

# Polyclinic Information System

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## **Abstract**

*The purpose of this research is to develop an application in the medical field based on the perspective of patient in Polyclinic XYZ. A process of developing an application in the medical field had been occurring since the technology collaborated with it. For this reason the author determined to develop two applications. One of it is a mobile based application and the other one is a web based application. Two of the applications are designed for patient.*

*This research divides into four phases of work. First, examines a requirement phase for the applications with the polyclinic XYZ. Second, defining a design of the applications from the result of requirement phase. Third, the user design and programming code apply to prototype applications, also there is testing phase for finding some bugs. At the end of phase the final applications are releasing and there will be a testing phase for the final release to make sure the applications work fine.*

*The outcomes of the research show that the applications are running fine with its features that suited with the requirement phase. The presence of the applications is able to be sufficiently modified for the purpose to improve the functionality.*

**Keywords**—Medical, Patient, Web-Based, Mobile-Based

## 1. INTRODUCTION

Today age, so many sectors that are not differentiated from the participation and the use of computer technology. Increasingly, advances in computer technology are not only developing very rapidly, but also developing towards easier in terms of deployment and lower in cost.

The hospital, as one of the institutes of public health ministers will serve patients in daily transactions. Supply of services and actions in many ways will influence the conditions and a sense of comfort for the patient. The more services of a hospital, will also increasingly complex kinds of actions and services to be supplied which should remain in one integrated coordination. In addition to providing services, hospitals must also manage funds to finance its operations. Linked to this condition, it is time for every hospital using advance technology as to increase handling better management. The advance technology that use can be computer or mobile.

A Health Care System or Health System is a kind of organization. Usually run by non-government or with government. The goal of it is to provide health care services to meet the health requirements of a target population. There are various kinds of health care system with a lot organizational structure. According to World Health Organization (WHO), a health system consists of all organizations, people and actions whose primary intent is to promote, restore or maintain health. This includes efforts to influence determinants of health as well as more direct health-improving activities. Most some countries, health care system planning is distributed among market participants. Among others, there is an integrated effort between the government, trade unions, charities, religious, or other coordinated bodies to deliver planned health care services targeted to the populations they serve. Progress towards them depends on how systems carry out four vital functions: provision of health care services, resource generation,

financing, and stewardship. Other dimensions for the evaluation of health systems include quality, efficiency, acceptability, and equity [3].

This research aims to develop polyclinic application both in web-based and mobile that manage the simplest system such as, create an appointment for treatment, show the doctor on duty schedules, show list of appointments that no claim yet, show list of prescriptions and show a list of diagnoses.

## 2. METHODOLOGY

The methodology for developing the mobile application is using Rapid Application Development (RAD). Rapid Application Development is a development lifecycle designed to give much faster development and higher-quality results than those achieved with the traditional lifecycle [5].

James Martin approach there are four phases of RAD, as follows [5]:

1. Requirements planning

This phase the stakeholder of this project discuss and agree on business needs, project scope, constraints, and system requirements. It ends when the team agrees on the key issues and obtains management authorization to continue.

2. User design

Users interact with systems analysts and develop models and prototypes that represent all system processes, inputs, and outputs. User Design is a continuous interactive process that contain of understanding, modifying, and eventually approving a workable model of the system.

3. Construction phase

This stage concentrates on training programs and application. However, users continue to can still suggest changes or improvements as reports are developed. This phase will result a prototype, but it will change in the next construction until it reaches the final working system match with the objective.

4. Cutover phase

This phase is a final phase that includes data conversion, testing, changeover to the new system, and user training. Compared with traditional methods, the entire process is compressed. As a result, the new system is built, delivered, and placed in operation much sooner.

## 3. RESULT AND DISCUSSION

The applications uses work of two components such as Client and Server. The server is needed to provide the functions that will be used for the client interaction. These applications need an Internet connection in order to store and communicate application data. User authentication is required to access the data. For this purpose, a patient need to register an account.

