Forums Management System

CSD415 Project Phase 1

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CERTIFICATE

This is to certify that the report titled **Forums Management System** is a bonifide work done by **CS20C31 Karthik Vijay, CS20C43 R Ashwin, CS20C48 Sanjay Mathew**, Seventh Semester B.Tech. Computer Science & Engineering students, for the course work in **CSD415 Project Phase I**, under our guidance and supervision, in partial fulfillment of the requirements for the award of the degree, B. Tech. Computer Science & Engineering of **APJ Abdul Kalam Technological University.**

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Abstract

The project proposal encompasses the creation of a comprehensive website designed to effectively manage and monitor various activities within the forums and communities at CEC, including IEEE, IEDC, Tinkerhub, GDSC, TPC, and others. This website not only serves as a centralized hub for these entities but also provides valuable functionality for college staff to oversee forum activities, facilitating accreditation and audit processes. Beyond internal management, the site offers external visibility, enabling visitors to view past and upcoming events. By fostering streamlined management, transparency, and accessibility, the proposed website is poised to significantly enhance the coordination and visibility of college forums, ultimately contributing to a more organized and engaged community.

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1. Introduction

In the rapidly evolving landscape of educational institutions, effective communication and collaboration among students, faculty, and various forums are paramount. Recognizing the need for a streamlined and centralized platform, our project endeavors to introduce a cutting-edge solution — the **Forum Management System (FMS)**.

The Forum Management System serves as a comprehensive web-based application, designed to be the central hub for managing and enhancing the functionalities of forums within our institution. By addressing the challenges associated with communication, event organization, and member engagement, FMS aims to revolutionize the way forums operate and interact.

1.1 Proposed Project

To address the challenges posed by the current decentralized forum management at Colleges, we aim to develop a comprehensive web application. This application will serve as a centralized solution, ensuring transparency and an enhanced experience for coordinators and members. The primary focus will be on precise database management and seamless event coordination.

1.1.1 Problem Statement

To develop a web application that centralizes forum management, ensures transparency, and enhances the experience for both coordinators and members, prioritizing precise database management and event coordination.

1.1.2 Proposed Solution

- **Forum Management System (FMS):** A web-based application as a centralized hub for CEC's forums and communities.

- **Key Features:**
  - **Centralized Management:** FMS provides a unified platform for efficient and centralized management of various forums within the CEC community. This includes streamlined administration, user roles, and content moderation.
  - **Event Scheduling:** The system incorporates a comprehensive event scheduling feature, allowing organizers to plan and coordinate events seamlessly. Users can access a shared calendar, ensuring everyone stays informed about upcoming activities.
  - **Attendance Tracking:** FMS offers an attendance tracking mechanism, enabling organizers to monitor and record participation in various events. This feature enhances the overall organization of events and ensures accurate attendance records.
  - **Communication Hub:** Serving as a dynamic communication hub, FMS facilitates seamless and effective communication among community members. It includes features such as discussion forums, messaging, and announcements to keep everyone connected.
  - **Transparency and Visibility:** FMS enhances transparency by providing real-time updates and visibility into community activities. Important information, announcements, and updates are easily accessible, fostering a sense of openness and inclusivity.
  - **Member Engagement:** FMS prioritizes member engagement through interactive features, including discussion forums and collaborative spaces. This promotes active participation, knowledge sharing, and the development of a vibrant and engaged community.

