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An Undergraduate Internship/Project on Topic “FamiPlasma Web App”

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An Undergraduate Internship/Project on Topic

“FamiPlasma Web App”

By

Lamisa Ferdous Ritu

Student ID: **1920573**

Summer, 2023

Supervisor:

Mr. Md. Mahmudul Kabir Peyal

Supervisor’s Designation:

Research & Development Officer

Department of Computer Science & Engineering

Independent University, Bangladesh

October 19, 2023

Dissertation submitted in partial fulfillment for the degree of

Bachelor of Science in Computer Science

Department of Computer Science & Engineering

Independent University, Bangladesh

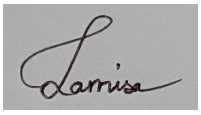
Attestation

I, Lamisa Ferdous Ritu (ID: 1920573), hereby certify that this report titled "FamiPlasma Web App" has been prepared and submitted in partial fulfilment of the requirements for the Degree of Computer Science and Engineering from Independent University, Bangladesh (IUB).

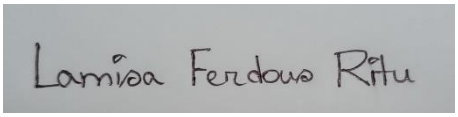
I would like to express my sincere gratitude to my supervisor, Mr. Md. Mahmudul Kabir Peyal, for his guidance and support throughout the internship period. His valuable insights and expertise have significantly contributed to the successful completion of this project.

I also confirm that all the work presented in this report is original and reflects my own understanding and knowledge gained during the internship. Any sources of information used in this project have been appropriately acknowledged and referenced.

For further information or clarification regarding this project, I encourage contacting my internship supervisor, Mahmuda Islam, at TechTrioZ Solution, via email at mahmuda.islam@techtrioz.com.

Signature:  Date: 19.10.2023

Write Your Name Here



Acknowledgement

My heartfelt gratitude to the Almighty for granting me the opportunity to complete my internship successfully. I extend my gratitude to my family, friends and seniors for their unwavering support and encouragement throughout my academic journey and internship. Their love and belief in me have been a constant source of motivation.

I would also like to thank all the professionals and experts in the field of computer science and software development who have shared their knowledge and resources, both through academic materials and online communities. Their contributions have greatly enriched my understanding and skills.

I am immensely grateful to my supervisor, Mr. Md. Mahmudul Kabir Peyal, Research & Development Officer, Computer Science and Engineering, Independent University, Bangladesh, for his support and guidance throughout my internship and report preparation. I would like to express my gratitude to the Independent University, Bangladesh, for providing me with a comprehensive education in computer science and engineering. The knowledge and skills I have acquired during my time at the university have laid a strong foundation for my professional growth.

I would like to extend my sincere appreciation to my industrial supervisor, Mahmuda Islam, Managing partner at TechTrioZ Solution, for her kindness, support, and guidance during my internship. Her motivating words and instructions have inspired me to achieve more than I had expected. I am grateful to have worked under her supervision.

I am grateful for all the support and guidance I have received throughout my internship and dissertation, and I am confident that this experience will greatly contribute to my future endeavors in the field of computer science. I am deeply indebted to all of them.

Letter of Transmittal

October 19, 2023

Mr. Md. Mahmudul Kabir Peyal

Research & Development Officer

Department of Computer Science and Engineering,

School of Engineering and Computer Science.

Subject: Submission of Internship Report for the completion of Graduation

Dear Sir,

I am writing to submit my Internship Report as a part of the Bachelor Program in Computer Science and Engineering curriculum. It has been a privilege to work under your guidance and supervision throughout my internship period. The report is based on my internship experience at TechTrioZ Solution, where I had the opportunity to work for a duration of three months under the supervision of Mahmuda Islam, the Managing Partner at TechTrioZ Solutions.

During my internship, I gained valuable academic and practical exposure, and it provided me with an excellent opportunity to immerse myself in the corporate environment. I have made every effort to make this report informative and comprehensive, incorporating the knowledge and experience I acquired during my internship period. I have followed the prescribed guidelines and have provided detailed information in all the required fields.

I sincerely hope that this report fulfills the requirements of my internship program. I would be grateful if you could kindly accept this report and provide your valuable judgment. It would be a great honor for me if you find this report useful and informative, enabling you to gain a clear perspective on the issues discussed. Thank you for your attention and support throughout this internship journey. I am grateful for the opportunity to learn and grow under your guidance. I look forward to receiving your feedback and comments on the report.

Sincerely yours,

Lamisa Ferdous Ritu

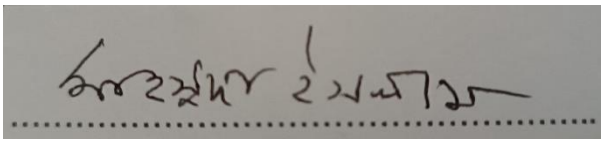
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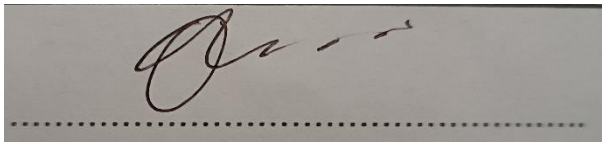
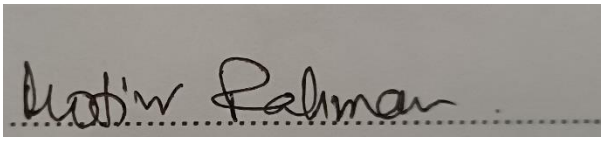
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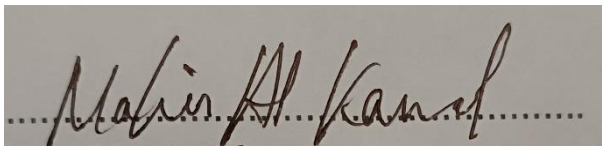
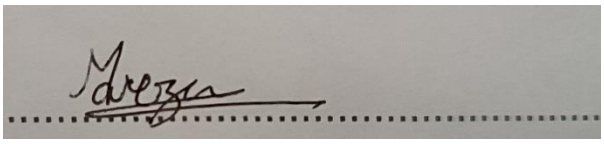
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Academic Supervisor Name: Md. Mahmudul Kabir Peyal	Industry Supervisor Name: Mahmuda Islam

