Assignment

Course Code: CSE414

Course Title: Web Engineering

Assignment Topic: **TeamUp DIU** (A Collaborative Platform for Student Project Teaming)

Submitted to

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Submission Date: 28th June, 2025

Table of contents

TeamUp DIU
A Platform for Student Project Teaming

Abstract — TeamUp DIU is a purpose-built, web-based platform developed to solve the problem of getting suitable partners for academic projects and competitions that many students from Daffodil International University face. As a one-stop solution, the system facilitates students from different departments and years to self-organize into effective teams with regard to skills, interests, and project scopes. This project is framed around an examination of collaboration within the university to ensure that the platform serves the needs of all DIU students. These core functions derive from basic needs like student user management and system collaboration, capturing workflow registration, personal user dashboards, posting and discovering projects via dynamic updates, as well as a feed for real-time opportunity sharing. Students are able to find other team members with predetermined skill sets such as certain programming languages or even design work due to advanced searching and filtering options improving synergy among teams and outcomes. TeamUp DIU automates most of the processes required hence removing most logistical burdens placed on students fostering innovation and learning. In addition to creating successful project groups, the platform supports shaping an interconnected community which is more helpful and collaborative toward each other. Basically, the system provides a way to bring ideas into realization so that students are able to build very wonderful things together thus improving their experiences in university.

1. Introduction

1.1 Overview of the Project

TeamUp DIU is a full-stack web application created to serve as an agile and centralized interface for students of Daffodil International University. The central purpose of the project is to assist in providing effective teams for academic projects, coding competitions, and other collaborations. The system has a friendly interface where students can create accounts, list their skills, and propose projects. It has safe user login and registration mechanisms, gives user specific dashboards to work with, as well as advanced searching and filtering options allowing users to quickly find not only projects but also partners with matching skills and interests. The backend was developed using Node.js with Express framework and MongoDB was used for keeping user data and related projects ensuring responsiveness ,and smooth experience.

1.2 Purpose and Significance

The main use case of TeamUp DIU is solving one of the major persistent problems in university as finding appropriate partners for group work is really difficult most times. By digitizing this process via automating manual steps taken while forming teams, this platform intends to reduce constraints which often act as hurdles towards academic or extracurricular efforts . The importance of this project stems from its ability focusing on creating a more collaboration oriented connected campus community." Each student is empowered.

1.3 Intended Users and Stakeholders

The intended users and stakeholders for the TeamUp DIU platform are primarily the students and faculty of Daffodil International University.

Students	As the primary users, students from all departments and academic years can leverage the platform to find teammates for course projects, final year projects, research, and to participate in national and international competitions.
Faculty Members	Educators and project supervisors are key stakeholders who can use the platform to monitor student collaborations, suggest project ideas, and guide teams more effectively. They benefit from seeing a more organized and proactive approach to team formation among their students.
University Administration	The administration benefits from the platform's ability to foster a more vibrant, innovative, and collaborative academic environment, which can enhance the university's reputation and student satisfaction.

2. Data Collection Process

2.1 Methods Used

(Informal Interviews)
I conducted one-on-one and small group interviews with a limited selection of students and two teachers. This qualitative method offered explorative aspects regarding their experiences, pain points, and expectations alongside contextual insights, which would not be possible through surveys.

2.2 Target Audience

DIU Students	The primary target audience included undergraduate students from the second to fourth year. They were selected since they are actively engaged in project-based work and are likely to encounter difficulties with team formation. Students from various departments such as CSE, SWE, EEE and BBA were included.
Faculty Members	A few supervising faculty members who regularly oversee student projects were interviewed. Their input was important as far as understanding the academic contexts and common contributing factors of team conflicts as well as how a solution like TeamUp DIU could align with their teaching objectives.

2.3 Primary Conclusions

The collection of data resulted in several insightful conclusions that helped shape the design and development of the TeamUp DIU platform. Difficulty in Acquiring Teammates Finding motivated and dependable teammates outside one's inner circle emerged as a challenge for more than 85% of students surveyed.

Interest in More Comprehensive Projects with Inter-Sectional Collaboration

One striking theme that came out from the interviews was the rigid restriction imposed by small, section-limited groups which comprise of one or two members only. Students showed a keen demand towards being able to work with their peers from other sections on larger and more ambitious projects. Forming a four-person team by picking two members from each of two different sections is an example model. This would enable larger-scale projects, greater diversity concerning ideas and skills plus allow the respective members to showcase a joint project within their academic sections. The findings addressed the need for a collaborative platform beyond administrative boundaries to enable significant cross-section collaborative work. Skill Level Differences is a Common Issue: A number of students cited differing levels of professional expertise among team members as one core issue towards project and team disputes

3. System Requirements

3.1 System Requirements

These requirements are tailored to address the features that the system must equip for the users who will be interacting with it.

