# Blockchain-Powered Library Management

## Project Report

Summited by

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### INTRODUCTION:

**Project overview:**

A library is a place where a huge collection of books and resources are available which can be accessible by the users. It acts as a brain for the institutions. It enhances the dissemination of knowledge and spiritual civilization among the students. The tons of books and research works are captivating the students to improvise their knowledge in all perspectives. It guides the students to promote their views differently. This knowledge optimizes the student to achieve a better result in academic as well as personal skill development. Improvisation in technology causes the demand for developing a way to enhance the traditional library set up to digital one. Numerous tedious processes reduce the efficiency of the library. For example, it always needs manual support to do any activities in the traditional library. The count and details of books are scribbled in the paper for reference. Each data is fetched in the notebook for future citations. To examine any data then they have to refer the notebooks. At the same time while distributing the books to the students they have to enter into the notebook where they need to represent the book id, distribution and renewal date, and student id. The librarians/staff have to assign a tag for each book and provide an id for it. They have to align and arrange the books on the shelves and marked it. Missing or theft of the book builds a serious issue and confusion to the librarians. While collecting the book from the students they have to verify the penalties of the books. Therefore it causes a monotonous among the staff.

Consequently, it builds an uninteresting among the student due to the slow progress of

**Purpose :**

- The library management system is a software to manage manual functions of a library. The software helps to manage the entire library operations from maintaining book records to issue a book. In addition, it allows streamlined management of fine details of books such as author name, edition, and many other important details. So, it is easier to search for books and find the right materials for students and the librarian.
- The electronic management via the software is essential to track information like issue date, due date, who has borrowed any material, etc. The system is developed and designed with an aim to facilitate efficient management to the schools to manage a modern library with accurate data management. Thus, school management or library head can get all the necessary details electronically without
- Admin login: the administrators can access the entire functionality of the system via this component. The admin can maintain the records and track them as per necessity. Also, the admin can add or remove entries into the system respectively.
- User login section: the students who want to access library materials, need to do registration first. The registration allows for maintaining records accurately. After registering, they can check out and check in the library material.
- Add and update books: The admin can add new books or other materials to the system with the essential details. Thus, the librarian can maintain the system effectively.
- Search option: all users of the system, including admin can search for library materials. Admin and students can search for books by entering the name of the book.
- View order status – the admin can view rented books and their due date. Also, the other details like students details who has rented a book will be available in this module.
- Check-in and check out– this is the distinct component of a library management system where a student can check in, and check out the library souveniers electronically. This facility helps to save the time of both; students, and the librarian.

- Fine calculator – The students and admin can view the issued materials with their due date. And, if any book is overdue, the system will allow calculating fine for the same.

**2.LITERATURE SURVEY:**

The library management system software helps in reducing operational costs. Managing a library manually is labor intensive and an immense amount of paperwork is involved. An automated system reduces the need for manpower and stationery. This leads to lower operational costs.

The system saves time for both the user and the librarian. With just a click the user can search for the books available in the library. The librarian can answer queries with ease regarding the availability of books. Adding, removing or editing the database is a simple process. Adding new members or cancelling existing memberships can be done with ease.

Stock checking and verification of books in the library can be done within a few hours. The automated system saves a considerable amount of time as opposed to the manual system.

# LIBRARY MANAGEMENT SYSTEM

**Definition:**

- An integrated library management system (LMS) is cap software that helps in simplifying the daily operations of the library. purpose of a library management system is to manage & tracked the daily works of the library such as issuing books, return books, due calculation etc.

**Language lab software:**

- powers language lab is word class english language lab software integrated with information technology techniques to impart high standards is language teaching and learning.

**Features of english language lab software:**

- it provides primary & effective learning and develops confidence in speaking english.

- it helps to develop the communication skill of the learners.

- it helps in teaching english as language and not merely as a subject.

## What is digital language lab

- Digital language lab is software which works on digital platform.

- Spoken language lab is a digital language lab which provides huge interactive content for learning English skills digitally.

- In the initial stage, the digital language lab focuses on listening and speaking skills of students. Students are asked to listen to audio lessons given in language lab software and practise them.

**Grammar:**
- Remedial grammar is provided for communication in grammatically correct English. One word substitution, prepositions, doing words etc.

**Intonation:**
- Intonation is to learn the accuracy of the pitch of speaking the English language. It is required to know where to stop and how to maintain the flow and avoid trouble.

**Listening skills:** To acquire any knowledge the first step begins from listening until we listen to something we cannot will speak it.

**Speaking skills:** Speaking is the second language skill. Speaking skills give us the ability to communicate effectively. Likewise, English language lab improves speaking skills and communication skills especially. Listening to the language over the headphones helps students

**Reading skills:** We start reading in school and improve gradually by practising the language. School many most software facilitate reading exercises with dictionaries and phonetic help for the students fluency and comprehension skills.

**Writing skills:** We initially start writing alphabets and gradually learn writing sentences. Writing is an important part of communication. Improving writing skills which will automatically enhance the communication skills among students and bring confidence.

* MTI:
.. it helps in the removal of mother tongue influence by practicing speaking skills in different accents like American and British.

* soft skills:
.. There are a variety of soft skills courses are available in the language lab like resume writing, interview skills, group discussion, presentation, personality development, etc.

The components of modern language lab:
# a system is allotted to the teacher for conducting language exercises.
# a storage device is required to keep all the lessons and materials on that screen.
# students require a media player or recorder to record audio lessons and listen to their speech.

The functions of a language lab systems are:
. The teacher can assign assignment to the students.
. it is based on paperless examinations.
. online learning enhances listening and speaking skills.

## english language lab:

- language lab software is a classroom based solution which will be installed on the computers in classroom and the content can be accessible in the respective classroom system.

## LSRW Activities for benefits of the students/learners:

- LSRW expands for listen, speak, read and write. LSRW is considered the most effective methodology for learning english language.

## Language lab software As per AICTE:

- AICTE is the organisation body governing the higher educational institutions in india. Few people in india know how to speak and write correct english. The english language lab provides and interactive platform and solves over the problems that a traditional english classroom would face.

**2.2REFERENCES:**

- A library management system can help you seamlessly transition from manually managed libraries to automated libraries, making them more efficient and effective. The Library management system's primary role is to securely keep all data on materials discovered in a library in a cloud data storage.

- Libraries play a vital role for a nation by preserving its cultural heritage. In the modern age with the abundance of information, libraries assist the society by maintaining and disseminating the relevant information as and when required.

- Research shows that school libraries have a positive impact on student literacy and learning outcomes. Read a selection of research reports illustrating the effectiveness of library services that are aligned with the school's vision and learning goals
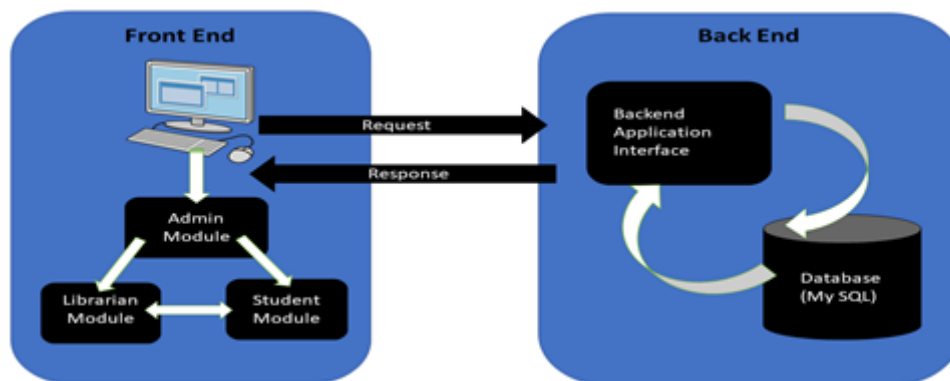


- As we know, any software application consists of broadly three parts: Front-End, Back-End and a Database part. This application also has these three parts.

- The front-end part helps the admin and librarian to interact with the database.

