

ADVANCES IN WEB TECHNOLOGIES

FINAL REPORT

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OVERVIEW

1. Project Description

A patient tracking system will be designed within the scope of our project. This system starts with the transfer of data from a smart watch attached to the patient and transferring it to a WEB portal via mobile application. Patient related blood pressure, step count, heart rate information is transferred to this portal. This information is transferred to the web portal by an expert person using the website is monitored. In this way, the development of the patient's health status can be observed. Patient location information will be added later in the project. In this way, the patient's relatives will have access to the patient in case of an emergency.

2. Project description with Business Rules

- It is expected that database tables will be created and logical data samples will be created in these tables.
- A 'Doctor Registration Page' is expected to be created for access to the web portal. The user's first name, if any, the median name, surname, 11-digit TC number, password is expected to be taken. The password control will be checked by a second password field. Once the control is verified, the information will be saved in the database. Figure 1 shows the design of the 'doctor registration page' to be developed.

SBPMS Home About ICU Contact Register Log in

Register.

Create a new Doctor account

TC NO :

First Name :

Middle Name :

Last Name :

Password :

Confirm password :

Figure 1. Doctor Registration Page design

- It is expected that the log in page will be created for the pre-registered physician to enter the web portal. The doctor's TC number and password are sufficient for this step. After the database is

checked, the system will be allowed to enter. Figure 2 shows the design of the 'doctor log in page' to be developed.

Figure 2. Doctor Log in Page design

- After the doctor is registered in the system, the homepage will be opened. On the main page, there will be a TC number entry field and a search button for the doctor to search a patient.
- The Doctor-Patient screen is the page that appears after pressing the 'Search' button on the homepage. In the Doctor-Patient screen, the patient's information on the following topics will be displayed:
 - Patient Information
 - If the doctor presses 'Patient Information', the patient's personal information such as name, surname, TC Number and isSmoke will be displayed.
 - Blood Pressure
 - Blood pressure data coming through the patient's clock will be displayed on the daily charts.

3. Time Schedule and Risk Analysis

- Table 1 shows the time schedule day by day of the Advances in Web Technologies Project which is called 'Smart Blood Pressure Monitoring System'. Due to the risks of time constraints, the SBPMS project time schedule is set at the end of the 1 week prior to completion. Thus, measures have been taken against possible time constraint risks.

ADVANCES IN WEB TECHNOLOGIES PROJECT TIME SCHEDULE						
25/03/19	26/03/19	27/03/19	28/03/19	29/03/19	30/03/19	31/03/19
sinav	SPEC DOKUMAN UPLOAD SPEC DOKUMAN	GITHUB AÇILIŞI VE EĞİTİMİ (BİRBİRİMİZE GÖSTERME)			WEB PRESENTATION HAZIRLIKLARI BAŞLANGIÇ (PLANLAMA GENEL ÇERÇEVE) (GÖREV DAĞILIMLARI)	
01/04/19	02/04/19	03/04/19	04/04/19	05/04/19	06/04/19	07/04/19
				sinav		
				SYSTEM DESIGN HAZIRLANIŞ (GÖREV DAĞILIMLARI)	SYSTEM DESIGN HAZIRLANIŞ	SYSTEM DESIGN UPLOAD
08/04/19	09/04/19	10/04/19	11/04/19	12/04/19	13/04/19	14/04/19
	SYSTEM DESIGN -DATABASE ŞEMASININ OLUŞTURULMASI DATABASE ŞEMASININ OLUŞTURULMASI	DATABASE ŞEMASININ OLUŞTURULMASI		WEB PRESENTATION BİTMESİ	WEB PRESENTATION PROVA (BERABER BULUŞMA) -)	
15/04/19	16/04/19	17/04/19	18/04/19	19/04/19	20/04/19	21/04/19
sinav	sinav		sinav			
WEB PRESENTATION KİŞİSEL EVDE PROVA	WEB PRESENTATION	LOGIN VE REGISTER SAYFALARININ OLUŞTURULMASI (DATABASE İLE BAĞLANTISININ YAPILMASI -İCU ÖRNEK İLE)				DOKTOR ANASAYFANIN OLUŞTURULMASI
22/04/19	23/04/19	24/04/19	25/04/19	26/04/19	27/04/19	28/04/19
	tatil					
	ÖRNEK VERİ SETLERİNİN OLUŞTURULMASI			DOKTOR HASTA SAYFASININ OLUŞTURULMASI	DOKTOR-HASTA HASTA BİLGİLERİ EKLENMESİ	DOKTOR-HASTA HASTA MESAJ EKLENMESİ İLAÇ EKLENMESİ
29/04/19	30/04/19	01/05/19	02/05/19	03/05/19	04/05/19	05/05/19
	DOKTOR-HASTA KONUM BİLGİSİ GÖSTERİLMESİ			DOKTOR-HASTA KONUM BİLGİSİ GÖSTERİLMESİ	WEB SERVİS SUNULMASI (HASTA TİCİLERİ)	DOKTOR-HASTA KAN BASINCI GRAFIKSEL GÖSTERİM
06/05/19	07/05/19	08/05/19	09/05/19	10/05/19	11/05/19	12/05/19
	PROJENİN SON HALİNİN HOCAYA GÖSTERİLMESİ			sinav		
13/05/19	14/05/19				SON DÜZELTMENİN YAPILMASI	PROJE UPLOAD
	SON FİNAL					

Table 1 the Time Schedule of the SBPMS project.