User Registration and Account Management

The system must enable users to create an account using a minimum name, student ID, and email as capture fields. Users must log in and out from the application securely.Each user will have a record that is personal to them where they can inscribe and modify their skills, department, semester, and other relevant information pertaining to academics.

Project Posting and Discovery

The system shall provide all registered users with access to a centralized dashboard or feed containing public posts for projects which have been added by users.Users should be able to create project posts indicating the description of the project, its goals, and what specific skills they wish their teammates to possess.

Search Options

The system must contain rigorous search options enabling users to find students or projects. Filtering search results based on specific skills like 'Python,' 'UI/UX'), department, and semester should all be a feature incorporated in the given system by the users.

Collaboration Beyond Boundaries

Students must be able to organize teams with any other person registered on the site regardless of academic section or class standing, thus satisfying user need for cross-sectional collaboration.

3.2 Non-Functional Requirements

The operational standards and qualities of the system are outlined in this requirements section.

Security

Every user password must be securely hashed before it is stored in the database, ensuring optimal security measures are taken. User sessions will be protected from unauthorized access using secure token-based authentication frameworks (JWT) which will shield personal dashboards and data. To enhance user experience for a trusted and authentic community, the platform strives to verify that users are genuine DIU students.

Performance

Enhancing productivity requires seamless multi-functional usage of the platform that allows for quick page loads and rapid search result returns alongside responsive interaction from the platform.
Speed efficiency when handling multiple concurrent users and numerous data queries should not slow down system operations.

Usability

For non-tech savvy students, the interface has to be clearly laid out and easy to navigate through. Users should only need to take minimal steps when creating profiles, posting projects, and searching for teammates.

Scalability

A surge in registered DIU students necessitates an increase in project data which in turn necessitates robust infrastructure capable of supporting a larger user base.

4. Use Case Analysis

Scenario 1: Finding a Teammate for a Course Project

(User)
A 4th-semester CSE student needs a partner for a database management course project that requires both front-end and back-end development skills.

Interaction Flow	*Flow Diagram*
➔ The student logs into their TeamUp DIU account. ➔ From the dashboard, they navigate to the "Browse Teammates" or search section. ➔ They use the filter to search for students in the CSE department who have "JavaScript" and "Node.js" listed as skills. ➔ The system displays a list of matching student profiles. ➔ The student reviews the profiles, looking at their listed skills and semester. ➔ They find a suitable candidate and click a "Connect" or "Show Interest" button, which initiates contact (e.g., sending a notification or direct message).	User Logs In → Accesses Dashboard → Clicks 'Browse Teammates' → Enters Search Filters (e.g., Skill='JavaScript', Dept='CSE') → System Displays Matching Profiles → User Reviews Profiles → Selects a Suitable Teammate → Clicks 'Connect' Button → System Sends Connection Request

Scenario 2: Forming a Cross-Sectional Team for a Competition

(User)
Two students from Section 'A' want to form a larger, more diverse team for an upcoming national robotics competition. They need members with skills in embedded systems and hardware design, who may be in other sections or departments.

Interaction Flow	*Flow Diagram*
➔ One of the students logs into their TeamUp DIU account. ➔ They navigate to the "Create Post" section. ➔ They fill out a form detailing the competition, their project idea ("Autonomous Robot Development"), and the specific skills they need ("C++," "Arduino," "Embedded Systems"). ➔ They publish the post, which becomes visible to all users on the platform. ➔ Other students from different sections (e.g., Section 'C' or the EEE department) see the post on their dashboard. ➔ Interested students review the post and respond by showing interest. ➔ The original poster receives notifications and can view the profiles of the interested students, enabling them to form a four-person team from multiple academic sections.	
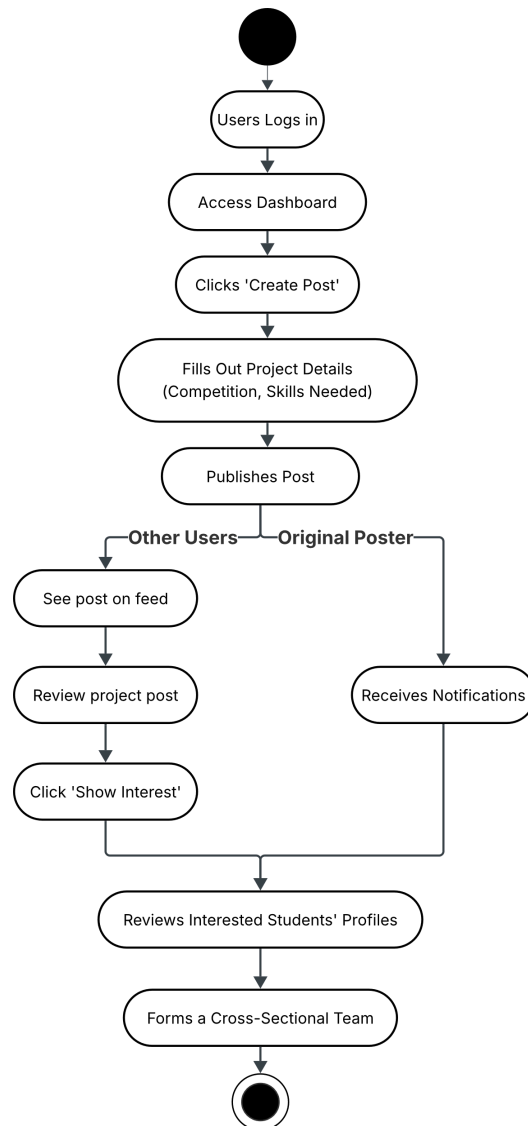
5. Data Utilization in Design

