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REVIEW ARTICLE

A Report on Library Management System

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ABSTRACT

The main aim of Library Management System is to keep the book in the proper way with its complete details including author and the student who is issuing this book. Everything is managed from the database (C++ Files). Our main aim of the project is to get the correct information about a particular student and books available in the library. The problems, which existed in the earlier system, have been removed to a large extent. Moreover, it is expected that this project will go a long way in satisfying user's requirements. The computerization of library management will boost productivity while also lowering stress levels among staff members, indirectly enhancing human resources.

Key words: Database(C++ Files), Library management system, Computerization of library management

INTRODUCTION[1]

The main aim of Library Management System is to keep the book in the proper way with its complete details including author and the student who is issuing this book. Everything is managed from the database (C++ Files). It needs to maintain the book and to check whether the books are available in the library. If the book is not available in the library then it should be removed from the data base (C++ Files).

Students are provided with the admission number for the issuing books. They can issue the book for 15 days and after they have to pay the fine per day rupee one. If the student lost the book, then he has to purchase the same book and submit to the library. This system helps to keep records of books, students details. The librarian can manage all the library books details and keep a track on all the books that are issued. Even fine collection can issued to late return on the book. All the details of the books such as author name and book name can be stored in the college library database (C++ Files).

Library Management System manages the complete management of the entire library through this system easy interface. It removes manual process of issuing books by easy way of issuing book saving time. The librarian can issue, return, and reserve book for a particular student through this system. This system automatically shows fine levied by automatically counting days from the date if issue in case of late return of the book. Student can also check the availability status of a particular book online generate customized report for library books, library inventory, and library fine collection.

TECHNOLOGY USED[1]

C++ Introduction

We are about to be introduce to a powerful programming language that is known a C++. C was developed in the early 1970 and C++ came 1st time in 1980. In the time since, C and C ++ have evolved from a small tool that research laboratory programmer built for himself and the worldwide object-oriented language of choice. C++ how has a published standard definition, the C standard has been formal for several years, and the proposed C++ standard definition recently was approved.

C++ features as a general-purpose programming language include imperative, object-oriented, and generic programming, as well as the ability to manipulate low-level memory. Its design criteria are performance effectiveness and flexibility of

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use, with a slant toward systems programming. Because it is a compiler-based programming language, no C++ programmer can be executed without compilation. We must first compile our software before running it.

- C++ is an object oriented programming language
- C++ is a super set of C
- C++ uses the control structures of structured programming
- C++ supports exception handling, which permits a program to make an orderly jump to a defined location.

C++ Features

- Simple - Every C++ program can be written in straightforward English to make it simple for programmers to comprehend and develop.
- Platform dependent - When a program is run on the same operating system where it was designed and compiled but not when it is run on another operating system, the language is said to be platform-dependent. Platforms differ while using C++.
- Proteblity - It refers to the idea of transferring instructions from one system to another. written in C++.Cpp files contain source code that can be edited. Only we are able to run the applications included in exe files. Any C++ software that is written and compiled on a Windows operating system can readily run on other Windows-based systems.
- Powerful - A extremely potent programming language is C++. There are many different data kinds, functions, control statements, decision-making statements, etc., in it.
- Object-oriented programming language- This main advantage of C++ is, it is object oriented programming language.it follow concept of oops such as polymorphism, inheritance, encapsulation, and abstraction.
- Case sensitive - C++ is a case sensitive programming language. In C++ programming, “break and BREAK” both are different.
- Compiler based - Since C++ is a compiler-based programming language, no C++ program can be run without compilation. To build and subsequently execute our program, we first need a compiler.
- Syntax based language - Strongly syntax-based, C++ is a programming language. Strongly tight syntax-based languages are those in which rules and regulations are adhered to with extreme strictness. For instance, if any language does not adhere to rules and regulations particularly tightly, it is known as a loosely tight syntax-based language, such as HTML.