2. Report of Preparatory Work

2.1 Literature Review

2.1.1 Platform Exploration

In our exploration of various platforms, we delved into three key sources that significantly shaped our understanding of event management and community-driven initiatives:

- **KonfHub:** Our investigation into KonfHub provided valuable insights into the intricacies of event organization. We gleaned in-depth knowledge on effective strategies, participant engagement, and overall event management practices, setting a foundation for our project's approach to hosting and organizing forums. [10]

- **GDSC Dashboard:** The exploration of the Google Developer Student Clubs (GDSC) Dashboard unveiled valuable insights into community-driven initiatives. Understanding the collaborative aspects and member engagement strategies employed by GDSC influenced our design decisions, particularly in fostering a sense of community within our Forum Management System. [11]

- **YepDesk:** YepDesk became a pivotal reference for optimizing our system's event features. By studying the functionalities of YepDesk, we gained practical insights into event scheduling, attendance tracking, and other features that contributed to the refinement of our own event management capabilities. [9]

2.2 System Study Report

To better comprehend the technological landscape, we delved into system studies, analyzing existing frameworks and platforms. Our focus was on understanding the

intricacies of Next.js for front-end development, Express.js for server-side operations, and Node.js for overall backend functionality. This systematic study informed our decision-making process and influenced the architecture of our Forum Management System.

To gather valuable insights and firsthand information, we actively engaged with the executive committee (execom) members of each forum within our college. These interactions were pivotal in understanding their needs, challenges, and the existing event database management systems employed by the forums. This direct engagement with the stakeholders provided essential inputs for the design and features of our Forum Management System.

2.3 A Mini Project based on Events Listing

As part of the preparatory work, we actively engaged in a hands-on project-making event organized by Tinkerhub, named "Stackup." In this collaborative endeavor, we participated as a team, leveraging our skills and knowledge to create a practical application—an Event Listing site.

Project Details:

- **Event Name:** Stackup
- **Organizer:** Tinkerhub
- **Objective:** Develop an Event Listing application using modern web technologies.

Technologies Utilized:

- **Frontend:** Hosted on Vercel, we utilized Next.js for the frontend, ensuring a seamless and responsive user interface. [2]
- **Backend:** Hosted on an Azure server, we employed Express.js [5] and Node.js [1]for the server-side logic.

Deployment and Showcase:

The successful deployment of our mini-project showcased our proficiency in utilizing cutting-edge technologies in a real-world scenario. The frontend hosted on Vercel ensured high availability and efficient delivery of content to end users. Simultaneously, the backend hosted on an Azure server, facilitated by Nginx [3], demonstrated our ability to create a robust and scalable server-side architecture.

Project Links:

- **GitHub Repository:** [6]
- **Live Website:** [7]

Learning Outcomes:

Participating in the "Stackup" event not only allowed us to apply theoretical knowledge but also provided valuable insights into collaborative project development, effective use of version control, and deployment strategies. The experience strengthened our understanding of the entire development lifecycle, from ideation to deployment.

This mini-project served as a pivotal experience in preparing for our main project, providing hands-on exposure to the technologies that would later form the foundation of our Forum Management System.

3. Project Design

This chapter outlines the architectural blueprint for the Forum Management System, emphasizing efficiency and user-friendliness. It covers web application architecture, hardware and software requirements, offering insights for developers and stakeholders. The clear presentation of design principles, with diagrams and detailed descriptions, lays the groundwork for effective implementation in subsequent development stages.

3.1 Web Application Architecture

Web application architecture is a vital framework that outlines how applications, middleware systems, and databases interact to ensure seamless operation of web applications. It serves as a blueprint for understanding the application's workings, guiding the development process, planning for future growth, troubleshooting issues, and documenting the application's structure. This architecture is crucial in a project report as it provides a comprehensive overview of the application's structure and data flow, thereby facilitating efficient development, robust scalability, and effective problem-solving.