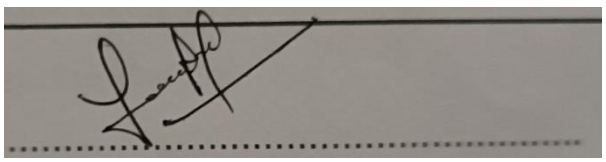
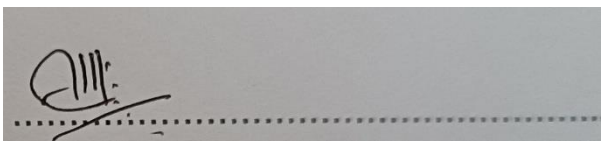
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Panel Member-1 Name: Sanzar Adnan Alam	Panel Member-2 Name: Mohammad Motiur Rahman

Panel Members

	
Panel Member-3 Name: Mahir Al Kamal	Panel Member-4 Name: Marzan Binte Hasan

Office Use

Program Coordinator Name: Subrata Kumar Dey	Head of Department Computer Science & Engineering Name: Mahady Hasan



An Undergraduate Internship/Project on

FamiPlasma Web App

By

Lamisa Ferdous Ritu

Student ID: **1920573**

Summer, 2023

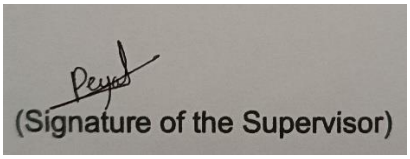
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Mr. Md. Mahmudul Kabir Peyal

Research & Development Officer

Department of Computer Science & Engineering

Independent University, Bangladesh

Abstract

During my internship at TechTrioZ Solutions, I had the opportunity to contribute to the creation and execution of the FamiPlasma Web App, a platform designed to facilitate blood donation within exclusive circles. FamiPlasma not only establishes a secure channel for friends and family to stay connected but also allows them access to an individual's medical history, disease details, and eligibility to donate blood. Joining the developer team at TechTrioZ Solutions for this internship opened avenues for collaboration on a project aimed at establishing a system that fosters connectivity and support among families and friends during medical emergencies.

The development and implementation of FamiPlasma were carried out using React.js for the frontend, while the backend was powered by Node.js and Firebase, incorporating MongoDB as the NoSQL database. The project progressed through various stages, encompassing requirements gathering, system design, development, testing, deployment, and continual refinement, all of which played a pivotal role in shaping the system and ensuring its effectiveness.

Looking ahead, I recommend incorporating advanced features into FamiPlasma, such as implementing notifications through mobile messages and email for posted messages on the platform, as well as introducing registration through QR code scanning. These enhancements will contribute to the platform's evolution and further enhance its utility and user experience.

Contents

Attestation 2
Acknowledgement 3
Letter of Transmittal 1
Evaluation Committee 3
Abstract 7
Contents 8
List of Figures 10
List of Tables 11
Chapter 1: Introduction 12
1.1 Overview/Background of the Work 12
1.1.1 Organization 13
1.1.2 Company Profile 13
1.1.3 Products and Services 14
1.2 Objectives 14
1.3 Scopes 15
Chapter 2: Literature Review 17
2.1 Relationship with Undergraduate Studies 17
2.2 Related Works 17
Chapter 3: Project Management & Financing 19
3.1 Work Breakdown Structure 19
3.2 Process and Activity wise Time Distribution 20
3.3 Gantt Chart 21
3.4 Process & Activity wise Resource Allocation 21
3.5 Estimated Cost 22
Chapter 4: Methodology 24
Chapter 5: Body of the Project 25
5.1 Work Description 25
5.2 Requirement Analysis 26
5.2.1 Rich Picture 26
5.2.2 Functional Requirements 26

5.2.3 Non-functional Requirements 27
5.3 System Analysis 27
5.3.1 Six Element Analysis 27
5.3.2 Feasibility Analysis 28
5.3.3 Problem Solution Analysis 29
5.3.4 Effect & Constraints Analysis 30
5.4 System Design 32
5.4.1 UML Diagram 32
5.5 Implementation 36
5.6 Testing 37
5.6.1 Input 38
5.6.2 Output 38
5.6.3 Designing Test Cases 39
5.6.4 Test Results 40
Chapter 6: Result & Analysis 41
6.1 System Functionality Result: 43
6.2 Impact on Business Operations: 44
6.3 Encountered Challenges: 44
Chapter 7: Project as Engineering Problem Analysis 45
7.1 Sustainability of the Project 45
7.2 Social and Environmental Effects and Analysis 45
7.3 Addressing Ethics and Ethical Issues 45
Chapter 8: Lesson Learned 47
8.1 Problems faced during this Period 48
8.2 Solution to those Problems 48
Chapter 9: Future Work & Conclusion 49
9.1 Future Works 49
9.2 Conclusion 49
Bibliography 50

