

LIBRARY MANAGEMENT SYSTEM

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ABSTRACT

This Library Management System can be used to maintain records of user details like registering books, checking balance penalty amount etc. This system not only works from admin side but also from user side. User can also check his/her own details and get the notification for balance amount of penalty, books returning date, can also check available books. This application also works by SMS. Users can directly send SMS to a particular phone no. with some predefined text and value. And he/she will get reply via SMS. He will be getting all kind of information via SMS, if someone wants the information only through SMS then the application is not required to be installed. In this application there are five modules namely, Admin, User, Counter staff, library staff and SMS User. Admin can register user details and provide him/her a login id and password, can also manage user search and renew activities, he/she can add books as well and can view the due dates and penalty amount. Users get login id and password, he/she can view his personal details, check for desire books and get update of due dates, issue date of books and penalty amount to be paid. Through SMS user can send text message on dedicated number and he/she can get information about books via SMS.

1. INTRODUCTION

A library management system is software that is designed to manage all the functions of a library. It helps librarian to maintain the database of new books and the books that are borrowed by members along with their due dates.

This system completely automates all your library's activities. The best way to maintain, organize, and handle countless books systematically is to implement a library management system software.

A library management system is used to maintain library records. It tracks the records of the number of books in the library, how many books are issued, or how many books have been returned or renewed or late fine charges, etc.

You can find books in an instant, issue/reissue books quickly, and manage all the data efficiently and orderly using this system. The purpose of a library management system is to provide instant and accurate data regarding any type of book, thereby saving a lot of time and effort.

Through SMS user can send text message on dedicated number and he/she can get information about books via SMS.

2. SYSTEM STUDY AND ANALYSIS

2.1. Preliminary Investigation

System study is done in order to understand the problem and emphasize what is needed from system. The information requirements of the user for their competitive world requires such system. The various techniques used in this phase are Observations, Interviews and Discussions. A complete understanding of software requirements is essential to the success of a software development effort. System Analysis refers to an orderly structured process for identifying and solving problems using computer.

It is the most essential part of the project development. It is the process of the gathering and interpreting facts, diagnosing problems and using the information to recommend improvements to the system. Training, experience and common sense are required for the collection of the information needed to do the analysis.

2.2. Existing System

- Early days Libraries are managed manually. It required lot of time to record or to retrieve the details. The employees who have to record the details must perform their job very carefully. Even a small mistake would create a lot of problems. Security of information is very less. Report generations of all the information is very tough task.

- Maintenance of Library catalogue and arrangement of the books to the catalogue is very complex task. In addition to its maintenance of member details, issue dates and return dates etc. manually is a complex task.
- All the operations must be performed in perfect manner for the maintenance of the library with out any degradation which may finally result in the failure of the entire system.

2.3. Proposed System

- The main purpose of this online Library Management System is to provide the students an easy atmosphere to use the library facilities.
- This is helpful for users to register from anywhere since we provide an android application for the students.
- The main advantage of this system is users can check the availability of books and request them without visiting the library.
- Since there is an SMS auto reply, users don't need an active internet connection.

2.4. Feasibility Study

A feasibility study is a preliminary study undertaken to determine and document a project's viability. The results of this study are used to make a decision whether to proceed with the project. If it indeed leads to a project being approved, it will, before the real work of the proposed project starts, be used to ascertain the likelihood of the project's success. It is an analysis of possible alternative solutions to a problem and a recommendation on the best alternative. It, for example, can decide whether an order processing be carried out by a new system more efficiently than the previous one. The feasibility study proposes one or more conceptual solutions to the problem set for the project. The conceptual solution gives an idea of what the new system will look like. They define what will be done on the computer and what will remain manual. It also indicates what input will be needed by the system and what outputs will be produced. These solutions should be proven feasible and a preferred solution is accepted.