HARDWARE REQUIREMENT

- Procedure: Dual core i3,i5
- Memory: 40–50 MB
- Hard disk: 40 MB
- Monitor: Colour
- Input: Key board, mouse

SOFTWARE REQUIREMENT

- Operating System: WindowXP,7,8,10
- Technology used: C++
- Editor: Turbo C++
- Tools: MS office

SYSTEM ANALYSIS WITH COST AND BENEFIT

Without performing this exercise a decision may be made based on the wrong criteria. The majority of the costs in a software system implementation occur on the front end while the benefits are realized over time.

Cost factors

There are several costs to consider when evaluating a new software system. Of course, there is the initial purchase price of the system, but there are many other factors to consider. There may be additional equipment costs. Never and more powerful computers may be needed to run the system. Stronger and faster network and/or internet connections may be required. Training will be required and in many cases this can be the biggest cost absorbed during a system implementation. Not only is training an item that is paid for but also when people are training

they are sometime taken away from their regular responsibilities.

Benefit factors

The benefits of a new system can be extensive and can impact many aspects of a business. A system can have a positive impact by reducing costs and/or by improving sales. At an operational level productivity, improvements may be realized and cost reduction gained. Unnecessary steps in processes and duplication of effort can be eliminate. Most of the cost factors will be in the beginning. The benefit factors should be started in monthly terms. This way the return on investment can be evaluated. The first thing this will project is the breakeven point. How many months into the future will it take to recoup the initial investment? Then, the analysis will indicate the net benefits to be cognized over the useful life of the system. These are very important points to consider. If the breakeven point is too far into the feature, then the system may not be a good investment. Furthermore, the benefits to recognize over the useful life of the system should justify the investment.

It should be stated that benefits are not always monetary and may not be quantifiable in terms of business impact. For a small business owner, a system may allow for more personal time which is hard to put a price tag on but no one ever seems to have enough of.

A software system is an important investment and care should be given to make sure the best decision is made. A detailed cost benefit analysis should always be part of the decision.

Tag: auto repair shop management, auto repair shop management software, auto repair shop software auto shop management software, fleet services software, repair shop management software, repair shop software, software evaluation, and tire shop management software.

SYSTEM DESIGN[2]

Design is the first step into the development phase for any engineered product or system. Design is a creative process. A good design is the key to effective system. It may be defined as process of applying various techniques and principles for the purpose of defining a device, a process or a system in sufficient detail to permit its physical realization. Software design sits at the technical kernel of the development paradigm that is used. The system design develops the architectural detail required to build a system or product. As in the case of any systematic approach, this software too has undergone the best possible design phase fine tuning all efficiency, performance, and accuracy levels. System design goes through two phases of development: Logical and Physical Design.

Logical design

The logical flow of a system and define the boundaries of a system it includes the following steps:

- Reviews the current physical system-its data flows, file content, volumes, frequencies, etc.,
- Prepares input specifications – format, content, and most of the input functions
- Prepare edit, security, and control specification
- Specifies the implementation plan
- Prepare a logical design walk through of the information flow, output, input, controls, and implementation plan.

Physical design

It includes the following steps:

- Design the physical system
- Specify input and output media
- Design the database and specify backup procedures
- Design physical information flow through the system and a physical design walk through
- Plan system implementation
- Prepare a conversation schedule and target date
- Determine training procedures, courses, and timetable.

Design/specification activities:-

- Concept formulation
- Problem understanding
- Feasibility study
- Requirements engineering
- Architecture design.

Module design

Admin- The administrator logs in using the admin login. In this, administrator has the full authority over the software. In this system, the administrator has the power to add or update or delete all the details.

Input design

The design of input focuses on controlling the amount of input required, controlling the errors, avoiding delay, avoiding extra steps, and keeping the process simple. The input is designed in such a way so that it provides security and case of use with retaining the privacy. Input design considered the following things:

