



**HACETTEPE UNIVERSITY
DEPARTMENT OF COMPUTER ENGINEERING
BBM 487:SOFTWARE ENGINEERING LABORATORY**

Group Number:5

21228544 :Şehrinaz Koca
21328103 :Burcu İskender
21328499 :Sergen Topçu

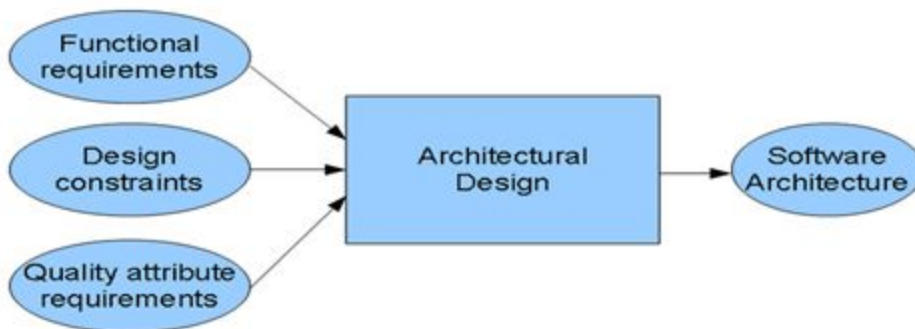
Library Book Loan System	
Architecture Notebook	Date: <04/04/2017>

<Library Book Loan System> Architecture Notebook

1. Purpose

This document describes the philosophy, decisions, constraints, justifications, significant elements, and any other overarching aspects of the system that shape the design and implementation.

The most important goals we will make in the library system are that the system is fast, easy to understand and simple. We think that most people will use our application on this.



2. Architectural goals and philosophy

The architecture of the system was shaped in core subjects. This system will be web based application.

As a working environment the internet is applied to any environment that supports the web base.

Database connection required when doing this application. The operation of the system may vary according to the internet speed.

The system is working up to maintenance.

Our system will be improved. New developments may come to our system in this respect. This is a convenience for developers. We expect the system to adapt to change. Interfaces can be changed, new functions can be added, or some attachments can come to the system. We are developing a system that will provide all of these.

The system we build will not be complicated. That's why we're trying to do things that are easier to understand. In the future some parts of the system may change. As an example, the

Library Book Loan System	
Architecture Notebook	Date: <04/04/2017>

background image of the system may change, new photos may be added in order to remove the visibility. In this view, a system that looks better may emerge.

Technical platform : This system will be web based application.

Transaction : System's transaction abilities is structured at Php , MySQL and their skills and functions.

Security: Basic security features: Authentication Users and librarian will login with ID and Password. This is obligatory.

Persistence: Data persistence will be addressed using a relational database.

Performance:Search queries should return %80 of the time below 1 sec.

In other version credit card payment transaction should finish in 3 sec.

Internationalization : Initially the system will support only English. But it should be easily modifiable to extend language support.

3. Assumptions and dependencies

- We tried to build an open architecture to add new features in the future, which was the most important criterion in the development phase.
- Database design was done to speed up the system.
- We preferred to build a web-based application because it was troublesome to add an interface to the desktop application, in addition group members are also experienced in PHP and MySQL. Because of this, these technologies were preferred for the system.
- System interface was designed independently of other similar systems.

4. Architecturally significant requirements

- System should work on browsers that support html5.
- Because of the web-based system internet connection is needed.
- System was deploy on Windows operating system.
- PHP and MySQL must be downloaded.
- The system should save all changes to user records for audit purposes.
- The system will be open seven days of a week and twenty four hours per day.
- System should be a responsive and efficient system
- If any connection lost or any problem about this system , Library system will recover.

5. Decisions, constraints, and justifications

- The number of librarians in the system will be restricted for security reasons.
- The number of users in the system will be limited.
- The user who signed up the system will pass the control of the librarian.