The feasibility study environment enables all alternatives to be discussed and evaluated. This phase starts with an identification of the main characteristics of the required system. During this stage it is important to collect information as much as possible about the software package that might meet the specification from as many sources as possible.

Normally, the central endeavor of a feasibility study is a cost benefit analysis of various alternatives. It can be defined as a systematic comparison between the cost of carrying out a service or activity and the value of that service or activity. The main benefits are qualitative than quantitative.

Technical Feasibility

This involves questions such as whether the technology needed for the system exists, how difficult it will be to build, and whether the firm has enough experience using that technology. The assessment is based on an outline design of system requirements in terms of Input, Output, Fields, Programs, and Procedures. This can be qualified in terms of volumes of data, trends, frequency of updating etc. in order to give an introduction to the technical system.

The system needs normal configurations of a computer system that are commonly available. The software requirements are Python and Android, Windows 8 or higher versions of OS. Thus, proposed system for our project work is technically feasible.

Operational Feasibility

This analysis involves how it will work when it is installed and the assessment of political and managerial environment in which it is implemented. People are inherently resistant to the change and the computers have been known to facilitate change. The new proposed system is very much useful to the users and there for it will accept a broad audience.

The proposed system offers:

- Greater user friendliness
- Better output which can be easily interpreted.
- Higher speed
- Meets the requirements of the passengers.

Economic Feasibility

This involves questions such as whether the firm can afford to build the system, whether its benefits should substantially exceed its costs, and whether the project has higher priority and profits than other projects that might use the same resources. This study presents tangible and intangible benefits from the project by comparing the developments and operational costs. The technique of cost benefit analysis is often used as a basis for assessing economic feasibility. This

system needs some more initial investment than the existing system, but it can be justifiable that it will improve the quality of service.

Thus, feasibility study should center along the following points:

- Improvement resulting over the existing method in terms of accuracy and timeliness.
- Cost comparison.
- Estimate on the life expectancy of the hardware.
- Overall objective.

Behavioral Feasibility

It involves evaluating whether the project is acceptable and practical to stakeholders, and whether it can be implemented effectively in the context of the organization or community. The project must have the support of key stakeholders, including those who will be directly impacted by the project, as well as those who will be responsible for implementing it. This requires effective communication and engagement throughout the project development process. The project must be compatible with the culture and norms of the organization or community in which it will be implemented. This requires an understanding of the values, beliefs, and practices of the organization or community, and ensuring that the project aligns with these. It must be feasible given the resources available, including financial, human, and material resources. This requires a realistic assessment of the resources required and an understanding of the constraints that may impact the project. Legal and regulatory requirements: It must comply with legal and regulatory requirements, such as environmental regulations, health and safety standards, and labor laws. This requires an understanding of the relevant regulations and ensuring that the project is designed to meet these requirements.

Legal Feasibility

Determines, whether the proposed system conflicts with legal requirements. E.g. a data processing system must comply with the local Data Protection Acts.

Schedule Feasibility

A project will fail if it takes too long to be completed before it is useful. Typically this means estimating how long the system will take to develop, and if it can be completed in a given time period using some methods like payback period. Schedule feasibility is a measure of how

reasonable the project timetable is given our technical expertise and are the project deadlines reasonable? Some projects are initiated with specific deadlines. We need to determine whether the deadlines are mandatory or desirable.

2.5. Project Planning and Scheduling

For the successful completion of every project there must have a detailed scheduling. The software development has different participating steps. First of all, we have done the requirement analysis phase. For this, we visited different sites which helped us to continue our project, visited different business websites and we discussed with my friends and project guide.

After collecting the requirements, a detailed study of preliminary investigation has done.

