

AUTOMATION OF MEDICAL RECORD MANAGEMENT SYSTEM

CSC320

SOFTWARE LABORATORY

SUBMITTED TO:

THE DEPARTMENT OF COMPUTER SCIENCE



FEDERAL UNIVERSITY OYE EKITI

BY

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1.0. Introduction

Health is wealth as it is commonly said. It is no longer a news that the mental or psychological behaviour of humans depends on the state of humans' physical and medical well-being. World Health Organization (WHO) had really played a very big and essential role in the global governance of health by establishing, monitoring and enforcing international norms and standards to coordinate multiple actors towards common goals. (Jennifer et al.).

However, technology is taking over in every areas of human activities especially the cognitive and convoluted aspects of human life purposely to achieve the same goal with human or better-off.

The most common way of keeping Medical Records for decades had been manual (paper record). (Mandl, 2001). However, the promise of a more efficient hospital service is obvious using Electronic Medical Records Management Systems (Stroetmann et al., 2011).

From personal experience in many Nigerian hospitals (Federal University Oye Ekiti (FOUYE) Medical Centre inclusive), it was observed that medical records are managed manually which had led to many difficulties in record management such as inconsistency or duplicate in records as well as loss of time during collations and distribution of medical files to different departments within the hospital.

More to the merits of Electronic Medical Record Management System is the safety of record during environmental and natural disaster occurrence such as fire outbreak, water spillage or criminal attacks.

2.0. Statements Of The Problem

Consequent to manual medium of keeping medical records is the inauspicious stress undergone by the Medical Record Officer during the registration of new Patients (Opening of new Medical Records), transferring or allocation of Patients' medical file(s) within the departments and in the case of office/store or cabinet relocation is alarming. Likewise the complexity in time Management during record sorting, searching and retrieving is nothing to reckon with.

More so, the risk of data loss, file damages, duplicate in patient medical records and lack of privacy is high in traditional ways of managing records.

2.1. Aims And Objectives

The aim is to develop an Automated System for managing Medical Records using Federal University Oye (FUOYE) Medical Center as Focus Group.

Objectives:

- i. To carry out a feasibility study for the development of FUOYE Medical Record Management System.
- ii. To design and develop a System for FUOYE Medical Centre.
- iii. To test and validate the Automated System.
- iv. To implement and evaluate the Medical Record Management System.

3.0. Methodology

3.1. The methodology subsequent to the development of the system are as follows:

3.1.1. Collection and understanding data.

3.1.2. Identifying the relationships between data sets.

3.1.3. Design of the database.

3.1.4. Design of the System Graphical User Interface (GUI) with Java programming language using JSWING and AWT.

3.1.5. Writing of Stored Procedures.

3.1.6. Development of the communication links between the application and the database.

3.2. Hardware

This Automated System was developed using a Personal Computer (PC) with 8G RAM, 500G Hard drive and core i5 Processor.

3.3 Software

The Software used for the development of this System are:

- i. Windows 10 Pro. as the Personal Computer's Operating System.
- ii. Eclipse For Developers, Standard Edition IDE.
- iii. JDK 13 as Java Compiler.
- iv. MySQL Workbench.

3.4. Data Acquisition

A Literature Research was conducted to gather relevant data for the development of the System.

During data collection process, the Matron and other Medical Personnel were interviewed to confirm, update, and understand the relationships between data collected.

4.0. Algorithm

STEP 1: Start.

STEP 2: Patient detail verification.

STEP 3: Is Patient verified?
NO: Displays “Invalid Credential” and go to STEP 2.
YES: Continue.

STEP 4: Patient joins the queue.

STEP 5: Is Patient picked up?
NO: Remain on queue.
YES: Continue.

STEP 6: Patient consulting the Doctor.