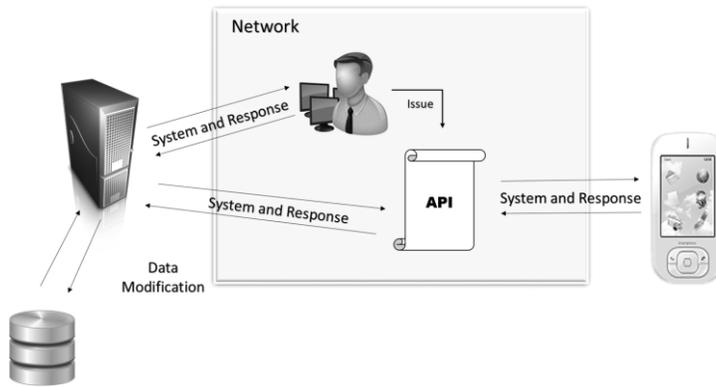


Figure 3.1 Work schema of Application

There is a workable schema of the application in the Figure 3.1. The Android devices access the message in JSON format which issued by the admin for getting a data from MySQL. Also, if the mobile application can send a data to server through the API, for example data from registration of new users, the API will process the data and input to MySQL over the network. The functions are needed in this application as follows:

- Login and Register Activity
- Sending a data into the databases server.
- Showing information in the interface client.

### Database Table Structure

Patient Table is used to store the patient's data. This data will be used in almost all parts of the mobile application system. The design of this table can be seen in the Figure 3.2.

Field	Type	Collation	Null	Key	Default
nip	varchar(40)	latin1_swedish_ci	NO	PRI	(NULL)
nama_depan	varchar(50)	latin1_swedish_ci	NO		(NULL)
nama_belakang	varchar(50)	latin1_swedish_ci	NO		(NULL)
tgl_lahir	varchar(30)	latin1_swedish_ci	NO		(NULL)
jenis_kelamin	enum('Laki-Laki', 'Perempuan')	latin1_swedish_ci	NO		Laki-Laki
alamat	varchar(200)	latin1_swedish_ci	NO		(NULL)
no_telp	varchar(20)	latin1_swedish_ci	NO		(NULL)

Figure 3.2 Patient Table

Schedule Doctor Table, this table will be used for storing information about schedule doctor that available in the Polyclinic XYZ. The design of this table in the Figure 3.3 below.

Field	Type	Collation	Null	Key	Default	Extra
kode_jadwal	int(11)	(NULL)	NO	PRI	(NULL)	auto_increment
nid	int(11)	(NULL)	NO		(NULL)	
nama_dokter	varchar(100)	latin1_swedish_ci	NO		(NULL)	
layanan	varchar(100)	latin1_swedish_ci	NO		(NULL)	
jam_praktik	varchar(30)	latin1_swedish_ci	NO		(NULL)	
ruangan	varchar(20)	latin1_swedish_ci	NO		(NULL)	
status	varchar(10)	latin1_swedish_ci	NO		(NULL)	
jenis_kelamin	enum('Laki-laki', 'Perempuan')	latin1_swedish_ci	NO		Laki-laki	

Figure 3.3 Schedule Doctor

Booking Table, this table will be used for storing information about new appointment which has been made. Also this table will be used for showing the list of appointments. The design can be seen in the Figure 3.4.

Field	Type	Collation	Null	Key	Default	Extra
no_token	int(11)	(NULL)	NO	PRI	(NULL)	
nip	varchar(40)	latin1_swedish_ci	NO		(NULL)	
kode_jadwal	int(11)	(NULL)	NO		(NULL)	
tgl_booking	date	(NULL)	NO		(NULL)	
status	varchar(20)	latin1_swedish_ci	NO		(NULL)	

Figure 3.4 Booking Table

Prescription Table, this table will be used for storing information about prescription for all patients. The design can be seen in the Figure 3.5.

Field	Type	Collation	Null	Key	Default	Extra
kode_resep	int(11)	(NULL)	NO	PRI	(NULL)	auto_increment
nip	int(11)	(NULL)	NO		(NULL)	
tgl_resep	date	(NULL)	NO		(NULL)	
nama_obat	text	latin1_swedish_ci	NO		(NULL)	
dosis	enum('Rendah', 'Sedang', 'Tinggi')	latin1_swedish_ci	NO		Rendah	

Figure 3.5 Prescription Table

Diagnose Table, this table will be used for storing information about diagnosis for all patients. The design can be seen in the Figure 3.6.

Field	Type	Collation	Null	Key	Default	Extra
kode_rwayat	int(11)	(NULL)	NO	PRI	(NULL)	auto_increment
nip	int(11)	(NULL)	NO		(NULL)	
nid	int(11)	(NULL)	NO		(NULL)	
tgl_diag	date	(NULL)	NO		(NULL)	
nama_penyakit	varchar(50)	latin1_swedish_ci	YES		(NULL)	

Figure 3.6 Diagnose Table

user Table, this table will be used for storing information login for web-based application. The design can be seen in the Figure 3.7.