3. SYSTEM REQUIREMENT SPECIFICATION

3.1. Introduction

A software requirements specification (SRS) is a description of a software system to be developed, laying out functional and non-functional requirements. (Non-functional requirements impose constraints on the design or implementation such as performance engineering requirements, quality standards, or design constraints.) The specification may include a set of use cases that describe interactions the users will have with the software. The software requirements specification document enlists enough and necessary requirements that are required for the project development. To derive the requirements, we need to have clear and thorough understanding of the products to be developed or being developed. This is achieved and refined with detailed and continuous communications with the project team and customer till the completion of the software.

3.2. Purpose

The purpose of this project is to develop an application that will automate the whole procedure of a library. The software that would be developed should have facilities like Add / Delete Members, Add / Delete Books, Issue & Return. The application should be secured, as well as with limited access. The main requirement of the project will be the ease of use, besides being the most efficient and effective tool for the purpose. The application should be user friendly. It should be robust and scalable. An automated solution would be very beneficial to the organization, as it would bring structure to the whole process so that it can be traced for any kind of query. Also, an automated solution will lead to optimal utilization of the available resources,

reducing duplication of effort, increasing efficiency and minimizing time-delays. Following are the main purpose of computerization:

- To provide services to the staffs of library for issue, return & search etc. at one place.
- To improve co-ordination in staff.
- To reduce paper filling work.
- To reduce risk of fraud.
- To reduce chances of information leaking.

3.3. Scope

There is a future scope of this facility that many more features such as online lectures video tutorials can be added by teachers as well as online assignments submission facility , a feature Of group chat where students can discuss various issues of engineering can be added to this project thus making it more interactive more user friendly and project which fulfills each users need in the best way possible.

3.4. System Requirements

Hardware Specification

The selection of hardware is very important in the existence and proper working of any of the software. When selecting hardware, the size and capacity requirements are also important. The hardware must suit all application developments.

- Processor : i3 or above.
- System Bus : 32Bit or 64Bit
- RAM : 2 GB or Above
- HDD : 1 TB or Above
- Monitor : 14" LCD or Above
- Key Board : Any type of keyboard
- Mouse : Any Type of mouse

- Mobile: Android supported mobile phone

Software Specification

One of the most difficult tasks is selecting software, once the system requirement is find out then we have to determine whether a particular software package fits for those system requirements. This section summarizes the application requirement.

- OS : Windows 10 And 32 bit or 64 bit platform
- Front End : Android, Python
- Back End : MySQL Server
- IDE : Eclipse or Android studio
Python 3.6 or above, PyCharm

4. SYSTEM DESIGN

The most creative and challenging phase of the system life cycle is system design. The term design describes a final system and the process by which it is developed. It refers to the technical specification that will be applied in implementing the candidate system. It also include the construction of the program and the program testing. the key question involved here is “how the problem should be solved”.

System design is a solution for the question of how to the approach to the creation of a new system. This important phase is composed of several steps. It provides the understanding and procedural details necessary for implementing the system recommended feasible study. Emphasis is on translating the performance requirements into design specifications. Design goes through logical and physical system; prepare input and output specification; make credit, security and control specification; details the implementation plan; prepare a logical design walk. Physical design maps out the physical system, plans the system implements, devices a test and implementation plan and specifies any new hardware and software.

The first most is to determine how the output is to be produced and in what format. Samples of output and input are presented. Second, input data and master files have to be designed to meet the requirements of the proposed output. The operational phases are handled through program construction and testing, including a list of programs needed to meet the system’s objectives and complete documentation. Finally, details related to justification of the

system and estimate of the impact of the candidate system on the user and organization are documentation and evaluated by management as a step towards implementation. The final report prior to the implementation phases includes procedural flowcharts, record layouts and workable plan for implementing the candidate system.

4.1. Module Description

Admin

The admin can log in to the webapp using a unique username and a password. Admin can verify student request, send notification, manage counter staff, library staff and books. The admin can view book request, damage info, fine info. The admin is responsible to manage the whole library.

Library Staff

The Library Staff can log in to the webapp using a unique username and a password. Library Staff can manage shelf, report damage, verify book request, view category and books.

