Design and Implementation of a web based Library

A Project Report Submitted to the College of Science, Baghdad University in Partial Fulfillment of the Requirements for the BSc Degree of Science in Computer Science

BY

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بسم الله الرحمن الرحيم

ق والفقران المجيد بل عجبوا أن جاءهم منذر منهم فقال الأكابر هذا شيء عجيب أود ما مثنا وكننا ترابا ذلك رجع بعيد قد علمنا ما تنصّ الأروض منهم وعندنا كتاب حفيظ بل كذبنا بالحق لما جاءهم فهم في أمر مريح أفلم ينظروا إلى السماء فوقعهم كيف بنيتاهما وربتاهما وما لها من فروج والأرض مصدنةها وألقينا فيها رؤاى وأنبتنا فيها من كل زوج نهيح تبصرة وذكري لكل عبد مثيب ونزلنا من السماء ماء مبارك فأبناءه يحس وحبل الخضيد والخيل باسقات لها طلع نضيد رقفا للعباد وأخيتنا به بلدة مثنا كذاك الخروج

صدق الله العظيم

سورة ق (1-11)

لاهديني وياه والد معاير

نجاحي وياه ورد معاير
الى اعظم شخص عرفة

التأريخ

ومنارة العلم

حبيبي رسول الله مسعود (صلى الله عليه وسلم)

الى من ساهم في وصولي طريق العلماء

الى عقل من علمي حزفاً

الى أصدقائي وصديقي

الى من ساهم معي في إنجعل هذا العمل

الي الأستاذ، حماد علي

الي الأستاذ، خالد مصفر

إلى من طبق أحلم ليحج لي لحظة معايدة

إلى من خصص الأموال عن حرمي ليحمي لي طريق العلم

إلى القلب الشمري

إلى والدي

إلى من أرضعتني الحب والحنان

إلى رمز الحب وملسم الهفاء

إلى القلب الحبوب

إلى والديي

إلى حاجي وعزيزي والائي بعد الله

إلى من أدركي على نفسه

إلى من علمي علم الحياة

إلى وحديي

أصدقاءتي التي خل من فريقتي فرحتي وحزني من طول طولتي لاحوتتي واحوتتي الأعزاء

الي أخوتي في الله الي من جمعتنا بهم الجامعة ونحن أقرباء ووفدان وحنن أصحاب
Abstract

The designed work is a website that is an interface for the library to enable researchers to access the library and searching easily, and the ability to borrow different kinds of documents online. In addition to that, the system facilitated the job of the librarians and the work became easier by keeping the data (books, theses, the borrowing information, user information etc…) stored electronically, and accessing them is much easier in any time, and that led to time consuming. It is easier to find a book and access it, now it is Able to follow up the operations of Borrowing and late follow-up elements, facilitate the process of inventory where they can now begin in the inventory without disrupting the activity of the library Borrowing.
1. Chapter one

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Introduction</td>
<td>1</td>
</tr>
<tr>
<td>1.2 The Advantages of Digital Libraries</td>
<td>2</td>
</tr>
<tr>
<td>1. Improved access</td>
<td>3</td>
</tr>
<tr>
<td>2. Wider access</td>
<td>3</td>
</tr>
<tr>
<td>3. Improved information sharing</td>
<td>3</td>
</tr>
<tr>
<td>4. Improved preservation</td>
<td>3</td>
</tr>
<tr>
<td>1.3 Functional Components of Digital Library</td>
<td>3</td>
</tr>
<tr>
<td>1. Selection and acquisition</td>
<td>3</td>
</tr>
<tr>
<td>2. Organization</td>
<td>4</td>
</tr>
<tr>
<td>3. Indexing and storage</td>
<td>4</td>
</tr>
<tr>
<td>4. Search and retrieval</td>
<td>4</td>
</tr>
<tr>
<td>1.4 The aim of the Project</td>
<td>4</td>
</tr>
<tr>
<td>1.5 Project layout</td>
<td>4</td>
</tr>
</tbody>
</table>