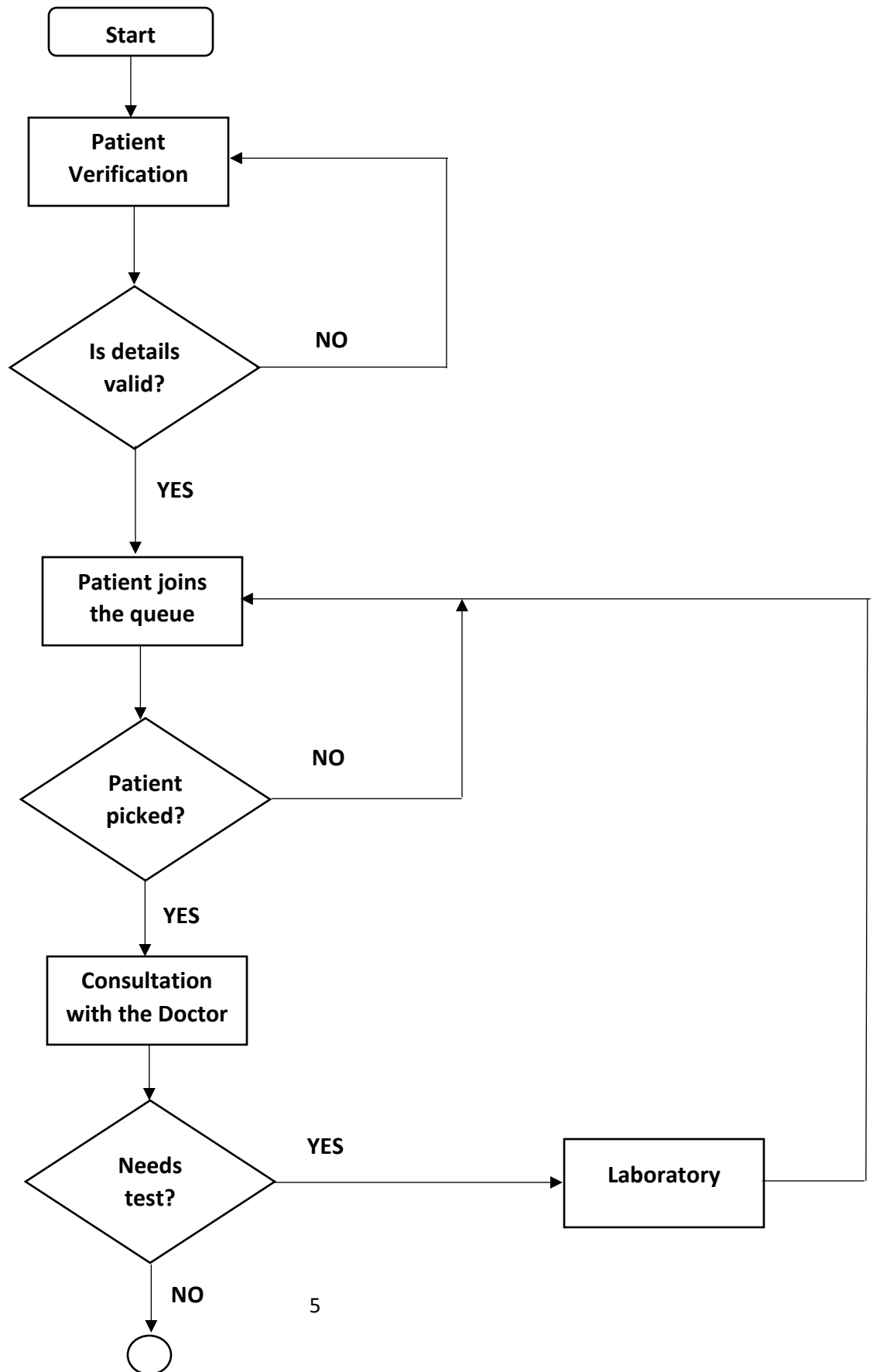
STEP 7: Does Patient need test?
YES: STEP 8: Patient visits the Laboratory.
STEP 9: Go to STEP 4.
NO: Continue.