List of Figures

Figure 1: Work Breakdown Structure 19
Figure 2: Time Distribution 20
Figure 3: Gantt Chart 221
Figure 4: Process/Activity wise Resource Allocation 22
Figure 5: Rich Picture 26
Figure 6: Entity Relationship Diagram 332
Figure 7: Activity diagram of User Registration 33
Figure 8: Activity diagram of Edit Profile 34
Figure 9: Activity diagram of Send Invitation 35
Figure 10: Activity Diagram of Blood Request 36
Figure 11: Programming Screenshot 37
Figure 12: Database Screenshot 37
Figure 13: APIs of User Collection 41
Figure 14: APIs of Families Collection 42
Figure 15: APIs of Invites Collection 43
Figure 16: APIs of Messages Collection 43

List of Tables

Table 1: Estimated Cost 19
Table 2: Six Element Analysis 20
Table 3: Input Table with Fields 21
Table 4: Output Table with Fields 22
Table 5: Design Test Cases with Input/Output with Pass/Fail 26

Chapter 1: Introduction

Engaging in student internships offers them hands-on experience, enabling them to channel their focus towards their chosen interests and unlock their maximum potential. This program affords students the opportunity to translate their theoretical knowledge into real-world scenarios, concurrently elevating their existing skills to new heights.

Within the Department of Computer Science and Engineering at Independent University, Bangladesh, internships are not only encouraged but also serve as a prerequisite for graduation. During my pursuit of an undergraduate degree, I completed a three-month internship at TechTrioZ Solutions, a well-regarded company.

This report delves into a more intricate exploration of my internship experience at TechTrioZ Solutions. It encapsulates a summary of the tasks I undertook, the valuable lessons I gleaned from them, and the impact this experience has had on propelling my professional development forward.

1.1 Overview/Background of the Work

On June 14, 2023, I started working as a software developer at TechTrioZ Solutions. I had the pleasure to help with the creation of the FamiPlasma Web App platform while I was an intern. React.js was used to build the front end of this application, and Node.js was used to build the back end. The application's main goal is to promote connectivity among family members and friends, providing mutual aid in case of a medical emergency.

During emergencies, obtaining blood for the required blood group becomes challenging, and the primary approach is to rely on family and friends for donations. However, the lack of information about their blood group, medical history, and recent blood donations poses significant obstacles. Collecting this information at the time of emergency is time-consuming and practically impossible. Additionally, the members might be unreachable, or their contact information may not be up to date.

To address these issues effectively, there is a need for a platform that enables friends and family members to connect and share their blood group information, medical history, and recent blood donation status beforehand. This platform would facilitate easy access to vital information during emergencies, ensuring timely availability of the required blood group and potentially saving lives.

The application was developed to be responsive, hence the user gets the flexibility to be accessible to the platform from different devices. The user also gets the chance to invite his/her closed ones to join the application through email.

1.1.1 Organization

TechTrioZ Solutions stands itself as a passionate IT service company with a strong commitment to providing superior solutions. Their team of skilled ICT professionals offers a wide range of services, including software development, data analysis, online and mobile app development, artificial intelligence, and more. By providing a single point of contact, TechTrioZ serves as a handy one-stop shop for all ICT requirements, streamlining the digital expansion of organizations.

The notion that building a strong online presence is essential for success in the modern business landscape has greatly influenced TechTrioZ's strategy. TechTrioZ has the knowledge and experience necessary to help businesses achieve their digital goals. TechTrioZ offers comprehensive solutions that are adapted to the particular needs of each client, whether it be creating user-friendly websites, creating cutting-edge mobile applications, or using sophisticated data analysis techniques.

The objective of TechTrioZ is to provide creative and effective solutions that foster business growth. This mission is driven by their everlasting dedication to quality and client happiness. Their committed staff members stay current on the most recent business developments and technological advancements to guarantee that clients receive the most cutting-edge and efficient solutions.

By working with TechTrioZ, organizations gain access to a variety of services, effective project management, and a collaborative mindset. TechTrioZ places a high importance on developing strong client relationships, talking with clients in-depth to understand their unique needs, providing tailored solutions, and constantly outperforming expectations in terms of results delivered. TechTrioZ Solutions emerges as the go-to partner for businesses looking to boost their online presence and achieve digital success as a dependable and comprehensive IT service provider.

1.1.2 Company Profile

Leading IT business TechTrioZ focuses on offering clients premium services and cutting-edge tactics. They are committed to advancing businesses in the digital age and have an enthusiastic and energized crew. TechTrioZ is a leader in a variety of IT disciplines, including the creation of responsive websites to boost online visibility, unique mobile applications for better service

delivery, and e-commerce storefronts that promote revenue growth. Intuitive app designs for the best user experience, search engine optimization, CRM integration, and digital advertising are all areas in which they are highly skilled. TechTrioZ creates solutions that are specifically suited to the needs of each client and recognizes the economic worth of their services. They work hard to give their clients the most benefit and value possible while assisting them in achieving their professional objectives.

1.1.3 Products and Services

TechTrioZ provides a wide range of services, including web-based applications, mobile applications, and data analysis services. The company is dedicated to creating customised, high-quality products that meet the unique demands of its clients. By creating intuitive interfaces that enhance the benefits customers receive from their services, TechTrioZ's primary goal is to meet customer requests and tackle unique difficulties.