Counter Staff

The Counter Staff can log in to the webapp using a unique username and a password. Counter Staff can issue/return book, view student history, notification and fine info, view/add damage info.

User

User uses an android application. Users need to register one time with their username, and they can login with the username and password. User can view category and shelf, browse based on book name/author/publisher/language. User can view history, fine information and notification. She/he can change password.

SMS User

Users can directly send SMS to a dedicated phone number with text of some predefined text and value.

5. CODING AND IMPLEMENTATION

5.1. Coding Environment

Front End

An Integrated Development Environment (IDE) (also known as Integrated Design Environment or Integrated Debugging Environment) is a software application that provides comprehensive facilities to computer programmers for software development. An IDE normally consists of:

- A source code editor
- A compiler and/or an interpreter
- Build automation tools
- A debugger

Pycharm

PyCharm is an integrated development environment (IDE) used in computer programming, specifically for the Python language. It is developed by the Czech company JetBrains. It provides code analysis, a graphical debugger, an integrated unit tester, integration with version control systems (VCSes), and supports web development with Django as well as Data Science with Anaconda.

PyCharm is cross-platform, with Windows, macOS and Linux versions. The Community Edition is released under the Apache License, and there is also Professional Edition with extra features – released under a proprietary license.

Features

- Coding assistance and analysis, with code completion, syntax and error highlighting, linter integration, and quick fixes
- Project and code navigation: specialized project views, file structure views and quick jumping between files, classes, methods and usages
- Python refactoring: includes rename, extract method, introduce variable, introduce constant, pull up, push down and others
- Support for web frameworks: Django, web2py and Flask [professional edition only]
- Integrated Python debugger
- Integrated unit testing, with line-by-line code coverage
- Google App Engine Python development [professional edition only]

- Version control integration: unified user interface

for Mercurial, Git, Subversion, Perforce and CVS with change lists and merge

- Support for scientific tools like matplotlib, numpy and scipy [professional edition only]

It competes mainly with a number of other Python-oriented IDEs, including Eclipse's PyDev, and the more broadly focused Komodo IDE.

Eclipse IDE

Google provides an integrated development environment (IDEs) to develop new applications. The Android Developer Tools (ADT) are based on the Eclipse IDE. ADT is a set of components (plug-ins), which extend the Eclipse IDE with Android development capabilities. Eclipse is an integrated development environment (IDE).it contains a base workspace and an extensible plug-in system for customizing the environment. It is written mostly in java. Eclipse can be used to develop applications. Eclipse sometimes performs multiple commands within a single connection to the server. This may cause problems with servers that are servers that are running server scripts in response to certain commands. Eclipse IDE contains all required functionality to create, compile, debug and deploy Android applications. This also allows the developer to create and start virtual Android devices for testing. Both tools provide specialized editors for Android specific files. Most of Android's configuration files are based on XML. In this case these editors allow you to switch between the XML representation of the file and a structured user interface for entering the data. Eclipse uses plug-ins to provide all the functionality within and on top of the runtime system.

The plug-in architecture supports writing any desired extension to the environment, such as for configuration management. Java and CVS support is provided in the Eclipse SDK, with support for other version control systems provided by third-party plug-ins. The Eclipse SDK includes the Eclipse Java development tools (JDT), offering an IDE with a built-in incremental Java compiler and a full model of the Java source files. This allows for advanced refactoring techniques and code analysis. The IDE also makes use of a workspace, in this case a set of metadata over a flat file space allowing external file modifications as long as the corresponding workspace "resource" is refreshed afterwards. Eclipse implements use the graphical control elements of the Java toolkit called SWT, whereas most Java applications use the Java standard Abstract Window Toolkit (AWT) or Swing. Eclipse's user interface also uses an intermediate graphical user interface layer called JFace, which simplifies the

construction of applications based on SWT. Eclipse was made to run on Wayland during a GSoC-Project in 2014.