3.1.1 Web Application Architecuture: General Design

The general architecture gives an overview of how the web application framework works, as shown in Figure 3.1. The explanation for the components is listed below:

- **Client Side:** These are the people using the website or application. They interact with the frontend via web browsers, which communicates with the backend to fetch and display data.
- **Server Side:** This includes the "Web Server service" (such as Nginx), "Cloud/Local

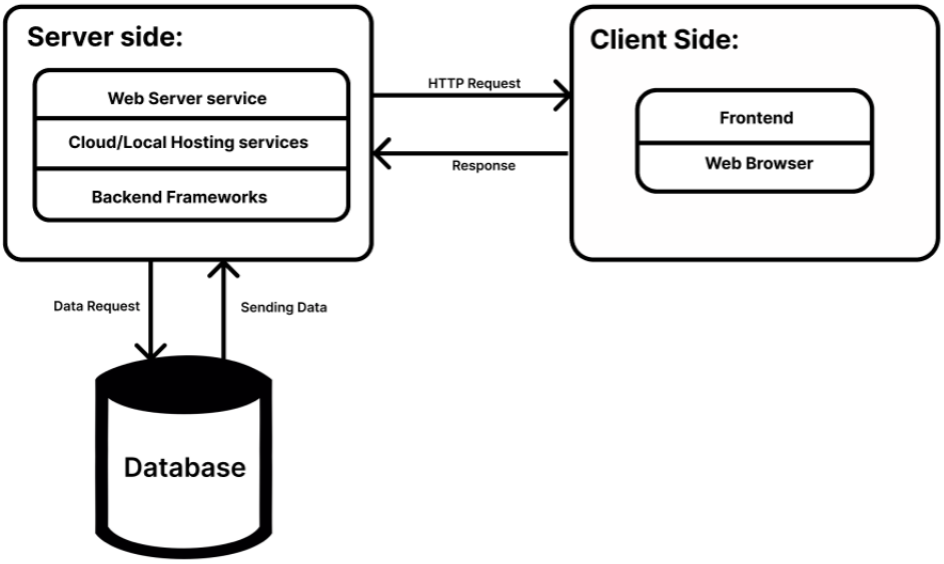

Figure 3.1: Web Application Architecture: General Design

Hosting services" (like Azure), and "Backend Frameworks" (the specific technologies used to build the backend).

- **Database:** This is where data is stored and managed.

3.1.2 Web Application Architecture: Initial Implementation Design

End Users:

- Institutional Admins: Responsible for overseeing and managing the overall functioning of the Forum Management System.
- Forum Execom: Members of individual forums who act as administrators, organizing events, and managing forum-specific content.
- Students: End users who engage with the system to access information about events, forums, and participate in activities.

Front End: Next.js, a React framework known for its simplicity, efficiency, and seamless client-side rendering, is used to build the user interface, ensuring a responsive and dynamic experience. [2]

