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THE IMPLEMENTATION OF "*POP UP NOTIFICATION*" ON ONLINE QUEUE SYSTEM IN HEALTH CLINIC, USING WEBSITE AND ANDROID PLATFORM

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Abstract

Queuing is a tedious activity and can spend a lot of time for some people, especially if it is a queue at a health clinic. The usual queue is the prospective patient (the person who is sick), have to undergo a queue process so long before can get health care. To facilitate the process of queuing at the health clinic and solve problems in the conventional queuing system, the author designed an Online Queue System at a health clinic using Waterfall system development method. The output of this queue system is divided into three components; namely "Clinical Admin Website" which serves as an Interface for the clinic to post all clinical information, "Patient Android Application" which serves as an Interface for patients to see the queue number is running, queue the queue number online, get notification in the form of Pop Up notification and Maps for real-time direction to the clinic location, and "Web Server" which functions to integrate data from the Clinical Admin Website to the Android Patient App.

Keywords*: Health Clinic, Online Queue, Waterfall, Pop Up Notification, Maps.*

1. Introduction

Queuing for some people is very ineffective, even more so if you have to queue for hours without knowing the rest of the time how much longer should queue up. In addition to being ineffective, queuing activities require real-time sacrifices to be allocated to more priority activities. For the patient, queuing too long becomes an uncomfortable and disadvantageous activity, because so much time is wasted.

In Law No. 36 of 2009, it is written that everyone has the right to obtain safe, quality and affordable health services. Fulfillment of affordable health service criteria does not mean to leave the quality of service. Quality service will always strive to satisfy its customers. In the management of public services, responsiveness is required to satisfy the customer [1].

Attention to the timeliness of waiting service is the thing that the healthcare organization needs to establish to maintain the dimension of responsiveness. Increasing the quality dimension of service is an important thing to do when the healthcare organization wants to satisfy its customers. This should be supported by the willingness of medical personnel and health service organization staff to provide the best services to the community [2].

Basically, health clinic managers will want to provide the best service facilities to patients. Some efforts that can be done to improve the quality of service is to add the number of queue counters or expand the capacity of the room/building. But this requires a lot of money.

As a win-win solution to the above problems, a system is required to facilitate both parties, so that the patient no longer needs to queue for hours and can use his time for other productive activities, and the clinic also does not need to spend big in efforts to improve the quality of service.

a. Queue

Queues can be defined as a waiting line from people/units requiring service from one or more service facilities [3]. Queues arise because the number of service facilities is less than the number of persons requiring the service [4]. According to Taha (1997: 176), the waiting phenomenon (queue) is a direct result of randomness in service operations [5]. The main purpose of queuing theory is to achieve a balance between service costs and costs caused by waiting time [6].

b. Pop-up Notification

Pop Up is a floating window display, whose position is above or overwrite the current main screen display. When the Pop-Up view has appeared, the current page will normally be disabled so that the page looks vague, and automatically the user's attention will be focused on the Pop-Up screen.

Notification is a notification of information or announcements from certain parties to the intended party made through the media such as email, SMS, or chat applications (line, WhatsApp, fuel etc.). Notification is required when information to be conveyed to related parties is not possible to be notified directly or face to face [7].

From the above description can be concluded that Pop Up Notification is a notification in the form of a window screen that floats above the main screen, so the user's attention will be focused on the notification page.

c. Android

Android is the operating system for mobile devices like Smartphone or Tablet PC. Android is developed by Google with the basic platform of Linux kernel and GNU / Linux software. The Android operating system program code uses Object Oriented Programming (OOP) based on Java Core Libraries, as well as other program codes in XML [8].

d. Web Server

Web Server is software that becomes the backbone of the world wide web (www). Web Server waits for requests from clients using browsers such as Netscape Navigator, Internet Explorer, Mozilla, and other browser programs. If there is a request from the browser, then the Web Server will process the request and then deliver the results of the process in the form of the desired data back to the browser [9].

e. The Concept of Conventional Queue System

In general, the queue process that occurs in a health clinic can be described as follows. A patient who comes to the clinic will take the queue number. After that, the patient will fill the slips provided by the clinic based on the needs. Stage filling form by a patient is done if needed. Then, the patient will enter the queue stage (queue) before it can eventually be served.

f. The Concept of Online Queue System

The concept of an online queue system at a health clinic designed by the author consists of three main components, namely website-based applications for clinical admin panels, Android-based applications for patients, and Web Server. This queue system uses the Internet network as a communication medium and data integration between the three components, as illustrated in Figure 1.