Library Book Loan System	
Architecture Notebook	Date: <04/04/2017>

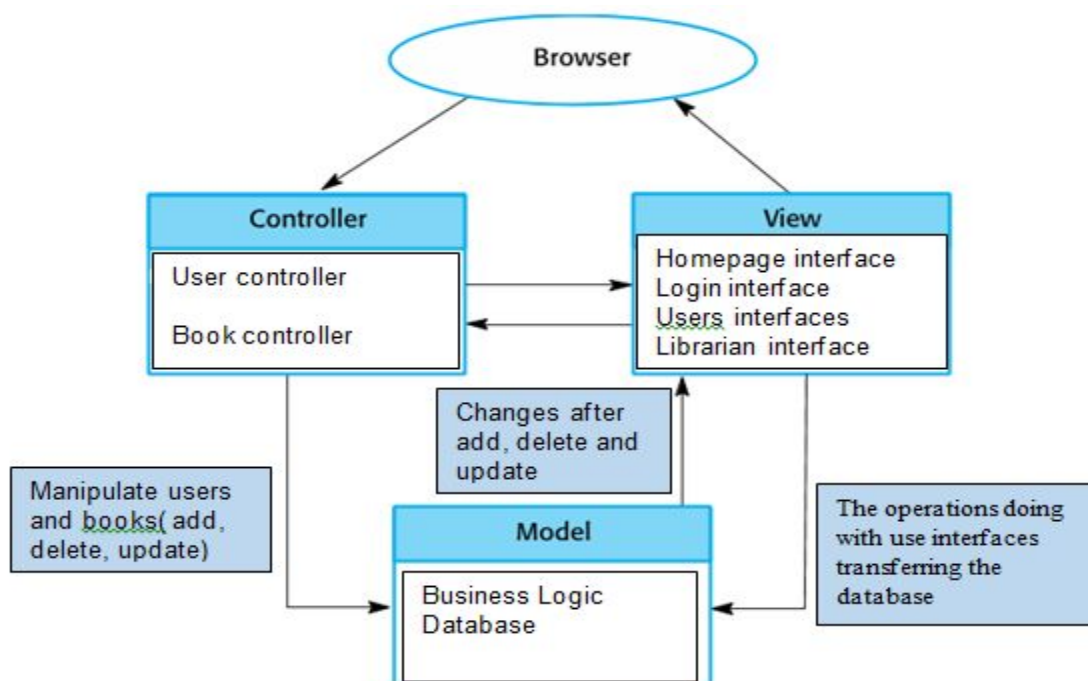
- Users who are not members of the system will only be able to search for books.
- The user will be informed about the system with a help of documentation.
- Book reservations is done after login.
- Book manipulation can be done only librarians, don't users.
- Don't access system without internet connection
- The messages and notifications which is given to the user will be understandable.
- Application will be user friendly.

6. Architectural Mechanisms

The process of projects should be smooth and controlled to achieve best project to customer. The development process sometimes can be complicated. Architectural mechanisms are needed to reduce complexity of development process and to create good product. Also architectural mechanism is used to standardize the solutions.

Due to the reasons is defined above, this project used an architectural pattern which is called "**Model View Controller (MVC)**." This mechanism consist of 3 levels. One of them is Model which contains the database and business logic. Second level is view which contains dynamic page generation and form management. Third level is Controller which contains data validation, application specific logic and if the type of project is a web it also contains http request processing.

This project is a web based project. The used MVC pattern express with the following way. It is stated on the diagram briefly, what purpose the levels of architecture used in the project.



Library Book Loan System	
Architecture Notebook	Date: <04/04/2017>

The levels of MVC patterns and their purposes of use defined as below.

Architectural Mechanism 1

Model: It contains MySql database server for the users and books operations. In the project, this level used to create database and keep the knowledges of users and books.

Architectural Mechanism 2

View: Contains the interfaces that users which name are students, faculty members, guests and librarian. In the project, this level used to create interfaces for users. For example, project has a homepage which is contain the search the books operation to all users; for the students, faculty members and librarians it has login page.

Architectural Mechanism 3

Controller: This level provide the communication between model and view levels. It contains controller for users and books. In this project, this level used to control the knowledges of users and books in the database at the model level, according to achieved result guide the related interface.