2. Chapter two

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 Introduction</td>
<td>5</td>
</tr>
<tr>
<td>2.2 Relational Database</td>
<td>7</td>
</tr>
<tr>
<td>2.3 Database Management System (DBMS)</td>
<td>8</td>
</tr>
<tr>
<td>2.4 SQL Structured Query Language</td>
<td>9</td>
</tr>
<tr>
<td>2.5 SQL Server</td>
<td>9</td>
</tr>
<tr>
<td>2.6 Applet</td>
<td>10</td>
</tr>
<tr>
<td>2.6.1 Advantages of Applet</td>
<td>11</td>
</tr>
<tr>
<td>2.6.2 Disadvantages of Java Applet</td>
<td>11</td>
</tr>
<tr>
<td>3. Chapter three</td>
<td>12</td>
</tr>
<tr>
<td>------------------</td>
<td>----</td>
</tr>
<tr>
<td>3.1 Introduction</td>
<td>13</td>
</tr>
<tr>
<td>3.2 The architecture of the work</td>
<td>13</td>
</tr>
<tr>
<td>1. Home page</td>
<td>13</td>
</tr>
<tr>
<td>2. Login and Delayed books page</td>
<td>14</td>
</tr>
<tr>
<td>3. Search page</td>
<td>17</td>
</tr>
<tr>
<td>4. Display page (update, delete)</td>
<td>20</td>
</tr>
<tr>
<td>5. Chick borrows and return book page</td>
<td>24</td>
</tr>
<tr>
<td>6. Insert book</td>
<td>25</td>
</tr>
<tr>
<td>7. Insert theses</td>
<td>26</td>
</tr>
<tr>
<td>8. Create user account</td>
<td>27</td>
</tr>
<tr>
<td>9. Create admin (director or employee) account</td>
<td>28</td>
</tr>
<tr>
<td>10. Change password page</td>
<td>29</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. Chapter four</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1 Conclusion</td>
<td>31</td>
</tr>
<tr>
<td>4.2 Results</td>
<td>31</td>
</tr>
<tr>
<td>4.3 Future work</td>
<td>32</td>
</tr>
<tr>
<td>4.4 Resources</td>
<td>32</td>
</tr>
</tbody>
</table>
Chapter Two

Theoretical Backgrounds

2.1 Introduction

A database is a collection of information that is organized so that it can easily be accessed, managed, and updated. In one view, databases can be classified according to types of content: bibliographic, full-text, numeric, and images.

In computing, databases are sometimes classified according to their organizational approach. The most prevalent approach is the relational database, a tabular database in which data is defined so that it can be reorganized and accessed in a number of different ways. A distributed database is one that can be dispersed or replicated among different points in a network. An object-oriented programming database is one that is congruent with the data defined in object classes and subclasses.

Computer databases typically contain aggregations of data records or files, such as sales transactions, product catalogue and inventories, and customer profiles. The system which provides such a facility is called
Database Management System or DBMS. The simplest form to store a data for latter retrieval is using a text file. This kind of storage is called flat file storage or unstructured storage. In this case the text editor uses the File and Directory services provided by the Operating System to accomplish the task of storing and retrieving data but these unstructured flat files are not suitable to large data such as storing stock details.

Since the stock data is large in volume and added and updated frequently it is not scale up well if we use a simple flat file. To overcome this we need some system which should perform the storing, retrieving, manipulating and querying operations on the data and give output. This kind of system is called Database Management System. So a DBMS is a system which organizes and stores data in a structural way for fast retrieval. A DBMS uses one or more files to store the given data. Since the DBMS is meant mainly for developers every DBMS has it is own language to write the commands.

The languages are standardized under the name SQL (Structured Query Language), which is represents “A language used to insert, retrieve, modify, and delete data in a relational database. SQL also contains statements for defining and administering the objects in a database. SQL is the language supported by most relational databases, and is the subject of standards published by the International Standards Organization (ISO) and the American National Standards Institute (ANSI). SQL Server 2000 uses a version of the SQL language called Transact-SQL.”

