Set-up



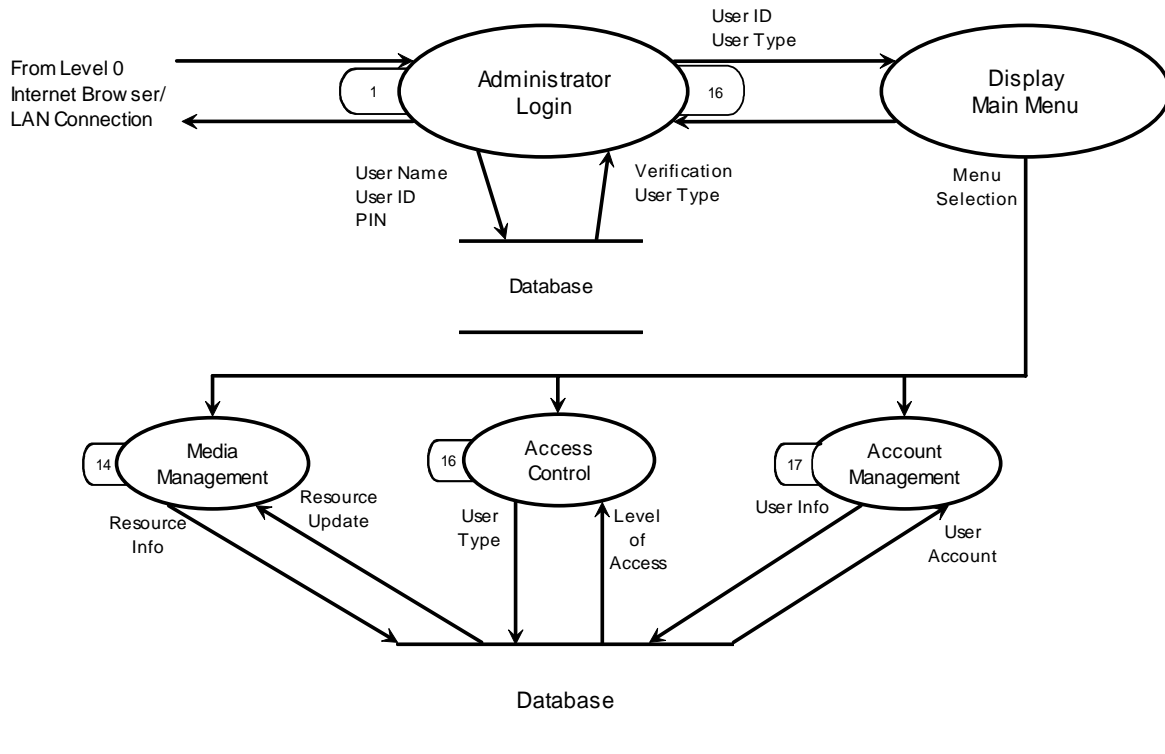
LEVEL 2
Diagram 11
Media Checkin/Checkout