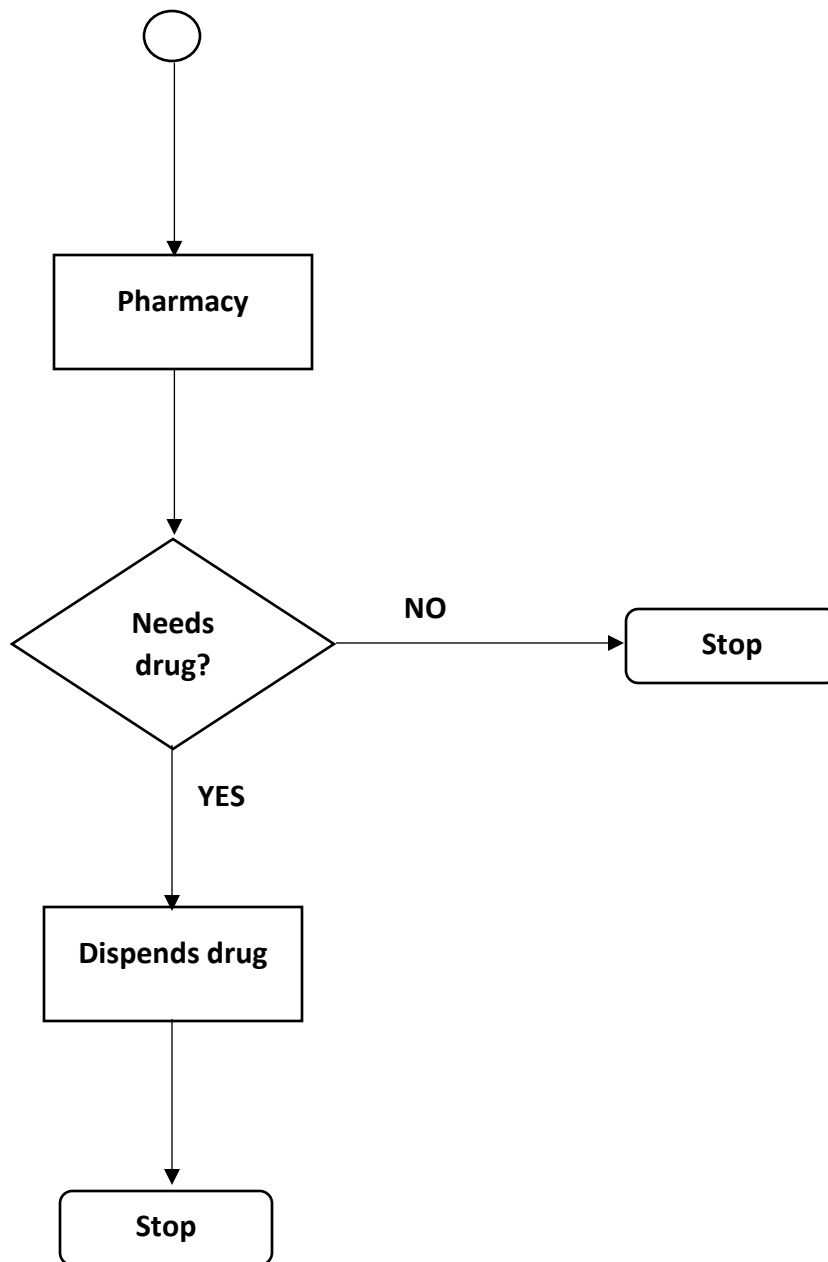
STEP 10: Does Patient need drug?
NO: Go to STEP 13.
YES: Continue.

STEP 11: Dispense drug.

STEP 12: Stop.

