



MEDILAB ADMINISTRATION: AN IMPLEMENTATION OF SECURE SYSTEM

Shamsher Singh

Research Scholar (Department of Computer Science & Engineering),

Lovely Professional University, Punjab, (India)

ABSTRACT

The concept of medical laboratory system has existed for years to identify the body problems of human beings. This study analyse the existing medical laboratory system. In this study MediLab system is developed in Java (J2SE) to simulate the working of medical administration management software. Firstly, study underlines the problems of existing system. To examine the problems of existing system Dashmesh Medical Laboratory was selected and with the use of Java programming and SQL Server database new system is developed according to user requirements. The outcomes after developing the software are compatibility with all printers, efficient generation of report, graph, and tips, save data in database, secured access to software. Developed software is designed in such a way that makes the visualization and analysis of reports easy and understandable.

Keywords: *Java (J2SE), Laboratory, MediLab, Software, SQL Server*

I. INTRODUCTION

In the era of modern technology, health care delivery system involves so many different personnel and specialties that the caregiver must have an understanding and working knowledge of other professional endeavours, including the role of diagnostic evaluation. Basically, laboratory and diagnostic tests are tools by and of themselves, they are not therapeutic. In conjunction with a pertinent history and physical examination, these tests can confirm a diagnosis or provide valuable information about a patient status and response to therapy. In addition to these, laboratory findings are essential for epidemiological surveillance and research purposes. If the entire network of a laboratory service is to be effectively utilized and contribute to health care and disease prevention, every member of its work force need to: Understand the role of the laboratory and its contribution to the nation's health service, Appreciate the need to involve all members in the provision of health service, Follow professional ethics and code of conduct, Experience job satisfaction and have professional loyalty, Medical laboratory science is a complex field embracing a number of different disciplines such as Microbiology, Haematology, Clinical Chemistry, Urinalysis, Immunology, Serology, Histopathology, Immunohematology and Molecular biology and others (WHO).

Medical Laboratory Science is the study of the scientific principles underlying the disciplines practised in diagnostic and medical research laboratories (Clinical Chemistry, Cytology, Cytogenetic, Haematology, Histology, Histochemistry, Microbiology, Microscopy, Molecular Biology, Immunopathology and Toxicology). This study evaluate the existing medical laboratory system. The main intention of developing software is to simulate the working of medical laboratory administration system. A medical laboratory or clinical laboratory is



a laboratory where tests are done on clinical specimens in order to get information about the health of a patient as pertaining to the diagnosis, treatment, and prevention of disease. So, the purpose of study is to examine the existing MediLab system and replace it with new technology based system. To achieve this purpose Java (J2SE) used as frontend and SQL Server used as backend.

The characteristics included in new system are:

- The system has Graphical User Interface (GUI),
- The system starts with one login frame in which there are two types of logins i.e. Admin Login and Temporary Login. The main admin of the laboratory login into the working area with his authenticated username and password where he can insert new record, search existing record, update existing record, delete existing record, view fees of tests, book appointments, view list of appointments booked today, view login information of temporary users, view the record inserted by temporary users, delete the temporary log data. The temporary user has to feed his name and one password is generated automatically. The temporary user can only insert new record, search existing record, book new appointment,
- The record of each and every patient is saving in the database,
- There is be one button to search the existing records with respect to patient id. For update the existing records using update button with respect to patient id. For delete the existing records with respect to patient id,
- There is count of test no. from beginning of test 1 to current test. This test no. is generated automatically by incrementing the previous value of test no.
- After successful insertion of record regarding a test category one graph is generated which shows a user the normal value of that test, the maximum value of that test and your value. By analysing your value of that test there are some tips which helps the patient to manage his level of value.
- There are eight time slots from 8:00 to 12:00 where we can book appointments of the today visiting patients. Each time slot is of 30 minutes and only 5 appointments are booked in one time slot.

II. RATIONALE OF STUDY

This is conducted to solve the problems existing medical laboratory system such as:

- Existing system was totally running on Command Line Interface (CLI). There was no Graphical User Interface.
- There was printing problem in old system i.e. report printing was only possible via dot matrix printer.
- No security was there in old system. In old system temporary user can access the whole system, which shows the lack of security. No authentication check was there in old system.
- No attractive reports was generated with old system. No proper database maintenance was there in old system.



III. RESEARCH METHODOLOGY

The study has been conducted on one Laboratory namely “Dashmesh Medical Laboratory” Bhogpur (Jalandhar). To overcome the problems of the existing system which is still running at Dashmesh Laboratory, new software is developed using Java programming as a frontend and SQL Server as backend. The software is developed for some more exciting features.