7. Key abstractions

Users: students, faculty members, librarian and guest

Interfaces: the view pages for the customers

Database: the system is for the keep knowledges of users and books

Payment system: the external system for the project

Barcode system: the external system for the project

8. Layers or architectural framework

Architectural framework provides a common environment to create, interpret, analyze and use architecture description. 4+1 view model is an example of it. This model is use to base on the use of multiple and concurrent views, description of the architecture of software-intensive systems. This multiple views are to identify different stakeholders like end-users, developers and project management in the system. The used views can be defined briefly as follows.

Development View: it may be call *implementation view*. It illustrates a system from a programmer perspective.

Library Book Loan System	
Architecture Notebook	Date: <04/04/2017>

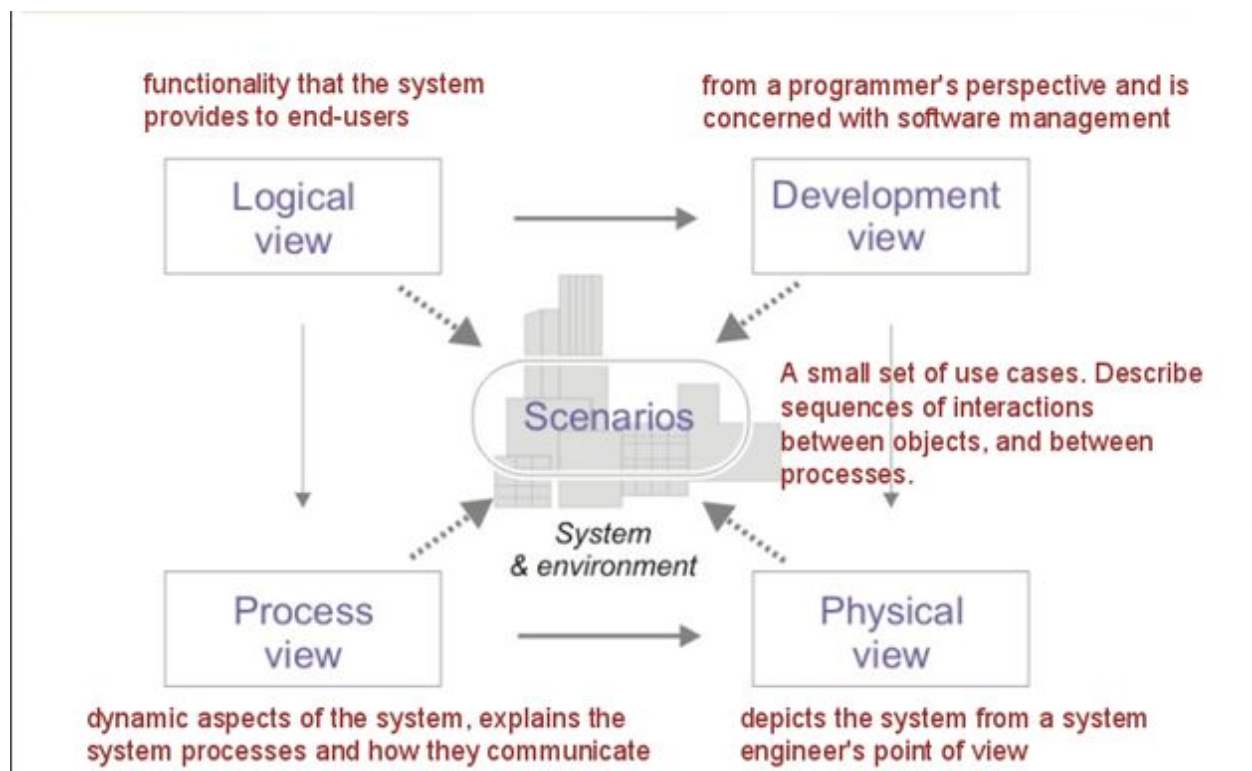
Logical View: It provides the system functionality to end-users.

Physical View: It shows the system from a system engineer's view. It is contained the topology of software components on the physical layer. Also shows the connections between these components.

Process View: it explains the system process, knowledge of communications, and focuses on the runtime behavior of the system.

Scenarios: they may be call **use case** view. They are used to identify architectural elements and confirm the architecture design.

In this project is used 4+1 architectural view model. The most important reason for choosing this architectural framework is that there are multiple users in this project and that the project has different user views. It express the following way.