- Another risk is the effective and regular use of GitHub within such a limited period of time.
- Another element that is desired but risky in the project is the publication of the project. The publication of the project is planned to be made within the remaining time which is the last week.

4. Technology Research

- Specific technologies will be used to develop the project. The technologies will be used and their uses are as follows:

Front-end side	Back-end side
HTML,CSS,JAVASCRIPT,BOOTSTRAP	ASP.NET, MYSQL, MVC

- Front – end Side
 - HTML
 - CSS
 - JAVASCRIPT
- Back – end Side
 - ASP.NET- MVC
 - MYSQL

➤ **GitHub**

➤ **HTML**

○ **POINTS ABOUT HTML:**

- 1. HTML is used to create webpages.
- 2. HTML used many tags to make a webpage. So it is a tag based language.
- 3. The tags of HTML are surrounded by angular bracket.
- 4. It can use wide ranges of colors, objects and layouts.
- 5. Very useful for beginners in web designing field.

○ **Advantages of HTML:**

- 1. It is widely used and every browser supports HTML language.
- 2. It's now a standard
- 3. Easy to learn and use.
- 4. It is by default in every windows so you don't need to use another software.
- 5. Its plain text so it's easy to edit.

○ **Disadvantages of HTML:**

- 1. It can create only static and plain pages so if we need dynamic pages then HTML is not useful.
- 2. Need to write lot of code for making simple webpage.
- 3. Security features are not good in HTML.
- 4. If we need to write long code for making a webpage then it produces some complexity.
- 5. It is not centralized (all pages must be edited individually).

➤ **CSS**

CSS is defined as a style sheet language that gives web designers control over how a website communicates with web browsers; including, the formatting and display of their HTML documents. CSS's main goal (as a style sheet language) was to separate document content from document presentation, which includes style elements, such as color, layout, and fonts to just to name a few.

CSS information is included or linked to by the pages on the website, and the author can then use simple tags to apply those formats to portions of the web page.

CSS is a language that describes the style of an HTML document. CSS describes how HTML elements should be displayed

○ **Advantages of CSS**

- CSS helps establish a consistent framework that Web designers can use across all the sites they build. (Consistency)
- CSS works with Internet Explorer, Firefox, Chrome and more.(Multiple Browser Support)

- *It provides you attractive look to your web pages*
- *It help to separates the document content*
- *It reduces the file transfer size*
- *It increases your website's adaptability*
- **Disadvantages of CSS:**
 - *CSS works differently on different browsers. IE and Opera supports CSS as different logic.*
 - *Browser compatibility (some style sheet are supported and some not)*
 - *Downloading an HTML page will always take longer if CSS is embedded within it. However, with ever-increasing Internet speeds, this is less of a problem than you might imagine.(Speed)*

➤ **JAVA SCRIPT**

- *JavaScript is the Programming Language for the Web*
- *JavaScript can update and change both HTML and CSS*
- *JavaScript can calculate, manipulate and validate data.*
- **Advantages of JavaScript :**
 - *Fast to the end user: Java scripting is written for client-side, it does not need the web server's support for execution. It also has no need to be compiled on the client side which gives it certain speed advantages. As the script is executed on the user's computer, depending on task, the results are completed almost instantly. For example, you can validate any user input before sending a request to the server. This makes less load on the server.*
 - *Simplicity: JavaScript is relatively simple to learn and implement. It uses the DOM model that provides plenty of prewritten functionality to the various objects on pages making it a breeze to develop a script to solve a custom purpose.*
- **Disadvantages of JavaScript :**
 - *Security: JavaScript is explicitly added to web pages and client browsers, it can exploit user's system, and so malicious code can be executed on client machine.*
 - *Browser Support: JavaScript is sometimes interpreted differently by different browsers. Different layout engines may render JavaScript differently resulting in inconsistency in terms of functionality and interface. Most of the JavaScript depends on the manipulation of Browsers DOM elements. And, different browsers given different type of access to objects, specifically Internet Explorer.*
 - *More and better Competitor: JavaScript is a very old scripting language running on the machines and there are other technologies which are doing the same thing in place of it (ex. JQuery) in a better and easy way.*
 - *Disable JavaScript: If you are disable JavaScript in browser, the entire JavaScript code is not run.*
 - *File Download: JavaScript file is download on client machine so anyone can read the code and reuse it.*

➤ **SQL**

- SQL is a standard language for storing, manipulating and retrieving data in databases.
- **Why do we use MsSQL?**
 - It is open source and easily available
 - The simplicity in use and startup is great
 - Handling a huge amount of data and good data management.
 - The basic SQL functions and stored procedures.
 - Speedy System.
 - Protection from an unauthorized user as we have to provide a valid username and password while logging into SQL DB.
- **What is the advantages of SQL?**
 - It takes time to create indexes on the table if we have a large amount of data.
 - Doesn't support ARRAY and other more detailed data types.
 - It can be quite slow at times if it's processing large amounts of data.
 - Lack of documentation for some functions.