5.1 Ways in Which the Collected Data Impact UI/UX Features

Data given by users was used specifically on important to notice feedback and critique to ensure a seamless experience as follows

Centralized Project Feed

Meeting students' needs led to the identification of a 'central hub' which has influenced both the main dashboard design and the "Recent Team Requests" area. To aid users in scanning for opportunities, project information was displayed using a card-based layout which is neat and easily digestible.

Prominent Search and Filtering

Addressing 'skill mismatch' needed greatly aided by placement of search bar halfway through page between major content filters idle on with no relevance skill within page hence put at compulsory prominent place on project discovery session This ensures user begin immediately narrowing sharpened their zeroing obtaining direct relevant collaborators step towards addressing dire need primary issue most concern crucial requirement need help assistance expectation utmost demand necessity persist.

Clear Skill Tagging

Fighting against skills mismatch problem posing challenge to offer neatly solved interface user profile boards reveals user project display design showcasing skills listed distinct "tags". Users are instantly able to glance at certain expertise that represents relevance and enable effortless identification.

Reduced Registration

The registration form was simplified into two steps as we noticed that a single-page form can be overwhelming for users. In the first step, personal and academic information is collected. The second step collects information related to the account and skills which makes onboarding feel lighter.

5.2 Structure of the Database

The data that was collected shaped how the User schema would appear in the MongoDB database. Decision-making fields such as fullName, email, department, and semester were stored as critical. Therefore, they were included in the schema. Due to student demand for skill-based matching systems, a 'skills' field (implemented as an array of strings) was added to the user model. This design enables robust querying and filtering based on multiple skills, which is beneficial for efficient retrieval. A user's requirement for security is satisfied since the platform's password field is encrypted before storage.

5.3 Considerations for System Architecture

User needs and expectations influenced system architecture at a more granular level.

Client-Server Collaboration

The architecture supports performance and scalability within non-functional requirements . With this arrangement, frontends/clients are served separately from back ends/servers; thus overall scaling becomes possible together with growth of users. Backend services are made available through a RESTful API. Hence, communication between backend and frontend occurs in a standardized manner without state information over REST which eases delivery of dynamic UI action responsiveness.

6. Challenges & Limitations

6.1 Issues Facing the Data Collection Process

The most prominent problem in collecting data was interacting with faculty members. However, this issue did not arise while working with students.

Faculty Engagement and Scheduling	A notable challenge faced was the engagement gaps for faculty members. Because of their heavy teaching workloads and other scholarly duties, working with them through individual interviews often necessitated multiple scheduling attempts.
Preferential Treatment by Remote Survey	Educators and project supervisors are key stakeholders who can use the platform to monitor student collaborations, suggest project ideas, and guide teams more effectively. They benefit from seeing a more organized and proactive approach to team formation among their students.
Discomfort With Visual Documentation	Some respondents expressed discomfort being documented visually while responding, which transformed these sessions into manual note taking ones.
Student Group Feedback	In comparison, students were enthusiastic and more than willing to be helpful in providing feedback, which within this user group enhanced the efficiency of collection tasks or workload.

6.2 Possible Biases and Their Effects

There is likely sampling bias in the data. The students who volunteered may be somewhat more proactive and engaged; hence, their views may not completely represent the average student population. In return, the faculty who took the time to give detailed, thoughtful feedback are likely more interested in student collaboration than the average professor.

Response Format Bias	It may be that the format preference of some faculty to asynchronous surveys resulted in more formal and less richly worded responses than would have been possible in a conversational interview. Thus, some subtler needs may not be fully captured.
Effect on Design	The constraints suggest that the initial design of the platform is very much suited to the needs of active and motivated users but may not entirely overcome the obstacles of more reluctant or less-involved students and this is an area for future research and development.

7. Conclusion & Future Considerations

7.1 Summary of Findings

The data collection process itself manifested that students of DIU face extreme difficulties in the process of forming project teams. The informal interviews uncovered a very explicit and consistent demand for a centralized platform which could ease this process. Key requirements that surfaced included skill-based searching, working with peers beyond one's own academic section, and a secure, university-specific environment. From these core findings, TeamUp DIU was architected to ensure that the features developed—from user profiles with skill tags to cross-sectional project postings—address directly the real, expressed needs of the student community.

Development Site

Appendix