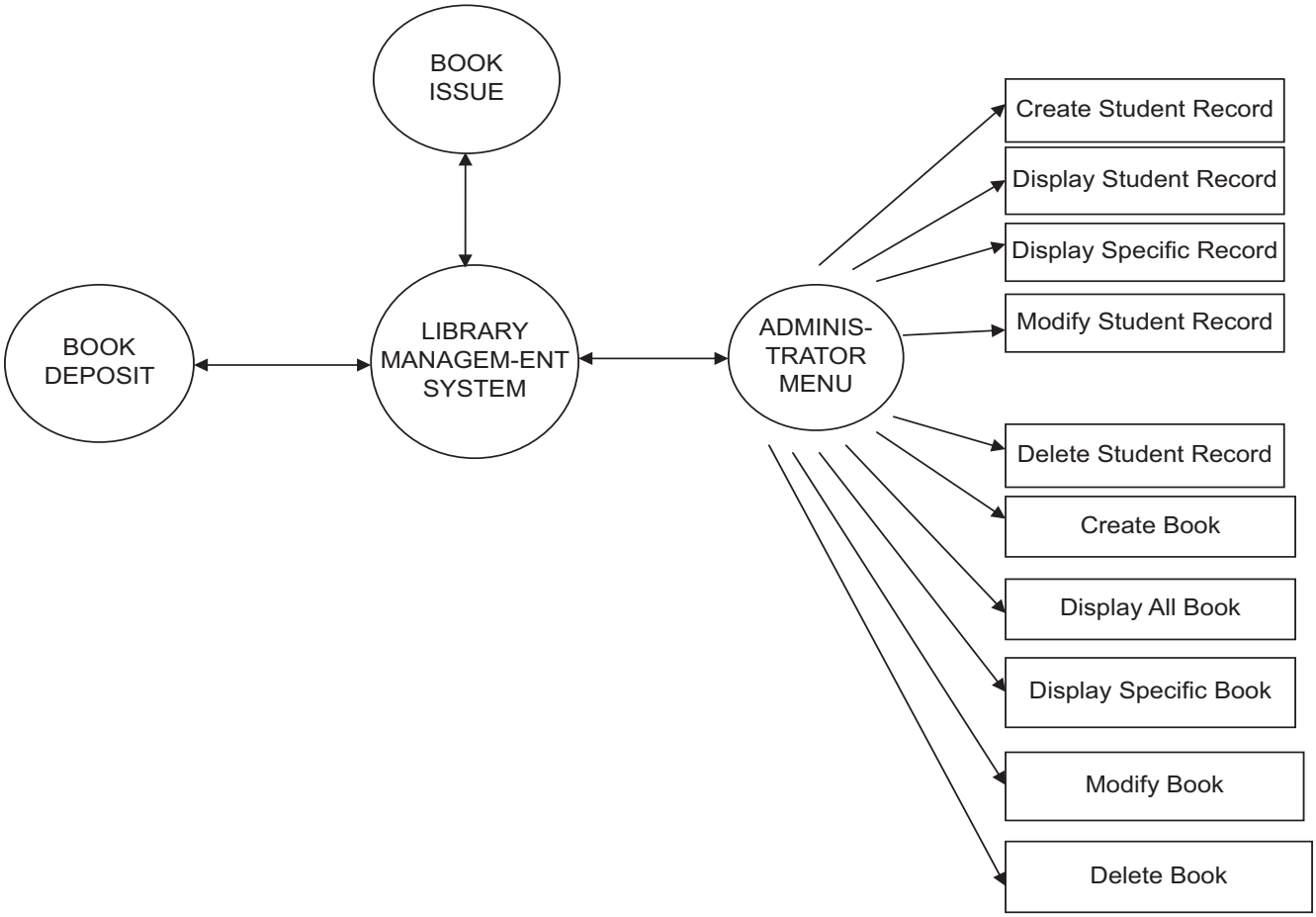
- What data should be given as input?
- How the data should be arranged or coded?
- The dialog to guide the operating personnel in providing input
- Methods for preparing input validations and steps to follow when error occur.

Output design

A quality output is one, which meets the requirements of the end user and presents the information clearly. In output design, it is determined how the information is to be displaced for immediate need and also the hard copy output. It is the most important and direct source information to the user. Efficient and intelligent output design improves the system's relationship to help user decision-making.

Designing computer output should proceed in an organized, well thought out manner; the right output must be developed while ensuring that each output element is designing so that people will find the system can use easily and effectively. When analysis designs computer output, they should:

- Identify the specific output that is needed to meet the requirements
- Select methods for presenting information
- Create document, report or other formats that contain information produced by the system.