TechTrioZ adheres to a set process to guarantee customer satisfaction. A data analyst first has extensive conversations with the client to properly comprehend their needs and expectations. The analyst also offers recommendations and insights throughout this phase on how to satisfy the client's requirements, thoroughly documenting them.

After finishing the requirements study, the analyst creates a demonstration to show the client the suggested solution. Further negotiations about project schedules, pricing options, package choices, support and post-sale services take place after the client approves the demo.

Effective customer participation and communication are strongly emphasized by TechTrioZ throughout the entire process. TechTrioZ ensures that its solutions are in line with the client's vision and objectives by actively involving the client. Additionally, the business provides ongoing support and post-sale services to help consumers use and maintain their equipment efficiently.

TechTrioZ is unwavering in its dedication to providing top-notch solutions that not only meet the needs of customers and have easy-to-use interfaces, but also give continuing support and assistance throughout the course of the project.

1.2 Objectives

The initiation of this system's development involved the pursuit of predetermined objectives, outlined as follows:

- Ensuring satisfaction of both functional and non-functional requirements articulated by the client.
- Ensuring the development cost and the deadline for the final delivery align with the client's preferences.
- Digitizing the existing sales process to enhance its simplicity and efficiency.
- Establishing a system that facilitates the client's comprehension through visualized data.
- Adapting to potential changes in business flow at any given time and enabling immediate actions within the application.
- Providing the public with an easily navigable application.
- Designing an innovative native UI/UX tailored for Android, iOS, and Windows platforms.

1.3 Scopes

User Registration and Logins: Registration and login process is maintained in such a way that the user can manually input email, password and other details or use his/her logged in Google accounts of the device.

Maintenance of the Profile: The user can update his/her account details at any time and will get the updated data immediately.

Invitation thorough email: The user can invite others to join and being a part of his/her family groups.

Messaging to the groups: Messages can be sent to all the members of all the groups, the user is a member of.

Administration of Family groups: The administrative power lies on creating a new family group, deciding which member can be a part of the family and which messages can be seen by all the members.

Integration of Medical Data: System is designed in such a way that enables users to enter and update details about any health issues that would limit their ability to donate blood.

Blood Group Lookup: Designed a thorough search function that enables users to quickly find blood groups within their family network and visualize blood group counting data in all of family groups.

Donor Eligibility Evaluation: Ensure that potential donors meet specific health requirements by conducting a thorough eligibility check prior to their participation in donation activities.

Privacy and Protection: Established rigorous privacy controls to limit who can access information about family members to just those who are permitted while retaining secrecy.

Database Administration: To ensure the functionality of the program, created a safe and expandable database to store user profiles, donation histories, and medical information.

Chapter 2: Literature Review

2.1 Relationship with Undergraduate Studies

The FamiPlasma project's development significantly benefited from the knowledge and skills gained through my undergraduate courses at IUB. The undertaking of this project would have posed considerable challenges in the absence of the foundational support offered by these courses. Notable examples include:

- **CSC445:** The software engineering course equipped me with various methodologies for software process development. I specifically applied the agile methodology in the software process development phase of the FamiPlasma project.
- **CSC305:** The object-oriented programming in Java courses deepened my understanding of OOP concepts. This knowledge proved beneficial as I am currently working on a project using JavaScript, which also employs the concept of classes.
- **CSC455:** The web application course introduced me to fundamental HTML and CSS, serving as the building blocks for not only the FamiPlasma project but also for others.
- **CSC405:** The system analysis and design course provided valuable insights into requirement analysis and diagram drawing. This knowledge has been instrumental in comprehending client requirements and designing the program accordingly.
- **CSC401:** The database management course covered essential charts such as ER and database design. This learning is directly applicable, as I utilize a NoSQL online server in my application, necessitating the creation of a database for the project.
- **CSC203 & CSC306:** The data structure and algorithm courses were instrumental in facilitating my understanding of the architecture of new programming languages encountered during the FamiPlasma project.

2.2 Related Works

In the initial stage of the internship, an extensive literature review was undertaken to evaluate the existing landscape of research on websites and technology within blood donation systems. Various papers, articles, and case studies were examined to acquire a deeper understanding of the obstacles confronted by blood donation programs and the prospective advantages that websites could offer

in addressing these challenges. The review underscored the significance of encouraging consistent blood donation, swift access to potential donors, and efficient communication among individuals willing to donate blood.

Chapter 3: Project Management & Financing

3.1 Work Breakdown Structure

The Work Breakdown Structure (WBS) arranges project tasks by visually representing roles and how they relate to one another. By dividing the project into more manageable chunks, it helps project managers by facilitating systematic oversight. This segmentation is important for allocating resources, assigning tasks, and tracking project progress. A Gantt chart can supplement the WBS for a more thorough breakdown, encouraging distinct responsibilities and improving team coordination. The WBS is a vital tool in project management that helps in planning, carrying out, and controlling projects.