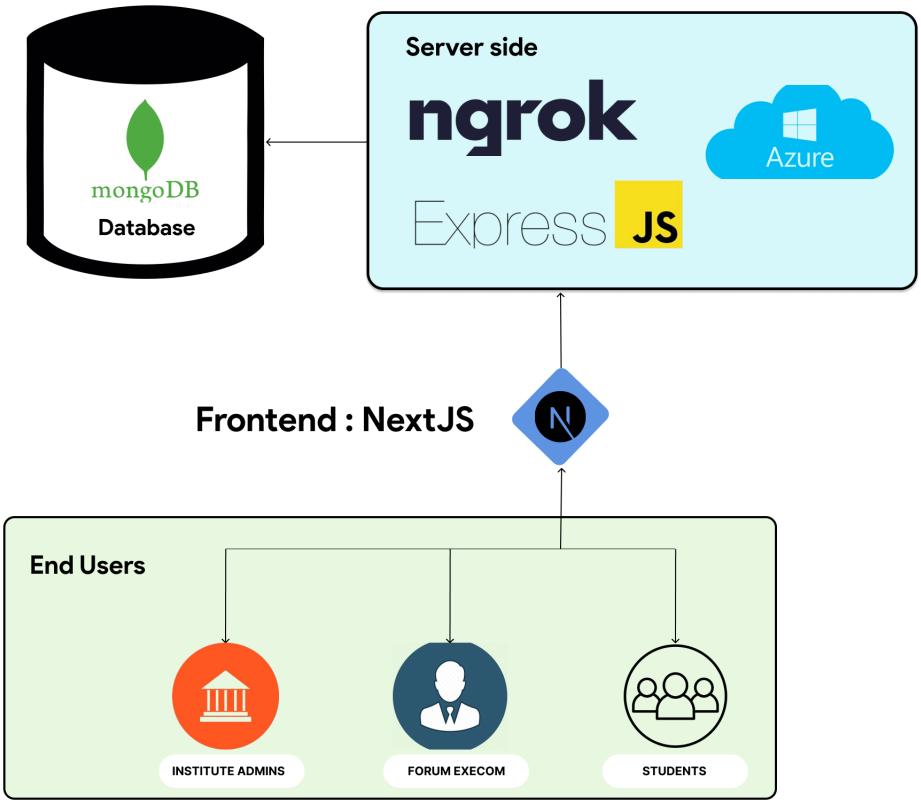

Figure 3.2: Web Application Architecture: Initial Implementation Design

Server Side:

- Ngrok: Utilized for secure and efficient tunneling, enabling secure access to our server from external environments. [4]
- Azure: The web application is hosted on Microsoft Azure, providing a scalable and reliable cloud platform to ensure optimal performance and accessibility. [8]
- Express.js: Chosen as the server-side framework, Express.js facilitates the development of robust and efficient server-side applications. [5]

Database: MongoDB, a NoSQL database, is adopted for its flexibility and scalability, making it ideal for managing diverse data structures related to forums, events, and user interactions.

3.2 Data-Flow Diagram

One of the key components of our project design is the Data Flow Diagram (DFD). The DFD provides a visual representation of the flow of data within our system. It helps us

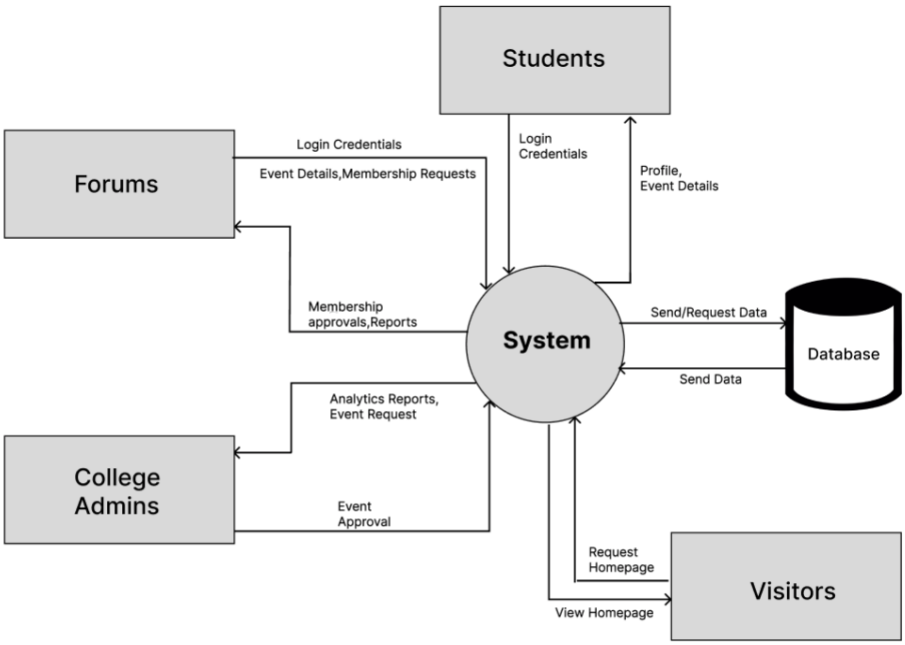

Figure 3.3: Data-Flow Diagram Level-0

understand how the system interacts with external entities and how data moves through it.

3.2.1 Level-0

The Level 0 DFD, also known as a context diagram, gives a broad overview of the system. It illustrates how the system interacts with external entities. In our case, these entities are “Students”, “Visitors”, and “College Admins”.