DBMS should represent the data stored by them in some form and it is most common to represent them as Column, Row, Tables and Databases. SQL have to know what are columns, rows, tables and database.
• Column: finite unit of data. It is represented by one of the data type.
• Row: collection of Columns.
• Tables: Collection of rows.
• Database: Collection of tables and other objects.

2.2 Relational Database

A relational database is a set of tables containing data fitted into predefined categories. Each table (which is sometimes called a relation) contains one or more data categories in columns. Each row contains a unique instance of data for the categories defined by the columns. For example, a typical business order entry database would include a table that described a customer with columns for name, address, phone number, and so forth. Another table would describe an order: product, customer, date, sales price, and so forth. A user of the database could obtain a view of the database that fitted the user's needs.

For example, a branch office manager might like a view or report on all customers that had bought products after a certain date. A financial services manager in the same company could, from the same tables, obtain a report on accounts that needed to be paid. When creating a relational database, you can define the domain of possible values in a data column and further constraints that may apply to that data value. For example, a domain of possible customers could allow up to ten possible customer names but be constrained in one table to allowing only three of these customer names to be specifiable. The definition of a relational database results in a table of metadata or formal descriptions of the tables, columns, domains, and constraints.

2.3 Database Management System (DBMS)
DBMS sometimes just called a *database manager*, is a program that lets one or more computer users create and access data in a database. The DBMS manages user requests (and requests from other programs) so that users and other programs are free from having to understand where the data is physically located on storage media and, in a multi-user system, who else may also be accessing the data. In handling user requests, the DBMS ensures the *integrity* of the data (that is, making sure it continues to be accessible and is consistently organized as intended) and *security* (making sure only those with access privileges can access the data). The most typical DBMS is a relational database management system (RDBMS). A standard user and program interface is the Structured Query Language (SQL). A newer kind of DBMS is the object-oriented database management system (ODBMS).

DBMS can be thought of as a *file manager* that manages data in databases rather than files in file systems. In IBM's mainframe operating systems, the non relational data managers were (and are, because these legacy application systems are still used) known as *access methods*. DBMS is usually an inherent part of a database product. On PCs, Microsoft Access is a popular example of a single- or small-group user DBMS. Microsoft's SQL Server is an example of a DBMS that serves database requests from multiple (client) users. Other popular DBMSs are IBM's DB2, Oracle's line of database management products, and Sybase's products.

### 2.4 SQL Structured Query Language

Structured Query Language SQL is a standard interactive and programming language for getting information from database and updating. Although SQL is both an ANSI and an ISO standard, many
database products support SQL with proprietary extensions to the standard language. Queries take the form of a command language that lets user select, insert, update, find out the location of data, and so forth. The SQL query language is characterized as follows:

- A language close to natural language.
- it can get any data from the database. The data can be obtained the entire file, or some fields from a file or set of files.
- user cares about the definition of need, do not care about them or how to get from where?

2.5 SQL Server

SQL Server is a relational database management system (RDBMS) from Microsoft that's designed for the enterprise environment. SQL Server runs on T-SQL (Transact-SQL), a set of programming extensions from Sybase and Microsoft that add several features to standard SQL, including transaction control, exception and error handling, row processing, and declared variables.

Code named Yukon in development, SQL Server 2005 was released in November 2005. The 2005 product is said to provide enhanced flexibility, scalability, reliability, and security to database applications, and to make them easier to create and deploy, thus reducing the complexity and tedium involved in database management. SQL Server 2005 also includes more administrative support. The original SQL Server code was developed by Sybase; in the late 1980s, Microsoft, Sybase and Ashton-Tate collaborated to produce the first version of the product, SQL Server 4.2 for OS/2. Subsequently, both Sybase and
Microsoft offered SQL Server products. Sybase has since renamed their product Adaptive Server Enterprise.