IV. FRONTEND AND BACKEND

The Java is an object oriented programming language developed by Sun Microsystems of USA in 1991. Java is first programming language which is not attached with any particular hardware or operating system. Program developed in Java can be executed anywhere and on any system. Event used in this study such as: AWT, Action, Input, Key, Mouse, Text, Window, Adjustment, Container, Mouse motion, Paint etc. Microsoft SQL Server is a relational database management system developed by Microsoft. As a database, it is a software product whose primary function is to store and retrieve data as requested by other software applications, be it those on the same computer or those running on another computer across a network (including the Internet). There are at least a dozen different editions of Microsoft SQL Server aimed at different audiences and for workloads ranging from small single-machine applications to large Internet-facing applications with many concurrent users. Its primary query languages are T-SQL. SQL Server can be a data storage backend for different varieties of data: XML, email, time/calendar, file, document, spatial, etc. as well as perform search, query, analysis, sharing, and synchronization across all data types (James, 2014).

V. HOW NEW MEDILAB ADMINISTRATION SYSTEM IS BETTER THAN THE PREVIOUS ONE

5.1 Old System for MediLab Administration: The existing system has all the test category pre-inserted since 2005. No new tests are there in the system and techniques of some old tests are changed but the system is static as shown in below figure:

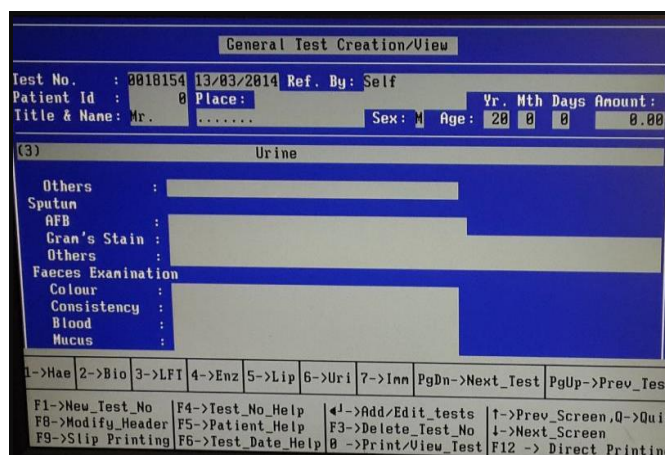


Fig. No.1: User Interface of Existing MediLab system

Fig. no.1 depicts the existing MediLab interface of laboratory i.e. based on Command Line Interface (CLI).

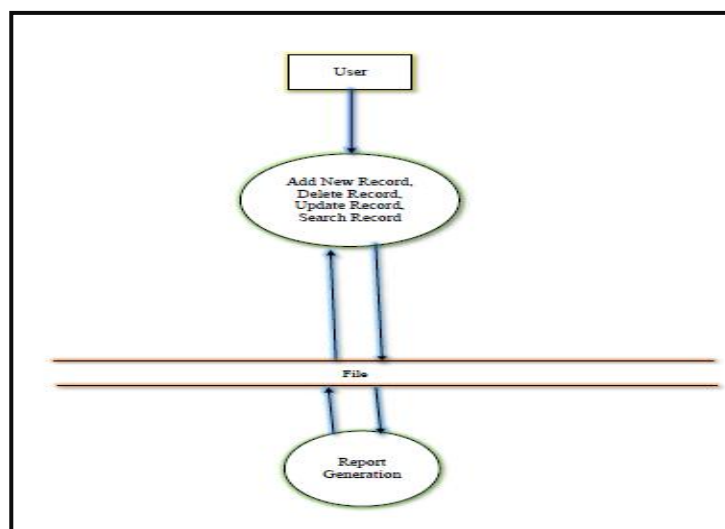


Fig. No. 2: Flow of data in existing MediLab system

Fig. no. 2 depicts the flow of data in existing system. It shows that user can perform only these tasks on existing system such as add new, delete, update and search the records followed by report generation. There was lack of authentication in old system. To overcome this problem password authentication is used in developed system.

5.2 New System for MediLab Administration: A medical laboratory or clinical laboratory is a laboratory where tests are usually done on clinical specimens in order to obtain information about the health of a patient as pertaining to the diagnosis, treatment, and prevention of disease.

The new system is just the successor of the existing system. The problems of the existing system, gather the requirements of our client, and add extra features in new system. The main new features of the proposed system are:

- The System has Graphical User Interface (GUI).
- The System is only accessible to the authorized users, now it has login form.
- The System is compatible with all types of printers.
- There is auto generation of graph and tips so that normal user or patient can understand the result of the test.
- New Test categories are added in the system.
- Old test categories are updated where needed.
- The file management system of the existing system for data saving is converted into database management system.
- There are a users of the system one admin which has all the rights to access all the features of the system. One temporary user which has limited access to the features of the system.
- The log of the temporary users are saved in the database and under the control of the admin.
- There is feature of booking appointments of the patients.
- Check the fees structure of the tests.