Back End

Database Servers

A database server is used to store data in a database. Users can access the data and manipulate it. There are many types of databases. The most popular among them is the Relational Database Management System (RDBMS).

RDBMS

RDBMS is a type of database management system that stores data in the form of related tables. Relational database are powerful because they require few assumptions about how data is related or how it will be extracted from the database. As a result, the same database can be viewed in many different ways. An important feature of relational systems is that a single database can be spread across several tables. This differs from flat-file database, in which each database is self-contained in a single table.

MySQL

MySQL is an open source relational database and it includes advanced data types. MySQL operates using client/server architecture in which the server runs on the machine containing the database and client connect to the server over the network. MySQL run on all platforms supported by MySQL and provides the most direct means of interacting with the server, so it's the logical client to begin with.

- You need to have the MySQL software installed.
- You need a MySQL account so that you can connect to the server.
- You need a database to work with.

The required software includes the MySQL clients and a MySQL clients and a MySQL server. The client program must be located on the machine where you will working. The server can be located on our machine although that is not required. As long as you have permission to connect to it the server can be located anywhere. In addition to the MySQL software you will need a MySQL account so that the server will allow you to connect and create us sample database and its table.

Microsoft SQL Server 2008 is a full-featured relational database management system (RDBMS) that offers a variety of administrative tools to ease the burdens of database development, maintenance and administration. In this article, we'll cover six of the more frequently used tool: Enterprise Manager, Query analyzer, SQL Profiler, Service Manager, Data Transformation Services and Books Online. Let's take a brief look at each:

Enterprise Manager is the main administrative console for SQL Server installations. It provides you with a graphical "birds-eye" view of all of the SQL Server installation on your network. You can perform high-level administrative functions that affect one or more servers, schedule common maintenance tasks or create and modify the structure of individual databases.

Query Analyzer offers a quick method for performing queries against any of your SQL Server databases. It's a great way to quickly pull information out of a database in response to a user request, test queries before implementing them in other applications, create/modify stored procedures and execute administrative tasks.

SQL Profiler provides a window into the inner workings of your database. You can monitor many different event types and observe database performance in real time. SQL Profiler allows you to capture and replay system "traces" that log various activities. It's a great tool for optimizing databases with performance issues or troubleshooting particular problems.

Service Manager is used to control the MS SQL Server (the main SQL Server process), MSDTC (Microsoft Distributed Transaction Coordinator) and SQLServer– Agent processes. An icon for this service Manager to start, stop or pause any one of these services.

Data Transformation Services (DTS) provide an extremely flexible method for importing and exporting data between a Microsoft SQL Server installation and a large variety of other formats. The most commonly used DTS application is the "Import and Export Data" wizard found in the SQL Server program group.

Programming Languages

Python

Python is a widely used general-purpose, high level programming language. It was initially designed by Guido van Rossum in 1991 and developed by Python Software Foundation. It was mainly developed for emphasis on code readability, and its syntax allows programmers to express concepts in fewer lines of code.

Python is a programming language that lets you work quickly and integrate systems more efficiently.

There are two major Python versions- Python 2 and Python 3. Both are quite different.

HTML

Hypertext Markup Language (HTML) is the standard markup language for creating web pages and web applications. With Cascading Style Sheets (CSS) and JavaScript it forms a triad of cornerstone technologies for the World Wide Web. Web browsers receive HTML documents from a web server or from local storage and render them into multimedia web pages. HTML describes the structure of a web page semantically and originally included cues for the appearance of the document

5.2. Implementation

Implementation of the system refers to the final installing of the package in its real environment , to the satisfaction of the indeed users and the operation of the system. It is the process of converting a new or revised system design to operation. It is the key stage in achieving successful new system. The process of putting the developed system in actual use is called system implementation. This includes all those activities that take place to convert from the old system to new system. It must therefore be carefully planned and controlled. Proper guidance should be imparted to the users so that he is comfortable in using the application.