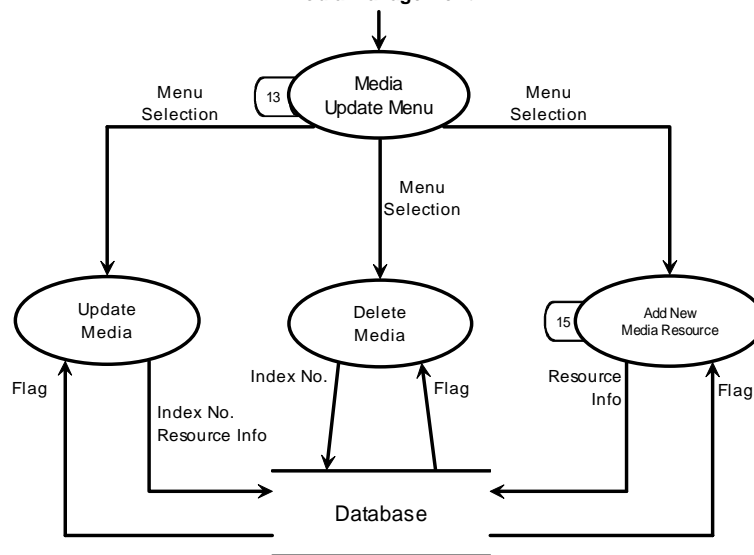
LEVEL 2
Diagram 12
Report Generation



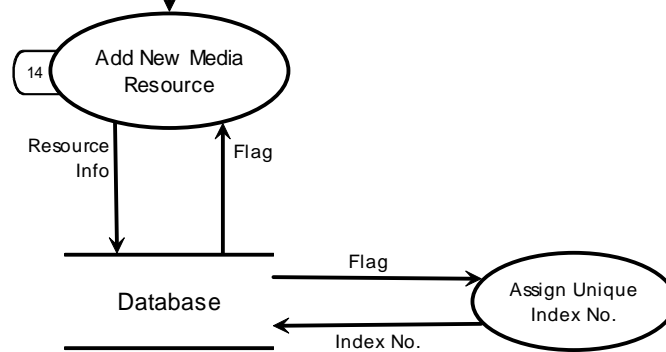
LEVEL 1
Diagram 13
Administrator Login



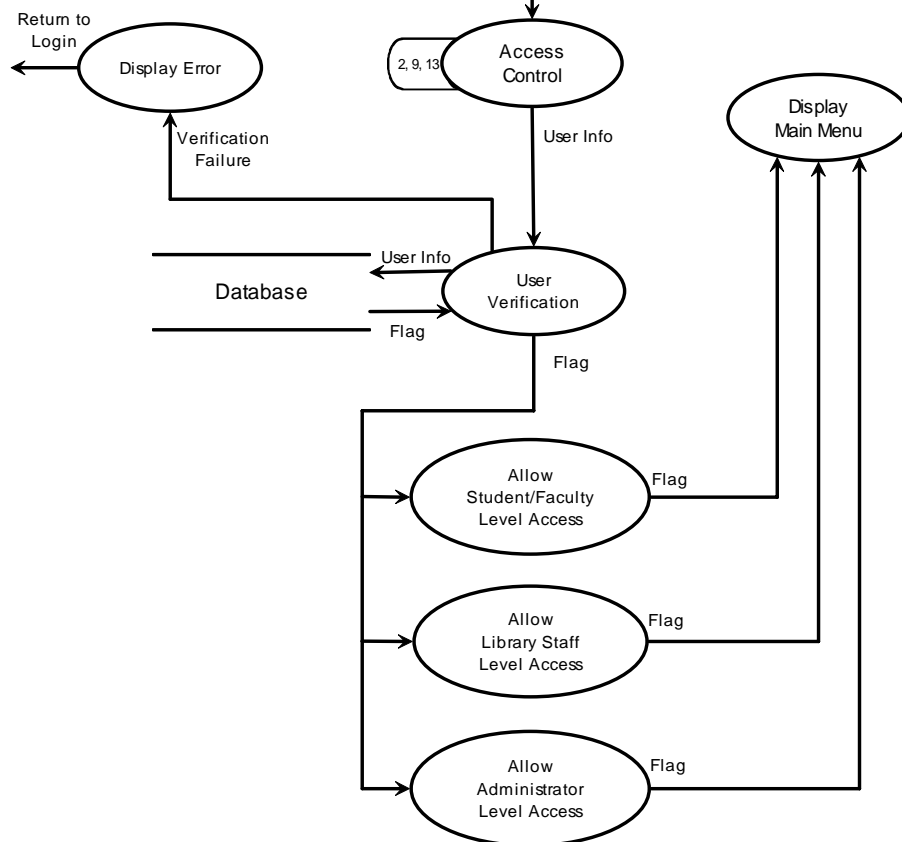
LEVEL 2
Diagram 14
Media Management



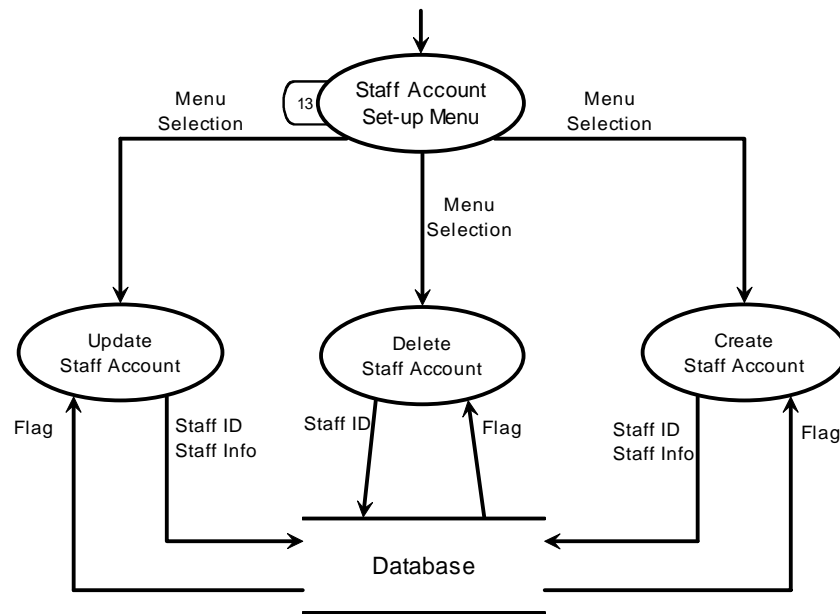
LEVEL 3
Diagram 15
Media Addition



LEVEL 2
Diagram 16
Access Control



LEVEL 2
Diagram 17
Account Management



Functional Partitioning

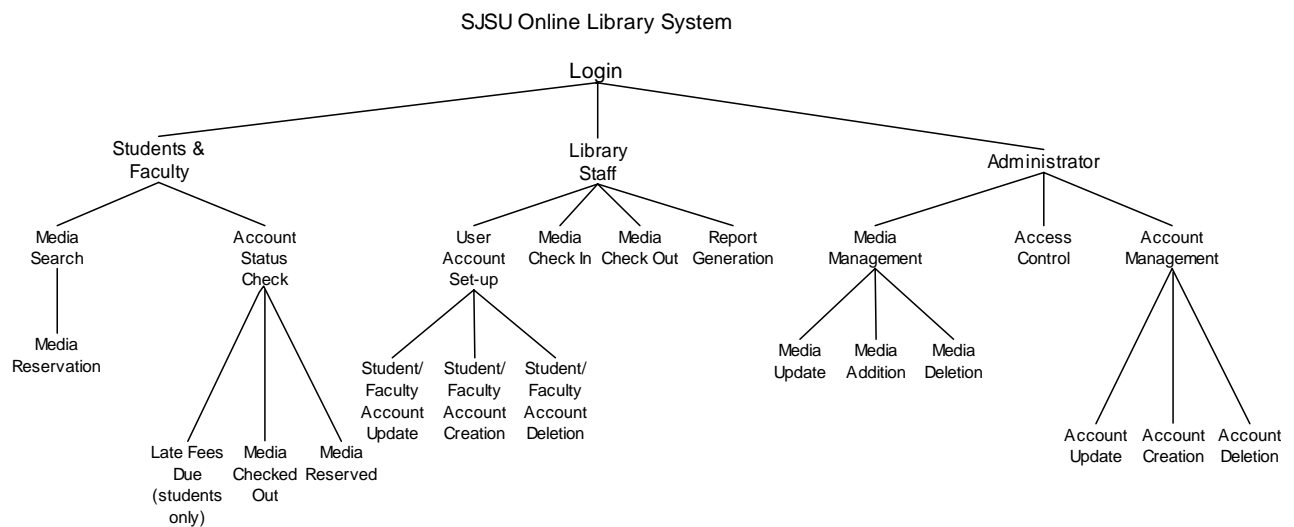


Figure 6: Tree Diagram with Horizontal and Vertical Partitioning

Functional Description

Function 1: Login Function (Shared Function)

This function is both for security and to control the user's level of access. This function requires the user's name, ID, and PIN. The user type is managed by the access control function. The system will verify that the user name, ID, and PIN are all correct before allowing access to the online library system. If the information is not correct, the user will receive an error message requesting that the user try again. With a correct login, the user will be taken to the appropriate menu. The student and faculty users will be able to login from any machine using an internet browser or from within the library using the LAN connection. The library staff will login via the library's LAN. The administrator will be able to login via the LAN connection or, for data management operations, the administrator will be able to logon to the actual server. Access time for account validation and determination of user access is expected to be no more than one second via the LAN connection and no more than five seconds using a remote internet browser. This time will be longer on older machines with slower modem speeds.

Function 2: Media Search Function (Shared Function)

The media search function will search the media database for books, magazines/periodicals, and multi-media. The user can search for a book by title, author, subject, or ISBN. Magazines and periodicals can be searched by publication and issue date only. A separate system is already in place for specific article searches and will not be linked to the main online library system. Multi-media searches can be performed either by title or subject. This function will return and display all items that match the query criteria. Access time for this function is expected to be no more than three seconds via the LAN connection and no more than ten seconds using a remote internet browser. This time will be longer on older machines with slower modem speeds.