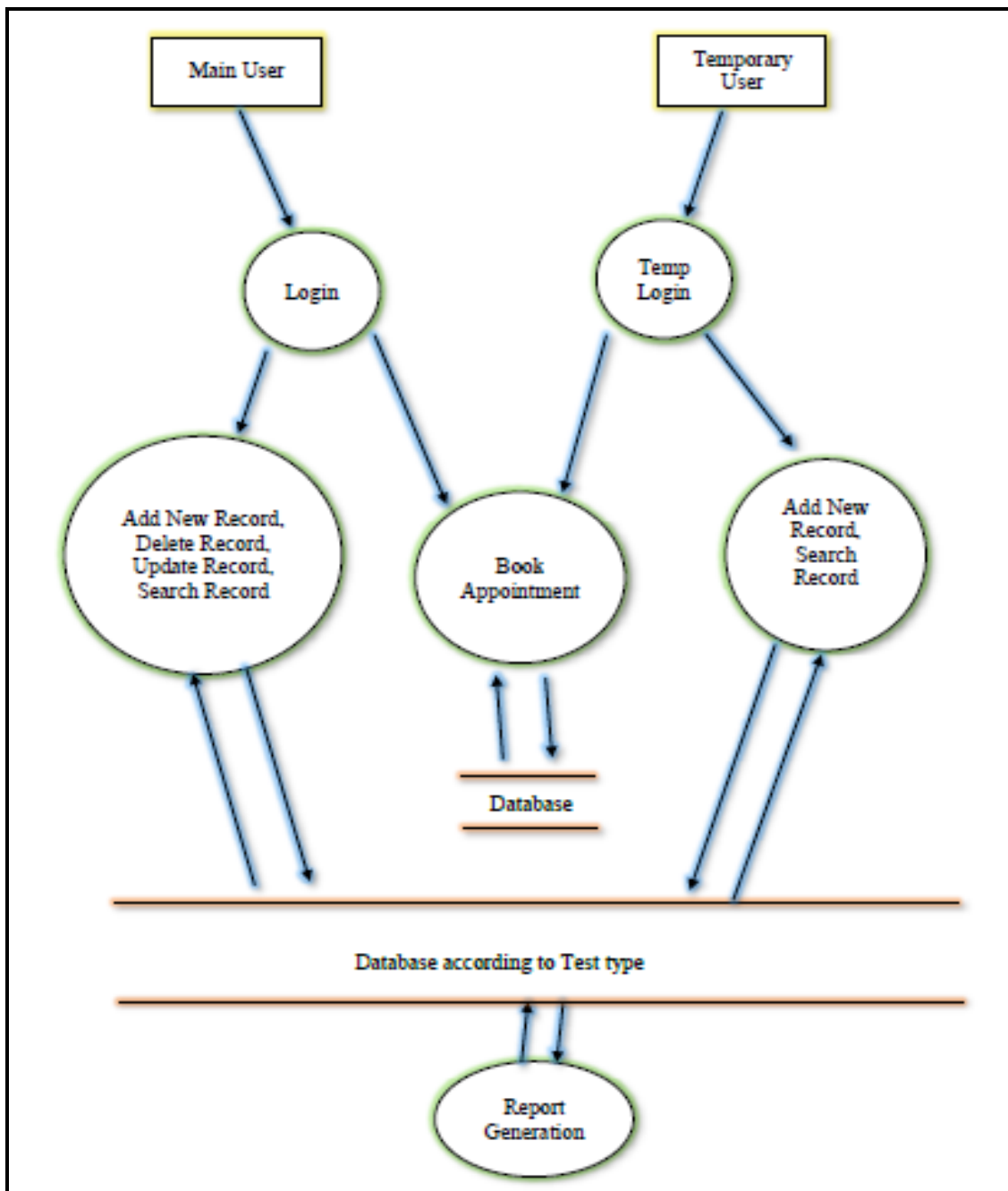


Fig. No. 3: Flow of data in developed system

Fig. no. 3 demonstrated the flow of data in developed system. Above figure illustrated that main user has all the authorities of adding, deleting, updating and searching the patients’ records but the temporary user can use only two functions i.e. adding and searching the data from records. It is for security purpose so that temporary user cannot change the patients’ information. The developed system has provide the facility of booking appointment for patients in advance to avoid the rush.