➤ **MVC ARCHITECTURE**

- MVC pattern has become the most popular and powerful framework since it improves development process of websites, web services and interactive web applications. It can be applied to JAVA, PHP, ASP.NET and many other programming languages and also facilities customization in World Wide Web applications.
- We use MVC Architecture to learn MVC Architecture better.
- **The Controller**, the View and the Model are the three components of MVC that actually does everything within an application such as:
- **The Controller** – In the web environment, the Controller plays a role of the traffic cop of the application. The Controller handles incoming HTTP request. It is also directing and identifying which view needs to load up and is interacting with the appropriate models.
- **The View** – The View in a web-based application is the representation of the user-interface. Buttons, forms and other information visible to the user on the web are all part of View. .
- **The Model** – the Model is a place where all data is stored regarding the application in separate models. This is the place where data from controller and sometimes the view is actually passed into, out of, and is manipulated.

5. Interfaces

- Specific interfaces have been designed for the doctors. Using these interfaces, physicians can perform procedures such as access, monitoring and monitoring of patients. These interfaces are;



Figure 3 the Main Page of the SBPMS project.

The screenshot shows the 'Patient Information' form in the SBPMS project. It includes a search bar, a 'Dr.' profile, and a 'Hasta Kayıt' button. The form fields are: 'TC No' (with a note: '(TC numarası girildiğinde otomatik olarak hasta kaydı kontrol edilecektir)'), 'E-Mail', 'Adı' (First Name), 'Soyadı' (Last Name), and 'Is Smoking?' (Yes/No). A 'Kaydet' (Save) button is at the bottom.

Figure 4 the Patient Information Page of the SBPMS project.

The screenshot shows the 'User Information' page in the SBPMS project. It includes a search bar, a 'Dr.' profile, and a 'Hasta Kayıt' button. The page displays a 'User info' section with a profile picture and 'TC No:'. Below this, there is an 'Update User Information' section with fields for 'Name' and 'Surname', and an 'Update' button. At the bottom, there is an 'Update Password' section.

Figure 5 the User Information Page of the SBPMS project.

Smart Blood Pressure Monitoring System

Log in

Log in

Log in

[Register here.](#)

Figure 6 the Log In of the SBPMS project.

Smart Blood Monitoring System

Sign Up !

Kaydol

Sign Up

[I have an account.](#)

Figure 7 the Sign Up of the SBPMS project.