Function 3: Media Reservation Function (Student/Faculty Function)

The media reservation function allows the user to reserve media resources that are currently checked out. When the user performs a search, the availability information for the resource will also be displayed. The screen will display the resource status, the expected availability date, and if the book is already on reserve for another student or faculty member. The user will have the option to reserve the resource by selecting the reserve resource field. The student will automatically be notified by email when the resource is available. Only books and multi-media will be accessible for reservation. Magazines and periodicals can only be viewed in the library and are not available for check out. A student will not be allowed to have for than ten resources on reserve at one time. An error message will be displayed if the user tries to exceed this limit. Faculty may have up to 25 resources on hold. Access time for this function is expected to be no more than three seconds via the LAN connection and no more than ten seconds using a remote internet browser. This time will be longer on older machines with slower modem speeds.

Function 4: Account Status Check Function (Student/Faculty Function)

The account status check will allow users to check the status of their library account. When this function is selected it will provide the following three options: view all resources currently checked out by the user, all resources on reserve, and a check for overdue fee. If the user selects resources borrowed, the title of each resource and the respective due date will be displayed. The resources reserved option will provide each title reserved by the user including the expected availability date. Only student accounts will include an overdue fee check;

overdue fees will not be assessed for faculty. If the student selects this option, there will be an option to pay overdue fees online with a credit card (see overdue fee payment function). Access time for this function is expected to be no more than three seconds via the LAN connection and no more than ten seconds using a remote internet browser. This time will be longer on older machines with slower modem speeds. Times may also be slower for credit card payments as the credit card must be verified through the banking system.

Function 5: Overdue Fee Payment Function (Student Function)

Students will be able to pay any overdue fees that may have been assessed using the overdue fee payment function. The user's balance will be displayed when this function is selected along with a button labeled **Pay Fees**. The user will be prompted for a credit number, expiration date, and the name on the card. The user will then submit the request, which will be processed using an online banking system. The bank will verify the user's information and return verification of the transaction once it has been approved. An error message will be displayed if the payment cannot be processed. The account balance field will be updated immediately. The time for this function will vary depending on the volume of transactions being processed through the online banking system, but the maximum transaction time is not expected to exceed 10 seconds.

Function 6: User Account Set-up Function (Library Staff and Administrator Function)

Both library staff members and the system administrator will have access to this function, although most student and faculty accounts will be set up by the library staff. There are three subfunctions: account update, account creation, and account deletion. The menu will display these three options and the staff member will make the appropriate selection. The screen will display fields for the user's name, ID, PIN, user type, address, email address, and phone number. The user will be given a default PIN and then prompted by the system for a new PIN on the first login. After the new account information has been entered, the staff member will click UPDATE button. If the account is being deleted, the staff member will select the DELETE button and the system will require verification that the account should really be deleted before it will be permanently removed from the system. Access time for this function is expected to be no more than two seconds via the LAN connection.

Function 7: Media Check in/Check out Functions (Library Staff Function)

The checkin/checkout functions will be performed by the library staff. All resources are identified in the database by a unique index number. This number will be entered to select the media resource. When checking out a resource, the availability status will change, the student/faculty member ID number will be assigned to the resource, and a due date assigned. There is a limit to the number of resources that can be checked out to a single user at any given time. The students are limited to 10 media resources while the faculty can checkout up to 25 media resources. Checking a book in will result in a change to the availability status and the association with the student/faculty member will be removed. If the resource has been reserved, an email will be generated with the availability status change. Access time for this function is expected to be no more than two seconds via the LAN connection.

Function 8: Report Generation Function (Library Staff and Administrator Function)

Both the library staff and administrator will be able to generate a variety of pre-defined status reports as well as customized reports. The report function will include a complete resource status report, a listing of all user accounts, and a list of all overdue fees owed. Reports may also be

generated using any combination of the search fields. The time required to generate reports is expected to be no more than ten seconds via the LAN connection.

Function 9: Media Management Function (Administrator Function)

Managing the media will include adding new resources to the database, updating resources already in the database, and deleting resources. When adding a new resource to the database, the system will automatically assign it a unique index number. This number will be used for the checkin/checkout function to identify the media resource. The administrator will have direct access to the database server and will perform most media management functions while logged onto this server. This will result in immediate response times.

Function 10: Access Control Function (Administrator Function)

The administrator will control the level of access for each type of user. Upon user login, the user type will identify the level of access and trigger the appropriate menu display. The user account validation will also be managed through this function. If the user name, user ID, and PIN can not be verified by the system, the user will be returned to the login screen and an error message will be displayed. If the user inputs an incorrect password on more than three consecutive attempts, the access control function will disable the account. Reinstatement of the account will require the assistance of a library staff member or the administrator. The administrator will have direct access to the database server and will perform most media management functions while logged onto this server. This will result in immediate response times.