- 4The front-end part is further divided in to three different sections or application modules. Those application modules are Admin Module, Librarian Module

and Student Module. These modules can be accessed by the administrator, librarian and students by interacting with the front-end screens of the application respectively. The modules are internally connected with the backend portion and the database.

- The whole software application is divided in to three modules which are Admin Module, Librarian Module and Student Module.

- These three sections are accessible through the application's three different panels.

making it user-friendly. The modules are interconnected with each other so that they can communicate the information between them. For example, admin module is connected to the librarian module and only those people can access the librarian module which are authorised by the administrator under the admin module. Similarly, the students will be able to access the student module only if they are registered in the library database by the librarian

## 2.3PROBLEM STATEMENT DEFINTION :

- Problem-solving enables us to identify and exploit opportunities in the environment and exert (some level of) control over the future. Problem solving skills and the problem-solving process are a critical part of daily life both as individuals and organizations.
- Problem solving is the act of defining a problem; determining the cause of the problem; identifying, prioritizing, and selecting alternatives for a solution; and implementing a solution.

## SPECIFY THE BUSSINESSPROBLEM:

- Data errors, which may be caused by human errors, system glitches, or external factors, are inconsistencies or inaccuracies in the information stored in your LMS. To prevent and correct these errors, you should establish and enforce data quality standards and policies for library staff and users.

- Needless to say, the average public library in the United States does not

have the resources, funding, or space to house those state-of-the-art facilities. In fact, operation expenses and administrative costs for libraries have grown exponentially over the last several years.

- The purpose of a library management system is to manage & track the daily work of the library such as issuing books, return books, due calculations, etc.

- The Paper also traces and analyze problems area like lack of proper planning, lack of fund/economical resources, lack of resources and technology, lack of skilled or trained staff /professional and other related issues.

- Never leave your stuff unattended, even to reshelve a book or go to the bathroom. Someone can steal your laptop or backpack in a few seconds. The toughest problem people face is concentration and focus.

- The main objective of the Library Services is to offer free book reading facilities to all, to grow healthy readership at all levels, to disseminate knowledge on all, subjects and topics to collect and preserve all documents having research value and local importance, to microfilm old records, Books for reference

- demands for new skills, cost/funding, managing of new generation of learners, lack of skilled manpower, lack of confidence in the face of increasingly information technology, lack of maintenance culture, resistances to changes etc were identified as challenges to managing university libraries in digital era.

- They connect people to information and connect people to people. They are safe havens for kids, providing after-school homework help, games, and book clubs. They offer computer classes, allowing older adults to stay engaged in a digital world.

- library management systems include Koha, Evergreen, and Alma, which are widely used in libraries to streamline operations and enhance user experiences.

- a Library Management system is a complete library automation software, aiming for library management. You can easily build up your own library information database with the help of ISBN auto-cataloging, and import items (collections, books, DVDs, CDs) records, members records from Excel. All the loan/return records, reports, statistics are able to export to Excel format.

- Easy-to-use, affordable, and fully featured library software for libraries. Our customers include schools, churches, communities, non-profits, and businesses from very small to medium sized libraries, mainly managed by casual, volunteer, or part-time librarians.

**BUSINESS REQUIREMENT:**

The purpose of a library management system is to operate a library with efficiency and at reduced costs. The system being entirely automated streamlines all the tasks involved in operations of the library. The activities of book purchasing, cataloging, indexing, circulation recording and stock checking are done by the software. Such software eliminates the need for repetitive manual work and minimizes the chances of errors.
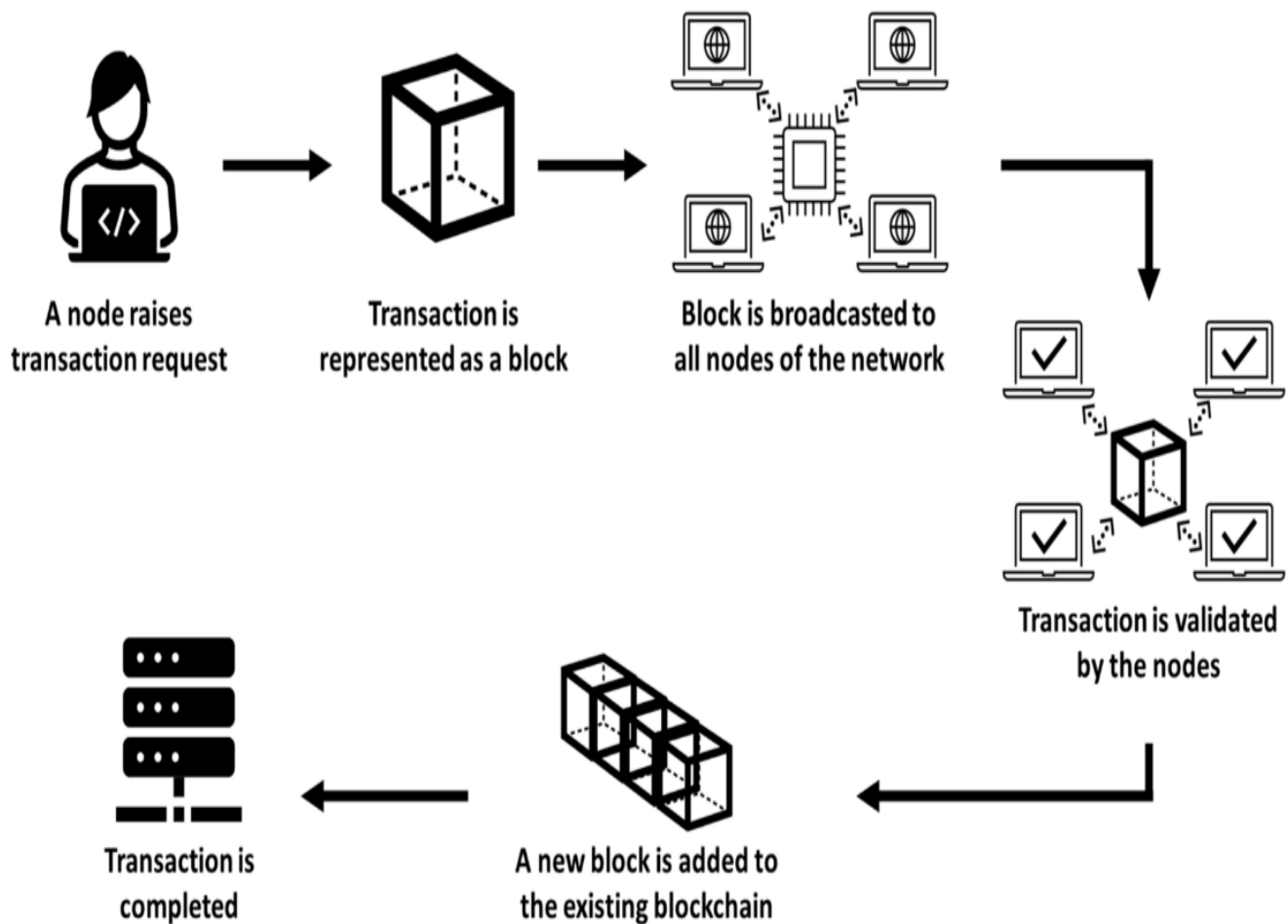
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The system saves time for both the user and the librarian. With just a click the user can search for the books available in the library. The librarian can answer queries with ease regarding the availability of books. Adding, removing or editing the database is a simple process. Adding new members or cancelling existing memberships can be done with ease.

Stock checking and verification of books in the library can be done within a few hours. The automated system saves a considerable amount of time as opposed to the manual system.

The library management system software makes the library a smart one by organizing the books systematically by author, title and subject. This enables users to search for books quickly and effortlessly.

Students need access to authentic information. An advanced organized library is an integral part of any educational institution. In this digital age a web based library management system would be ideal for students who can access the library's database on their smartphones.