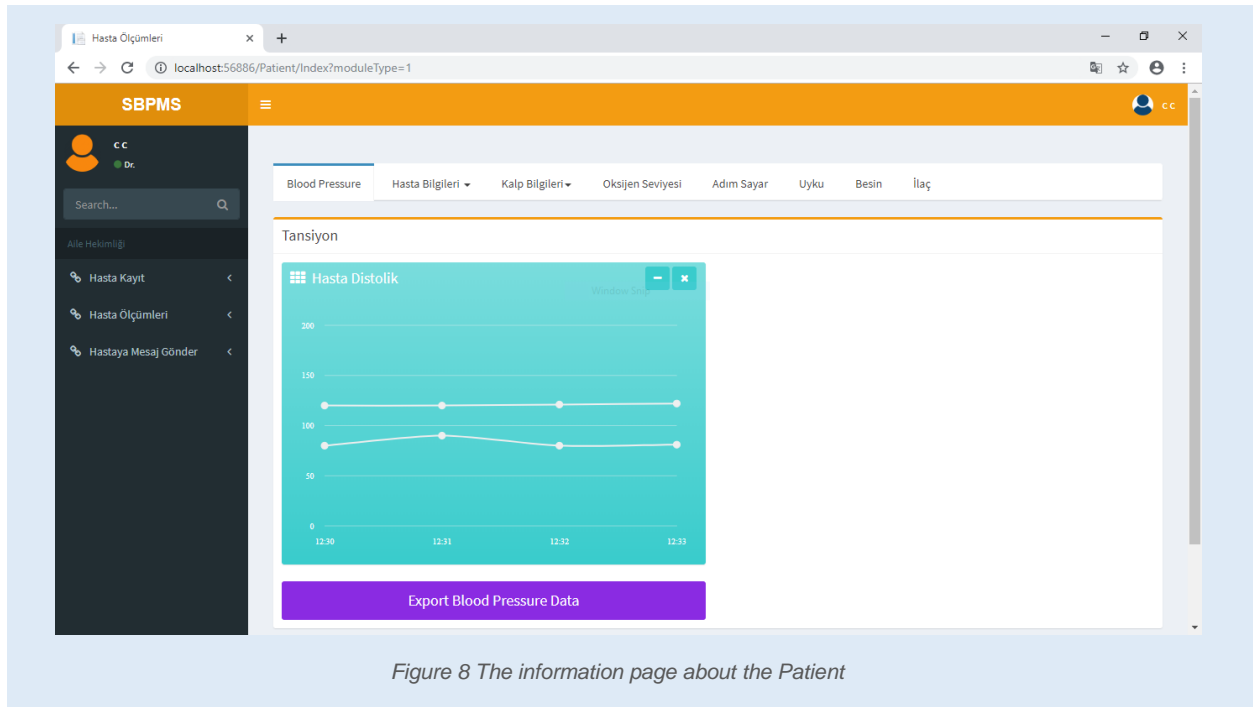


Figure 8 The information page about the Patient

6. Database schema

- Our project has a database. This database contains information about patients and doctors. Information relevant to patients is important for their healing process. For this reason, information about patients such as blood pressure, heart rate is stored in the database.

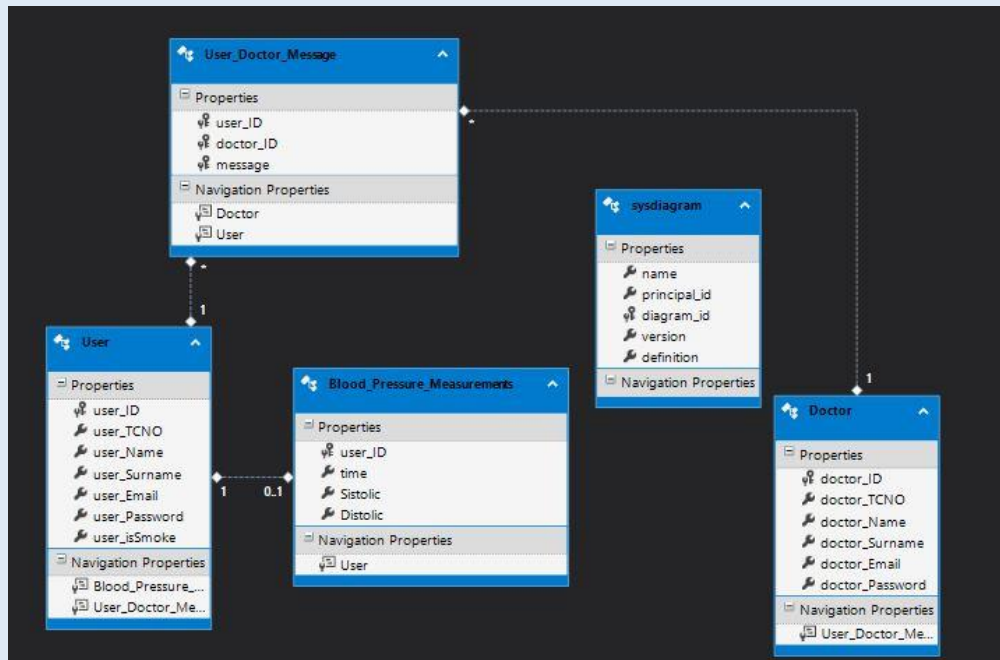


Figure 9 the Time Database Schema of the SBPMS project.

7. Used Web service/API

i In our project we use ADO.NET as a web service because it is already integrated with the Visual Studio. The ADO.NET is easy to use, it models the entire web service automatically. As shown in the Figure 10 below. We also added some services the make the usage of data to be easy.

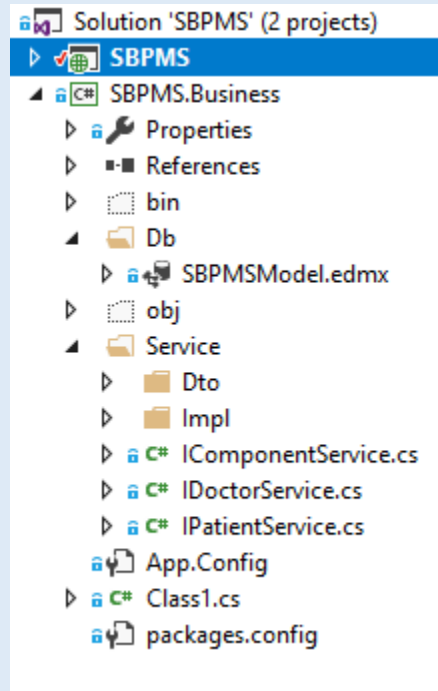


Figure 10. Show the structure of the Web Service in the Visual Studio

- We use web service to add doctor, update doctor, search patient, and retrieve patient information.
- General usage of the ADO.Net is shown in the below. We use the same structure in our project.

