

# System Design Document

**Project Name:** Article Manager

**Team Name:** Gen-Z

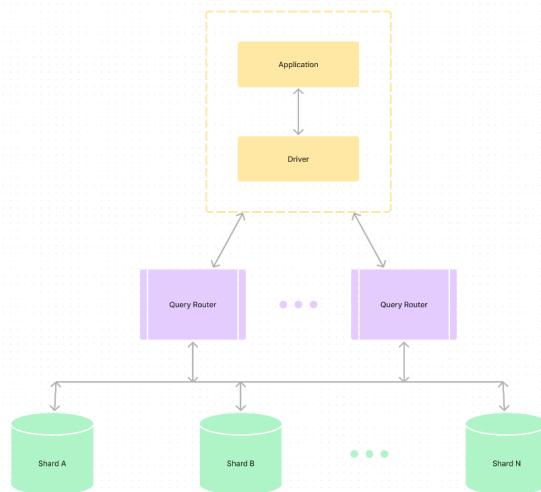
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## ARCHITECTURE

### MongoDB Overview:

MongoDB is a NoSQL, document-oriented database that stores data in BSON (Binary JSON). Each document consists of key-value pairs, and documents are grouped into collections, analogous to tables in relational databases. MongoDB supports dynamic schemas, horizontal scalability via sharding, and built-in replication for high availability.

- **Documents** contain fields and values (flexible types).
- **Collections** store multiple documents.
- **Sharding and Replication** are supported to handle scale and availability.



## WEB FRAMEWORK

### User Interface (Frontend):

Implemented in React.js, it serves as the entry point for users, allowing interaction with the system.

### Client-side Components:

- **Authentication:** Secure login interface.
- **Search Interface:** UI to filter articles by category and keyword.
- **Document Interface:** To read and view articles.

### Server-side Components:

- **Server:** Node.js with Express.js to handle routes and logic.
- **Database:** MongoDB via Mongoose for object modeling and schema definition.

## DATA ACCESS DESIGN

### MODEL DESIGN (DATA MODEL)

#### Collections:

##### 1. Users:

- userID, username, password , email, userRole

```
_id: ObjectId('6862f6d35219bc3c6fbb844b')
username : "annta"
email : "annta@gmail.com"
password : "$2a$10$JKw5Sx6p0ZturBYtzmxVxuMfllydvz4HKcxBI6FkhStaIgIfgFx/a"
role : "Student"
createdAt : 2025-06-30T20:42:19.635+00:00
updatedAt : 2025-06-30T20:42:59.730+00:00
__v : 0
```

## **2. Articles:**

- \_id, category, type, name, born, died, nationality, knownFor, notableWork, about

## FUNCTIONAL DECOMPOSITION

### **User Authentication:**

- Login/logout mechanisms
- Token-based auth with role-specific access

### **Article Management:**

- Browse articles by category or keyword
- Tutor: Add & edit
- Admin: Add, edit, delete

### **Database Interaction:**

- REST APIs for create/read/update/delete
- Mongoose queries and model validations

## FOLDER STRUCTURE

```
src/
  +-- components/
  |  +-- auth/
  |    |  +-- Login.jsx
  |    |  +-- Signup.jsx
  |  +-- articles/
  |    |  +-- ArticleForm.jsx
  |    |  +-- ArticleItem.jsx
  |    |  +-- ArticleList.jsx
  |  +-- layout/
  |    |  +-- Header.jsx
  +-- pages/
  |  +-- Dashboard.jsx
  |  +-- LoginPage.jsx
  |  +-- SignupPage.jsx
  +-- context/
  |  +-- AuthContext.jsx
  +-- api/
  |  +-- auth.js
  |  +-- articles.js
  +-- App.jsx
```

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## SECURITY DESIGN

### MongoDB Security:

- Authentication via username/password or identity providers (LDAP, OIDC)
- Authorization through role-based access controls
- Encryption at rest and in-transit (TLS/SSL)
- IP Whitelisting & Network peering

### App Security Mechanisms:

- Password hashing (bcrypt)
- JWT-based session management
- Role-specific access (middleware validation)
- Daily/weekly database backups

## USER ROLES & PERMISSIONS

### **Student:**

- View/browse articles by category or keyword

### **Tutor:**

- Add new articles
- Modify own articles

### **Administrator:**

- Add, modify, delete all articles
- Manage user access

## USER INTERFACE DESIGN

### **User Stories:**

#### **Students**

- Easily navigate and access category-based and keyword-based articles.
- Responsive UI for mobile and desktop access.
- Personalized content recommendations (future scope).

## Tutors

- Simple UI to add/edit articles.
- Support for multimedia-rich content (future scope).
- Review student-contributed content (if allowed).

## Administrators

- Manage users securely.
- Dashboard with usage stats.
- Database backup/restore tools.

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## ELEMENTS / MOCKUPS

- **Login Page**

A detailed view of the "Login" form. It features a title "Login" at the top. Below it are two input fields: one for "Email" and one for "Password", both with placeholder text. A large blue "Sign In" button is centered below the password field. At the bottom of the form, there is a small link that says "Don't have an account? [Sign Up](#)".