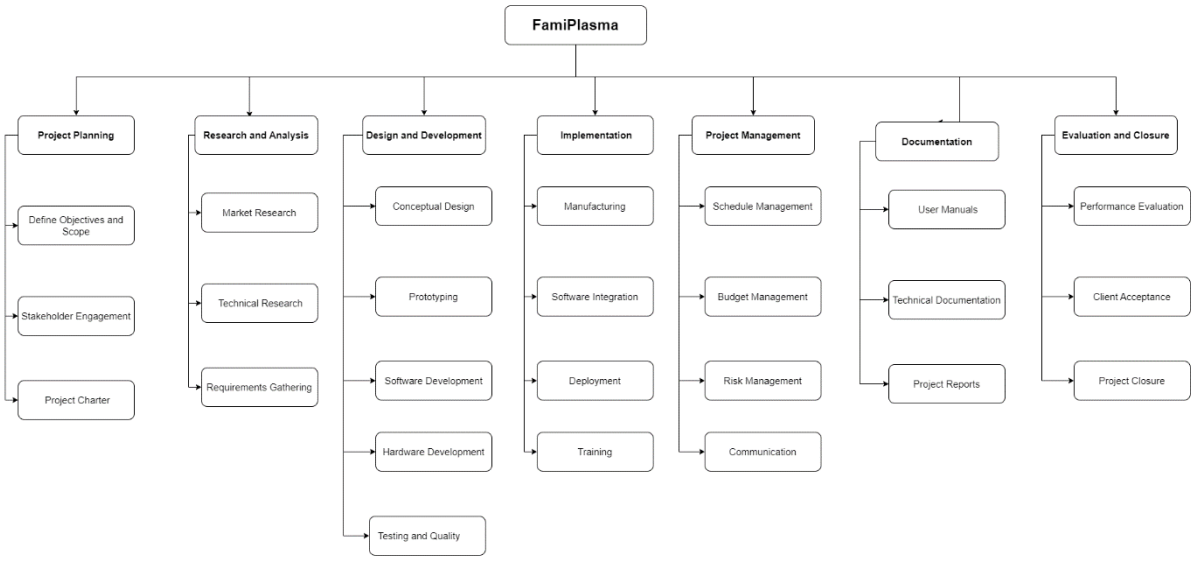


Figure 1: Work Breakdown Structure

3.2 Process and Activity wise Time Distribution

Project Planning:

Ctivity	Duration (in day)
Define Objectives and Scope	2
Stakeholder Engagement	5
Project Charter	2
Total	**9 days**

Research and Analysis:

Activity	Duration (in weeks)
Market Research	5
Technical Research	2
Requirements Gathering	2
Total	**9 days**

Project Management:

Activity	Duration (in day)
Schedule Management	3
Budget Management	5
Risk Management	3
Communication	5
Total	**16 days**

Design and Development:

Activity	Duration (in day)
Conceptual Design	2
Prototyping	3
Software Development	15
Testing and Quality Assurance	2
Total	**22 days**

Implementation:

Activity	Duration (in day)
Manufacturing	5
Software Integration	30
Deployment	2
Training	1
Total	**38 days**

Documentation:

Activity	Duration (in day)
User Manuals	3
Technical Documentation	2
Project Reports	2
Total	**7 days**

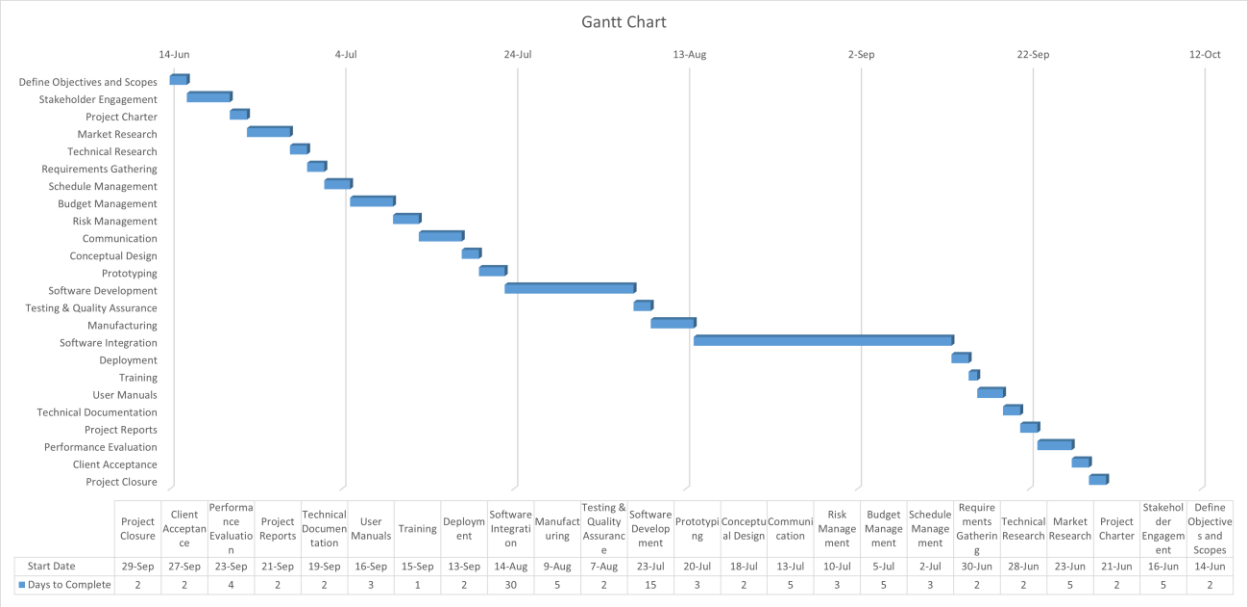
Evaluation and Closure:

Activity	Duration (in day)
Performance Evaluation	4
Client Acceptance	2
Project Closure	2
Total	**8 days**