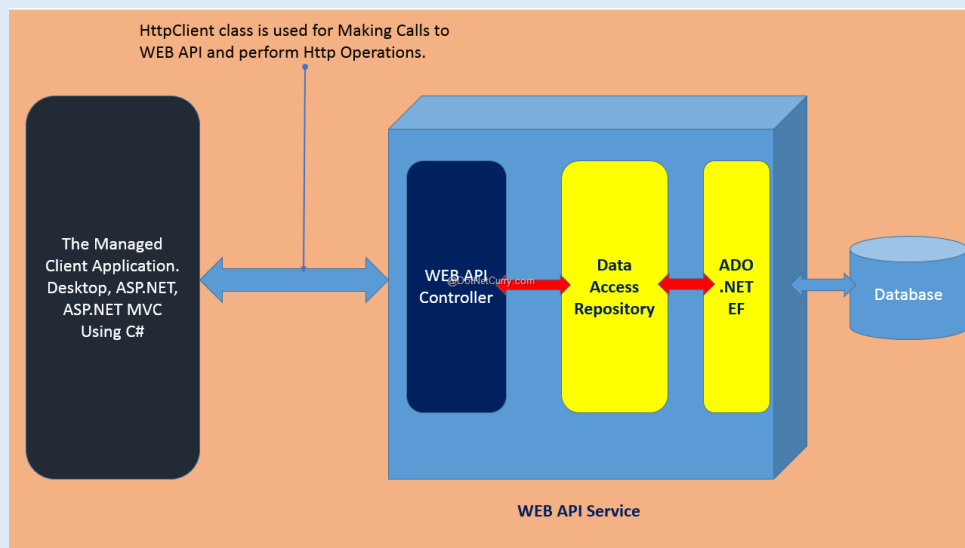


Figure 11. Shows the general usage of the ADO.Net

8. Output of your web service (xml/json format)

i As the output of the web service, we chose the json format. We also create a json file with the export button for doctor to be able to download the file. The file is shown in the figure below.

```
"bpmodel": [
  {
    "bp_ID": 0,
    "user_ID": 1,
    "time": "5/13/2019 12:30:00 PM",
    "Distolic": 80,
    "Sistolic": 120
  },
  {
    "bp_ID": 0,
    "user_ID": 1,
    "time": "5/13/2019 12:31:00 PM",
    "Distolic": 80,
    "Sistolic": 120
  },
  {
    "bp_ID": 0,
    "user_ID": 1,
    "time": "5/13/2019 12:32:00 PM",
    "Distolic": 80,
    "Sistolic": 121
  },
  {
    "bp_ID": 0,
    "user_ID": 1,
    "time": "5/13/2019 12:34:00 PM",
    "Distolic": 82,
    "Sistolic": 122
  }
]
```

Figure 12. Json File of the all Blood Pressure Data.

9. Structure/ architecture schema

- The Model-View-Controller (MVC) is an architectural pattern that separates an application into three main logical components: the model, the view, and the controller.

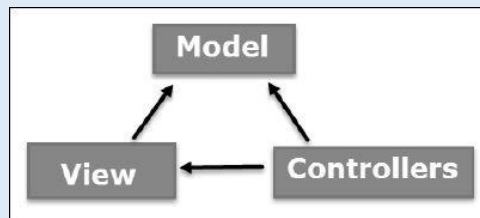


Figure 13 the General Structure of MVC

- **Model:** The Model component corresponds to all the data-related logic that the user works with. This can represent either the data that is being transferred between the View and Controller components.

- *View: The View component is used for all the UI logic of the application.*
- *Controller: Controllers act as an interface between Model and View components to process all the business logic and incoming requests, manipulate data using the Model component and interact with the Views to render the final output.*
- *The following figure represents our MVC architecture;*

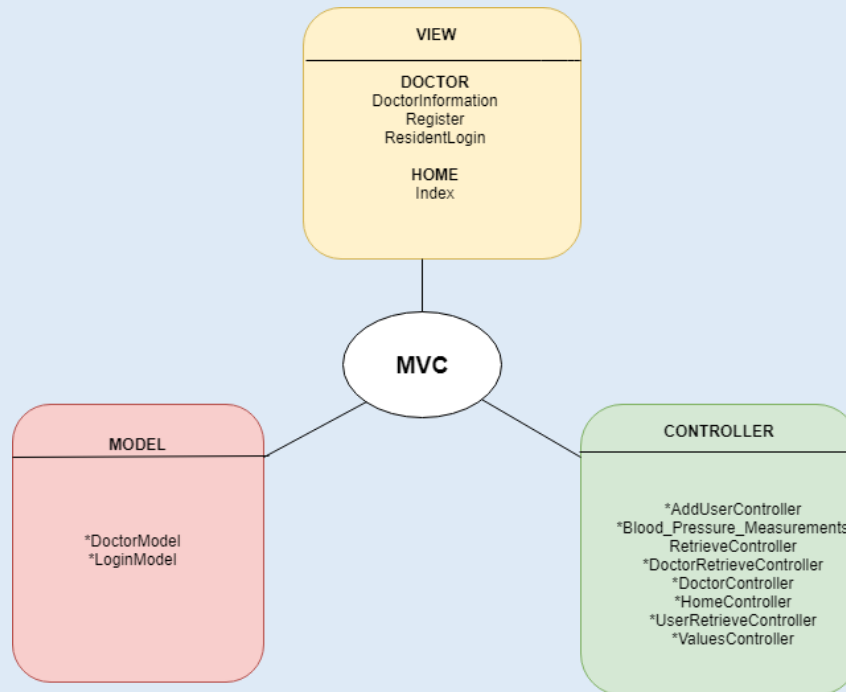


Figure 14 the General MVC Structure of the SBPMS project.