Library Book Loan System	
Architecture Notebook	Date: <04/04/2017>

9. Architectural views

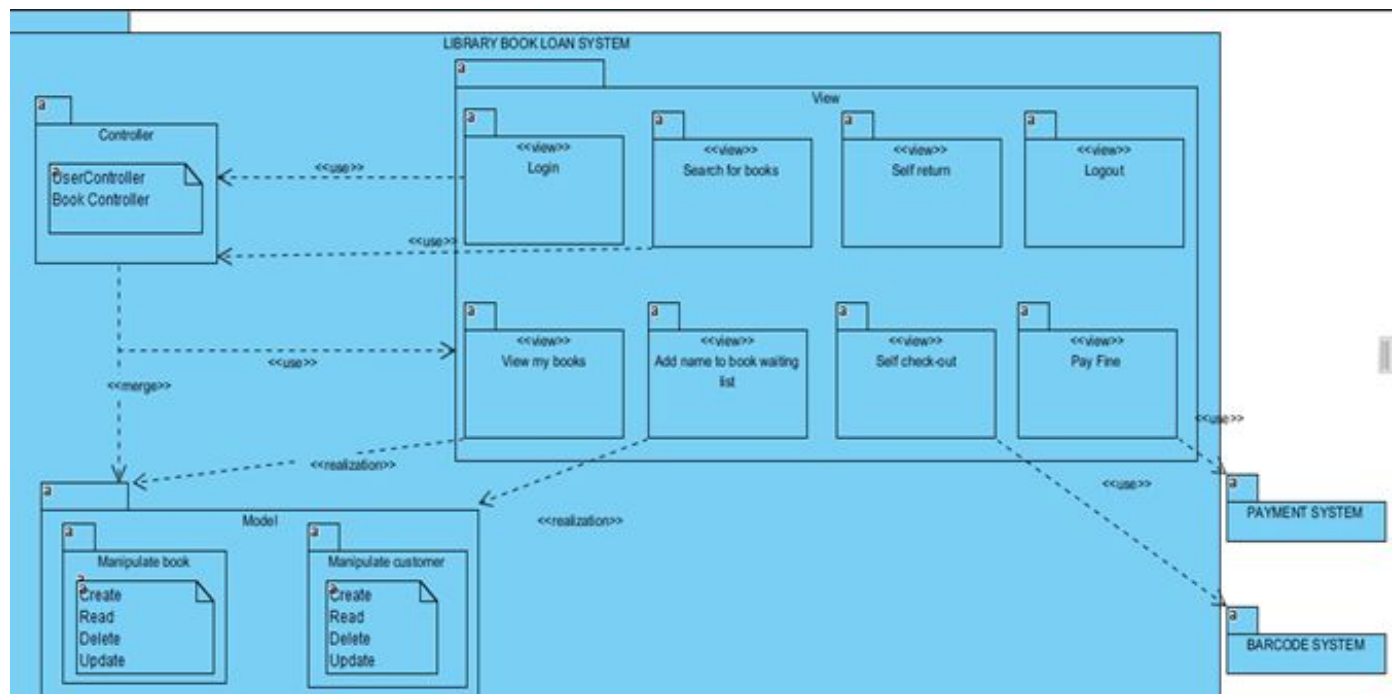
USE CASE DIAGRAM



Library Book Loan System	
Architecture Notebook	Date: <04/04/2017>

PACKAGE DIAGRAM

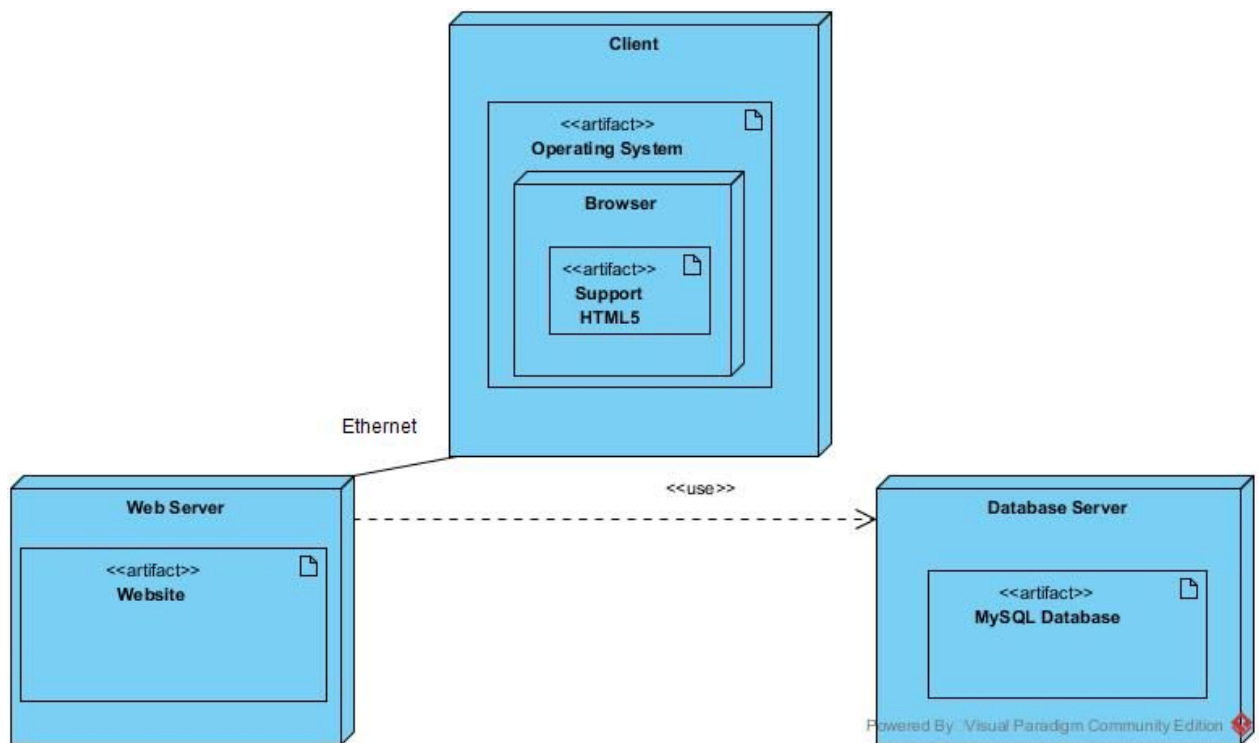
The library book loan system is a web based system, so in this system is use php and mysql. In this project is used the web based MVC architecture pattern. The packages of projects were created according to this architecture pattern. The project has 3 main package and 2 external system. The relationships are defined according to properties of architectural pattern' layers. Controller package is help to connect model and view packages , so the relationship is merge between controller and model. And the merge relationship and view package is connected the use relation to each other. The external systems and their about use cases have use relationship. And realization relationships are used in the diagram, because the use cases need the knowledges of books and users in the model package.



Library Book Loan System	
Architecture Notebook	Date: <04/04/2017>

DEPLOYMENT DIAGRAM

The physical deployment of information generated by the software program on hardware components describe with a deployment diagram below :



Library Book Loan System	
Architecture Notebook	Date: <04/04/2017>

Library Book Loan System	
Architecture Notebook	Date: <04/04/2017>

Sample true input:

Log in

sergen

112233

Login

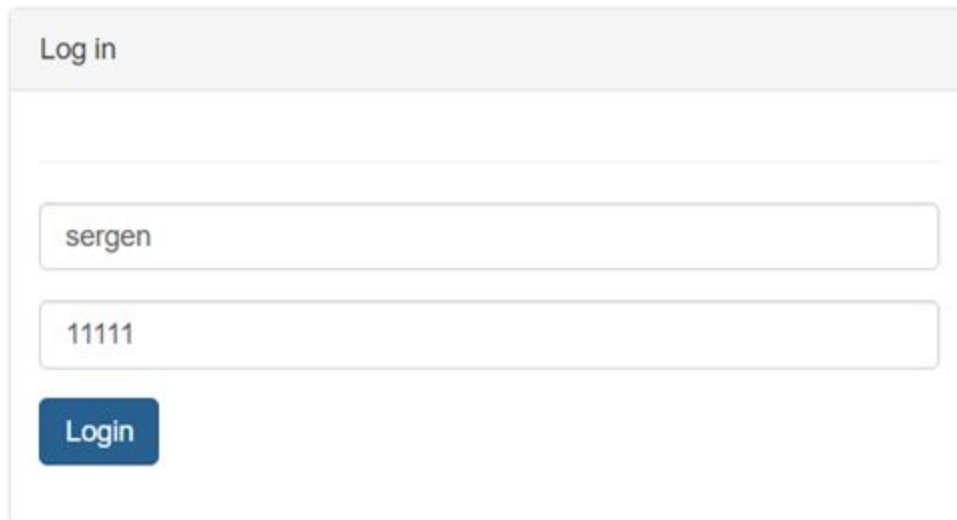
Correct input interface



Welcome sergen

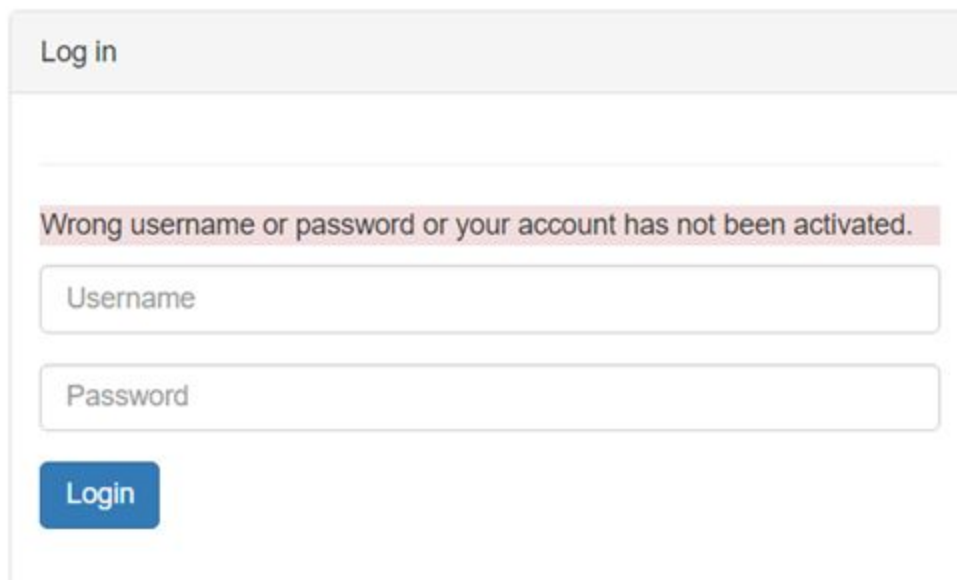
Library Book Loan System	
Architecture Notebook	Date: <04/04/2017>

False Input:



A login form titled "Log in" with a light gray header. Below the header is a horizontal line. There are two input fields: the first contains the text "sergen" and the second contains "11111". Below the input fields is a blue button with the text "Login".

Error message for false input:



A login form titled "Log in" with a light gray header. Below the header is a horizontal line. A red error message is displayed: "Wrong username or password or your account has not been activated." Below the error message are two input fields: the first is labeled "Username" and the second is labeled "Password". Below the input fields is a blue button with the text "Login".

Library Book Loan System	
Architecture Notebook	Date: <04/04/2017>

Database:

Sunucu: 127.0.0.1 » Veritabanı: librarydb » Tablo: users

Gözet Yapı SQL Ara Ekle Dışa aktar İçe aktar Yetkile

✓ Gösterilen satır 0 - 0 (toplam 1, Sorgu 0.0005 saniye sürdü.)

SELECT * FROM 'users'

☐ Tümünü göster | Satır sayısı: 25 ▼ | Satırları süz: Bu tabloda ara

+ Seçenekler

	id	username	pass
<input type="checkbox"/> Düzenle <input type="checkbox"/> Kopyala <input type="checkbox"/> Sil	1	sergen	112233

☐ Tümünü işaretle | Seçilileri: ☐ Düzenle ☐ Kopyala ☐ Sil ☐ Dışa aktar

☐ Tümünü göster | Satır sayısı: 25 ▼ | Satırları süz: Bu tabloda ara