A node raises transaction request → Transaction is represented as a block → Block is broadcasted to all nodes of the network → Transaction is validated by the nodes → A new block is added to the existing blockchain → Transaction is completed

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.
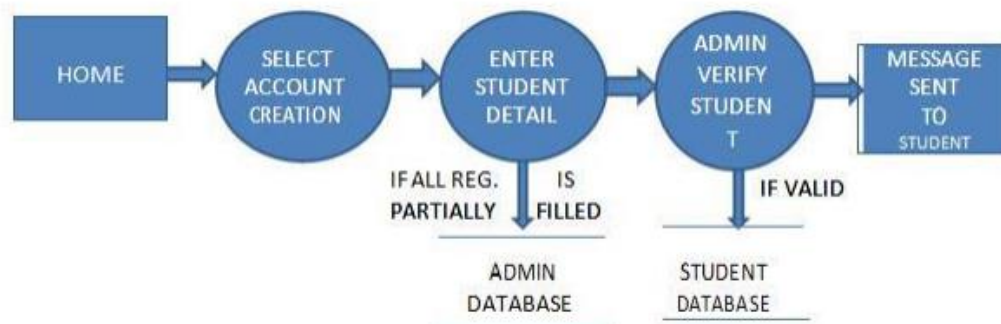
## 3.IDEATION & PROPOSED SOLUTION:

### 3.1EMPATHY MAP CANVAS:

EmpathyMapCanvas:

Anempathymapisasimple,easy-to-digestvisualthatcapturesknowledgeaboutauser's behavioursandattitudes.

Itisausefultooltohelpsteamsbetterunderstandtheirusers.
Creating an effective solution requires understanding the true problem and the person whois experiencing it. The exercise of creating the map helps participants consider things fromtheuser'sperspectivealongwithhisorhergoalsandchallenges.

**Example:**

Reference:https://www.mural.co/templates/empathy-map-canvas

A blockchain is a decentralized, distributed and public digital ledger that is used to record transactions across many computers so that the record cannot be altered retroactively without the alteration of all subsequent blocks and the consensus of the network
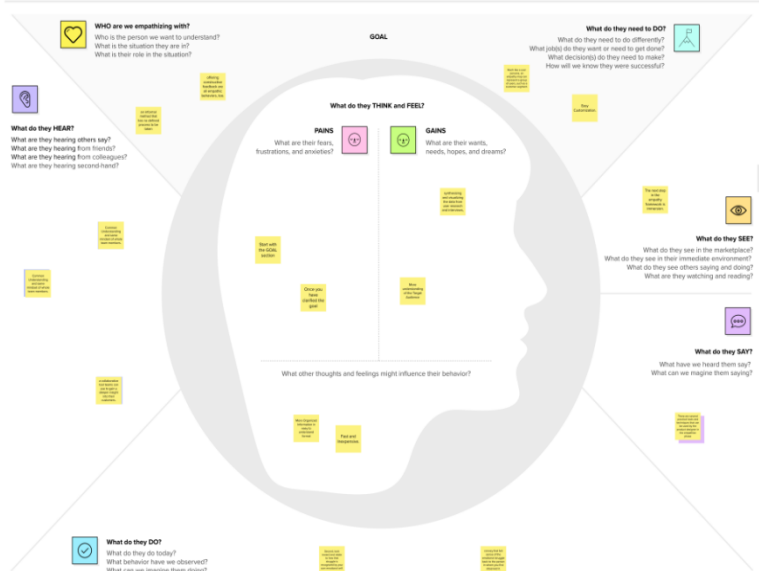
# Empathy map canvas

Use this framework to empathize with a customer, user, or any person who is affected by a team's work. Document and discuss your observations and note your assumptions to gain more empathy for the people you serve.

Originally created by Dave Gray at

XPLANE

Share template feedback

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Develop shared understanding and empathy

Summarize the data you have gathered related to the people that are impacted by your work. It will help you generate ideas, prioritize features, or discuss decisions.

**WHO are we empathizing with?**
Who is the person we want to understand?
What is the situation they are in?
What is their role in the situation?

**GOAL**

**What do they need to DO?**
What do they need to do differently?
What job(s) do they want or need to get done?
What decision(s) do they need to make?
How will we know they were successful?

**What do they THINK and FEEL?**

**PAINS**
What are their fears, frustrations, and anxieties?

**GAINS**
What are their wants, needs, hopes, and dreams?

**What do they HEAR?**
What are they hearing others say?
What are they hearing from friends?
What are they hearing from colleagues?
What are they hearing second-hand?

What other thoughts and feelings might influence their behavior?

**What do they SEE?**
What do they see in the marketplace?
What do they see in their immediate environment?
What do they see others saying and doing?
What are they watching and reading?

**What do they SAY?**
What have we heard them say?
What can we imagine them saying?

**What do they DO?**
What do they do today?
What behavior have we observed?
What can we imagine them doing?

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**Need some inspiration?**
See a finished version of this template to include in your work.

Open example

## 3.2 Ideation & Brainstorming
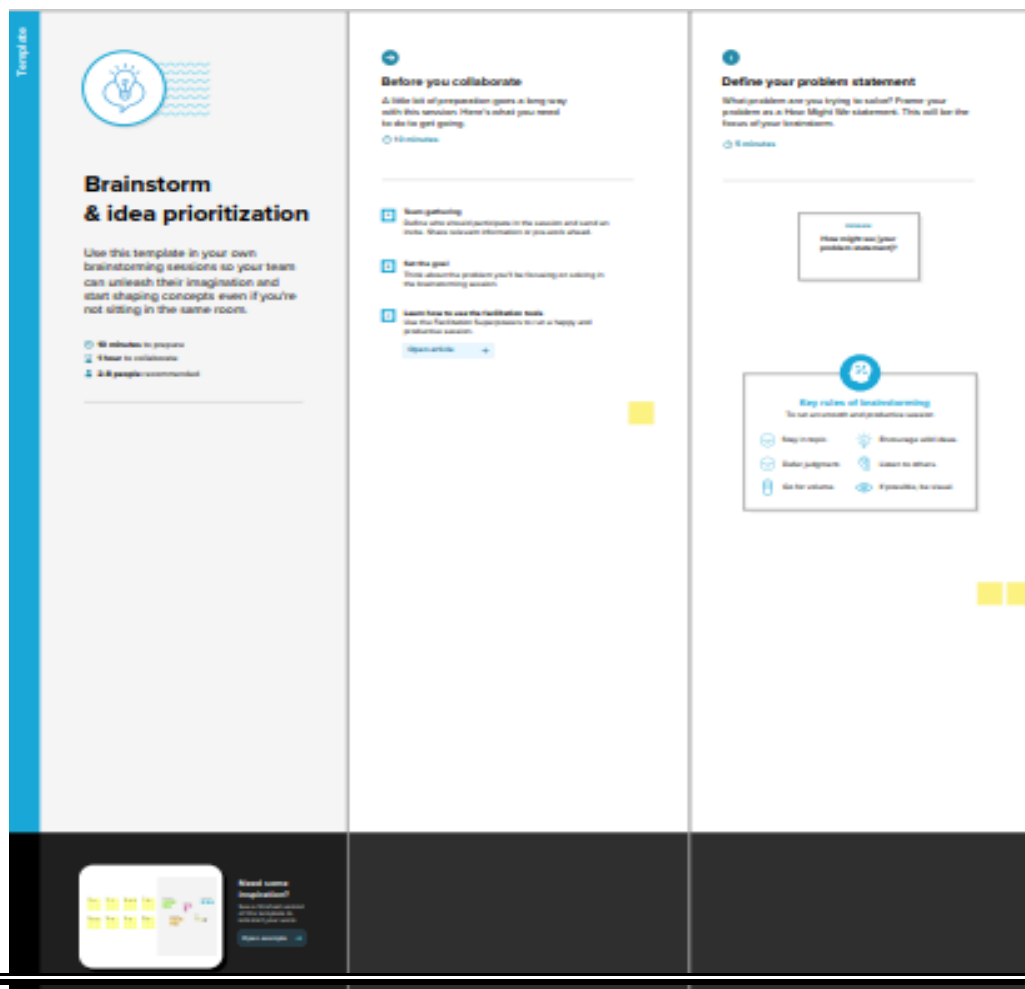
Brainstorm&IdeaPrioritizationTemplate:

Brainstormingprovidesafreeandopenenvironmentthatencourageseveryonewithinat eamto participate in the creative thinking process that leads to problem solving. Prioritizingvolumeovervalue,out-of-the-boxideasarewelcomeandbuiltupon,andallparticipantsareencouragedtocollaborate, helpingeachotherdeveloparichamountofcreativesolutions.