Function 11: Account Management Function (Administrator Function)

All user accounts will be managed by the administrator. Although the library staff may set up student/faculty accounts, only the administrator may set up library staff accounts and other administrator accounts. There are three subfunctions: account update, account creation, and account deletion. The menu will display these three options and the administrator will make the appropriate selection. The screen will display fields for the library staff member's name, ID, PIN, user type, extension, position, and email address. The staff member will be given a default PIN and then prompted by the system for a new PIN on the first login. After the new account information has been entered, the administrator will click UPDATE button. If the account is being deleted, the administrator will select the DELETE button and the system will require verification that the account should really be deleted before it will be permanently removed from the system. The administrator will have direct access to the database server and will perform most media management functions while logged onto this server. This will result in immediate response times.

V System Interface Design

Graphic User Interface Design

This section provides the graphic user interface for the online library system. The interface design for each screen is based on the functionality described in the Function Description section. References are provided as appropriate to the corresponding function descriptions.

Student and faculty users will be able to log onto the system from computers both within the SJSU library or from any computer connected to the internet. The library's computers will access the system via a LAN connection while remote computers will access the system through an internet browser. The user interfaces displayed in this document will reflect the screens that will be seen when using the library's computers. The user interface will be almost identical when viewed through the internet browser. The user login will be the same for all types of users. The access control function will determine the level of access based on the user type. The user type will be triggered by the user ID, and the appropriate menu will be displayed. The following screen will be displayed for the initial login to the system (Function 1).

SJSU
Library
System

Welcome to the SJSU Library System
Please log in

,
Last Name First Name

- -
Social Security Number

PIN

The data submitted will be verified via the access control function. If the user name or social security number does not match the PIN, an error message will be displayed. The user will have the option to try again, or cancel the operation.

The screenshot shows the SJSU Library System login interface. At the top is the SJSU Library System logo. Below it, the text "Welcome to the SJSU Library System" and "Please log in" is displayed. There are two input fields: "Last Name" and "PIN". A "Submit" button is located below the PIN field. An "Error" dialog box is overlaid on the screen, containing the message "The user ID and PIN do not match - please try again" and two buttons: "Try again" and "Cancel".

Students and faculty will see the following options upon successful login. Users will be given the option to exit at any time.

The screenshot shows the SJSU Library System main menu. At the top is the SJSU Library System logo. Below it, the text "Please make your selection" is displayed. There are three buttons: "Perform Media Search", "Check Account Status", and "Exit".


If the user selects **Perform Media Search** (Function 2), the following screen will be displayed to enter the user's search criteria.

The screenshot shows a yellow rectangular window titled "SJ SU Library System" at the top center. Below the title, the text "Please input your search criteria" is displayed in blue. There are five input fields, each preceded by a label: "Title", "Author", "Subject", "ISBN", and "Publication". At the bottom of the window, there are two buttons: "Return to Main" on the left and "Exit" on the right.

If no matches are found, the following message will be displayed. The user will be given the opportunity to provide new search criteria.

This screenshot shows the same yellow rectangular window as the previous one, but with a gray message box overlaid in the center. The message box contains the text: "No Matches Found", "There were no items matching your request.", and "Please try again.", followed by a "Try again" button. The search criteria labels and input fields are still visible behind the message box. The "Return to Main" and "Exit" buttons remain at the bottom of the window.

When the search criteria is submitted, the database will be queried and all matches returned.



The following results match your request

<u>Title</u>	<u>Author</u>	<u>Locator ID</u>	<u>Checked Out</u>	<u>Reserved</u>
Software Design Concepts	Martin, L.	1011.77	Y	N <input type="button" value="Reserve"/>
Database Design	Schaffer, M.	1011.89	N	N <input type="button" value="Reserve"/>

[More Matches](#)

If the user wishes to reserve an item, the reserve button can be used to reach the following reservation screen (Function 3). The user will be shown the estimated availability date (based on the due date) and can reserve the item by entering their user ID. The user will be returned to the query result screen.



Please enter your user ID and submit
reservation request
(you will be emailed when the item is available)

Title to Reserve

Software Design Concepts

Social Security Number

- -

Estimated Availability Date: December 14, 2001

The user can also check their account status by selecting **Check Account Status** (Function 4) from the main menu. The following options will be provided.

SJSU
Library
System

Please make your selection

View
Media
Borrowed

View
Media
Reserved

Overdue Fees: \$ 0.00 Pay Fees

Return to Main

The user may check the status of media that is currently checked out to them. The title, author, and due date for each item will be displayed.

