**BUSINESS REQUIREMENT DOCUMENT (BRD)**

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**Project Name:** Digital Learning Platform

**1. INTRODUCTION**

**1.1 Purpose**  
The purpose of this Business Requirements Document (BRD) is to define and describe the requirements for a comprehensive Digital Learning Platform. This platform aims to address the challenges faced by students in digital learning environments by providing features such as assignment management, resource support and AI-driven doubt solving. The goal is to create a seamless, interactive, and supportive digital learning experience for students.

**1.2 Scope**  
The Digital Learning Platform will include features for:

* Assignment Management: Teachers can upload assignments and also set the deadlines to submit the assignment
* Result Metrics: Students can view their scores for individual assignments
* Resource Support: Teachers can provide essential study materials directly to students. The resources can be the YouTube url’s or pdf’s. There is a resource section to professors also where the professors can search for the books related to a topic
* News Section: A section specifically designed to cover the technology related news
* AI doubt solver: A personal AI-driven doubt solver to assist students with their queries.
* The frontend will be developed using HTML, CSS, JavaScript, TypeScript, and Angular, while the backend will be built with Java and Spring Boot, with MySQL serving as the database.

**1.3 Definitions**

* **Assignment:** A task or set of tasks assigned to students, typically with a deadline.
* **Result Metrics:** Visualization of scores for assignments.
* **AI doubt solver:** An artificial intelligence-driven component that answers students' queries.

**1.4 Stakeholders**

* **End Users:** Students and teachers using the platform for educational purposes.
* **Development Team:** Engineers and developers responsible for building and maintaining the application.
* **Academic Institutions:** Schools, colleges, and universities that will implement and utilize the platform.

**2. BUSINESS OBJECTIVES**

**2.1 Goals**

* **Enhance Assignment Management:** Simplify the process for teachers to distribute assignments and manage deadlines.
* **Provide Comprehensive Resource Support:** Ensure students have access to all necessary study materials.
* **Offer Personalized Learning Support:** Utilize AI to assist students in understanding course material and addressing doubts.

**2.2 Benefits**

* **Centralized Performance Insights:** Students receive a clear and concise overview of their performance.
* **Easy Access to Resources:** Students have ready access to lecture notes, reading lists, and other essential materials.
* **Personalized Learning Assistance:** AI doubt solver provides instant help, reducing dependency on teacher availability.

**3. FUNCTIONAL REQUIREMENTS**

**3.1 Assignment Management**

* **Requirement:** Teachers must be able to upload assignments and set deadlines.
* **Details:**
  + **Upload Assignment:** Teachers can upload assignments directly onto the platform.
  + **Set Deadlines:** Teachers can assign deadlines for each asignment, ensuring timely submissions.

**3.2 Result Metrics**

* **Requirement:** Students must be able to view their assignment score.
* **Details:**
  + **Visualize Scores:** Display scores in a bar graph format for each course.

**3.3 Resource Support**

* **Requirement:** Teachers must be able to upload and organize study materials for students.
* **Details:**
  + **Upload Resources:** Teachers can upload lecture notes, reading lists, practice exercises, and even YouTube links etc.
  + **Organize Content:** Resources are organized by course and topic for easy access.
  + **For professors:**- Professors can search among the wide range of available books to have an in depth knowledge about a topic

**3.4 AI Doubtsolver**

* **Requirement:** Provide students with a personal AI-driven doubt solver for query resolution.
* **Details:**
  + **Query Resolution:** AI doubt solver responds to students' queries and provides explanations.
  + **Interactive Learning:** AI doubt solver interacts with students to clarify concepts and provide additional information which helps in mastering a concept.

**4. NON-FUNCTIONAL REQUIREMENTS**

**4.1 Usability**

* **Requirement:** The platform must be user-friendly and intuitive for both students and teachers.
* **Details:**
  + **User Interface:** The UI should be clear and easy to navigate.
  + **Cross-Device Compatibility:** The platform must be accessible on both desktop and mobile devices.

**4.2 Performance**

* **Requirement:** The platform should perform efficiently even under high user loads.
* **Details:**
  + **Fast Loading Times:** Pages should load quickly to avoid delays, especially during peak usage.
  + **Responsive Interactions:** The platform should remain responsive even with multiple active users.

**4.3 Reliability**

* **Requirement:** The platform must be reliable and available at all times, especially during critical academic periods.
* **Details:**
  + **High Availability:** The platform should have minimal downtime.
  + **Robust Infrastructure:** Ensure a stable and reliable backend to support all users.

**4.4 Scalability**

* **Requirement:** The platform must be able to scale according to increasing user numbers and features.
* **Details:**
  + **Horizontal and Vertical Scaling:** The system should support both types of scaling.
  + **Adaptability:** The platform should be flexible to accommodate future growth.

**4.5 Interoperability**

* **Requirement:** The platform should be compatible with various systems, devices, and educational tools.
* **Details:**
  + **Cross-Platform Compatibility:** Support for different operating systems and browsers.
  + **Integration with Other Tools:** Easy integration with other educational platforms and tools.

**5. COMPONENTS AND SERVICES**

**Frontend (Angular, HTML, CSS, JavaScript, TypeScript):**

* **Components:**
  + **AssignmentComponent:** For managing assignment uploads and deadlines.
  + **ResourceSupportComponent:** For uploading and managing study materials which will help students. Also to have an option of searching the books on a topic for professor
  + **AIDoubtSolverComponent:** For interacting with the AI doubt solver.
  + **NewsComponent:** For providing the news related to technology so that students are up to date and also get motivated towards developing new ones.
* **Services:**
  + **AssignmentService:** Handles HTTP requests for managing assignments.
  + **ResourceService:** Manages the upload and organization of study materials.
  + **AIDoubtSolver:** Manages AI-driven interactions and query resolutions.

**Backend (Java, Spring Boot):**

* **Services:**
  + **AssignmentService:** Contains business logic for assignment management and interacts with the database.
  + **ResourceService:** Manages the database interactions for study materials.
  + **AIDoubtSolverService:** Manages the AI model for student interactions and query responses.

**6. INTERACTION**

**6.1 Frontend and Backend Communication**

* **HTTP Requests:** Angular frontend communicates with Spring Boot backend via HTTP requests for all operations.
* **Data Binding:** Data models are exchanged between frontend and backend to keep the application synchronized.

**6.2 Real-Time Updates**

* **Angular Components:** Reactively update the UI based on data changes from the backend.
* **Spring Boot Services:** Process requests and manage data, ensuring consistency and reliability