Usethistemplateinyourownbrainstormingsessionssoyourteamcanunleashtheirima ginationandstart shapingconceptseven if you'renot sittinginthe same room.

Reference:https://www.mural.co/templates/empathy-map-canvas

**Step-1:TeamGathering,CollaborationandSelecttheProblemStatement**

## Step-2:Brainstorm,IdeaListingandGrouping

**Step-3:IdeaPrioritization**



## 4.REQUIREMENT ANALYSIS:

### 4.1 Functional requirement

- ➢ User Authentication and Authorization:
  - o Users (librarians and patrons) must be able to log in securely with unique usernames and passwords.
  - o Different user roles (e.g., librarian, administrator, patron) should have specific access permissions.
- ➢ Catalog Management:
  - o The system should allow librarians to add, update, and delete books, journals, and other library materials.
  - o Each item should have attributes such as title, author, publication date, ISBN, and category.
- ➢ Search and Discovery:
  - o Patrons should be able to search the catalog using various criteria (e.g., title, author, keywords) to find available materials.
  - o Search results should include availability status and location of items.
- ➢ Check-Out and Check-In:

- o Librarians should have the ability to check out and check in library materials for patrons.
- o The system should record due dates and manage overdue items.
- ➢ Reservations and Holds:
  - o Patrons should be able to reserve or place holds on items that are currently checked out.
  - o The system should notify patrons when reserved items become available.

## 4.2 Non- Functional requirement

The following are the non-functional requirements for a Library Management System:

1. User-friendly interface for easy navigation and use
2. High performance and scalability to handle large amounts of data
3. Data security and protection to ensure the privacy and confidentiality of library patrons and their information
4. Compatibility with various operating systems and devices
5. Ability to handle multiple users and concurrent access to the system
6. Compliance with relevant laws and regulations regarding library management and data privacy
7. Regular updates and maintenance to ensure the system remains functional and secure over time.

## 5. PROJECTDESIGN

## 5.1 DataFlowDiagrams
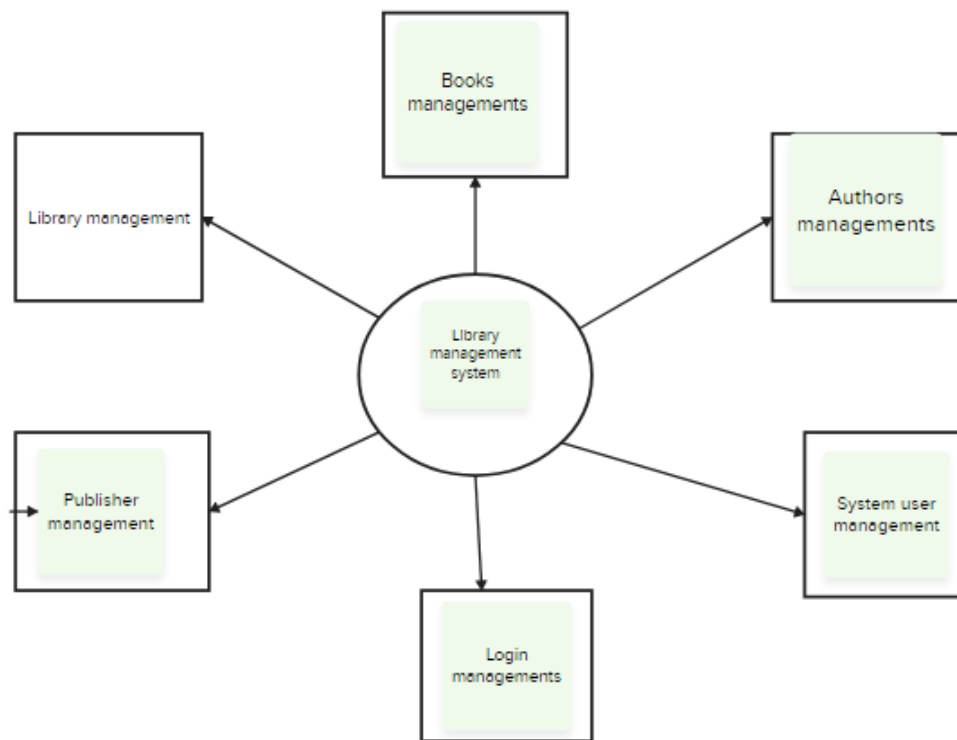
- Blockchain-based library management systems being transparent and immutable records are the answer to full proof auditing and stocktaking in the present setup of advanced libraries. Blockchain library management system restricts the use of copyright digital materials.
- Here we are demonstrating an illustration of library management using blockchain written using solidity language on Remix IDE.

- The blockchain implementation of Library management of books is successfully executed on Remix IDE.
- In this paper, we have given the source code of the smart contract and its snapshots for the blockchain library management of books using blockchain technology

**UserStories:**

- User stories are a set of possible uses designed to enable a conversation about what services, tools and features to provide, and what their priority might be.
- The list should be inclusive, so that far-off and even improbable uses are raised. This is <u>not</u> a list of features. When in doubt, add it!


- As a librarian, I want to be able to import VIA metadata into Omeka so that I can create on-line exhibits of Harvard visual materials (Fine Arts Library, Schlesinger Library)
- As a developer, I want to create and interpret "data portraits" of a variety of library and museum collections around the country so that I can chart  the changing meanings of collections and collections data over time (the metaLAB Data Artifacts initiative)
- As a data aggregator, I want to be able to bulk ingest library metadata and efficiently update changed metadata so that I can create a single search interface for disparate data sources (DPLA)
- As a developer, I want to be able to find and display topic specific resources so that I can customize a topic based library web site
- As a cataloger, I want to be able to create persistent links from finding aids to HOLLIS records so that my finding aids continue to work if the underlying HOLLIS system is replaced.
- As a student, I want to be able to quickly build a javascript application that can search and display library data and digital objects so that I can get an A in my course with minimal time investment
- As a developer, I want to be able to create my own delivery services for DRS page turned objects so that I can meet the needs of specialized applications, such as medieval music manuscript display and annotation.
- As a developer, I need to be able to access the metadata for DRS objects, such as access restrictions and image sizes, so that I can create web applications that embed that data.

## 5.2 SolutionArchitecture

**Solution Architecture:**

Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to:

• Find the best tech solution to solve existing businessproblems.

 • Describe the structure, characteristics, behavior, and other aspects of the software to project stakeholders.

• Define features, development phases, and solutionrequirements.

• Provide specifications according to which the solution is defined, managed, anddelivered.