SJSU
Library
System

You currently have on loan the following items

<u>Title</u>	<u>Author</u>	<u>Date Due</u>
1 Programming in Java	Bruce, L.	12/14/2001
2 Introduction to Unix	Gaffy, M.	12/14/2001

Return to Main Exit

The user may also check the status of items they have put on reserve (Function 4). The screen will display the title, author, and expected availability date of all items currently of reserve.

The screenshot shows a web interface for the SJSU Library System. At the top center is the logo "SJ SU Library System". Below the logo, a blue heading reads "You currently have on reserve the following items". Underneath this heading is a table with three columns: "Title", "Author", and "Expected Availability". The table contains two rows of data. At the bottom of the interface, there are two buttons: "Return to Main" on the left and "Exit" on the right.

<u>Title</u>	<u>Author</u>	<u>Expected Availability</u>
1 Component Based Design	Lewis, V.	12/8/2001
2 Algorithms in C	Murphy, J.	12/16/2001

If the user would like to pay overdue fees, selecting the **Pay Fees** (Function 5) selection will access an online credit card payment system. This interface is displayed in the External System Interface Design Section. Only the student users will be offered this option. Faculty members are exempt from paying any overdue fees.

The Library Staff will see the same initial login screen; however, different menu of options will be displayed. The Library Staff will have access to the same options as the student and faculty users as well as their own set of functions. The Library Staff will be able to perform queries or assist a user in reserving media resources as well as create and maintain user account, check media in and out and generate a variety of reports.

The screenshot shows a yellow rectangular window with a black border. At the top center is the logo "SJ SU Library System" in blue. Below the logo, the text "Please make your selection" is displayed in blue. A vertical column of seven buttons is centered: "Perform Media Search", "Check Account Status", "User Account Set-up", "Media Checkout", "Media Checkin", "Reports", and "Exit". The "Exit" button is positioned to the right of the "Reports" button.

The **Perform Media Search** screen may be accessed directly from the main menu just as in the user menu, but the **Check Account Status** will require an additional interface with a prompt for the user ID of the person the staff member is checking.

The screenshot shows a yellow rectangular window with a black border. At the top center is the logo "SJ SU Library System" in blue. Below the logo, the text "Please enter the user ID for the user you wish to display" is displayed in blue. Underneath, the text "Social Security Number" is shown in blue. Below this text are three input boxes separated by hyphens. At the bottom, there are two buttons: "Submit" on the left and "Cancel" on the right.

The Library Staff will have the ability to set-up, delete, or change both student and faculty user accounts. When the staff member selects **User Account Set-up** (Function 6), a screen with user

information fields will be displayed. If it is a new user account, the information will be entered and the **Submit New** button selected. If there are changes being made to an existing account, the staff member will enter the user ID and select the **Edit** button.

The screenshot shows the 'User Type (Check One)' section with 'Student' and 'Faculty' options. Below this are input fields for 'Last Name', 'First Name', 'Social Security Number', 'PIN', 'Email Address', 'Address', 'City', 'State', 'Zip', 'Phone No.', 'Extension', and 'Office No.'. The 'Submit New' button is highlighted.

All of the user information will be displayed. Changes shall be made on this screen and then accepted using the **Submit** button, or the account may be deleted by selecting the **Delete** button.

The screenshot shows the same form as the previous one, but with the 'Student' option selected. The input fields are now populated with the following data: Last Name: Stephens, First Name: Amy, Social Security Number: 550-77-9876, PIN: *****, Email Address: amy_stephens6@aol.com, Address: 499 Blossom Way, City: San Jose, State: CA, Zip: 95109, Phone No.: (408) 449-1919. The 'Submit' button is highlighted.

The user will be prompted to verify all destructive transactions.

The screenshot shows the 'SJSU Library System' user management interface. A user is being edited, with fields for Last Name (Stephens), Social Security Number (550-***), Email Address (amy_stephens@...), Address (499 Blossom Way), and Phone Number ((408) 449-1919). The user is identified as a Student. A modal dialog box titled 'Warning' is displayed in the center, asking 'Are you sure you wish to delete this user account?' with 'Okay' and 'Cancel' buttons. At the bottom of the form are 'Submit', 'Delete', and 'Return to Main' buttons.

The system will not allow an account deletion if the user currently has items on loan. The staff member will receive a message denying the request for deletion.

This screenshot shows the same user management interface as the previous one, but with a different modal dialog box. The dialog is titled 'Request Denied' and contains the message: 'This user currently has media resources on loan. All items must be turned in prior to account deletion.' It has an 'Okay' button. The background form shows the same user details and navigation buttons ('Submit', 'Delete', 'Return to Main').