- Article List with Category Filters

The screenshot shows a web browser window titled "localhost:5173". The main content area is titled "Article Manager" and contains a table titled "Articles". The table has columns: Name, Category, Type, About, and Actions. There are three rows of data:

Name	Category	Type	About	Actions
Pythagorean theorem	Mathematics	Theorem	In mathematics, the Pythagorean theorem, also known as Pythagoras' theorem, is a fundamental relatio...	Updated: 01/07/2025 <button>Edit</button>
Euclid	Mathematics	Biography	Euclid, sometimes given the name Euclid of Alexandria to distinguish him from Euclides of Megara, wa...	Born: 4th century BC Died: 3rd century BC Known For: Euclidean geometry <button>Edit</button>
Quicksort	Mathematics	Algorithm	Quicksort (sometimes called partition-exchange sort) is an efficient sorting algorithm, serving as a...	<button>Edit</button>

On the left side, there is a sidebar with a dropdown menu showing "All Categories" and "Arts" selected. Below that is a search bar with placeholder text "Search articles...". On the right side, there is a "Logout" button.

- Article List with Search Filters

The screenshot shows a web browser window titled "localhost:5173". The main content area is titled "Article Manager" and contains a table titled "Articles". The table has columns: Name, Category, Type, About, and Actions. There are two rows of data, both filtered by the search term "leonardo":

Name	Category	Type	About	Actions
Leonardo da Vinci	Arts	Biography	Leonardo di ser Piero da Vinci, more commonly Leonardo da Vinci, was an Italian polymath of the Rena...	Born: 1452 Died: 1519 Nationality: Italian Known For: Art and Science Notable Work: Mona Lisa, The Last Supper <button>Edit</button>
Mona Lisa	Arts	Painting	The Mona Lisa is a half-length portrait painting by the Italian Renaissance artist Leonardo da Vinci...	Year: 1503-1506 Medium: Oil on poplar panel Size: 77cm x53 cm Location: Musee du Louvre, Paris <button>Edit</button>

On the left side, there is a sidebar with a dropdown menu showing "Category" and "All Categories" selected. Below that is a search bar with the text "leonardo" entered. On the right side, there is a "Logout" button.

- **Add/Edit Article Form**

A screenshot of a web browser showing an 'Articles' management interface. At the top, there's a header bar with a back arrow, forward arrow, refresh button, and a search bar containing 'localhost:5173'. Below the header, the word 'Articles' is displayed in bold. On the left, there are two dropdown menus: 'Category' (set to 'All Categories') and 'Search' (with placeholder text 'Search articles...'). To the right of these is a blue 'Add Article' button. A modal window titled 'Add New Article' is open in the center. It contains fields for 'Name' (empty), 'Category' (set to 'Arts'), 'Type' (set to 'Biography'), and a large 'About:' text area (empty). At the bottom of the modal are two buttons: a blue 'Create' button on the left and a grey 'Cancel' button on the right.

A screenshot of a web browser showing an 'Articles' management interface. At the top, there's a header bar with a back arrow, forward arrow, refresh button, and a search bar containing 'localhost:5173'. Below the header, the word 'Articles' is displayed in bold. On the left, there are two dropdown menus: 'Category' (set to 'All Categories') and 'Search' (with placeholder text 'Search articles...'). To the right of these is a blue 'Add Article' button. A modal window titled 'Edit Article' is open in the center. It contains fields for 'Name' (set to 'Quick Sort'), 'Category' (set to 'Technology'), 'Type' (set to 'Programming Language'), and a large 'About:' text area containing the text 'Quicksort is an efficient, general-purpose sorting algorithm that uses a divide-and-conquer strategy.' At the bottom of the modal are two buttons: a blue 'Update' button on the left and a grey 'Cancel' button on the right.

## • Admin Dashboard

The screenshot shows a web browser window with the URL `localhost:5173` in the address bar. The page title is "Article Manager". On the right, it says "Welcome, harsimran@gmail.com (admin)" and has a "Logout" button. The main content area is titled "Articles". It features a search bar with "Category" dropdown set to "All Categories" and a "Search" input field. A blue "Add Article" button is located on the right. Below is a table with four columns: "Name", "Category", "Type", and "About". The "Actions" column contains "Edit" and "Delete" buttons.

Name	Category	Type	About	Actions
<b>Quick Sort</b>	Technology	Programming Language	Quicksort is an efficient, general-purpose sorting algorithm that uses a divide-and-conquer strategy...	<b>Developer:</b> Tony Hoare <b>Created:</b> 30/06/2025 <b>Updated:</b> 01/07/2025 <a href="#">Edit</a> <a href="#">Delete</a>
<b>Claude Monet</b>	Arts	Biography	Oscar-Claude Monet was a French painter, a founder of French Impressionist painting and the most con...	<b>Born:</b> 1840 <b>Died:</b> 1926 <b>Nationality:</b> French <b>Known For:</b> Painter <b>Notable Work:</b> Water Lilies <a href="#">Edit</a> <a href="#">Delete</a>
<b>Leonardo da Vinci</b>	Arts	Biography	Leonardo di ser Piero da Vinci, more commonly Leonardo da Vinci, was an Italian polymath of the Rena...	<b>Born:</b> 1452 <b>Died:</b> 1519 <b>Nationality:</b> Italian <b>Known For:</b> Art and Science <b>Notable Work:</b> Mona Lisa, The Last Supper <a href="#">Edit</a> <a href="#">Delete</a>
<b>Mona Lisa</b>	Arts	Painting	The Mona Lisa is a half-length portrait painting by the Italian Renaissance artist Leonardo da Vinci...	<b>Year:</b> 1503-1506 <b>Medium:</b> Oil on poplar panel <b>Size:</b> 77cm x53 cm <b>Location:</b> Musee du Louvre, Paris <a href="#">Edit</a> <a href="#">Delete</a>
<b>Pythagorean Theorem</b>			In mathematics, the Pythagorean	<a href="#">Edit</a> <a href="#">Delete</a>