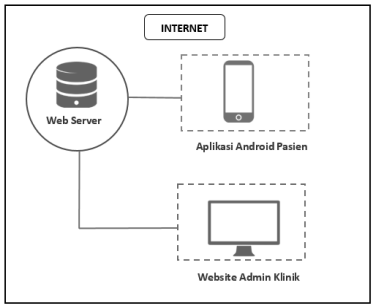

Figure 1. Online Queue System Workflow

Figure 3 illustrates how the components of the online queuing system in this clinic can run and integrate with each other. Each component has different features. The following is an explanation of each component of the system and the features contained in it :

1) Website Admin Clinic

The Clinical Admin website serves as an Interface or interface for the clinic to post everything related to clinical data for the patient, such as the name of the clinic / hospital, doctor's name, address, telephone number, queue quota as well as queuing status (Online or Offline). Features that are on the website of admin clinic is Form Login, Data Booking, Identity Form, and Next Button.

2) Patient Android App

The Patient Android app serves as the interface or interface for the patient to see the currently running queue number, queue the queue number and get a notification. The features contained in the Android Patient Application include details of clinical information, Booking, registration form, login form, Maps, and Pop Up Notification.

3) Web Server

The web server on this queue system integrates data from the clinic admin website into the patient's android application, displays the queue number that is running in real time to the Android Customer Application, and sends notifications to the patient automatically when the queue number is running is approaching the patient queue turn.

2. Research Purposes

The purpose of this study are as follows:

1) Optimize conventional queuing system at the health clinic, through making online queue system based on website and android.
2) Make it easier for patients to register and order queue online.
3) Helping health clinic in improving service quality to patient

3. Research Method

The process of developing an online queue system at this health clinic using Waterfall system development method, as illustrated in Figure 2.

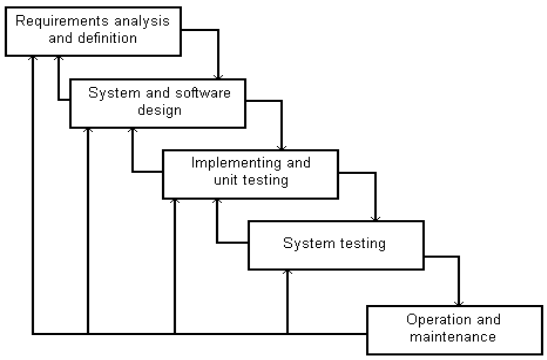

Figure 2. Waterfall System Development Method.

The following is an explanation of the Waterfall system development method used in this study.

a) Analysis

In this stage, the authors do the system needs analysis, which determines what components are needed in the process of building an online queue system in the health clinic.

b) Design

After performing the analysis process, the next step is to design the workflow system design and User Interface design.

c) Coding

After the Design stage is done, the next step is to implement the design into the application form through the Coding process.

d) System Testing

After the system is finished, the next step is to perform testing (Testing). The testing system in this research is done by using the method of White Box Testing and Black Box Testing.

e) Operation and Maintenance

After the Testing process is completed, the system is ready for use and enters the operation and maintenance stages.

4. Results and Analysis

4.1 Hardware Requirements

The hardware required in the process of making an online queue system at this health clinic is presented in table 1.

Tabel 1. Hardware used

No	Hardware	Merk
1	Processor	Intel® Celeron® B815 CPU @ 1.60GHz
2	Memory RAM	RAM 4,00 GB
3	Harddisk	500 GB
4	Computer	Laptop Lenovo G470
5	VGA	Intel® HD Graphics
6	Smartphone	Lenovo A6600

4.2 Software Requirements

The software required in making this system is :

- Windows 8.1
- Java Development Kit (JDK) 6.
- Android Studio
- XAMPP V.3
- Adobe Photoshop CS 6.