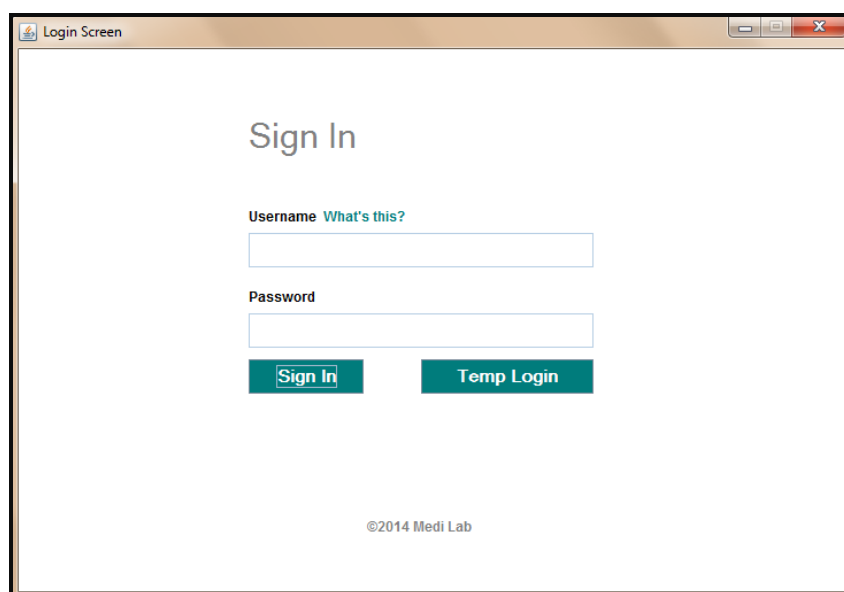


Fig. No. 4: Login Screen of developed system

Fig. no. 4 displayed the login screen of developed system. There are two cases as shown in above figure i.e. Administrator Login and Temporary User Login.

The admin of the system has its own valid username and password which he will use to login into the system. User enter username and password in the corresponding text fields and click on sign in button.



Fig. No. 5: User Interface of Developed System

Fig. no. 5 shows the user interface of developed system which provide all the facilities that fulfil the requirements of MediLab system.

VI. CONCLUSION

The medical laboratory services play a pivotal role in the promotion, curative and preventive aspects of a nation's health delivery system. The service gives a scientific foundation by providing accurate information to



those with the responsibility for: Treating patients and monitoring their response to treatment, Monitoring the development and spread of infectious and dangerous pathogens (disease causing organisms), deciding effective control measures against major prevalent disease, Deciding health priorities and allocating resources. The developed software aimed basically at the level concerned with the Laboratory Administration. The Problems with the existing system are solved and now our proposed system has following features: Compatibility with printers, Secures access to the system, Graphical User Interface, Database management system for data saving, Updated and advanced test categories, Managed searching, Managed updating, etc., Report generated is understandable to the patient. This software has eliminated these problems which have led to accurate, error free, reliable, relevant, secured and valid software. It eliminates the chances of mishandling and unreliability. Along with the above mentioned problems of the existing system we also include the new features in our system which were not present in the existing system. The usability of the system is made easy and attractive so that the user will not have any problem while running the system.

Implementation and maintenance of the software is very easy which add up to one of its quality. Accomplishments are satisfactory and are in accordance to whatever was visualize during analysis and design of the software.

REFERENCES

Books:

- [1]. James, G et.al (2014). *Java™ Programming Language SL-275-SE6*. Sun Microsystems U.S.A.
- [2]. Arnold, K. (2005). *Java Programming Language..* Sun Microsystems U.S.A.
- [3]. Kogent (2013). *Java 7 Programming - Black Book [Paperback]*. Learning Solutions Inc., Dreamtech Press.
- [4]. Schildt, H (2006). *Java: The Complete Reference 7th Edition (2006)*. Tata Mcgraw Hill Education Private Limited.

Magazines:

- [5]. Computer Active UK – April 2014, category computer & mobile, language English.
- [6]. Digit Magazine – March 2014 by Robert Sovereign-Smith, category computer, frequency monthly, country India, language English.
- [7]. PCQuest Magazine – March 2014 by Pradeep Gupta, category computer, frequency monthly, country India, language English.

Websites:

- [8]. <http://www.fortishealthcare.com/india/> accessed on 15 Feb. 16
- [9]. http://en.wikipedia.org/wiki/Java_%28software_platform%29 accessed on 18 Feb. 16
- [10]. http://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/med_lab_tech_students/MedicalLabTechnology.pdf accessed on 25 Feb. 16
- [11]. <http://www.calendar.ubc.ca/vancouver/?tree=12,209,375,1278> accessed on 25 Feb. 16