- System: This is the main component of the diagram, representing the system we’re designing.
- Data Flows: These are the arrows that show the direction of data flow. They include “Login Credentials”, “Event Details”, “Membership Reports”, “Analytics Reports”, “Event Approval”, “Send Data”, “Request Data”, and “View Homepage”.
- Database: This represents the system’s data storage, where all the necessary data is stored and retrieved from.

This Level 0 DFD is a crucial part of our project design as it provides a high-level understanding of the system’s processes and the flow of data. It aids in the clear communication of how the system is designed to work, making it an invaluable tool in

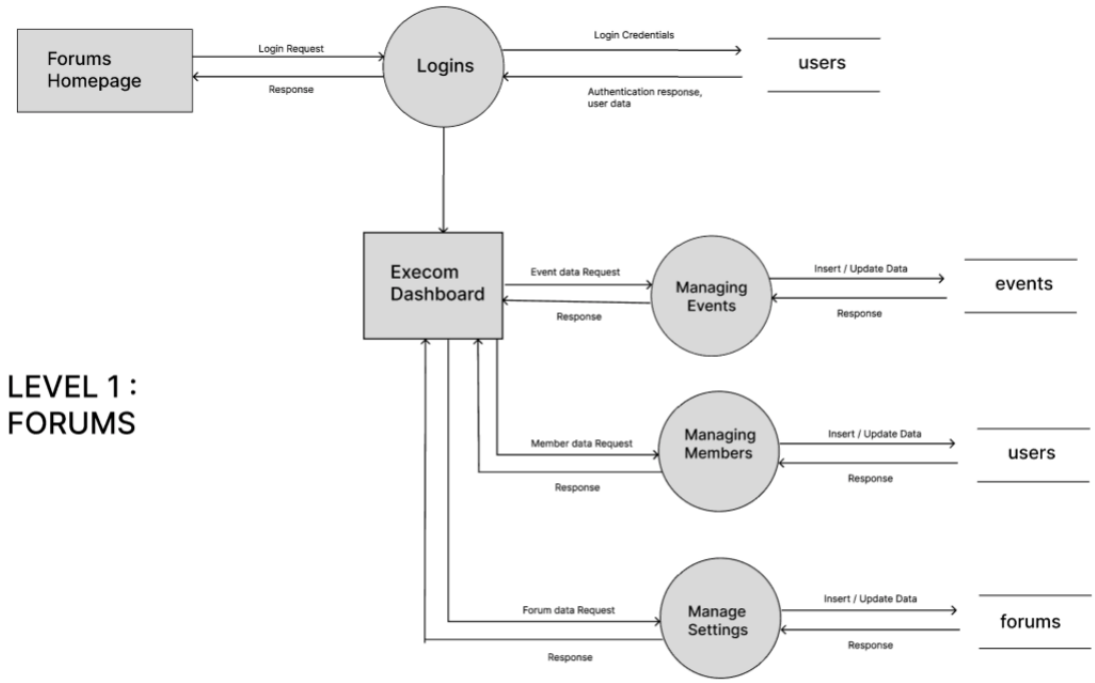

Figure 3.4: Data-Flow Diagram Level-1 Forums

our project design documentation.

3.2.2 Level-1

A Level 1 Data Flow Diagram (DFD) offers a detailed perspective of a system, breaking down major processes from the Level 0 DFD into sub-processes. Each sub-process is represented as a separate process, displaying associated data flows and data stores. This level provides a nuanced view, illustrating how data flows within the system and interacts with various entities. Essentially, it serves as an "exploded view" of the context diagram, offering insight into the main functions of the system. The choice of DFD level depends on the system's complexity and the desired level of detail, with higher levels providing a broad overview and lower levels delving into specific processes, data flows, and data stores. A combination of different DFD levels ensures a comprehensive understanding of the system.