- *In addition to N-tier architecture, we used MVC architecture. Under normal circumstances, while the database related processes in MVC are done under the Model folder, we have done the operations related to the database in the Business layer.*
- *The figure 15,16 and 17 shows our projects Model, View and Controllers.*

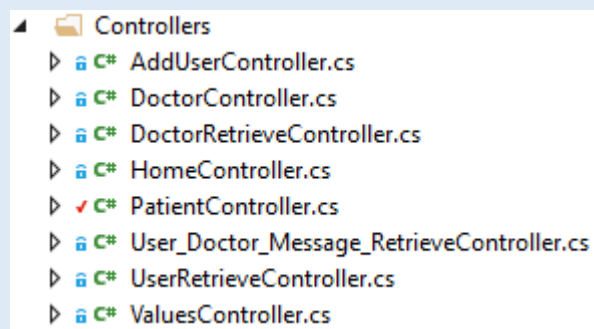


Figure 15. the Controller Part of the SBPMS project.

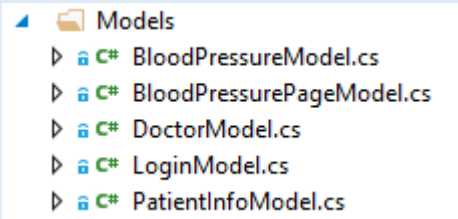


Figure 16. The Model part of the SBPMS project.

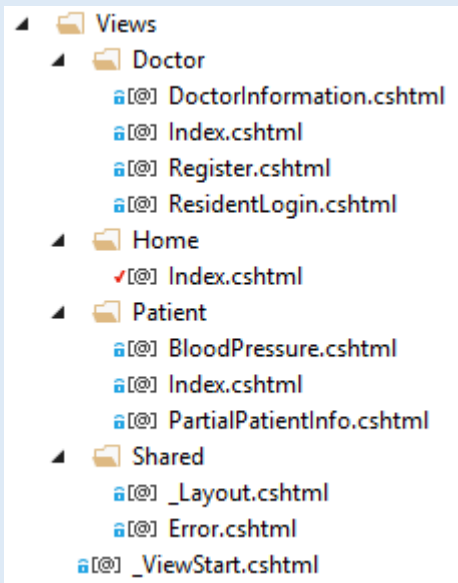


Figure 17. the View Part of the SBPMS project

10. General schema of your project

- In general terms, the project consists of the transfer of certain information from the mobile application to the WEB portal with the help of a watch and the monitoring of the patient data from this portal by the experts. The specialist can view the patient information through a Website.

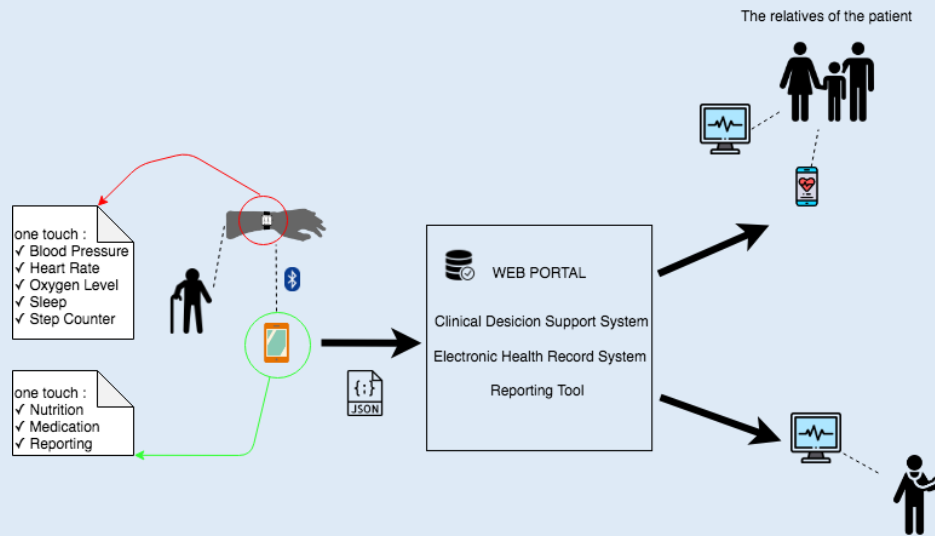


Figure 18 the General Schema of the SBPMS project.