### 2.6 Applet

Applet is java program that can be embedded into HTML pages. Java applets runs on the java enables web browsers such as mozilla and internet explorer. Applet is designed to run remotely on the client browser, so there are some restrictions on it. Applet can't access system resources on the local computer. Applets are used to make the web site more dynamic and entertaining. The structure of an applet takes the form of five events that can take place as an applet is running. When the events occur, a method is automatically called. The methods also can be called directly within the applet. The methods are the following:

- **Initialization:** The init() method is called the first time the applet is loaded.
- **Destruction:** The destroy() method is called the final time the applet is exited.
- **Stopping:** The stop() method is called each time an applet is stopped. A *stop* happens automatically when a Web page containing the applet is exited and also when the stop() method is called directly in a program.
- **Starting:** The start() method is called each time an applet is loaded or reloaded. A *start* follows initialization and also takes place each time the applet is restarted. A *start* happens when a Web user comes back to the applet's page after leaving it; you can also call start() directly.
- **Painting:** The paint() method is called any time the applet window must be repainted. This occurs automatically at certain times, such
as when the applet window is covered up by another window and then uncovered. It also can be called by using a repaint() call when a program needs a screen update to take place.

2.8.1 Advantages of Applet

- Applets are cross platform and can run on Windows, Mac OS and Linux platform
- Applets can work all the version of Java Plugin
- Applets runs in a sandbox, so the user does not need to trust the code, so it can work without security approval
- Applets are supported by most web browsers
- Applets are cached in most web browsers, so will be quick to load when returning to a web page
- User can also have full access to the machine if user allows

2.8.2 Disadvantages of Java Applet:

- Java plug-in is required to run applet
- Java applet requires JVM so first time it takes significant startup time
- If applet is not already cached in the machine, it will be downloaded from internet and will take time
- Its difficult to design and build good user interface in applets compared to HTML technology
Chapter 3

Design and Implementation of the Practical work
3.1 Introduction

The purpose of this project is to build an integrated system for the central library in order to facilitate the work of the Central Library to store data books, thesis, names of staff and users. It also facilitates the search and borrows books by users using the Internet. The strong points of The Proposed Web Library are that the Library may be used with any
Operating System (OS) such as Windows XP, vista, Linux and Unix. With the availability of any computer connected to the network, the reader can access the library so easy, without needing any installation of any application; any internet explorer can be enough for exploring the library. The site contains both English and Arabic Interfaces. And this work divided the users of this site into three types. The first type is the Director; the director that is responsible of the site is the only one who has the authority to add employees in addition to all other privileges. The second type is the employee, he will have the right to add a book or a thesis or user, the third type is the ordinary User, he can login to the site and conduct the search on a book or thesis and asked borrowed books online.

3.2 The architecture of the work

This work contains many branches each will be discussed in this thesis:

1. **Home page:** the web page contains information and terms of the borrowing mechanism, which the user has to follow if he wants to borrow from the library.
2. Login and Delayed books page

That page displays the names of students that are late in returning the book that they have borrowed from the library, and the period devoted to borrow the book is expired.

2. Login and Delayed books page
The frame above is used to enter the user name and password to sign in, and check if the user name and password are correct, and then check the type of the user willing to enter the system. The type of user determines the frame that will appear, and each user will have his own frame, as follows:
a. If the user has a director user name and password, he will enter the management web page that contains more than one link, each described below in the figure:

- Search page
- Update or delete page
- Check borrows and return book page
- Insert book page
- Insert theses page
- Create user account page
- Create employee account page
- Change password page
b. This user has a name and password for an employee, this user will enter the management webpage, the page that contains more than one link, these links are found on all pages except the search page and confirmation page borrow and change password.
c. The user name and password are for an ordinary user, he will enter the page of search, and this page has a link that leads to the change password page.