Forums:

The description of the components in the DFD has listed below:

- **Forums Homepage:** This is where users land when they visit the website where they can view the gallery of the forums in the college.

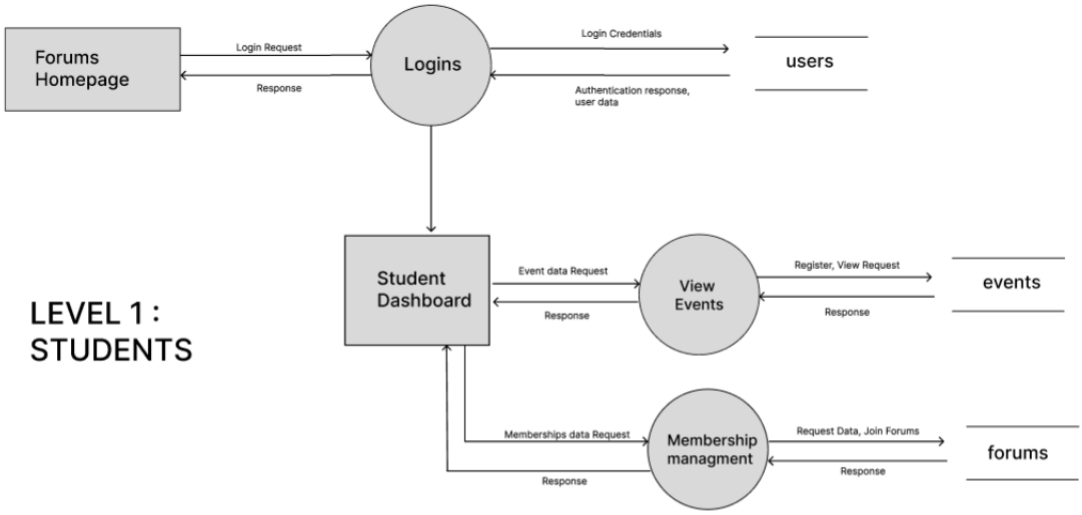

Figure 3.5: Data-Flow Diagram Level-1 Students

- **Logins:** This process handles user authentication. When users provide their credentials, this process verifies them and grants access based on their roles.
- **Users:** This data store contains information about the registered users of the forum.
- **Events:** This data store holds information about the events posted on the forum.
- **Forums:** This data store contains the threads and posts made in the forum.
- **Execom Dashboard:** This is a special dashboard for the executive committee (Execom). It may provide features for managing the forum, such as moderating discussions and managing users.

Students:

- **Forums Homepage:**This is where users land when they visit the website where they can view the gallery of the forums in the college.
- **Student Dashboard:** This is a special dashboard for students. It may provide features for managing the forum, such as moderating discussions and managing users.
- **Logins:** This process handles user authentication. When users provide their credentials, this process verifies them and grants access based on their roles.
- **View Events:** This process involves a user requesting to view event data.