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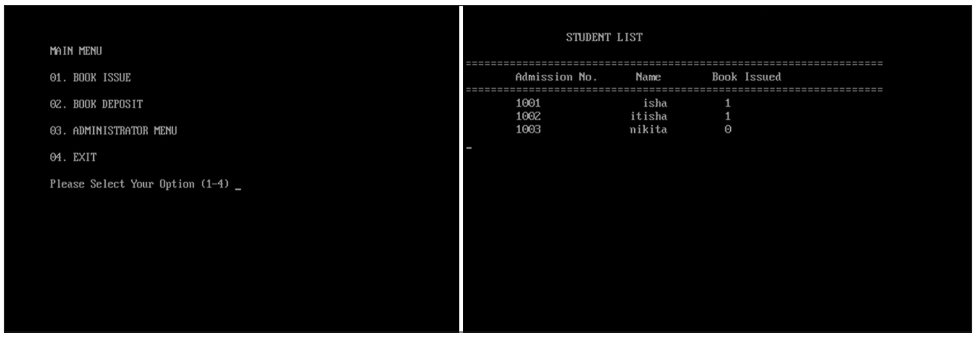
MAIN MENU
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02. BOOK DEPOSIT
03. ADMINISTRATOR MENU
04. EXIT
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Admission No. Name Book Issued
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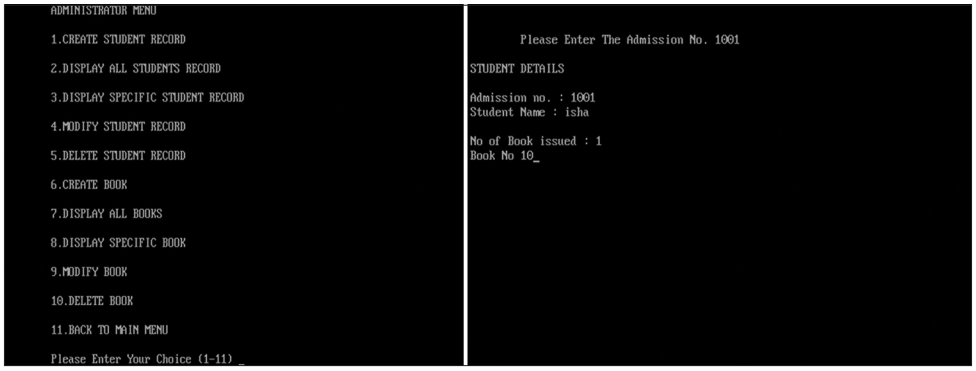
1002 itisha 1
1003 nikita 0