**Example - Solution Architecture Diagram:**
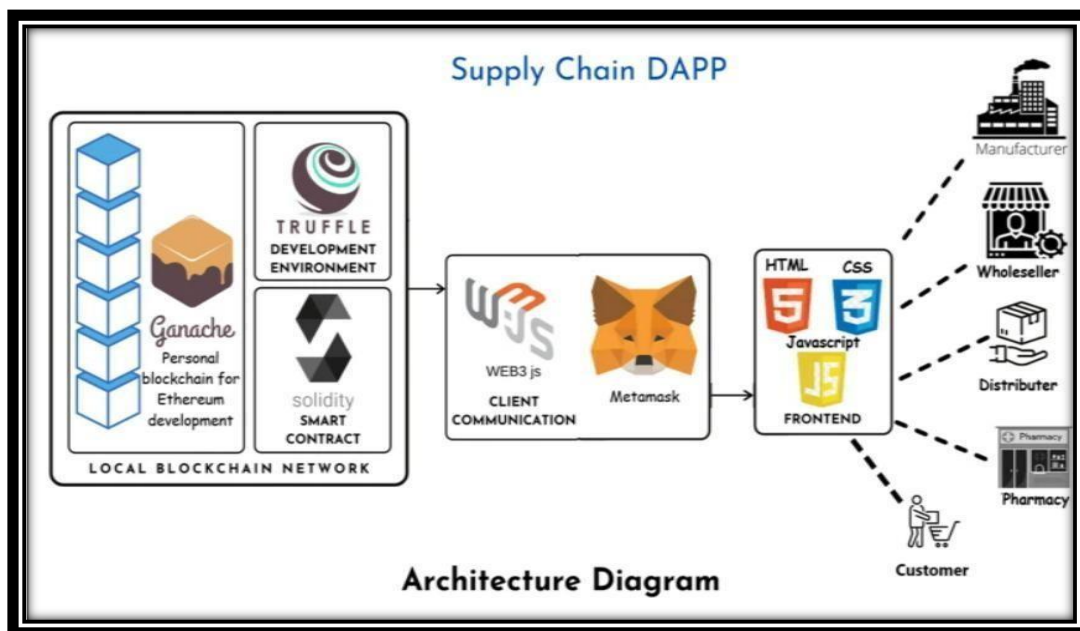


**Prerequisite**

 1 download node.js :

 Node.js

 2 download vs code:

 Li4nk

 3 download metamask : https://metamask.io/

**Steps to complete the project**

**Step 1:-**

1. Open the Zip file and download the zipfile.
2. Extract all zipfiles

**Step 2 :**

1. Open vs code in the left top select open folder. Select extracted file and open.

2. Select the projectname.sol file and copy thecode.

3. Open the remix ide platform and create a new file by giving the name of projectname.sol and paste the code which you copied from vs code.

4. Click on solidity compiler and click compile theprojectname.sol

5. Deploy the smart contract by clicking on the deploy and runtransaction.

6. select injected provider - MetaMask. Inenvironment

7. Click on deploy. Automatically MetaMask will open and give confirmation. You will get a pop up click onok.

8. In the Deployed contract you can see one address copy theaddress.

9. Open vs code and search for the connector.js. In contract.js you can paste the address at the bottom of the code. In export constaddress.

10. Save thecode.

**Step 3:**

open file explorer

1. Open the extracted file and click on thefolder.

2. Open src, and search forutiles.

3 . You can see the frontend files. Select all the things at the top in the search bar by clicking alt+
A. Search for cmd

4. Open cmd

    entercommands

    npminstall

    npm bootstrap

    npm start

4. It will install all the packages and after completing it will open {LOCALHOST IP ADDRESS}  copy the address and open it to chrome so you can see the frontend  of yourproject.

5. Blockchain technology was financially first introduced by Satoshi Nakamoto in the mining of bitcoin in a paper in 2008. Bitcoin is the first digital money (crypto-currency) followed by Ethereum (public blockchain implementation) and other crypto-currencies. Blockchain is being used in various industries, sectors, and academics for accountancy as auditable records are cannot be changed and highly secure distributed ledger. Blockchain 1.0 (Digital Currency) is evolving to Blockchain 3.0 (Digital Society) through Blockchain 2.0 (Digital Economy i.e.

6. Bitcoin 2.0 protocols, Bitcoin 2.0, Smart property, Smart Contracts, DAPPS). The Areas of implementation of blockchain technology in library are DRM (DRM helps copyright owners to maintain and control their content in digital medium), Plagiarism of articles, Interlibrary loans (interlibrary services), payments of journals and books to a publisher, scholarly publishing in various research fields. BLOCKCHAIN BASED LIBRARY MANAGEMENT In the library automation based on RFID in KOHA with kiosk, the problem of auditing and stocktaking of books, papers, and periodicals persists. The solution to absolute transparency and immutability is blockchain-based library management systems. Library management can be done by the novel blockchain technology. To understand the purpose of the proposed proposal, consider Ram wanting to borrow books from "Library A" (LB_A), and taking notes in Library B (LB_B). LB_A and LB_B are working together through the system.

7. LB_A can recognize Ram's needs and claim his right to act without knowing Ram's exact identity. Hence, Ram can continue to borrow books in loan transactions stored in blocks. A week later, Sam, who is registered with Library B (LB_B), wants to borrow the same book that Ram currently has.

8. Sam could contact Ram through the system and ask him if he could deliver the book to him without knowing Ram's exact identity.

9. Ram no longer needs it, so he can use the system to execute block transactions and transfer the required loan to Sam. You can combine this by delivering Sam's books directly to Ram without returning them to the library. Thanks to the blockchain, the library staff, and the librarian can always check and find the current borrower of the issued book

10. Blockchain is an innovative technology that could replace the current internet framework with a secure hash algorithm based on consensus-based transactions in P2P networks. Library management is an important part of modern libraries. In an advanced library, Library management is currently done

## 6. PROJECTPLANNING&SCHEDULING

### 6.1 TechnicalArchitecture



A node raises transaction request

Transaction is represented as a block

Block is broadcasted to all nodes of the network

Transaction is validated by the nodes

Transaction is completed

A new block is added to the existing blockchain
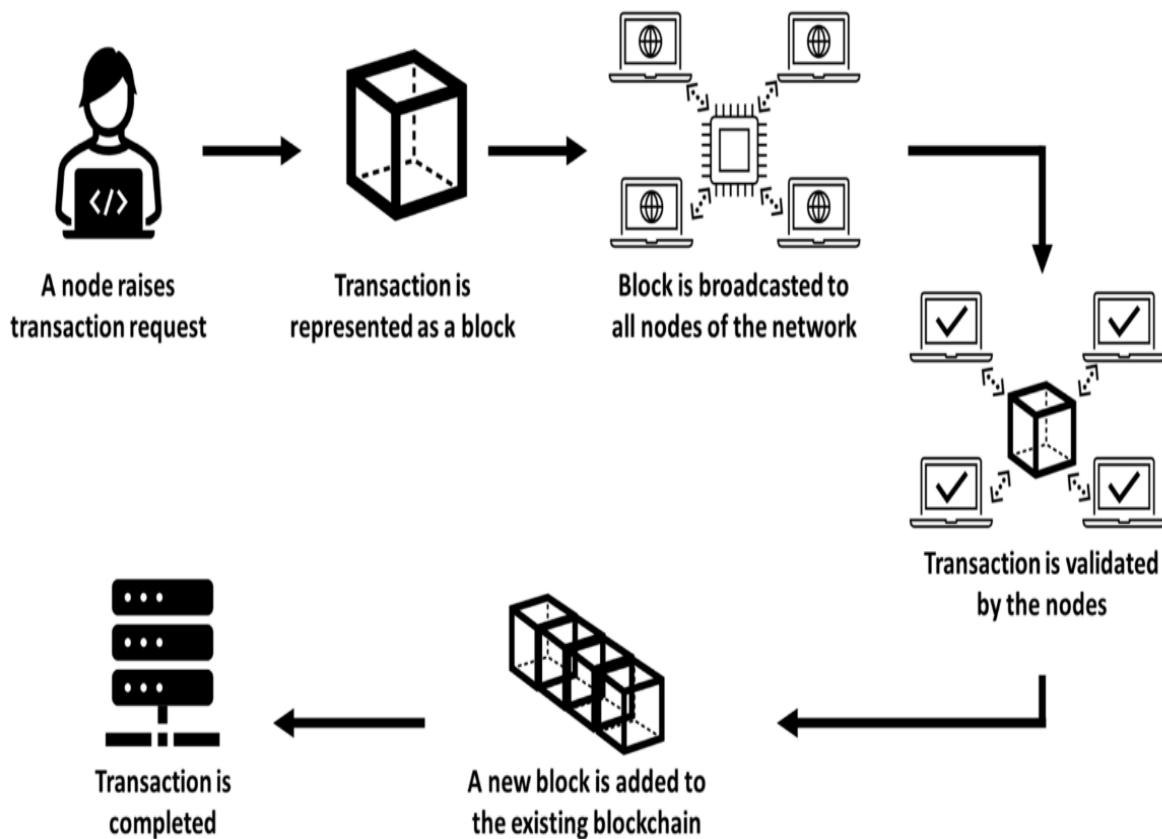
Project planning and scheduling involve the process of defining the scope, objectives, and tasks required to complete a project, as well as establishing a timeline and allocating resources to accomplish these tasks. Effective project planning and scheduling are crucial for delivering a project on time and within budget. Here are some key aspects:

• Scope Definition: Clearly define what the project aims to achieve, including the deliverables, features, and functionalities to be developed.