### 3. Search page

This page is used to search for books or theses and there are options to choose different book or theses.

a. Normal search is used for general search. By writing any statement or word in the text box than click on command search.
To search on the theses

Change password page

To search on the books

To display the advance search

This is command to start search

Borrow page
b. Advanced search, by click on link Advance Search the system will show four options to the user and he can choose any one to search by it (title, author, subject or abstract)
If found result more than one you can display it be commands next and previous when you need borrow the book click on command Go to borrow to borrow page
c. Borrow page display a list of the borrowed books also it display the information about the new book that you want to borrow it now to confirm borrow click on ok.

List to display the book that you borrowed

To display information the book

OK
4. Display page (update, delete)

This page is used to display information of (books theses, users and employees)
a. Display books
b. Display theses

To display class number of theses

To display all information the theses
The page of display books and theses has three type of display

1-all: to display all books or theses

2-by id number: to display books or theses that between the id numbers that you enter it in the text

3-by class number: to display the book or theses that has class number that you enter it in text.

After selected type of display click on command display to class number of the books or theses in list than when you selected class number of one will display the information of it in text. You can delete it by click on command delete, and you can update the information by
click on command update then will show update page content information of the book or theses you can update on any information than click save.

c. Display user

To display user name of users

To display all information the User
d. Display employee
The page of display user or employee has type of display:
1. all: to display all user or employee
2. by user name: to display the user or employee has this user name
After selected type of display click on command display to display the user name of the parsons in list when you select the any user name will show the information in the txt. You can delete the parsons from the list but you cannot update his information.

To display user name of employee

To delete employee

Update page (will be enable)
5. Chick borrows and return book page

Display the book that you borrowed or you register to borrow it

To return book

To get the book that you registered to borrow
6. Insert book
7. Insert theses

<table>
<thead>
<tr>
<th>Theses</th>
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</thead>
<tbody>
<tr>
<td>- Registration number</td>
<td></td>
</tr>
<tr>
<td>- Class Number</td>
<td>- Author Name</td>
</tr>
</tbody>
</table>
| - Title |  | +
| - Author |  | +
| - Supervisor |  | +

Sign Out Welcome: admin
8. Create user account
To create user account
9. Create admin (director or employee) account
10. Change password page
Chapter Four

Conclusions
4.1 Conclusion

Through our work in this project, one of the conclusions we reached, is that the Java applets are loaded to the client only when the user visits a page containing an applet. The second conclusion is concerned with the security model, the security model behind Java applets has been designed with the goal of protecting the user from malicious applets. The third conclusion is, Java Applet is a good language to build such a project because it allows to link databases with the site in a very friendly way. The fourth conclusion, they can easily display HTML documents using the showDocument method of the java.applet.AppletContext class, the final conclusion, java can invoke public methods of other applets on the same page or other.

By using the java applet to design and implement this project we found some problem, witch are:

1- Java does not deal directly with the Arabic language, but we have overcome this problem by using a function that changes the ASCII characters to ASCII Arabic Language.
2- Do not see the applet into the html, but we resolved this problem by changing some properties of the applet, one of them was the layout of the frame has to equal null.
3- There was a problem connecting the database to the java applet, its not straight forward like connecting the classes to the database, we had to add an authorization to the authorization file of java to allow use do that connection.

4.2 Results

This work led to many advantages for the college that are as follows:

1- It facilitated the work of the employee library, and their work became easier.
2- This project also avoided the students from visiting the library, and from now and on they can access the library through the network.
3- This project added accuracy to the library job, and no book will be delayed any more, because an alerting system was added to the work, to give the employee an alert about any delayed book.
4- Many students can be served in the same time, because of the multiprocessing that the work supplies.
4.3 Future work

1. Add an email system to our work to enable the students send their forms by email.
2. Enable our system to download electronic holdings from the library, from our server to enable the user to download e-books and theses online.
3. Add a visa card system to our work to enable the users to buy from the library as required.

4.4 Resources

How to program java 8th edition
Oracle Database 11g SQL
http://docs.oracle.com
http://java.sun.com/applets/
Design and Implementation of a web based Library

By the language used

الجافا

Implementation of the project on the Computer Science Department in the College of Science, Baghdad University for the requirements of the bachelor’s degree in the Department of Computer Science.

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