ADMINISTRATOR MENU
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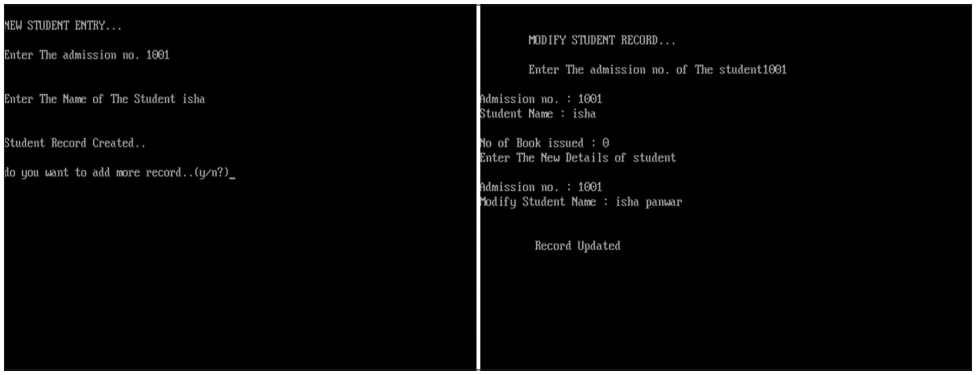
2.DISPLAY ALL STUDENTS RECORD
3.DISPLAY SPECIFIC STUDENT RECORD
4.MODIFY STUDENT RECORD
5.DELETE STUDENT RECORD
6.CREATE BOOK
7.DISPLAY ALL BOOKS
8.DISPLAY SPECIFIC BOOK
9.MODIFY BOOK
10.DELETE BOOK
11.BACK TO MAIN MENU
Please Enter Your Choice (1-11)
Please Enter The Admission No. 1001
STUDENT DETAILS
Admission no. : 1001
Student Name : isha
No of Book issued : 1
Book No 10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Enter The admission no. 1001
Enter The Name of The Student isha
Student Record Created..
do you want to add more record..(y/n?)
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Enter The admission no. of The student1001
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Admission no. : 1001
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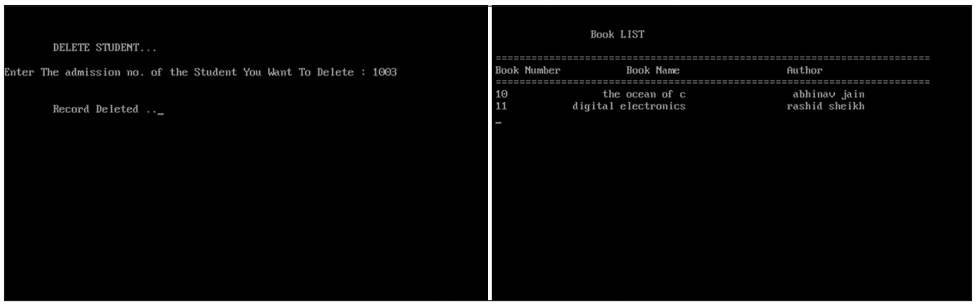
Record Updated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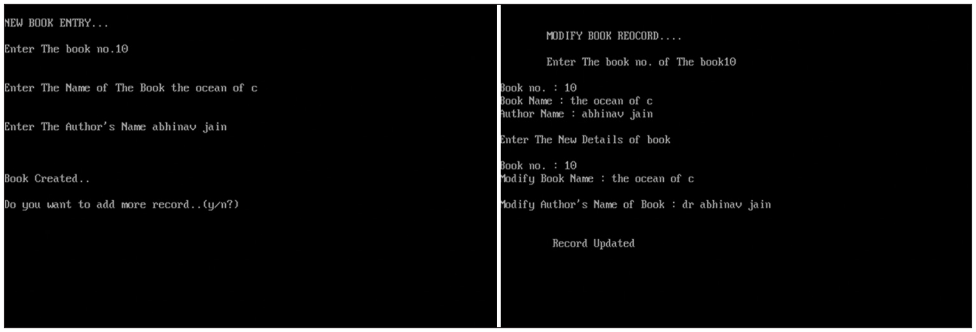
11 digital electronics rashid sheikh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Enter The Author's Name abhinav jain
Book Created..
Do you want to add more record..(y/n?)
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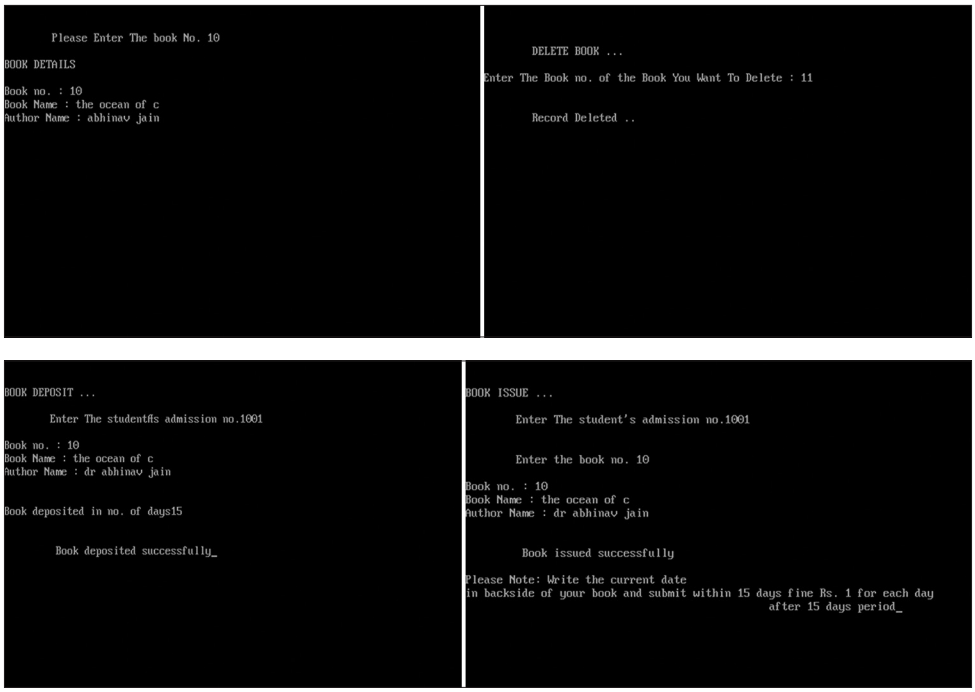