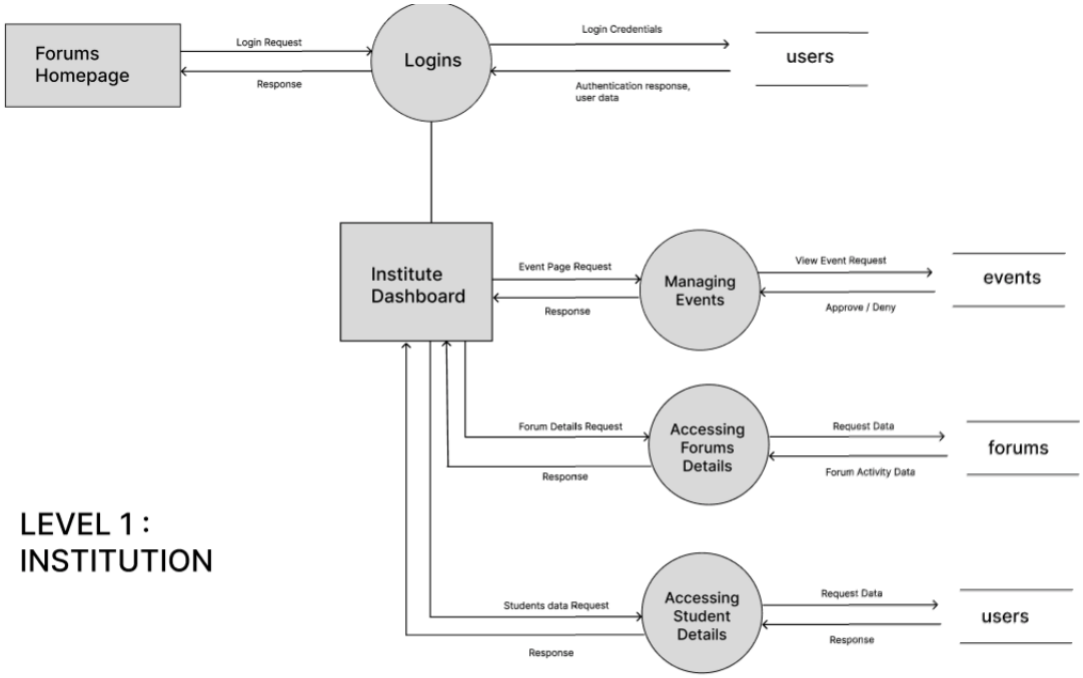

Figure 3.6: Data-Flow Diagram Level-1 Institution

- **Membership Management:** This process involves managing the members of the forum, such as adding new members, updating member information, or removing members.

Institution:

- **Forums Homepage:**This is where users land when they visit the website where they can view the gallery of the forums in the college.
- **Institute Dashboard:** This is a special dashboard for the institute. It may provide features for managing the forum, such as moderating discussions and managing users.
- **Logins:** This process handles user authentication. When users provide their credentials, this process verifies them and grants access based on their roles.
- **Managing Events:** This process involves managing the events posted on the forum.
- **Accessing Students Details:** This process involves accessing the details of the students of the institution.
- **Accessing Forum Details:** This process involves accessing the details of the different discussion threads available in the forum.