Field	Type	Collation	Null	Key	Default	Extra
login_username	varchar(30)	latin1_swedish_ci	NO	PRI	(NULL)	
login_password	varchar(100)	latin1_swedish_ci	NO		(NULL)	
name	varchar(50)	latin1_swedish_ci	NO		(NULL)	
email	text	latin1_swedish_ci	YES		(NULL)	
usertype	smallint(1)	(NULL)	YES		(NULL)	

Figure 3.7\_user Table

Field	Type	Collation	Null	Key	Default	Extra
sessionts	timestamp	(NULL)	YES		(NULL)	
sessionid	varchar(100)	latin1_swedish_ci	NO		(NULL)	
param	varchar(100)	latin1_swedish_ci	NO		(NULL)	
value	varchar(100)	latin1_swedish_ci	NO		(NULL)	

\_session Table, this table will be used for storing information session login for web-based application. The design can be seen in the Figure 3.8.

Figure 3.8 \_session Table

There are two user interface design for patient in mobile application and for admin in web based application. For mobile application the user interface will built corresponding to the Android Layout

Design using an XML language. For Web-based application, the user interface design will built in PHP and CSS.

### ***Android User Interface Design***

- **Login Screen.**

A login screen will be appeared first when the application starts. The login screen has two input text field and 2 buttons. The two input text field is for patient ID (NIP) and birth of date. There are two buttons, register button and login button. The register button will be directly connected to the registration screen. The Login button will connect to the main menu screen. The layout is shown in Figure 3.9.

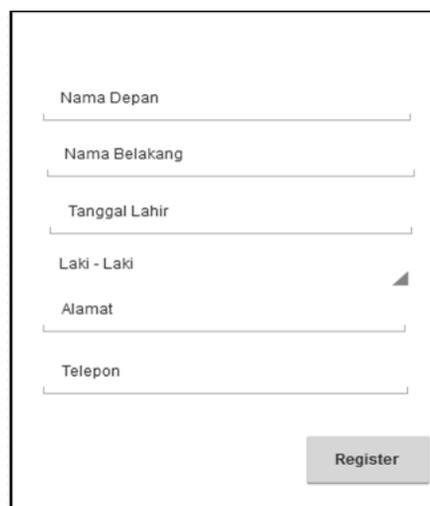


The screenshot shows a login screen with a white background and a black border. At the top, there is a text input field labeled 'NIP'. Below it is another text input field labeled 'Tanggal Lahir'. At the bottom, there are two buttons: 'Register' on the left and 'Login' on the right. Both buttons are gray with black text.

Figure 3.9 Login Screen

- **Registration Screen**

Registration screen contains a form of register which consists of fields to input any kinds of information which are needed by the system. There are two button, register button and cancel button. The register button will process the inputted data to the server.



The screenshot shows a registration screen with a white background and a black border. It contains six text input fields stacked vertically: 'Nama Depan', 'Nama Belakang', 'Tanggal Lahir', 'Laki - Laki', 'Alamat', and 'Telepon'. The 'Laki - Laki' field has a small downward-pointing triangle on its right side. At the bottom right, there is a gray button with the text 'Register'.

Figure 3.10 Register Screen

If the register is a success, the system will deliver a patient ID. The layout is shown in Figure 3.10.

- **Main Menu Screen**

The Main menu contains all features that available in the mobile application. There are six image button that represents the menu. Each image button has own link to the each activity. This screen displays a page which appears after the user has been successfully logged in to the system using a valid account. The layout is shown in Figure 3.11.

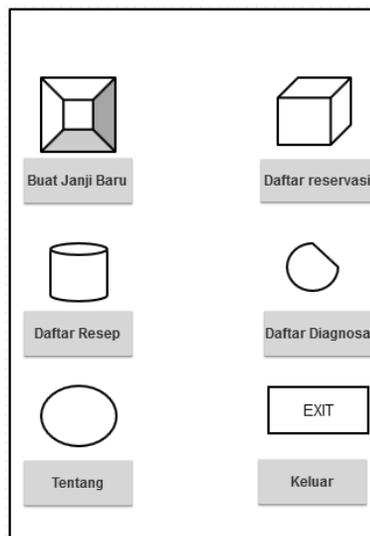


Figure 3.11 Main Menu Screen

- **New Appointment**

This feature contains three user interface as follows, search schedule, list of schedules, and details of schedules. The search schedule has one input text that will be a pop-up dialog date if the user tap it and also there is a spinner that represented the services of the polyclinic and there is a single search button.