SYSTEM IMPLEMENTATION OF HARDWARE AND SOFTWARE[3]

Implementation literally means to put in to effect or to carry out. The system implementation phase of the software deals with the translation of the design specification in to the source code. The code and documentation should be written in a manner that cases debugging, testing, and modification. System flowcharts, sample run on packages, sample output, etc., are part of the implementation. An effort was made to satisfy the following goals in order specified:

- Minimization of response time
- Clarity and simplicity of the code
- Minimization of hard-coding.

Various types of bugs were discovered while debugging the modules. These ranged from logical errors to failure on account of various processing cases.

Implementation is the stage of the project where the theoretical design is turned into a working system. It can be considered to be the most crucial stage in achieving a successful new system gaining the users confidence that the new system will work and will be effective and accurate. It is primarily concerned with user training and documentation.

SYSTEM TESTING METHODOLOGY[4]

While performing software development project, error can be occurred at any state during development. No techniques are perfect and it is accepted that some of the error of earlier phases will finally manifest them self in a code. Hence, code developed during coding activity is lightly to have some error. Testing is phase where error remaining from all the previous phases must be detected. Hence, testing performs a critical role for software quality assurance.

- Testing plan and implementation

Testing is performed to ensure that the system meets its objectives, represents the system correctly, has no ambiguities, and is easily understandable. The scope of testing summarizes specific functional, performance, and internal design characteristics that are to be tested. A good testing method will manage to find out all the errors in the program. Below is the summarization of the various functions that are to be tested.

Testing performed at graphical user interface level:

- Test of validation on the login page for user id and password
- Test for robustness in case of various malicious inputs
- Test of the response from the application in case of no inputs
- Testing performed to check the functional validity
- Test to check the transfer of the session between various pages
- Test to check the capabilities of the server
- The expected results or success criteria for the test

- The test plan describes the overall strategy for carrying out the testing and integration of the system. System is quite large and testing is done thoroughly that is testing part will find all the errors in the system. All the required necessary testing and overall testing of the system was carried out.

TESTING METHOD

Software testing

Software testing is a process used to identify the correctness, completeness, and quality of development computer software.
A set of activities which can be planned in advance and conducted systematically is testing. Software testing indicates the ultimate review of specification, design, and code generation. Once source code has been generated, software must be tested to uncover and correct maximum possible errors before been delivered. Due to this reason, a template for software testing, which is set of steps into which we can place specific test case design techniques and methods should be defined for the software process. Software testing is a quality assurance activity in its own right and its testing objective is as follows:

- Testing is a process of executing a program with the intent of finding an error
- A good test case is one that has high probability of finding an as yet undiscovered error
- When a program is translated into programming language source code, some typing errors may occur.

White-box testing

White-box testing is a test case design method that makes use of the control structure of the procedural design to drive test cases. White-box testing exercise all logical designs, exercise all loops at their boundaries and within their operational bounds, exercise internal data structure to ensure their validity, etc., white-box testing enables the test case designer to drive a logical complexity measure of a procedural design. It helps in using this measure as a guide for defining a basis set of execution paths. Following are the reasons, each of which provides an arguments for conducting white-box testing-

- Logical errors and incorrect assumption are inversely proportional that a path of the program will be executed
- When a program is translated into programming language source code, some typing errors may occur.