Implementation Plan

The transformation from theoretical designs to working system is done in this stage. Developed package of system is tested with simple data, accurate error identification and then through proposed change from the user etc. a dress rehearsal working of system is done, so as the system is scrutinized, for pointing out errors and modifications required if any keeping in mind the expectations and specifications from the system.

Education And Training

The expectations from the system are achieved by the people who will be involved to be confident of their role in the new system. The complexity of the system is directly proportional to the amount of training and education given for the user .Education is different from the training, as

the user through education can be a part of development of the system. Education has the capability to make training more interesting and important contributions in the system changes.

Training just means to give user specific skills in order to meet their new job requirements. The role of system analyst in training will make it more understandable and effective. Training provides a better overview of new system and its present objectives.

Training of the Application Software

Awareness about the new system is made to the users through training, and with the underlying philosophy of the system (screen design, flow, error types during inputs, validation checks etc.) application use the system, as the users of the system may be of at different levels of hierarchy.

Post Implementation Review

System performance v/s expected requirements are evaluated. The implementation problems if any is taken seriously and taken care of along with admiring the achievements, failures etc. The works done here are used to improve the efficiency and user friendliness of the system.

Security

System security is a branch of technology known as information security as applied to computers and networks. The objective of system security includes protection of information and property from theft, corruption, or natural disaster, while allowing the information and property to remain accessible and productive to its intended users. The term system security, means the collective processes and mechanisms by which sensitive and valuable information and services are protected from publication, tempering or collapse by unauthorized activities or untrustworthy individuals and unplanned events respectively. The technologies of system security are based on logic. As security is not necessarily the primary goal of most computer applications, designing a program with security in mind often imposes restrictions on that program's behavior.

Maintenance

Maintenance is making adaptation of the software for external changes (requirements changes or enhancements) and internal changes (fixing bugs). When changes are made during the maintenance phase all preceding steps of the model must be revisited.

There are three types of maintenance:

1. Corrective (Fixing bugs/errors)

2. Adaptive(Updates due to environment changes)

3. Perfective (Enhancements, requirements change)

Maintenance is an enigma of the system development. The definition of the software maintenance can be given describing four activities that are undertaken after the program is released for use.

The maintenance activity occurs since it is unreasonable to assume that software testing will uncover all in a large system. The second activity that contributes the definition of maintenance occurs since rapid changes are encountered in every aspect of computing. The third activity involves recommendation for new capabilities, modification to the existing functions and general enhancements when the software is used. The fourth maintenance activity occurs when software is changed to improve future maintainability or reliability.

6. TESTING

6.1. Testing Objectives

Testing is an important step in the software engineering process that could view rather than constructive. Testing is the process of executing a program with the intent of finding an error . a good test is that has probability to find an as yet undiscovered error.

- A good case is one that has a high probability of finding an unpredictable error.
- A successful case is one that has a high probability of finding an unpredictable error.
- A good test case is one that provides solution to that unpredictable error.
- A test plan entailed the following activities. We prepare list plan.
- We specified condition for users acceptance testing.
- We prepared list data for program testing .
- Also we prepared list data transaction plan testing.
- Then we planned user training.
- Our programs were compiled and assembled.
- Job performance aids were prepared.

Need For Testing

Software testing is a critical element of software quality assurance and represents the ultimate review of specification , design and coding . testing includes the verification of the basic logic of each program and verifies that the entire system works properly. Testing the individual program involves and attempt to be sure of the most likely possible. Test case design focuses on asset of technique for the creation test the cases that meet over all testing objectives.