• Task Breakdown: Break the project into smaller tasks and subtasks, creating a Work Breakdown Structure (WBS). Each task should be well-defined and manageable.

• Estimation: Estimate the time and resources needed for each task. This includes effort estimation, resource allocation, and cost estimation.

• Sequencing: Determine the order in which tasks should be performed. Identify dependencies between tasks and create a project schedule.

• Resource Allocation: Allocate human resources, hardware, software, and other necessary resources to the project.

• Timeline: Create a project timeline or Gantt chart that outlines the start and end dates for each task, as well as milestones and deadlines.

• Risk Management: Identify potential risks and develop mitigation strategies to address them. Include a risk management plan in the project.

• Monitoring and Control: Continuously monitor progress, compare it to the schedule, and make necessary adjustments to keep the project on track.

• Communication: Establish a communication plan to ensure that all team members and stakeholders are informed about the project's status and any changes.

• Documentation: Keep detailed project documentation, including project plans, schedules, and status reports.

2. Technical Architecture:

Technical architecture refers to the structure and organization of the software or IT system. It defines the components, their interactions, and the technologies used to implement the system. A well-designed technical architecture is essential for the long-term success and maintainability of the project. Key aspects of technical architecture include:

• System Components: Define the major components of the system, such as databases, servers, client applications, APIs, and third-party integrations.

• Data Architecture: Plan how data will be structured, stored, and managed. Define the database schema, data models, and data flow.

• Technology Stack: Choose the programming languages, frameworks, libraries, and tools that will be used to build the system.

•       Scalability: Consider the system's ability to handle increased loads and user growth. Plan for scalability by using appropriate technologies and architectures.

•       Security: Design security measures, including authentication, authorization, encryption, and data protection, to safeguard the system against threats.

•       Performance: Optimize the system for performance, considering factors such as response times, latency, and resource utilization.

•       Integration: Define how the system will integrate with external services, APIs, or other systems.

•       Reliability and Availability: Ensure that the architecture supports high availability and fault tolerance to minimize downtime.

•       Deployment and Hosting: Plan the deployment process, including the choice of hosting environments (e.g., on-premises, cloud, or hybrid).

•       Documentation: Create architecture documentation that explains the design, components, and interactions for reference and maintenance.

### 6.2 SprintPlanning&Estimation

Our company applied Scrum Framework into some of products in the company

However, applying this framework, we have a lot of situation that we don't know the best way to resolve these. I hope that experts in forum can support our team

1. In the development team has a various domain including designer, business analyst, tester and developer therefore in the sprint planning how to all members can estimate product backlog item effectively? for example: designer doesn't understand coding or opposite thus viewpoint of each individuals are different, developers believe that product backlog item is 13 point however, designers claim that product backlog item is 8 point

2. In scrum guide had mentioned 3 topics in sprint planning, which the best agenda in sprint planning?

3. In scrum guide had mentioned 3 titles including PO, SM, Developer attend sprint planning event. Notwithstanding, what will you do if the development team is lack of members? We search on the internet has a lots of options to follow, for example: required members join fully, or allow forecast velocity and pick product backlog item, etc. I'm not sure which the effective way in the situation?

### 6.3 SprintDeliverySchedule

Since sprints take place over a fixed period of time, it's critical to avoid wasting time during planning and development.

And this is precisely where sprint scheduling enters the equation.

In case you're unfamiliar, a sprint schedule is a document that outlines sprint planning from end to end.

It's one of the first steps in the agile sprint planning process—and something that requires adequate research, planning, and communication.

Sprint is one timeboxed iteration of a continuous development cycle. Within a Sprint, planned amount of work has to be completed by the team and made ready for review.

The term is mainly used in Scrum Agile methodology but somewhat basic idea of Kanban continuous delivery is also essence of Sprint Scrum

A project sprint in Scrum is a short period of time wherein a development team works to complete specific tasks, milestones, or deliverables. Sprints separate a project timeline into smaller, more manageable blocks.

**7.CODING&SOLUTIONING(Explainthefeaturesaddedintheprojectalongwithco de)**

**7.1 Feature1:**

**QUESTION**

1. Download the dataset: Dataset
2. Load the dataset.
3. Perform the Below Visualizations.
● Univariate Analysis
● Bi - Variate Analysis
● Multi-Variate Analysis
4. Perform descriptive statistics on the dataset.
5. Handle the Missing values.
**CODE**
1.IMPORT LIBRARIES
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
2. LOAD DATASET
data = pd.read_csv('/content/drive/MyDrive/NM/House Price India - Assignment_1.csv')
3.1.UNIVARIATE ANALYSIS
#Create histogram
sns.histplot(data['Price'])
#show plot

```
plt.show()
3.2.BIVARIATE ANALYSIS
#Create scatter plot
sns.scatterplot(x='Price', y='grade of the house', data=data)
#show plot
plt.show()
3.3.MULTIVARIATE ANALYSIS
#Plot pair plot
sns.pairplot(data, hue='number of bedrooms')
plt.show()
4.STATICS OF THE DATASET
#Define descriptive statistics
print(data.describe())
5.HANDLE THE MISSING VALUES
#Check for missing values
print(data.isnull().sum())
#Replace missing values with mean
mean = data['id'].mean()
data['id'].fillna(mean, inplace=True
```

**7.2 Feature2**

QUESTION
1. Preprocess the Dataset
2. Build the ANN Model
a. Input layer
b. Minimum of 2 Hidden layers
c. Output layer
3. Test the Mode

CODE

```
 import numpy as np
import pandas as pd
from sklearn.preprocessing import LabelEncoder, StandardScaler
from keras.models import Sequential
from keras.layers import Dense
from google.colab import drive
drive.mount('/content/drive')
dataset = pd.read_csv('/content/drive/MyDrive/NM/House Price India.csv')
```

```
X = dataset.iloc[:, :-1].values
y = dataset.iloc[:, -1].values
```

1. PREPROCESS THE DATASET

#SPLIT THE DATASET INTO TRAINING AND TESTING DATASET

```
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,
random_state=42)
sc = StandardScaler()
X_train = sc.fit_transform(X_train)
X_test = sc.fit_transform(X_test)
```

2. BUILD THE ANN MODEL

```
model = Sequential()
```

A. INPUT LAYER AND

B. MINIMUM TWO INPUT HIDDEN LAYERS

```python
# Add the input layer and the first hidden layer :
model.add(Dense(units=10, activation='relu', input_dim=X_train.shape[1]))
# Add the second hidden layer :
model.add(Dense(units=8, activation='relu'))
```

**C. ADD THE OUTPUT LAYER**

```python
# Add the output layer:
model.add(Dense(units=1, activation='sigmoid'))
# Compile the model:
model.compile(optimizer='adam', loss='binary_crossentropy', metrics=['accuracy'])
#TRAIN THE MODEL
model.fit(X_train, y_train, batch_size=32, epochs=100, validation_data=(X_test, y_test))
```

**3. TEST THE MODEL**

```
y_pred = model.predict(X_test)
y_pred = (y_pred > 0.5)
#EVALUATE THE MODEL
from sklearn.metrics import confusion_matrix
cm = confusion_matrix(y_test, y_pred)
print(cm)
```

**Database Schema (if Applicable)**

QUESTION:

1. Data Augmentation
2. Build the CNN Model
a. Input layer
b. Minimum 1 Convolution & 1 Pooling layer
c. 1 Flatten layer
d. Minimum of 2 Hidden layers
e. Output layer
3. Test the Model
CODE:
Import Libraries
[ ]
```
import numpy as np import matplotlib.pyplot as plt import tensorflow as tf
from tensorflow.keras import datasets, layers, models
```
Load the dataset
[ ]
↳ *2 cells hidden*
Data Augmentation
[ ]
```
from tensorflow.keras.preprocessing.image import
ImageDataGenerator,array_to_img, img_to_array, load_img
```

```
[ ]
datagen = ImageDataGenerator( rotation_range = 40, shear_range = 0.2,
zoom_range = 0.2, horizontal_flip = True, brightness_range = (0.5, 1.5))
[ ]
img = load_img('/content/animals/animals/bear/093836b753.jpg')
[ ]
x = img_to_array(img)
[ ]
x
array([[[152., 166., 177.],
[151., 165., 176.],
[151., 163., 175.],
...,
[149., 156., 166.],
[150., 157., 167.],
[147., 154., 164.]],
[[156., 170., 181.],
[155., 169., 180.],
[155., 167., 179.],
...,
[143., 150., 160.],
[146., 153., 163.],
[149., 156., 166.]],
[[153., 167., 178.],
[153., 167., 178.],
[153., 165., 177.],
...,
[141., 150., 159.],
[143., 150., 160.],
[149., 156., 166.]],
...,
[[156., 136., 111.],
[157., 137., 112.],
[156., 136., 111.],
...,
[169., 139., 115.],
[172., 144., 120.],
[168., 142., 117.]],
[[160., 140., 115.],
[161., 141., 116.],
```

[160., 140., 115.],
...,
[164., 134., 110.],
[166., 138., 114.],

```
       [162., 136., 111.]],
       [[163., 143., 118.],
       [164., 144., 119.],
       [163., 143., 118.],
       ...,
       [158., 128., 104.],
       [160., 132., 108.],
       [155., 129., 104.]]], dtype=float32)
```

[ ]
```
train_datagen=ImageDataGenerator(rescale=1./255,zoom_range=0.2,horizontal_flip=True,vertical_flip=False)
```

[ ]
```
train_datagen
```
<keras.preprocessing.image.ImageDataGenerator at 0x7fdee6732650>

Convolution & Pooling layer

[ ]
```
from tensorflow.keras.models import Sequential from tensorflow.keras.layers import Dense,Convolution2D,MaxPooling2D,Flatten
```

[ ]
```
model=Sequential()
```

[ ]
```
model.add(Convolution2D(32,(3,3),input_shape=(64,64,3),activation='relu'))
```

[ ]
```
model.add(MaxPooling2D(pool_size=(2,2)))
```

[ ]
```
model.summary()
```
Model: "sequential"

_____

Layer (type) Output Shape Param #
=================================================================
conv2d (Conv2D) (None, 62, 62, 32) 896
max_pooling2d (MaxPooling2D (None, 31, 31, 32) 0
)
=================================================================
Total params: 896
Trainable params: 896
Non-trainable params: 0

_____

_
Flatten layer

[ ]
```python
model.add(Flatten())
```
Minimum of 2 Hidden layers
[ ]
```python
model.add(Dense(300,activation='relu'))
model.add(Dense(150,activation='relu'))
```
Output layer
[ ]
```python
model.add(Dense(500,activation="relu"))
model.add(Dense(2,activation="softmax"))
```
[ ]
```python
model.compile(loss='categorical_crossentropy',optimizer='adam',metrics=['accuracy'])
```
Test the Model
[ ]
```python
from tensorflow.keras.utils import load_img, img_to_array test_image = load_img('/content/animals/animals/bat/0315a4b6b7.jpg', target_size = (64, 64))
```
[ ]
```python
test_image
```
[ ]
```python
x = img_to_array(test_image)
x = np.expand_dims(x, axis =0)
x.shape
```
```
(1, 64, 64, 3)
```
[ ]
```python
pred = np.argmax(model.predict(x), axis = 1)
pred
```

```
1/1 [=============================] - 0s 41ms/step
array([0])
[ ]
print(pred) [0]
```

### 7.3 DatabaseSchema(ifApplicable)

In this article, we will build Library Management System using MYSQL. We will build the database, which includes tables. Imagine that you go to the library, take a book, and just enter that book into the computer rather than entering your details and book details in a register.

The library system database will execute a textual analysis on uploaded books to identify keywords within the books and thereby create an index. A library query will return a list of books and will show a list of locations where a keyword is found within each book.

A database schema refers to the logical and visual configuration of the entire relational database. The database objects are often grouped and displayed as tables, functions, and relations. A schema describes the organization and storage of data in a database and defines the relationship between various tables.

As books are the core element in the library system, our database needs to contain information about them and their authors. The most intuitive way is to create two tables: book and author . Note that a single book may have more than one author and a single author may write more than one book

Information in a database has been tagged with all sorts of data, allowing you to search much more effectively and efficiently. You can search by author, title, keyword, topic, publication date, type of source (magazine, newspaper, etc.) and more.

## 8. PERFORMANCETESTING

### 8.1 PerformaceMetrics

Performance Measurement Outcomes Respondents were asked to list three outcomes that were attributable to their assessment activities. A large number of areas were reported, with changes to opening hours being the most frequent service improvement. Other improvements include changes to the Web site, improvement in IT facilities, faster reshelving of returned books, changes to loan regulations, investment in e-resources, and improvements to library space.

A number of respondents also reported changes to staffing structures as a result of performance measurement activities, including changes to enquiry desk staffing, staff training programmes, and creation of academic liaison roles. Respondents were also asked if their library strategy includes a specific commitment to assessment and evaluation activities. Forty-nine respondents (79%) reported a specific commitment, and several commented on how performance measurement is embedded in strategy. Professional Development When asked if their library provides some form of assessment training for staff, about half of the respondents (32 or 51%) reported that no particular training is provided.

The others (31 or 49%) reported that training is provided outside of the institution and/or by the library or parent institution. These results differ markedly from the SPEC survey, which indicated that 71% of respondents had support for training, whether provided in-house or by external means. When the library provides training, the main focus is on assessment methods (62%), followed by report writing (54%), basic statistics, and data presentation (46% each). Some other areas of good practice were described, including the use of external experts to look at how to get the best out of SCONUL statistics. Except for SCONUL, CILIP, and LibQUAL+® training sessions, the majority of respondents had not attended the assessment-related professional development events listed in the survey. Respondents also mentioned other training providers such as NOWAL and the M25 Consortium.

All but a few of those who had attended events would recommend them to others. When asked to identify professional development needs that are not

being met by currently available events, respondents identified as key areas the need for training on data analysis tools such as ATLAS ti, understanding of survey techniques, and survey design methodologies. Culture of Assessment The survey included a series of statements on the culture of assessment.

Respondents were asked to rate on a scale of 1 to 5 how well the statements described their respective libraries, where 1 is strongly disagree and 5 is strongly agree.

The percentage response rates for staff who agreed (4) or strongly agreed (5) with the statements are shown below. • Assessment results are used to improve my library (75%) • My library evaluates its operations and programmes for service quality (69%)

Assessment is a library priority (67%) • Assessment is evident in our library planning documents (60%) • Library managers are committed to supporting assessment (60%) • Staff accept responsibility for assessment activities (34%)

My library has local assessment resources and experts (28%) • There is support and/or rewards for staff who engage in assessment activities (26%) • Staff have the necessary assessment expertise and skills (26%) • Staff development in assessment is adequate (13%)

The results show that, whilst there is some agreement that assessment is taken seriously at the senior level in library services, and that results are actively used to improve services, there are some serious concerns about engagement with assessment at all staff levels, support and reward, skills levels, and access to training and expertise. As with the SPED survey results, there appears to be a strong senior management commitment to performance measurement that does not translate to the organisation as a whole.

Slightly more than half of the survey respondents (33 or 53%) indicate that their library has some form of assessment plan in place, whether for the entire service or for specific units. This is a little higher figure than in the SPEC survey where 46% of respondents reported having an assessment plan in place.