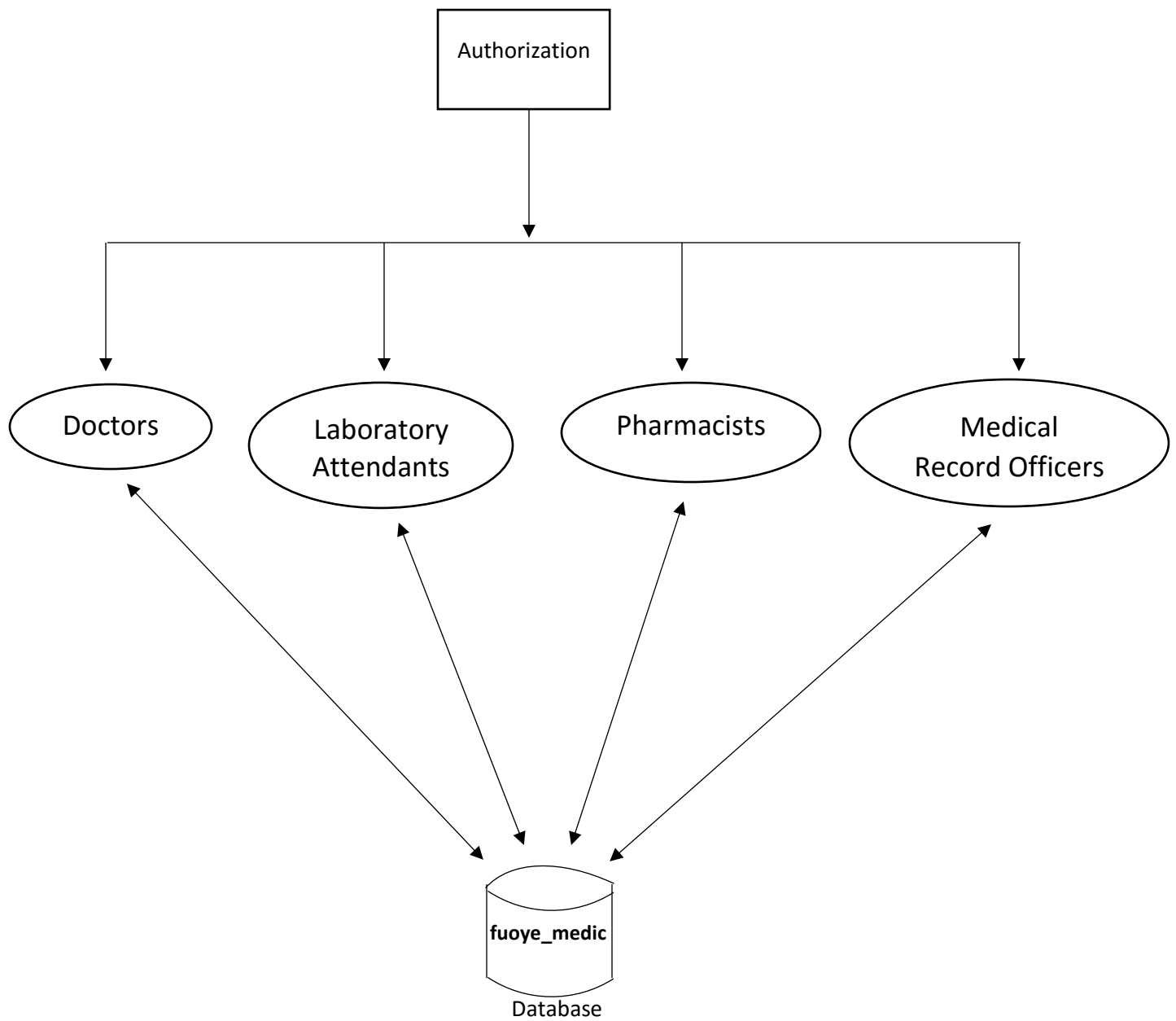
4.2. Flowchart





5.0. Implementation

5.1. Architecture



5.2. Functional Requirements

- i. Registration of new Patient(s).
- ii. Easy search of Patient's Medical Record especially during emergency.
- iii. Shows how often a Patient visit the Hospital.
- iv. Shows the Doctor that frequently attends to a particular Patient.
- v. Monitoring of Patient's Medical Process within the Hospital.
- vi. Remote access to the database server.