Total Duration: 109 days

Figure 2: Time Distribution

3.3 Gantt Chart



	Project Closure	Client Acceptance	Performance Evaluation	Project Reports	Technical Documentation	User Manuals	Training	Deployment	Software Integration	Manufacturing	Testing & Quality Assurance	Software Development	Prototyping	Conceptual Design	Communication	Risk Management	Budget Management	Schedule Management	Requirements Gathering	Technical Research	Market Research	Project Charter	Stakeholder Engagement	Define Objectives and Scopes
Start Date	29-Sep	27-Sep	23-Sep	21-Sep	19-Sep	16-Sep	15-Sep	13-Sep	14-Aug	9-Aug	7-Aug	23-Jul	20-Jul	18-Jul	13-Jul	10-Jul	5-Jul	2-Jul	30-Jun	28-Jun	23-Jun	21-Jun	16-Jun	14-Jun
Days to Complete	2	2	4	2	2	3	1	2	30	5	2	15	3	2	5	3	5	3	2	2	5	2	5	2

Figure 3: Gantt Chart

3.4 Process & Activity wise Resource Allocation

The tables highlight the resource allocation and duration of the "FamiPlasma" project. This table helps project managers designate the appropriate individuals for tasks and establish a schedule. The "FamiPlasma" initiative will take 96 weeks to complete. These tables aid project administrators, team members, and stakeholders. They aid in resource and schedule planning and project coordination. With the independent format, it is simpler to represent progress in a clear manner, manage resources, and communicate project timelines.

Activity	Resources Assigned	Time Duration (Days)
Project Planning	**Project Manager, Business Analyst**	
Define Objectives and Scope	Business Analyst	2
Stakeholder Engagement	Project Manager, Communication Specialist	5
Project Charter	Project Manager	2
Research and Analysis	**Research Team, Analysts**	
Market Research	Market Research Team	**5**
Technical Research	Technical Experts	2
Requirements Gathering	Business Analyst, Subject Matter Experts	2
Project Management	**Project Manager, Project Coordinator**	
Schedule Management	Project Manager, Scheduler	3
Budget Management	Project Manager, Finance Team	5
Risk Management	Project Manager, Risk Analysts	3
Communication	Project Manager, Communication Specialist	5
Design and Development	**Designers, Developers, QA Team**	
Conceptual Design	Designers	2
Prototyping	Designers, Prototyping Team	3
Software Development	Developers, QA Team	15
Testing and Quality Assurance	QA Team	2
Implementation	**Manufacturing Team, IT Team**	
Manufacturing	Manufacturing Team	5
Software Integration	IT Team	30
Deployment	IT Team	2
Training	Training Specialists	1
Documentation	**Technical Writers**	
User Manuals	Technical Writers	3
Technical Documentation	Technical Writers	2
Project Reports	Analysts, Report Writers	2
Evaluation and Closure	**Project Manager, QA Team**	
Performance Evaluation	QA Team, Analysts	4
Client Acceptance	Project Manager, Client	2
Project Closure	Project Manager	2
Total		**109 days**

Figure 4: Process/Activity wise Resource Allocation

3.5 Estimated Cost

The predominant portion of the total cost of a software project is attributed to development expenses (amounting to 100,000 taka), infrastructure outlays (totaling 56,000 taka), and maintenance expenditures (equivalent to 30,000 taka). Development costs encompass the hourly wages of team members, while infrastructure costs may encompass servers and hosting, contingent upon the scale and complexity of the application. Maintenance costs encompass ongoing problem resolution and updates. The overall project cost is subject to significant fluctuations based on

factors such as project intricacy, infrastructure needs, and the necessity for post-development support and improvements. Effectively managing and optimizing these costs over the software project's lifecycle necessitates careful budgeting and administration.

Table 1: Estimated cost

Task	Cost amount in BDT
Development cost	100,000 Tk
Infrastructure cost	56,000 Tk
Maintenance cost	30,000 Tk
Total	**186,000 Tk**

Chapter 4: Methodology

The development process of the FamiPlasma mobile application followed a systematic approach, encompassing the following key phases:

- **Requirements Gathering:** The initial phase involved collecting requirements through surveys, interviews, and user feedback. Designing an effective and user-friendly program necessitates a comprehensive understanding of user needs.
- **Application Design:** Based on the gathered requirements, the program's architecture and user interface were devised. Special attention was given to user experience, resulting in a straightforward and user-friendly application design.
- **Development:** The website was created using contemporary software development techniques and technology. Agile methodologies were employed to ensure a flexible and iterative development approach.
- **Testing:** Rigorous testing was conducted to identify and rectify any weaknesses or issues in the program. The development team executed both manual and beta testing with a select group of users.
- **Security & Privacy:** Stringent security measures were implemented to safeguard data confidentiality and privacy. Access to information about individual family members was restricted to approved family members only.
- **Integration:** The application was seamlessly integrated with external databases to provide users with information on nearby blood banks, including their locations and contact details.

Chapter 5: Body of the Project

5.1 Work Description

FamiPlasma Web App is a dynamic and user-friendly platform crafted to revolutionize the organization of blood donation initiatives within families. At its core, FamiPlasma emphasizes user enrollment, allowing individuals to establish accounts and participate in a dedicated network focused on preserving lives through blood donation. Streamlining access to crucial features is achieved through email invitations, and family member management facilitates seamless additions to the network, nurturing a sense of cohesion and encouragement. A robust function for searching blood groups enables users to swiftly identify compatible donors within their family network, particularly during emergencies. Furthermore, the website delivers a comprehensive overview of potential donors' health conditions, ensuring their eligibility and the safety of the donation process. Privacy controls safeguard sensitive health information, granting access exclusively to authorized family members. Users can track their blood donation history, promoting regular contributions and offering access to vital information. Through the integration of these features and the utilization of a centralized database, FamiPlasma emerges as an indispensable tool, not only for effective blood donation but also for fostering health awareness and fortifying familial bonds of support. This, in turn, contributes to the preservation of lives and the cultivation of a culture of unity and responsibility within families.