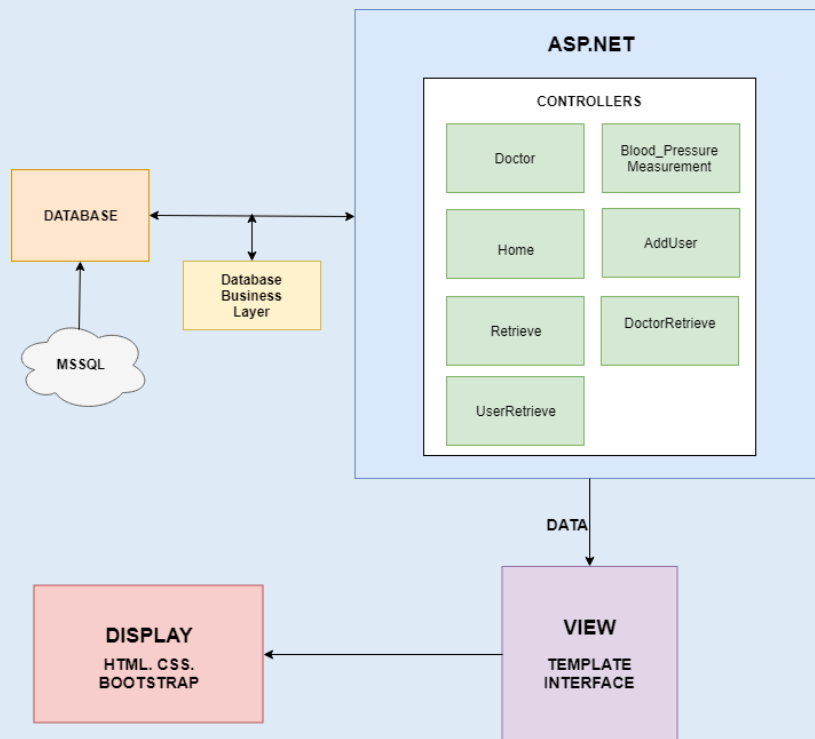


Figure 19 the General Schema of the SBPMS project.

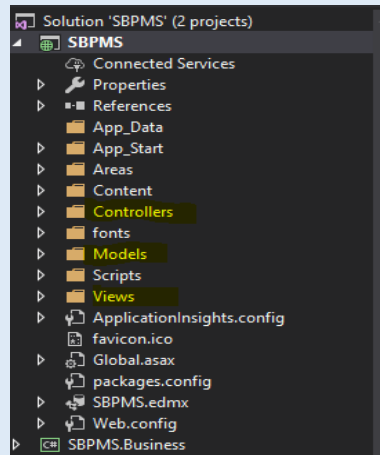


Figure 20 the General Structure of Project

11. Detailed diagram of your project (with web service/API)

In SBPMS Project we use ADO.NET Web Service to get doctor information, get & update doctor information, get patient information. We also use to retrieve patient blood measurements while we are retrieving patient information.