5.3. Non-functional Requirements

- i. Medical Record confidentiality.
- ii. Access control function.

5.4. Input Design

According to the data collected, the formats for input data are as follows:

5.4.1. Doctor

- i. Medication – String
- ii. Administration – String

5.4.2. Laboratory Attendant

- i. Fasting Blood Sugar – Integer
- ii. Random Blood Sugar – Integer
- iii. Sugar level – Integer
- iv. Malarial parasite – String
- v. Typhoid test – String
- vi. Pregnancy test – String

5.4.3. Pharmacist

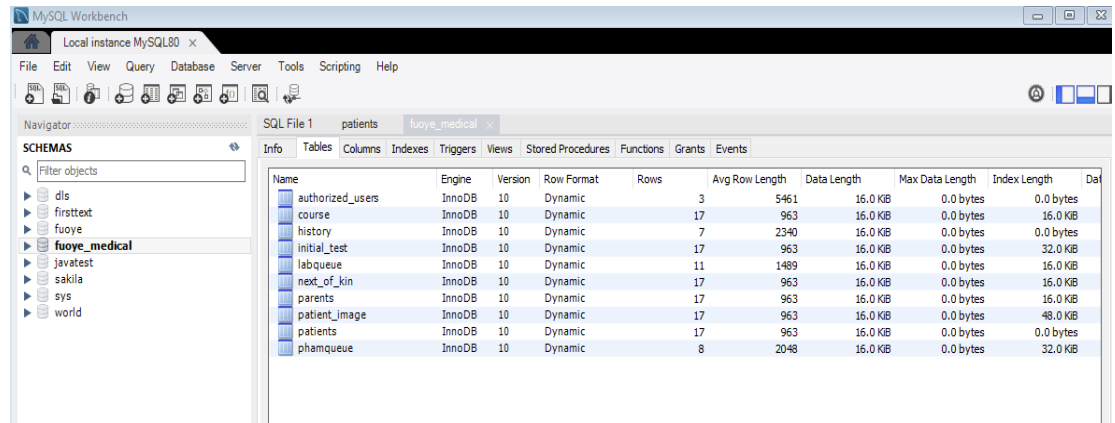
Comment (Reason for rejection) – String

5.4.4. Medical Record Officer

- i. Names – String
- ii. Age – Integer
- iii. Date – YY-MM-DD
- iv. Address – String
- v. Image – Portable Network Graphic (.png)

5.5. Database Design

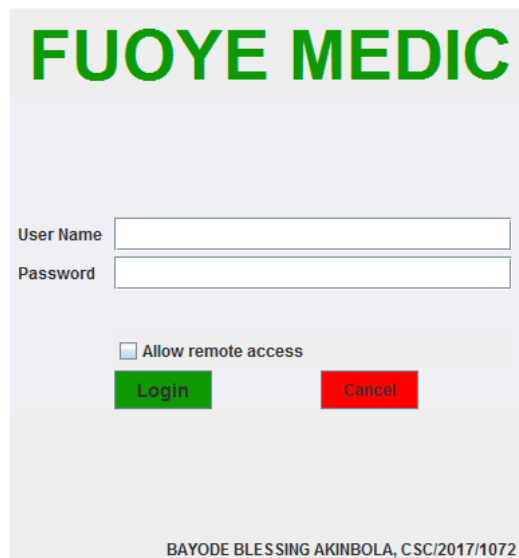
- i. authorized_users (user_id, surname, first_name, post, password, username).
- ii. course (course_id, patient_id, faculty, department, entry_year, entry_level).
- iii. history (id, patient_id, pregnancy, sugar_level, typhoid, fbs, rbs, malarial_parasite, temperature, bp, weight, status, medication, rejection_reason, doctors_comment, lab_test, date, process, doctorName)
- iv. initial_test (id, patient_id, pregnancy, sugar_level, typhoid, fbs, rbs, malarial_parasite, temperature, bp, weight, breast_test, xray, eyes_test)
- v. next_of_kin (nok_id, patient_id, surname, first_name, address, phone_number)
- vi. parents (parent_id, patient_id, surname, firstname, address, phone_number)
- vii. patients (patient_id, surname, firstname, midde_name, sex, dob, weight, height, blood_group, genotype, address, temperature, phone_number)