4.3 App Interface

- **Detail Clinical Information**

Figure 3. Detail Clinic Information

Figure 8 shows all the details of the clinical information displayed on the Patient Android App that is the name of the clinic, doctor's name, clinic address, phone number, queue number running, quota, queue remaining, and queuing status (online or offline). The app also comes with Maps for patients to come to the clinic location on time, and clinic photos that help ensure that patients have come to the right location.

- **Booking**

Figure 4. Booking

Figure 9 shows the booking feature, which allows a patient to make the process of booking the queue number from home or from anywhere online through the Android app. In the booking process, the patient is free to choose how far the queue number he wants, before the system call notification. Suppose Patient A orders the queue number 35, and he selects the notification distance 10, then on the 25th queue (10 numbers before the queue 35), the system will automatically send notifications for the patient to go to the clinic location.

- **Registration and Login Form**

Figure 5. Registration Form and Login

Figure 10 shows the registration form and login form. Before being able to book a queue number, a patient is required to register the account and login first. Disadvantages of this feature is the absence of account verification stage in the form of Email / Phone Number Verification that can prove the authenticity of patient data. The risk that can happen is the possibility of a Victive Booking from a fake account or irresponsible person.

- **Maps**

Figure 6. Maps

Figure 11 shows a Maps feature that can provide real-time direction to the patient, and is accompanied by distance calculations and estimated travel time for trips to the clinic site. This feature allows patients to arrive on time.

- **Pop Up Notification**

Figure 7. Pop Up Notification

Figure 12 shows the Pop-Up Notification feature, which can tell the patient to get to the clinic immediately when the queue number is approaching the patient's turn number. With this feature, patients no longer need to come to the clinic for hours before getting health care, so patients can use their time for more priority activities. On the other hand, the clinic also no longer need to think about the expensive cost to increase the number of the counter queue or the expansion of the room/building

4.4 Testing

System testing is done to ensure the program is working properly according to the design. System testing aims to avoid errors that may occur in the writing of the program (Syntax Error), process error (Runtime Error) or logic error (Logic Error). Test methods used for testing the queue system online at this health clinic is Whitebox Testing and Black Box Testing.

- **White Box Testing**

  White Box Testing is done by testing the program path logic and program syntax on the system. If there is a syntax error it will be indicated with an error sign. White box testing test results are shown in Figure 13.

Figure 8. White Box Testing

  Figure 13 shows that after checking the entire program source code, no syntax errors and logic errors occur in the program.

- **Black Box Testing**

  Black box testing is done to find out whether the program features can function according to their functional requirements. The author performs a trial process in the form of simulations on the main features of the system such as the process of booking the queue number and ¬Pop Up notification. Simulations performed on Android Smartphone with different specifications, everything works well. The complete results of testing Black Box Testing can be seen in table 2.

Table 2. Black Box Testing

No	Android version	Installation	Running
1	Froyo/Forzen Yogurt v2.2	successful	successful
2	Jelly bean v4.1.2	successful	successful
3	KitKat v4.4.2	successful	successful
4	Lolipop v5.0	successful	successful
5	Marsmelow v6.0	successful	successful

5. Conclusion

From the above discussion, this work can conclude that the testing system in this research is still at the level of developer (White Box & Black Box Testing), which is to test the performance and error rate of programming logic. The author has not yet tested the user level (Patient and health clinic). But overall, the system is ready to be implemented to the health clinic for further testing process at the user level. There are some shortcomings of the system that need to be developed in the next research, which include the addition of Skipp Button button on the Clinical Admin Website to handle the possibility of late arrival of the patient, and the addition of Email / Phone Number Verification at the registration stage of the account on the Android Patient Application to ensure the authenticity of the data patient and eliminates the risk of a possible Victive Booking from an irresponsible person.

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