## 9. RESULTS

### 9.1 OutputScreenshots
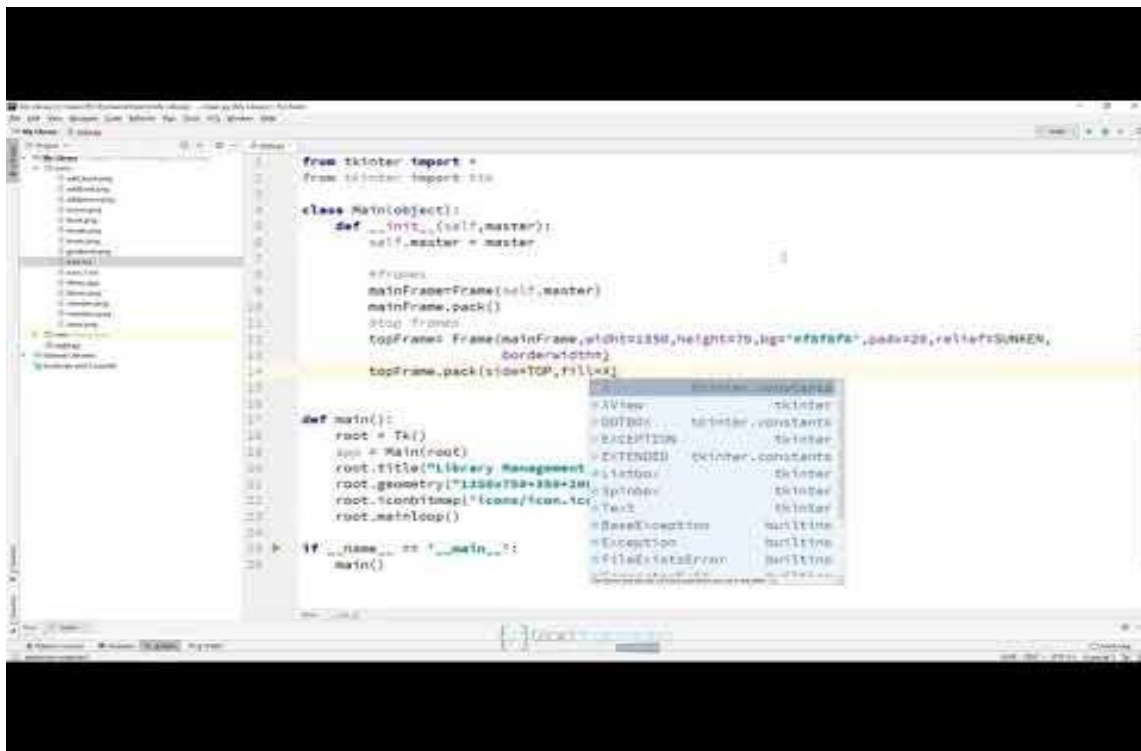


The purpose of the Operation Result design pattern is to give an operation (a method) the possibility to return a complex result (an object), allowing the consumer to: Access the result of an operation; in case there is one. Access the success indicator of an operation.

## 11.ADVANTAGES & DISADVANTAGES

### ADVANTAGES :

1. **Cost-effective:** Open source systems are often free to use and may have lower costs associated with installation, maintenance, and upgrades compared to proprietary systems.
2. **Customizable:** Open source systems can be modified and adapted to the specific needs of a library, allowing for greater flexibility in terms of functionality and integration with other systems.
3. **Transparent:** The source code for open source systems is publicly available, which allows for greater transparency and accountability in terms of how the system works and how it is being developed.

4. **Community support:** Open source systems often have a large user community, which can provide support and resources such as documentation, tutorials, and forums.

**DISADVANTAGES :**

1. **Limited vendor support:** Open source systems may have less vendor support compared to proprietary systems, which can make it more difficult to find help with installation, troubleshooting, and upgrades.
2. **Limited functionality:** Open source systems may have fewer features and functionalities compared to proprietary systems, which can make it more difficult to perform certain tasks.
3. **Technical expertise:** Open source systems may require a higher level of technical expertise to set up, maintain and customize, which can be a disadvantage for libraries with limited IT staff.
4. **Dependency on the community:** The development and maintenance of open source systems depend on the community, which can be unpredictable, and may not always align with the library's needs and priorities.

## 11. CONCLUSION

- The library management system software helps in reducing operational costs. Managing a library manually is labor intensive and an immense amount of paperwork is involved. An automated system reduces the need for manpower and stationery. This leads to lower operational costs.

- Utilizing a library management system makes it very simple, quick, and productive to complete all tasks like book acquisition, cataloging, serial control, binding, and stock verification. The tasks are streamlined as a result of the automation of the entire process, so you are spared from doing tedious work.

## 12. FUTURESCOPE

- 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 primary objective of any library system is to collect, store, organize, retrieve and make available the information sources to the information users. A library, as a system, is a subsystem of some super-system (an organization in any field, whether education, research or social service).

- The library management system software helps in reducing operational costs. Managing a library manually is labor intensive and an immense amount of paperwork is involved. An automated system reduces the need for manpower and stationery. This leads to lower operational costs.

- The benefits of a library management system, particularly Koha, are numerous, such as centralized management, improved access, easy cataloging, efficient circulation, real-time reporting, multi-lingual support, interoperability, community support, and security.

- Library management software system makes the primary functions of adding and deleting, issuing and returning of books very simple. The processes of book indexing, cataloging, book reservations and overdue notifications are automated. The software system makes the process simpler and more accountable.

**13. APPENDIX**

 SourceCode

```python
class BookDAO():

    def __init__(self, DAO):

        self.db = DAO

        self.db.table = "books"



    def delete(self, id):

        q = self.db.query("DELETE FROM @table where
id={}".format(id))

        self.db.commit()



        return q



    def reserve(self, user_id, book_id):

        if not self.available(book_id):

            return "err_out"
```

```python
            q = self.db.query("INSERT INTO reserve (user_id, book_id)
VALUES('{}', '{}');".format(user_id, book_id))


            self.db.query("UPDATE @table set count=count-1 where
id={};".format(book_id))

            self.db.commit()


            return q


    def getBooksByUser(self, user_id):

            q = self.db.query("select * from @table left join reserve on
reserve.book_id = @table.id where reserve.user_id={}".format(user_id))


            books = q.fetchall()

            print(books)

            return books


    def getBooksCountByUser(self, user_id):

            q = self.db.query("select count(reserve.book_id) as books_count
from @table left join reserve on reserve.book_id = @table.id where
reserve.user_id={}".format(user_id))
```

```python
        books = q.fetchall()


        print(books)

        return books



    def getBook(self, id):

        q = self.db.query("select * from @table where id={}".format(id))


        book = q.fetchone()


        print(book)

        return book



    def available(self, id):

        book = self.getById(id)

        count = book['count']


        if count < 1:

            return False
```

```python
            return True


    def getById(self, id):

            q = self.db.query("select * from @table where
id='{}'".format(id))


            book = q.fetchone()


            return book


    def list(self, availability=1):

            query="select * from @table"

            # Usually when no-admin user query for book

            if availability==1: query= query+"  WHERE
availability={}".format(availability)


            books = self.db.query(query)


            books = books.fetchall()


            return books
```

```python
def getReserverdBooksByUser(self, user_id):

    query="select concat(book_id,',') as user_books from reserve WHERE user_id={}".format(user_id)


    books = self.db.query(query)


    books = books.fetchone()



    return books


def search_book(self, name, availability=1):

    query="select * from @table where name LIKE '%{}%'".format(name)


    # Usually when no-admin user query for book

    if availability==1: query= query+"  AND availability={}".format(availability)


    q = self.db.query(query)

    books = q.fetchall()
```

**return books**

**GitHub&Project DemoLink**

**GitHub:** **https://github.com/Apecgowshikkumar**

**DemoLink:**
**https://youtube.com/watch?v=OCvnnDQTDCQ&si=CKlvvuuaf0_fc4OQ**