Test Results

Test results emphasize how the actual results differed from the expected results. This suggests the need for re-testing, and to discover the source of differences. The test phase of systems development process involves the defining of the criteria by which the system will be tested and measuring the criteria against the acceptable failure rate. Individual modules are tested during the development itself. Errors detected are corrected and re-tested, and the project leader has verified the compliance. Each input, output and processes are tested to verify that it performs as specified in the design. The units in the system are re-compiled and errors found are corrected as indicated by the compiler. The tests are repeated until all known errors are eliminated and the program matched the design specifications. Separate tests are performed to ensure that program units are properly interfaced with each other to form a complete system.

6.2. Testing Strategy

Software testing determines the correctness, completeness, and quality of software being developed. Validation refers to the process of checking that the developed software meets the requirements specified by the user. The activities involved in the testing phase basically evaluate the capability of that system meets its requirements. The main objective of software testing is to detect errors in the software. Errors occur if some part of the developed system is found to be incorrect, incomplete or inconsistent. Test techniques include, but are not limited to, the process of executing a program or application with the intent of finding software bugs (errors or other defects).It involves the execution of a software component or system to evaluate one or more properties of interest. In general, these properties indicate the extent to which the component or system under test:

- meets the requirements that guided its design and development,
- responds correctly to all kinds of inputs,

- performs its functions within an acceptable time,
- is sufficiently usable,
- can be installed and run in its intended environments, and
- achieves the general result its stake holders desire.

As the number of possible tests for even simple software components is practically infinite, all software testing uses some strategy to select tests that are feasible for the available time and resources. As a result, software testing typically (but not exclusively) attempts to execute a program or application with the intent of finding software bugs (errors or other defects). Software testing can provide objective, independent information about the quality of software and risk of its failure to users and/or sponsors. Software testing can be conducted as soon as executable software (even if partially complete) exists. The overall approach to software development often determines when and how testing is conducted. For example, in a phased process, most testing occurs after system requirements have been defined and then implemented in testable programs. In contrast, under an Agile approach, requirements, programming, and testing are often done concurrently.

White-box Testing

Tests are performed to ensure that all internal operations of the software are performed according to the specifications of the client. This is called White box testing. White-box testing (also known as clear box testing, glass box testing, transparent box testing, and structural testing) is a method of testing software that tests internal structures or workings of an application, as opposed to its functionality (i.e. black-box testing). In white-box testing an internal perspective of the system, as well as programming skills, are used to design test cases.

White-box testing can be applied at the unit, integration and system levels of the software testing process. Although traditional testers tended to think of white-box testing as being done at the unit level, it is used for integration and system testing more frequently today. It can test paths within a unit, paths between units during integration, and between subsystems during a system-level test. Though this method of test design can uncover many errors or problems, it has the potential to miss unimplemented parts of the specification or missing requirements. The details entered by the administrator are saved and stored in the database, and testing is done to verify whether the control of each form or action is working in the exact way.

Black-box Testing

Tests are performed to ensure that each function is working properly. This is referred to as Black-box testing. Black-box testing is a method of software testing that examines the functionality of an application (e.g. what the software does) without peering into its internal structures or workings. This method of test can be applied to virtually every level of software testing: unit, integration, system and acceptance. It typically comprises most if not all higher level testing, but can also dominate unit testing as well. Test cases are built around specifications and requirements, i.e., what the application is supposed to do. Test cases are generally derived from external descriptions of the software, including specifications, requirements and design parameters. Although the tests used are primarily functional in nature, non-functional tests may also be used. The test designer selects both valid and invalid inputs and determines the correct output without any knowledge of the test object's internal structure. Testing is conducted in the system so that the functions namely Login, sending requests, searching the nearest donor, getting routes to the nearest blood banks etc. are done properly.

Condition Testing

Test cases are derived to determine whether the logic conditions and decision statements are free from errors. Condition testing strategy is used to check if the operators used are correct and to verify conditions such as if an error message is displayed if a non registered user is signed in to the app, or a user is registered without providing his body mass index value.

Loop Testing

This testing is used to check the variety of loops present in programming. The working of the loops such as while, for and do while are checked for its proper execution. The statements inside the loop body are executed line by line for every condition that satisfies the loop.

