MISSOURI STATE UNIVERSITY

DEPARTMENT OF COMPUTER SCIENCE

Library Management Api

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Software Features

End User

Fetching Library Books Module

Feature 1

End users will have the capability to fetch all the books for their specific stream and their availability status.

Feature 2

End users will be authenticated by authentication layer.

Feature 3

End users are protected by authorization layer. So, end users are restricted to perform only fetch operations.

Feature 4

End users are restricted to fetch 10 times per minute.

Admin User

Managing Library Books Module

Feature 1

admin user will have capability to create, Read, update, and Delete the books, streams, and book availability status.

Feature 2

admin users are protected by authentication layer.

Feature 3

admin users are protected by authorization layer. So, they can perform create, update and delete operations.

Feature 4

Admin users are restricted to fetch 20 times per minute.

Software Development

Product Backlog

To Do List

Project Planning

Basic Setup

- **Item 1:** Choose a virtual environment.

- **Item 2:** Choose Frameworks.

- **Item 3:** List Dependencies.

Planning Api

- **Item 4:** Define Requirements.

- **Item 5:** Identify Resources.

- **Item 6:** Define Endpoints.

- **Item 7:** Choose HTTP Methods.

- **Item 8:** Define Request and Response Formats.

Database Design

- **Item 9:** Identify the Entities and their Attributes.

- **Item 10:** Identify the relationships between the entities.

- **Item 11:** Derive the Functional Dependencies.

- **Item 12:** Identify the problems that exists in the unnormalized tables.

- **Item 13:** Normalize the created Tables to Third Normal Form.

Software Development

Product Backlog

To Do List

Project Planning

Security

- **Item 14:** Decide Authentication Mechanism.

- **Item 15:** Decide the Access Control for Authorization.

- **Item 16:** Decide Rate Limiting Factor to Limit Network Traffic.

- **Item 17:** Decide security measures such as SSL/TLS for Encryption.

- **Item 18:** Decide Input Validation to Prevent Injection Attacks.

Performance

- **Item 19:** Define Caching Mechanisms.

- **Item 20:** Define Pagination Factors.

- **Item 21:** Define Asynchronous Processing Tasks.

Error Handling

- **Item 22:** Define how errors will be handled by the API.

- **Item 23:** Define meaningful error messages.

- **Item 24:** Define appropriate HTTP status codes.

Software Development

Product Backlog

To Do List

Project Implementation

Setting Up Interface

- **Item 25:** Create a setup for End User Authentication.

- **Item 26:** Create a setup for Admin User Authentication.

- **Item 27:** Create a setup for Registering the users.

- **Item 28:** Create a setup for adding the users to manager group and for deleting the user from manager group.

DataBase Implementation

- **Item 29:** Create a Stream Entity Model.

- **Item 30:** Create a Book Entity Model.

- **Item 31:** Create a Availability Entity Model.

- **Item 32:** Create a Serializers to the models.

- **Item 33:** Derive De-Serializers to the models.

Creating EndUser View

- **Item 34:** Create a view where, End users should have the capability to fetch all the books for their specific stream and their availability status.

- **Item 35:** Implement Authentication Layer.

- **Item 36:** Implement Authorization Layer.

- **Item 37:** Implement API Throttling.

- **Item 38:** Implement De-serializers.

- **Item 39:** Create the URL End-Points to access the End-User views.

Software Development

Product Backlog

To Do List

Project Implementation

Creating Admin User Views

- **Item 40:** Create all the CRUD views for the Stream Model.

- **Item 41:** Create all the CRUD views for the Book Model.

- **Item 42:** Create all the CRUD views for the Availability Model.

- **Item 43:** Implement Authentication Layer.

- **Item 44:** Implement Authorization Layer.

- **Item 45:** Implement API Throttling.

- **Item 46:** Implement De-serializers.

- **Item 47:** Create the URL End-Points to access the Admin-User views.

Error Handling

- **Item 48:** Implement Error Handling Methods for the Stream Serializer.

- **Item 49:** Implement Error Handling Methods for the Book Serializer.

- **Item 50:** Implement Error Handling Methods for the Availability Serializer.

Software Development

Product Backlog

Project Implementation

Security

- **Item 51:** Implement security measures such as SSL/TLS for Encryption.

- **Item 52:** Create Input Validation methods to Prevent Injection Attacks.

Performance

- **Item 53:** Implement Caching Mechanism.

- **Item 54:** Implement Pagination.

- **Item 55:** Enable Asynchronous Processing for the needed Methods.

Testing

- **Item 56:** Create the setup for testing API URL Endpoints.

- **Item 57:** Create a setup for writing the test cases for individual components.

Documentation

- **Item 58:** Setup the Open API swagger to document the URL Endpoints Methods.

Versioning

- **Item 59:** Consider versioning, To manage changes and updates over time without breaking existing client applications.

Deployment

- **Item 60:** Deploy API to a production environment.

Maintenance

- **Item 61:** Regularly update and maintain the API to address any bugs, security vulnerabilities, or changes in requirements.

Software Development

Product Backlog

Supplementary Tasks

Scaling Api

- **Item 62:** Deploying API to the Cloud Services.

- **Item 63:** Integrating CI/CD Pipeline.

- **Item 64:** Implement Database Indexing.

- **Item 65:** Compress API Responses.

- **Item 66:** Implement Load Balancing.

- **Item 67:** Implement Horizontal Scaling.

- **Item 68:** Implement Vertical Scaling.

- **Item 69:** Implement Monitoring and Profiling.

Software Development

Sprint Backlog

Sprint 1

Basic Api Setup

- **Task 1:** Complete items 1,2,3.

- **Task 2:** Complete 4,5,6,7,8.

- **Task 3:** Complete 9,10,11,12,13.

- **Task 4:** Complete 14,15,16,17,18.

- **Task 5:** Complete 19,20,21.

- **Task 6:** Complete 22,23,24.

- **Task 7:** Complete 25,26,27,28.

- **Task 8:** Complete 56,57,58.

Sprint 2

Stream Model

- **Task 9:** Complete items 29,40,47.

- **Task 10:** Complete item 32,48.

- **Task 11:** Complete items 56,57.

- **Task 12:** Complete item 43,56,58.

- **Task 13:** Complete items 44,56,58.

- **Task 14:** Complete items 45,56,58.

- **Task 15:** Complete items 33,46,56,58.

Software Development

Sprint Backlog

Sprint 3

Book Model

- **Task 16:** Complete items 30,41,47.

- **Task 17:** Complete item 32,49.

- **Task 18:** Complete items 56,57.

- **Task 19:** Complete item 43,56,58.

- **Task 20:** Complete items 44,56,58.

- **Task 21:** Complete items 45,56,58.

- **Task 22:** Complete items 33,46,56,58.

Sprint 4

Availability Model

- **Task 23:** Complete items 31,42,47.

- **Task 24:** Complete item 32,50.

- **Task 25:** Complete items 56,57.

- **Task 26:** Complete item 43,56,58.

- **Task 27:** Complete items 44,56,58.

- **Task 28:** Complete items 45,56,58.

- **Task 29:** Complete items 33,46,56,58.

Software Development

Sprint Backlog

Sprint 5

Enduser View

- **Task 30:** Complete items 34,56,57,39.

- **Task 31:** Complete item 35,56,57.

- **Task 32:** Complete items 36,56,57.

- **Task 33:** Complete item 37,56,58.

- **Task 34:** Complete item 33,38,56,58.