5.2 Requirement Analysis

5.2.1 Rich Picture

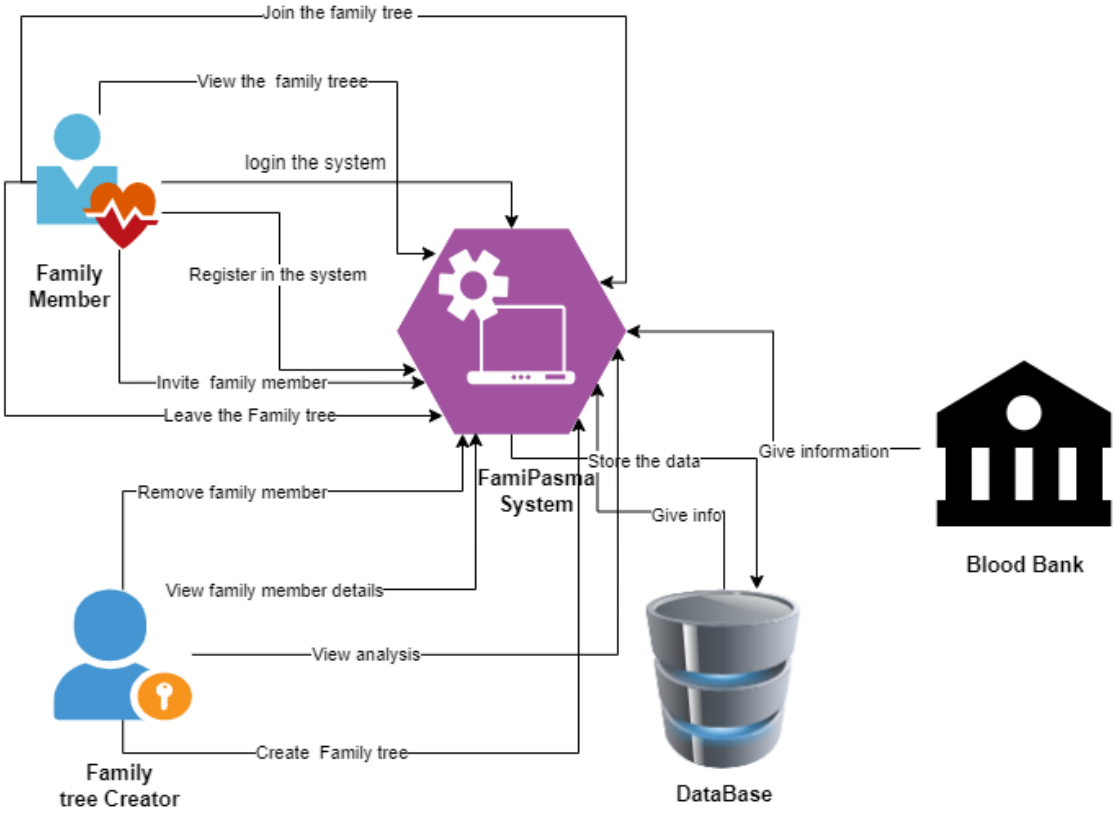


Figure 5: Rich Picture

5.2.2 Functional Requirements

1. User Registration and Authentication:
    - Users should be able to register and create accounts using their personal information.
    - Users should be able to sign up and log in using their Google accounts.
    - To guarantee that only users who have registered for the application may access it, the system must securely authenticate users.
2. Family Member Management:
    - Users have the capability to invite family members via email, and the application allows for the organization and categorization of family members.
3. Blood Group Search:
    - Users must have the ability to search for relatives based on their blood groups.
4. Donor Information:

- Users are empowered to input and review medical information and diseases for family members. The system should assess donor eligibility based on their most recent blood donation date.

5. Privacy Controls:
    - Access to family member information is restricted to authorized family members only. Both user information and medical data must be securely protected.
6. Blood Donation History:
    - The application must enable users to review their personal blood donation history.
7. Donor Contact Information:
    - Users should be granted access to the contact information of donors within their family network.
8. Database Integration:
    - The system is designed to maintain a centralized database for storing user profiles, donation histories, and medical information.

5.2.3 Non-functional Requirements

1. Security: The application needs to implement stringent security measures to safeguard user information and uphold confidentiality, with a focus on data encryption and secure authentication.
2. Performance: The application's responsiveness and efficiency should be at their highest level, with quick search and data retrieval response times, even with a sizable user base.
3. Scalability: The system needs to be able to handle future growth in user counts and data volumes.
4. Usability: Users with various degrees of technical skill should be catered to via an intuitive and user-friendly user interface.
5. Reliability: The program must run consistently and error-free, preserving the accuracy and consistency of data.
6. Compatibility: To reach a wider audience, the application should work with a variety of mobile devices and operating systems.
7. Accessibility: The program should follow accessibility guidelines to make sure that people with disabilities may use and access all its features.
8. Performance tracking: Continuous monitoring and optimization are necessary to ensure the application's continuous responsiveness and efficacy.