The Library Staff is responsible for all media check in and check out activities (Function 7). When a student or faculty member wishes to check out media, the staff member will enter the user ID and the media resource unique ID number. All other fields will be automatically entered.

SJSU
Library
System

Please enter the user ID to begin check out process

550 - 77 - 9876
Social Security Number

<u>Index</u>	<u>No.</u>	<u>Title</u>	<u>Author</u>	<u>Date Out</u>	<u>Date Due</u>
▲	813001	Programming in Java	Bruce, L.	11/30/01	12/14/01
■	914987	Introduction to Unix	Gaffy, M.	11/30/01	12/14/01
■	416979	Unix for Dummies	Preston, F.	11/30/01	12/14/01
▼					

Return to Main Submit Exit

A warning will notify the staff member when the maximum number of media resources that may be checked out has been reached.

SJSU
Library
System

Please enter the user ID to begin check out process

550 - 77 - 9876
Social Security Number

Warning

The maximum number of items for this user has been reached.

Okay

<u>Index</u>	<u>No.</u>	<u>Title</u>	<u>Author</u>	<u>Date Out</u>	<u>Date Due</u>
▲	813001	Programming in Java	Bruce, L.	11/30/01	12/14/01
■	914987	Introduction to Unix	Gaffy, M.	11/30/01	12/14/01
■	416979	Unix for Dummies	Preston, F.	11/30/01	12/14/01
▼					

Return to Main Submit Exit

To check in media resource, only the Index Number needs to be entered. All other field will be automatically entered. The association with the user will be terminated when the checked out status is removed. If the item was on reserve, an email will automatically be sent to the user.

SJSU
Library
System

Please enter the Index No. for resource check in

<u>Index No.</u>	<u>Title</u>	<u>Author</u>	<u>Date Returned</u>
813001	Programming in Java	Bruce, L.	11/30/01
914987	Introduction to Unix	Gaffy, M.	11/30/01
416979	Unix for Dummies	Preston, F.	11/30/01

The Library Staff can also generate a variety of reports (Function 8). There are several predefined reports, but the staff may also customize the reports as necessary.

SJSU
Library
System

Please make your selection

- ☐ Print all overdue media by user last name
- ☐ Print all overdue media by due date
- ☐ Print all users with an overdue balance
- ☐ Print status for specific user
- ☐ Print users and last activity date (by date)
- ☐ Customized reports

The Administrator can log on through the LAN connection, but can also log on to the server directly. Although the Administrator has access to all of the general user and Library Staff functions, only the Administrator's primary activities are displayed at the main menu.

SJ SU
Library
System

Please make your selection

Media
Management

Account
Management

Exit

To enter a new media resource item (Function 9), the Administrator shall select the Media Type and click on the **New** button. A unique index number will be assigned by the system.

SJ SU
Library
System

Select Media Type and New to enter a new resource or
enter the resource index number and select Edit to edit

Index No.

Media Type (check one)

☐ Book

☐ Magazine

☐ Multi-media

New Edit Return to Main

The appropriate screen for the selected Media Type will be displayed. Changes can be made or new information entered. The following display is for a resource of type book. The displays for the other media types are similar.

SJSU
Library
System

Please select **Submit** to accept changes
or to delete, select **Delete**

<input type="text" value="780001"/> Index No.	<input type="text" value="1102.89"/> Locator No.	
<input type="text" value="Designing with ASP"/> Title	<input type="text" value="Bently, R."/> Author	
<input type="text" value="computer programming language"/> Subject	<input type="text" value="345-08988-98675"/> ISBN	

The Administrator will be prompted to verify all destructive transactions.

SJSU
Library
System

Please select **Submit** to accept changes
or to delete, select **Delete**

<input type="text" value="780001"/> Index No.		
<input type="text" value="Designing with ASP"/> Title	<input type="text" value="Bently, R."/> Author	
<input type="text" value="computer programming language"/> Subject	<input type="text" value="345-08988-98675"/> ISBN	

Warning

Are you sure you wish to
delete this media resource?

The Administrator will have the ability to set-up, delete, or change all types user accounts. When the Administrator member selects **Account Management** (Function 11), a screen with user information fields will be displayed. If it is a new user account, the information will be entered and the **Submit New** button selected. If there are changes being made to an existing account, the Administrator will enter the user ID and select the **Edit** button.