Unit Testing

Unit testing focused verification efforts on the smallest unit of software design, the module. This is also known as “module testing”. The modules are tested separately. This testing is carried out during programming stage itself. In this testing step each module is found to be working satisfactorily as regard to the expected output from the module.

Project Aspect: User interfaces are tested for data acceptance. Each of the modules such as Login, item add modules etc are tested individually and found error free.

Integration Testing

Data can be lost across the interfaces; one module can have an adverse effect on the other; sub functions when combined, may not produce the desired major functions. The integration testing is a systematic testing for constructing the programs structure, while at the same time conducting tests to uncover errors associated within the interface. The objective is to take unit tested modules and build a program structure. All the modules are combines and tested as a whole. Here correction is difficult because the vast expenses of the entire program complicate the isolation of causes. Thus in the integration testing step, all the errors uncovered are corrected for the next testing steps.

Project aspect: Using integrated test plans prepared in the design phase of the system developed as a guide, the integration test was carried out. The modules are integrated and tested and all the errors found in the system were corrected for the next testing steps.

Output Testing

After performing the validation testing, the next step is output testing of the proposed system since no system could be useful if it does not produce the required output in specific format. Asking the users about the format required by them tests the outputs generated or displayed by the system under consideration. The output format of the screen is found to be correct as the format was designed in the system design phase according to the user needs. For the hard copy also, output comes out as the specified requirements by the user. Hence output testing does not result in any correction in the system. Various reports are generated in graphical output format and being pictorial representation it is found more convenient to understand by the users of the system.

User Acceptance Testing

User acceptance testing of a system is the key factor for the success of any system. The system under consideration is tested for user acceptance by constantly keeping in touch with the prospective system users at the time of developing and making changes wherever required. This is done with regard to the following points.

Objectives

- A good case is one that has a high probability of finding an unpredictable error.
- A successful case is one that has a high probability of finding an unpredictable error.

- A good test case is one that provides solution to that unpredictable error.
- A test plan entailed the following activities. We prepare list plan.
- We specified condition for users acceptance testing.
- We prepared list data for program testing .
- Also we prepared list data transaction plan testing.
- Then we planned user training.
- Our programs were compiled and assembled.
- Job performance aids were prepared.

Test Results

Test results emphasize how the actual results differed from the expected results. This suggests the need for re-testing, and to discover the source of differences. The test phase of systems development process involves the defining of the criteria by which the system will be tested and measuring the criteria against the acceptable failure rate. Individual modules are tested during the development itself. Errors detected are corrected and re-tested, and the project leader has verified the compliance. Each input, output and processes are tested to verify that it performs as specified in the design. The units in the system are re-compiled and errors found are corrected as indicated by the compiler. The tests are repeated until all known errors are eliminated and the program matched the design specifications. Separate tests are performed to ensure that program units are properly interfaced with each other to form a complete system.

7. FUTURE ENHANCEMENT

In future, can add more features to this proposed system. There is a future scope of this facility that many more features such as online lectures video tutorials can be added by teachers as well as online assignments submission facility , a feature Of group chat where students can discuss various issues of engineering can be added to this project thus making it more interactive more user friendly and project which fulfills each users need in the best way possible.

8. CONCLUSION

This website provides a computerized version of library management system which will benefit the students as well as the staff of the library.

It makes entire process online where student can search books, staff can generate reports and do book transactions. It also has a facility for student login where student can login and can see status of books issued as well request for book or give some suggestions. It has a facility of teacher's login where teachers can add lectures notes and also give necessary suggestion to library and also add info about workshops or events happening in our college or nearby college in the online notice board.

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Links

1. <https://stackoverflow.com/questions/25193275/run-code-after-rendering-django>
2. <https://developer.android.com/studio>
3. https://docs.opencv.org/trunk/db/d28/tutorial_cascade_classifier.html