The list of schedule doctors screen contains a list view that accommodates the schedule doctors' data from database. Each of the schedule has a link to the Detail Schedule Screen. The Detail Schedule screen shows a text that contains the schedule doctors' detail. There is a button for a book process the schedule. After that there will be a token number given by the system.

- **List View Screen**

This screen is a template for three features in the mobile based application. The three features are List of Appointments, List of Prescription, and List of Diagnose. The three features have same screen layout. The screen layouts contain a list view that carried a list of data from the database. The List of Appointment carried a date of appointments that no claim yet. The List of Prescriptions carried a date of prescriptions. The List of Diagnoses carried a data on diagnoses of the patient.

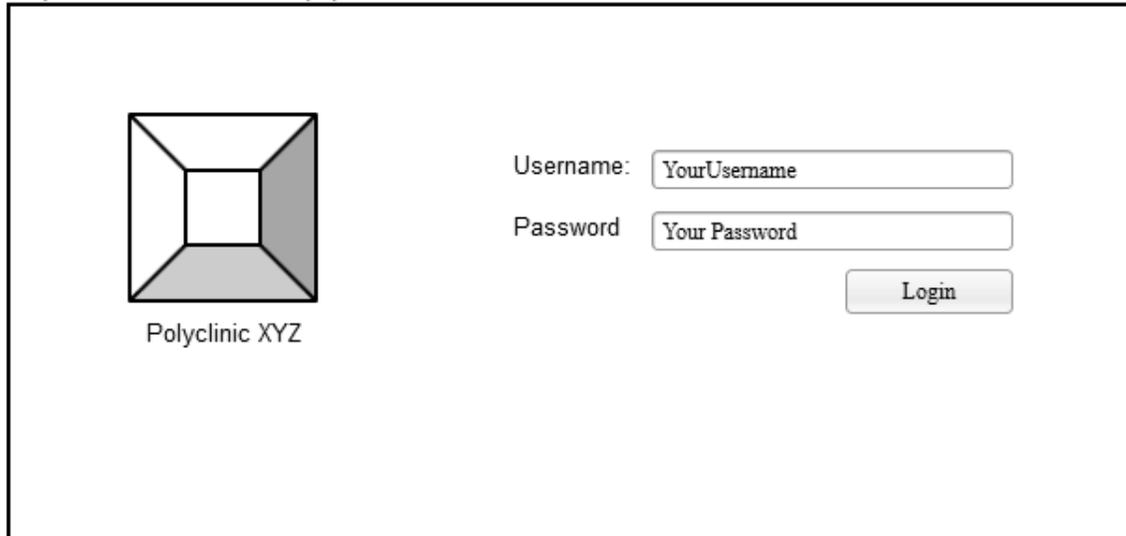
## Web User Interface Design

- Login Screen

A login page in the web based application is a standard page which shows the username and password fields to be filled in order to gain access to the main menu system. Just like another web page, this page contains two fields to input login data and a button to continue the process. After clicking “Sign In” button, the application will check username and password whether it's same with the database or not.

After that, there will be a check login page. This page accommodates for checking the username

<http://localhost/PHA/index.php>



Polyclinic XYZ

Username:

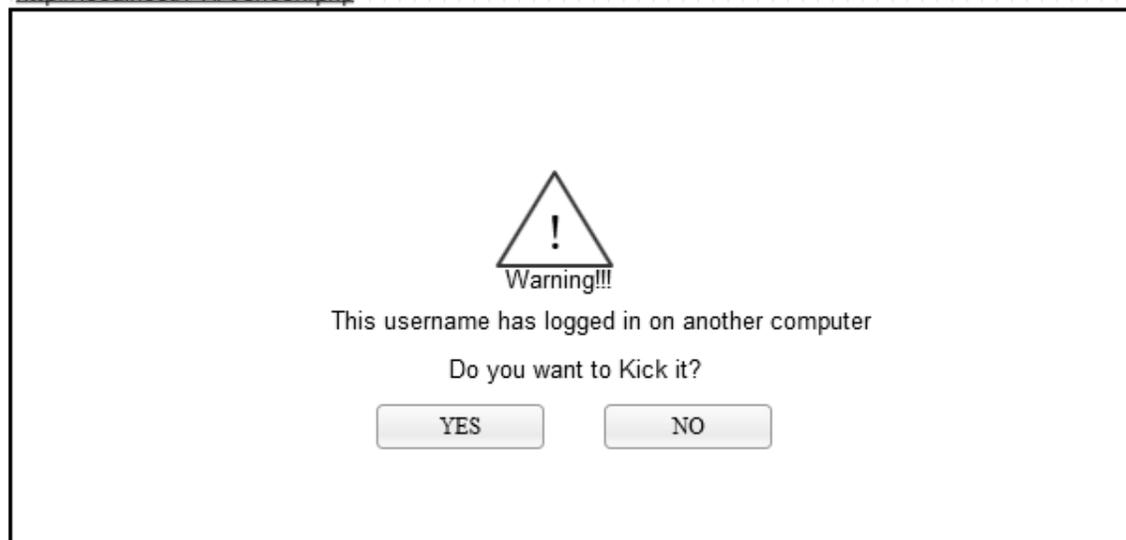
Password

and show to the admin if the current username is already logging in another place. The layout shown in Figure 3.12 and Figure 3.13.

Figure 3.12 Login Screen

Figure 3.13 Check Login Screen

<http://localhost/PHA/check.php>



Warning!!!

This username has logged in on another computer

Do you want to Kick it?

- Home Page

The Home Page screen is a display page which appears after the admin has been successfully logged in to the system. This page contains 5 main menus and each of the menus has a several sub-menu. The main menu is represented in the main tab and for the sub-menu represent in sub-tab. All of the menus have a table that represented the data for each menu. There is a several action button on a table that has a function depends on the menu selected. The layout shown in Figure 3.14.

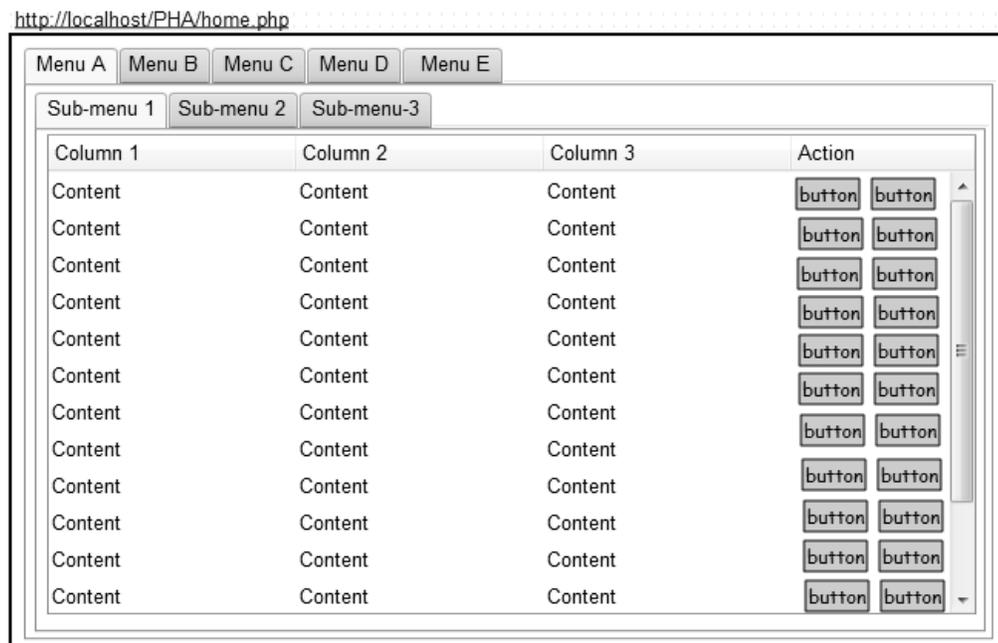


Figure 3.14 Home Page Screen

#### 4. CONCLUSIONS

This research proves that a mobile application can use connected files from web-based application to support the function of the application. The transfer data can be more visible and convenience of using Android device.

Based on the development and system testing result, there are several conclusions That can be extracted from the applications:

1. Android application can consume some kind of files from web-based for supporting the functionality of the application.
2. Android application receives the information easy, fast and flexible.
3. Every data is shown based on the user who logging for application.

4. The web based application is help for managing the data to and from the mobile application.

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