Black-box testing

Black-box testing enables an engineer to drive sets of input conditions that will fully exercise all functional requirements for a program. It attempts to find errors such as:

1. Interface errors
2. Incorrect or missing functions
3. Errors in data structures or external data base access
4. Behavior or performance errors
5. Initialization and termination errors.

Integration testing

After unit testing, the integration test is applied. Now, we are having integrated program to test and no assurance that they will be working well when put together. At this stage, error is mainly due to non-compatibility of data among the programs. Data can be lost across an interface one module can have no adverse effect on other; sub function when combined may not produce the desired major function.
Hence, this integration of modules will test using this test procedure. Then, the entire program is tested as a whole and set of errors has encountered.

Unit testing

For application, the unit testing was carried out by individual programmer before integration of the unit (module) into a large system. After coding was done for that unit testing. Each tester carried out that testing for code developed by the tester. A unit is a code function. Since the DCMS application was delivered in the phases to the client unit, testing was also carried in phase.
The module interface was tested which ensure that information properly flowed into and out the program unit under test.

System testing

This kind of test is simply executing programs to check logical changes made with intention of finding errors. A system is tested for response,

volume of circulation, recovery from failure, etc., system testing is done to ensure that the system satisfies all the user requirements.

Validation testing

Validation can be defined in many ways but a simple definition is that validation succeeds when software functions in a manner that can be reasonably expected by the users, reasonable which describes all user visible attributes of the software.

Beta testing

In beta testing, actual data is taken for testing instead of simulated data. This test is conducted at the users place and it is not necessary for developer to present there. It is the live application of the software, in an environment that cannot be controlled by the developer, the test is conducted at one or more user's sites by the end user of the software; in this test, the developer is generally not present. Moreover, according to the problem, the developer does modifications. The test is generally done to ensure that testing is unbiased and satisfactory.

In our project, this test is not performed till now, because we have just implemented it, and currently, the librarian is working on it, when he will face problem he will inform us and we will make modifications according to him.

This test stimulates operation of the entire system and confirms that system is also tested for recovery and back after various major failures to ensure that no data is lost during the emergency.

Software testing is the process of executing software in a controlled manner, to answer the question – does the software behave as specified.

Software verification and validation. Validation is the checking or testing of items, which includes software, for conformance and consistency with an associate specification.

Testing is a set of activity that can be planned in advanced and conducted systematically. Nothing is complete without testing as it vital success of the system testing objectives, there are several rules that can serve as testing objectives.

A good test case is one that has high possibility of finding an undiscovered error.

CONCLUSION

After we have completed the project, we are sure that the problems in the existing system would overcome. The "LIBRARY MANAGEMENT SYSTEM" process made computerized to reduce human errors and to increase the efficiency. The main focus of this project is to lessen human efforts. The maintenance of the records is made efficient, as all the records are stored in the C++ Files (Student.dat and Book.dat), through which data can be retrieved easily. The navigation control is provided in all the forms to navigate through the large amount of records. If the numbers of records are very large, then user has to just type in the search string and user gets the results immediately. The editing is also made simpler. The user has to just type in the required field and press the update button to update the desired field. The Books and Students are given a particular unique id no so that they can be accessed correctly and without errors. Our main aim of the project is to get the correct information about a particular student and books available in the library. The problems, which existed in the earlier system, have been removed to a large extent. Moreover, it is expected that this project will go a long way in satisfying user's requirements. The computerization of library management will boost productivity while also lowering stress levels among staff members, indirectly enhancing human resources.

Limitation

- Book order processing is not implemented
- Library members cannot book issue in advance if book is unavailable
- Fine management process is not implemented.

REFERENCES

1. Available from: https://www.w3schools.com/css/css_rwd_frameworks.asp
2. Available from: https://www.mlsu.ac.in/econtents/16_EBOOK7th_ed_software_engineering_a_practitoners_approach_by_roger_s._pressman_.pdf
3. Available from: https://player.uacdn.net/slides_pdf/bf8i0ss2u8elhzxi7qns/quick_revision__download_c_oops_slides_lec_1533_with_anno.pdf
4. Available from: https://github.com/topics/library-management-system?l=c%2B%2B