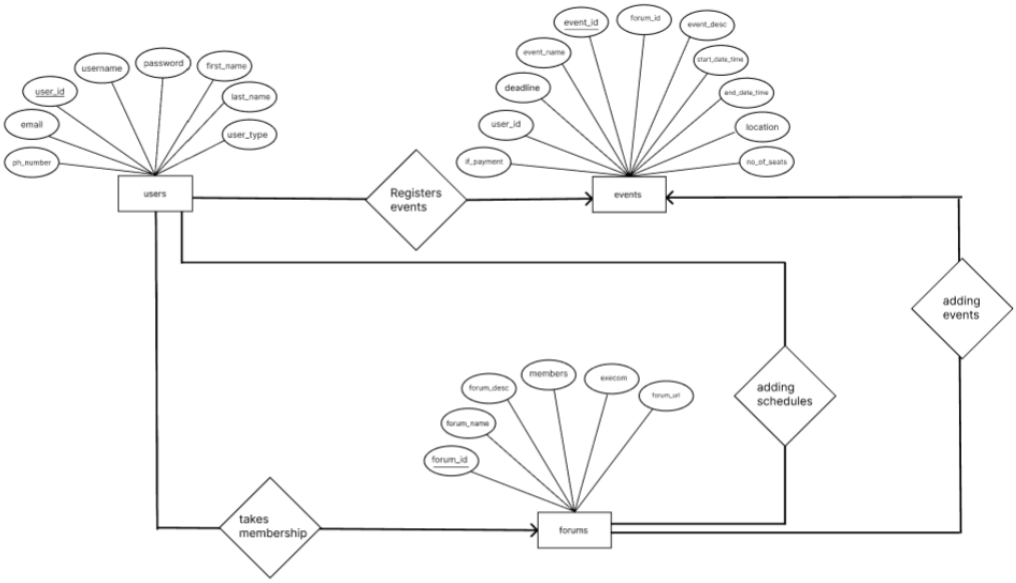

Figure 3.7: ER Diagram

3.3 Database Design

The foundation of our forum system lies in a well-thought-out database design, visualized through an Entity-Relationship (ER) Diagram. This diagram serves as a crucial guide, offering a comprehensive overview of the data entities and relationships within our system. It acts as a blueprint, illuminating the structure of our database and facilitating a clear understanding of data flow and dependencies.

Entities: These represent the fundamental building blocks of our system, each playing a distinctive role:

- **Users:** Individuals registered within the forum, engaging in various activities such as content creation, discussions, and event participation.
- **Events:** Diverse events posted on the forum, each associated with a user who acts as the event creator.
- **Members:** Registered users with additional privileges, including forum participation and event engagement.

Relationships: These connections define the interplay between entities, elucidating the dynamics of our system:

- **Schedules:** Event schedules providing structured timelines, each linked to a specific event.

- **Adding Events:** Action representing users adding new events to the forum.
- **Adding Schedules:** Action representing users adding schedules for events.
- **Registers Events:** Action representing users registering for various events.

3.4 Hardware & Software Requirements

3.4.1 Hardware:

The minimum hardware configuration required for the proper functioning of the system can be outlined below:

- A Desktop or Laptop with i3 processor and 4GB Ram or above
- Internet Connectivity

3.4.2 Software:

- Operating System, Windows 10 or above, or the latest version of any Linux Distros.
- Development tools such as Visual Studio Code (VSCode) for coding and project management.
- Web Browsers like Google Chrome, Microsoft Edge, Mozilla Firefox
- Git and Github for Version Control
- Frontend development frameworks (e.g. NextJS, ReactJS)
- Frontend Hosting platform (e.g. Vercel, Netlify)
- Backend development framework (e.g., Django, Express, Ruby on Rails) for web application development.
- Backend Hosting server i.e. nginx or apache
- Database management system (e.g., MySQL, MongoDB, PostgreSQL).

3.5 Work Schedule

3.5.1 Works Done: Progress Overview

- **August - September 2023:** In this initial phase, our focus will be on project planning, team formation, and assessing the availability of necessary resources.

We will ensure that all required hardware and software resources are in place, and any deficiencies will be addressed promptly.

- **October - December 2023:** These months will be dedicated to system design and architecture development. Our team will collaboratively design the structure and core functionality of the web application, outlining its key components and user interfaces.

3.5.2 Work Schedule: Next Steps

As we conclude the design phase, the next steps involve transitioning into the implementation stage. The detailed designs, including DFDs and the database schema, will guide the development process. Key areas of focus in the upcoming phases include:

- **January - February 2024:** Proceeding with the actual implementation of the Forum Management System based on the design specifications.

- **March - April 2024** Conducting thorough testing to ensure the system functions according to the design, identifying and resolving any issues that may arise. Also to deploy, the website in college server by April 30th.

4. Results & Conclusion

4.1 Design Phase Outcomes

During the design phase, significant progress was made in conceptualizing the Forum Management System through the creation of Data Flow Diagrams (DFDs). These visual representations have provided a comprehensive view of the system's data flow and processes.

The design of the database for the Forum Management System has been successfully completed. The database schema outlines the structure of data storage, ensuring efficient and organized data management once implemented.

4.2 Conclusion

The successful completion of the design phase marks a crucial milestone in the development lifecycle of the Forum Management System. The detailed designs provide a roadmap for the subsequent stages, ensuring a structured and well-guided approach towards system implementation.

As we transition into the implementation phase, the collaborative efforts of the design team and the forthcoming development activities are poised to bring the envisioned Forum Management System to fruition.

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