Name	Engine	Version	Row Format	Rows	Avg Row Length	Data Length	Max Data Length	Index Length	Data Length
authorized_users	InnoDB	10	Dynamic	3	5461	16.0 KB	0.0 bytes	0.0 bytes	16.0 KB
course	InnoDB	10	Dynamic	17	963	16.0 KB	0.0 bytes	0.0 bytes	16.0 KB
history	InnoDB	10	Dynamic	7	2340	16.0 KB	0.0 bytes	0.0 bytes	16.0 KB
initial_test	InnoDB	10	Dynamic	17	963	16.0 KB	0.0 bytes	0.0 bytes	16.0 KB
labqueue	InnoDB	10	Dynamic	11	1489	16.0 KB	0.0 bytes	0.0 bytes	16.0 KB
next_of_kin	InnoDB	10	Dynamic	17	963	16.0 KB	0.0 bytes	0.0 bytes	16.0 KB
parents	InnoDB	10	Dynamic	17	963	16.0 KB	0.0 bytes	0.0 bytes	16.0 KB
patient_image	InnoDB	10	Dynamic	17	963	16.0 KB	0.0 bytes	0.0 bytes	16.0 KB
patients	InnoDB	10	Dynamic	17	963	16.0 KB	0.0 bytes	0.0 bytes	16.0 KB
phamqueue	InnoDB	10	Dynamic	8	2048	16.0 KB	0.0 bytes	0.0 bytes	16.0 KB

5.6. Interface Design

Login



The login interface for FUOYE MEDIC features a green header with the application name. Below the header, there are input fields for 'User Name' and 'Password'. A checkbox labeled 'Allow remote access' is positioned below the password field. At the bottom of the form, there are two buttons: a green 'Login' button and a red 'Cancel' button. The footer of the interface displays the text 'BAYODE BLESSING AKINBOLA, CSC/2017/1072'.