The screenshot shows a web form titled "SJSU Library System". The form is divided into several sections with colored backgrounds: yellow for the top section, light green for the middle section, and grey for the bottom section. The form includes the following fields and options:

- User Type (Check One):** Four radio buttons for ☐ Student, ☐ Faculty, ☐ Library Staff, and ☐ Administrator.
- Last Name:** A text input field.
- First Name:** A text input field.
- Social Security Number:** A text input field.
- PIN:** A text input field.
- Email Address:** A text input field.
- Address:** A text input field.
- City:** A text input field.
- State:** A text input field.
- Zip:** A text input field.
- Phone No.:** A text input field.
- Students only:** A label for the green section.
- Extension:** A text input field.
- Office No.:** A text input field.
- Position:** A text input field.
- All other users:** A label for the grey section.

At the bottom of the form, there are three buttons: **Submit New**, **Edit**, and **Return to Main**.

All of the user information will be displayed. Changes shall be made on this screen and then accepted using the **Submit** button, or the account may be deleted by selecting the **Delete** button.

SJ SU Library System

User Type (Check One)
☐ Student ☐ Faculty ☒ Library Staff ☐ Administrator

Last Name: Fitzsimmons First Name: Lyle

Social Security Number: 468 - 78 PIN: 4567 *****

Email Address: lfitz@sjsu.edu

Address: City: State: Zip: Students only

Phone No. Extension: 2517 Office No.: Librarian Position: All other users

Submit New Edit Return to Main

The user will be prompted to verify all destructive transactions.

SJ SU Library System

User Type (Check One)
☐ Student ☐ Faculty ☒ Library Staff ☐ Administrator

Last Name: Fitzsimmons First Name: Lyle

Social Security Number: 468 - 78 PIN: 4567 *****

Email Address: lfitz@sjsu.edu

Address: City: State: Zip: Students only

Phone No. Extension: 2517 Office No.: Librarian Position: All other users

Submit New Edit Return to Main

Warning

Are you sure you wish to delete this user account?

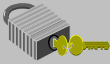
Okay Cancel

All access control functions will be managed through a direct login to the server and will not be displayed via the online system (Function 10).

External System Interface Design

Students will be able to pay any overdue fees that may have been assessed using the overdue fee payment function. The user's balance will be displayed when this function is selected along with a button labeled **Pay Fees** (Function 5). The user will be taken to the following payment screen and will be prompted for a credit number, expiration date, and the name on the card. The user will then submit the request, which will be processed using an online banking system through a secure site.

SJSU
Pay Online

Secure Site 

User ID:

Current Balance:

Enter Amount to Pay:

Select Payment Method

Visa ☐

Mastercard ☐

Discover ☐

Student Account ☐


Credit Card No. (no spaces or dashes)

Exp Date (MM/YY)

Name as it appears on card

The bank will verify the user's information and return verification of the transaction once it has been approved. An error message will be displayed if the payment cannot be processed. The account balance field will be updated immediately.

SJSU
Pay Online

Secure Site 

User ID:

Current Balance: Amount to Pay:

Select Payment Method

Visa ☐

Mastercard ☐


Discover ☐

Student Account ☐

Request Denied
Please check to make sure the information is correct and try again.

Name as it appears on card

SJSU
Pay Online

Secure Site 

User ID:

Current Balance: Amount to Pay:

Select Payment Method

Visa ☐

Mastercard ☐

Discover ☐

Student Account ☐

SUCCESS
Your transaction has been validated.

Name as it appears on card

VI Bibliography

Pressman, Roger S. Software Engineering - A Practitioner's Approach. Fifth edition. The McGraw-Hill companies, Inc.

VII Appendix

Major Function Summary

Function 1: *Login Function (Shared Function)* – provides security and to control the user's level of access.

Function 2: *Media Search Function (Shared Function)* – search the media database for books, magazines/periodicals, and multi-media

Function 3: *Media Reservation Function (Student/Faculty Function)* – allow users to reserve media resources that are currently checked out

Function 4: *Account Status Check Function (Student/Faculty Function)* – allow users to check the status of their library account

Function 5: *Overdue Fee Payment Function (Student Function)* – allow users to pay overdue fees through online banking system

Function 6: *User Account Set-up Function (Library Staff and Administrator Function)* – allow library staff to add, delete, and update user accounts

Function 7: *Media Check in/Check out Functions (Library Staff Function)* – allow library staff to check media in and out

Function 8: *Report Generation Function (Library Staff and Administrator Function)* – allow library staff and administrator to generate reports

Function 9: *Media Management Function (Administrator Function)* – allow administrator to add, delete, and update media resources

Function 10: *Access Control Function (Administrator Function)* – controls the users level of access and provides user verification

Function 11: *Account Management Function (Administrator Function)* – allow administrator to add, delete, and update library staff accounts