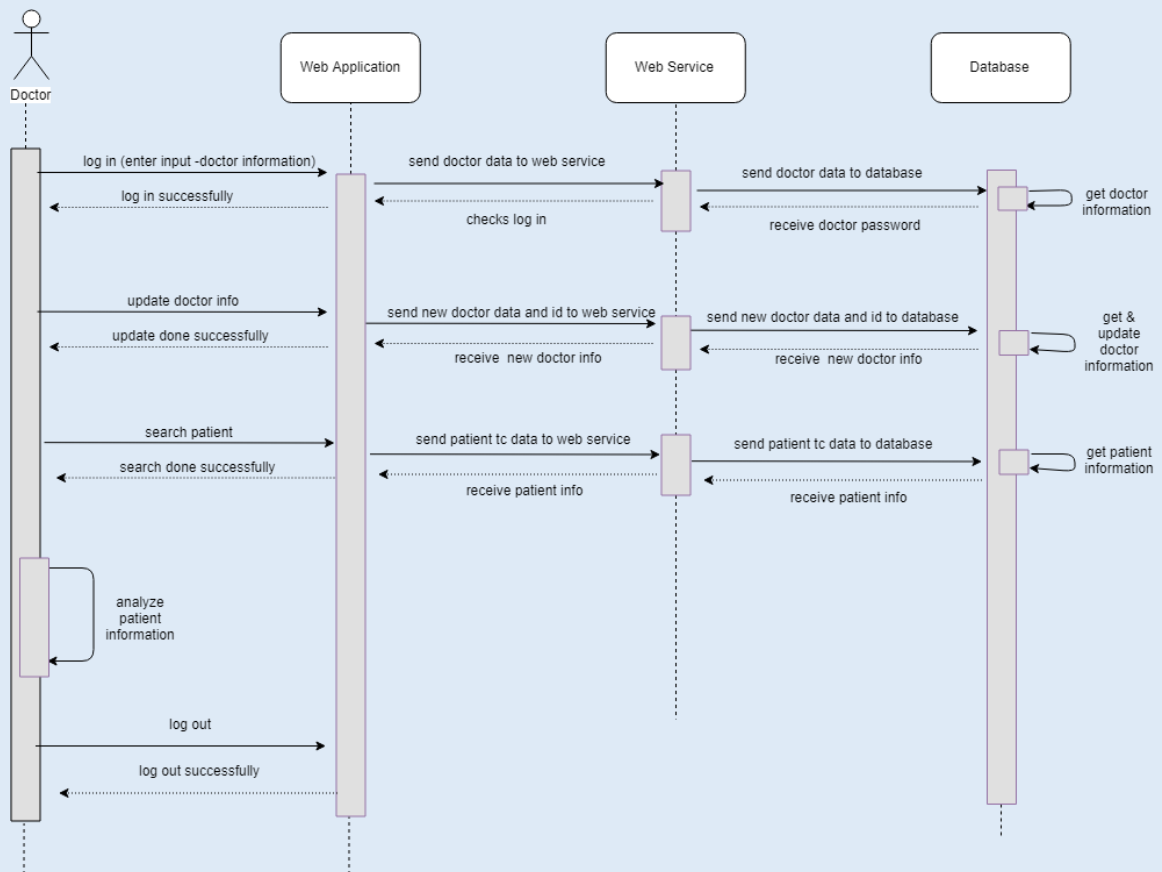


Figure 21 . Shows the Detailed diagram of SBPMS project (with web service/API)

12. Security

- Patient data is stored in the database. This data should be stored in a very secure way without being transmitted quickly. For this reason, the connection to the database and the operations on the database should be done safely. Therefore, it was decided to perform database operations on .Net. In addition, a modular design was obtained by using N-tier architecture. This improves the performance of the project and provides isolation of the data.
- Authentication is the process of establishing the identity of a user or system and verifying that the identity is valid. We check ID's when users try to login the system.
- Users can log in after logging in to their website and it is important to keep them confidential. For this reason, user's passwords are hidden when they logging in.

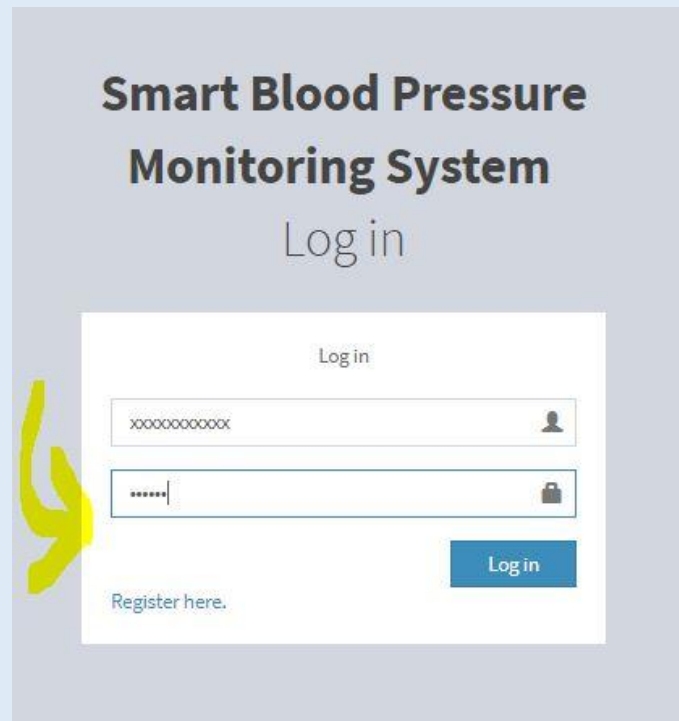


Figure 22 hide the user's password in Log In Page.

13. Domain name info

i We published our visual studio project to the web server. We used IIS MS. The url is : <http://88.248.54.227/sbpms>.

14. GitHub usage info

- During the development phase of the project, it was decided to carry out certain steps separately. The current versions of the project were stored using Github. Each project element was sent to the github branch and shared with the group friends.

12 commits 1 branch 0 releases

Branch: master New pull request Create new file Upload files Find File Clone or download

Erylmzlm Some changes are constructed. Latest commit 4ca34db 5 hours ago

SBPMS.Business	Download Json Blood Pressure Button added	19 hours ago
SBPMS	Some changes are constructed.	5 hours ago
.gitattributes	Add .gitignore and .gitattributes.	17 days ago
.gitignore	Add .gitignore and .gitattributes.	17 days ago
SBPMS.sln	Add project files.	17 days ago

Commits on May 14, 2019

Some changes are constructed. Erylmzlm committed 40 seconds ago 4ca34db

Responsiveness is checked. Erylmzlm committed 7 minutes ago 001a3e6

Commits on May 13, 2019

Removed unnecessary codes. Web service codes have been activated. guledaaydemir committed 13 hours ago ad8adb5

Removed unnecessary codes. Web service codes have been activated. guledaaydemir committed 13 hours ago 7afb034

Download Json Blood Pressure Button added guledaaydemir committed 14 hours ago 4701a87

15. The Changes

- Our project was designed in the first phase by using N-tier architecture, but later it was continued with the transition to MVC architecture.
- In addition, the patient's location information process and the doctor and the patient's messaging process is not done for now.
- We change the update doctor information part after the code control. We understand that we were trying to send doctor id rather than Doctor TC No. The update part is working successfully.

16. References

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- <https://getbootstrap.com>
- <https://dotnet.microsoft.com/apps/aspnet/mvc>
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