FUOYE MEDIC

User Name

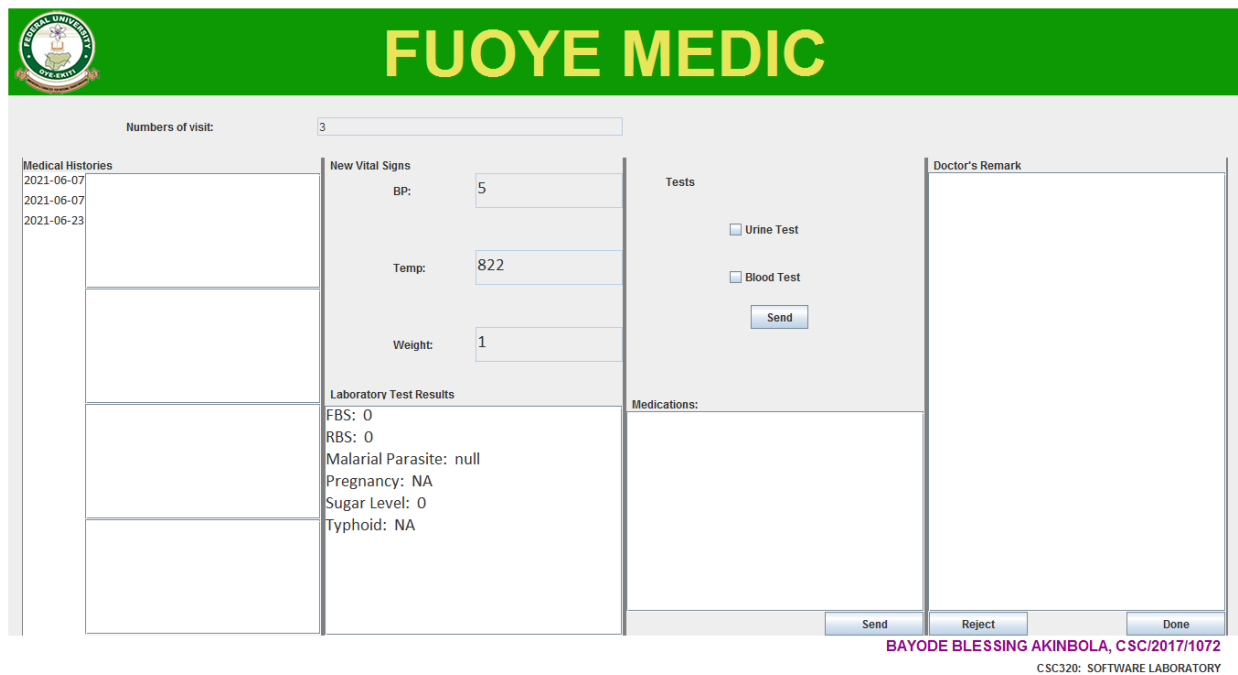
Password

☐ Allow remote access

Login **Cancel**

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Doctor



The doctor interface for FUOYE MEDIC has a green header with the application name and a logo on the left. The main area is divided into several sections. On the left, there is a 'Medical Histories' table with dates. To its right is a 'New Vital Signs' section with input fields for BP (5), Temp (822), and Weight (1). Below this is a 'Laboratory Test Results' section with text for FBS, RBS, Malarial Parasite, Pregnancy, Sugar Level, and Typhoid. To the right of the vital signs is a 'Tests' section with checkboxes for 'Urine Test' and 'Blood Test', and a 'Send' button. Below the tests is a 'Medications' section. On the far right is a large 'Doctor's Remark' text area. At the bottom, there are three buttons: 'Send', 'Reject', and 'Done'. The footer of the interface displays the text 'BAYODE BLESSING AKINBOLA, CSC/2017/1072' and 'CSC320: SOFTWARE LABORATORY'.

FUOYE MEDIC

Numbers of visit:

Medical Histories
2021-06-07
2021-06-07
2021-06-23

New Vital Signs

BP:

Temp:

Weight:

Laboratory Test Results

FBS: 0
RBS: 0
Malarial Parasite: null
Pregnancy: NA
Sugar Level: 0
Typhoid: NA

Tests

☐ Urine Test
☐ Blood Test
Send


Medications:

Doctor's Remark

Send **Reject** **Done**

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Laboratory



FUOYE MEDIC

NAME:	1	BAYODE BLESSING	Ready
	2	ASOBELE VIVIAN	Ready

POST:

LAB ATTENDANT


Refresh

Exit

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Pharmacy



FUOYE MEDIC

NAME:

Medications:

Prescribed Drugs

Reason for rejection:

Reject

Done

NAME:

OMOYAJOWO FAITH

POST:

PHARMACIST

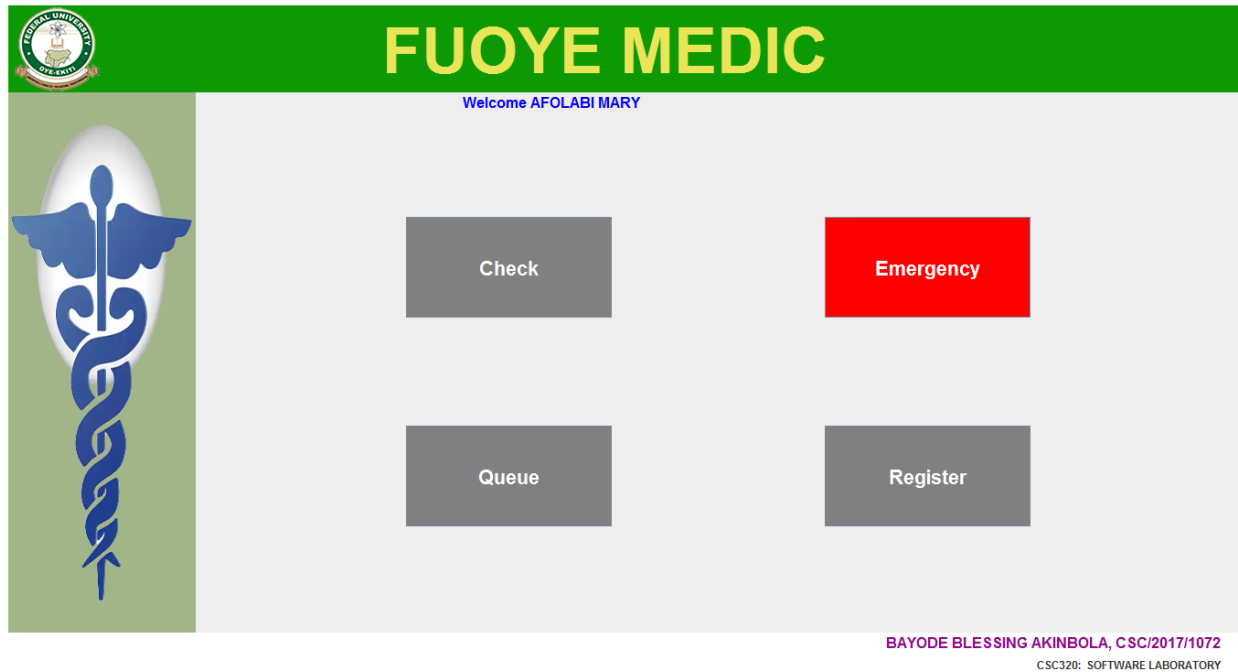
Refresh

Exit

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Medical Record Officer



6.0. User Guide

1. Medical Record Officer

- i. Launch the application **FUOYE MEDIC**.
- ii. At the display of the login page, enter your **login credentials**.
- iii. Click on the **Check** button at the visit of each Patients, verify their details to proceed on the vital test capturing.
- iv. From the home page, click on the **Emergency** button to perform an emergency search.
- v. To view the available Patients and their present stage, click on the **Queue** button.
- vi. To open a new Medical Record for a new Patient, click on the **Registration** button.

2. Doctor

- i. Launch the application **FUOYE MEDIC**.
- ii. At the display of the login page, enter your **login credentials**.
- iii. **Refresh** the page to view available Patient(s).
- iv. Click on the **Ready** button to attend to the patient selected.

3. Laboratory Attendant

- i. Launch the application **FUOYE MEDIC**.
- ii. At the display of the login page, enter your **login credentials**.
- iii. **Refresh** the page to view available Patient(s).
- iv. Click on the **Ready** button to attend to the patient selected.

4. Pharmacist

- i. Launch the application **FUOYE MEDIC**.
- ii. At the display of the login page, enter your **login credentials**.
- iii. **Refresh** the page to view available Patient(s).
- iv. Click on the **Ready** button to attend to the patient selected.

7.0. References

1. Jennifer Prah Ruger and Dereck Yach. The Global Role of the World Health Organisation.
www.ncbi.nlm.nih.gov/pmc/article/PMC3981564/
2. Mandl, K.D. Public standards and patients' control: how to keep medical Records (2001).
<https://doi.org/10.1136/bmj.322.7281.283>
3. stroetmann, K.A., Artmann, J., Stroetmann. European countries on their journey towards National e-health infrastructures. (2011).