5.3 System Analysis

5.3.1 Six Element Analysis

Table 2: Six Element Analysis

Process	**Human**	**Hardware**	**Software**	**Database**	**Network**

Register	All	Any device	FamiPlasma Web app	FamiPlasma Database	Internet
Login	All	Any device	FamiPlasma Web app	FamiPlasma Database	Internet
Add Family members by inviting though email	All	Any device	FamiPlasma Web app	Update family creator tree data.	Internet
Remove Members	Family Creator	Any device	FamiPlasma Web app	Update family creator tree data	Internet
Update user data	All	Any device	FamiPlasma Web app	Update user data	Internet
View family member data	Only family members	Any device	FamiPlasma Web app	Load data Family members	Internet
Filter family member data	Only family members	Any device	FamiPlasma Web app	Load data Family members	Internet
Message family member	Only family members	Any device	FamiPlasma Web app	Post messages of Family members	Internet
View messages of family member	Only family members	Any device	FamiPlasma Web app	Load messages of Family members	Internet

5.3.2 Feasibility Analysis

Technical Feasibility

The technical feasibility of FamiPlasma relies on the availability of necessary infrastructure and technology. To ensure the project's success, it needs access to modern development platforms, secure data storage solutions, and databases capable of seamless integration with external sources like blood bank records. While implementing robust security measures like data encryption and secure authentication is technically achievable, it necessitates cybersecurity expertise for the safe protection of user data. Scalability, achievable through cloud services or server enhancements, demands careful planning to accommodate potential growth in both user numbers and data volume. Ensuring compatibility with various devices and operating systems is technically possible but requires extensive testing and development efforts.

Operational Feasibility

The operational feasibility of FamiPlasma relies on user adoption within families and efficient coordination. To encourage users to register and actively participate, a strategy for user engagement and education on the app's benefits might be essential. Successful family coordination necessitates effective communication and collaboration among family members, which may require awareness campaigns and support efforts. While enforcing privacy controls and managing data within a central database is operationally feasible, it mandates explicit user management and education on data privacy. Ongoing support, updates, and maintenance are operationally viable but demand dedicated resources and a committed support team.

Economic Feasibility

Evaluating the economic feasibility of the FamiPlasma project involves analyzing potential costs and revenues. This encompasses expenses like website development, technology infrastructure, ongoing operational costs, and salaries for support personnel. To ensure long-term success, it is crucial to identify sustainable revenue streams, including subscription fees, advertising, and forming partnerships with blood banks. Economic viability hinges on calculating the expected return on investment (ROI), considering user numbers and potential revenue against development and operational costs. Conducting market research is essential to assess demand, competition, and growth prospects, thereby determining the project's economic viability. Careful financial planning and a sound business strategy are imperative for ensuring the project's economic success.

5.3.3 Problem Solution Analysis

Problem Statement

The FamiPlasma initiative tackles the challenge of ineffective coordination in family blood donation. Historically, families encountered difficulties in swiftly mobilizing blood donors during emergencies, verifying donor eligibility, and safeguarding the confidentiality of confidential medical information. Current communication methods often prove inadequate in efficiently linking family members for blood donation, leading to delays and complications in critical, life-threatening situations.

Solution

The FamiPlasma Web App presents an innovative resolution to the challenge by offering a comprehensive and user-friendly platform for orchestrating blood donation within families. It streamlines the establishment of a network of potential donors through user registration, invitation through email, and family member management. Users can search for specific blood groups, retrieve donor information, and confirm eligibility. Stringent privacy controls restrict access to sensitive information to authorized family members. Furthermore, the system empowers users to track their blood donation history. By incorporating these functionalities and utilizing a centralized database, FamiPlasma enables families to respond promptly during emergencies, ensuring swift access to life-saving blood donations and promoting a culture of familial unity and responsibility.

5.3.4 Effect & Constraints Analysis

Effect Analysis:

1. Efficiency in Blood Donation Coordination: FamiPlasma streamlines the coordination of blood donations within families, resulting in quicker response times during emergencies. This has the potential to save lives by ensuring timely access to blood.
2. Promotion of Family Unity: The application nurtures a sense of solidarity and support within families, encouraging members to unite for a common purpose and strengthening familial bonds and mutual responsibilities.
3. Health Education: FamiPlasma enhances health awareness by providing information on the medical conditions and blood types of family members, facilitating proactive health management.
4. Encouraging Regular Blood Donation: The app's monitoring of blood donation history and recognition of donors may motivate individuals to donate blood regularly, contributing to blood banks and alleviating shortages.

5. Data Security: Rigorous privacy controls protect sensitive medical data, ensuring its confidentiality and restricting access to authorized family members.

Constraints Analysis:

Throughout the development and implementation of FamiPlasma, various constraints and challenges must be considered:

1. User Acceptance: Convincing family members to adopt and actively use the application may pose challenges. Effective user engagement strategies are essential to overcome resistance to change and ensure widespread adoption.
2. Privacy Concerns: Despite privacy controls, there may be lingering security concerns regarding sensitive medical information. Addressing these concerns and ensuring robust data security is imperative.
3. Technical Challenges: Establishing and maintaining a secure and scalable technical infrastructure may present technical hurdles. Compatibility with diverse devices and operating systems is also a technical consideration.
4. Market Competition: The presence of existing blood donation applications and platforms could impact the success of FamiPlasma. To stand out and attract users, effective marketing and distinctive features are necessary.
5. Economic Sustainability: Defining a viable revenue model and achieving economic sustainability are critical for the project's long-term success. Balancing development and operational costs with potential revenue streams is essential.
6. User Guidance: Educating users on the application's benefits and features may require resources and continuous effort. Providing training and support for users is crucial for successful adoption.

5.4 System Design

5.4.1 UML Diagram

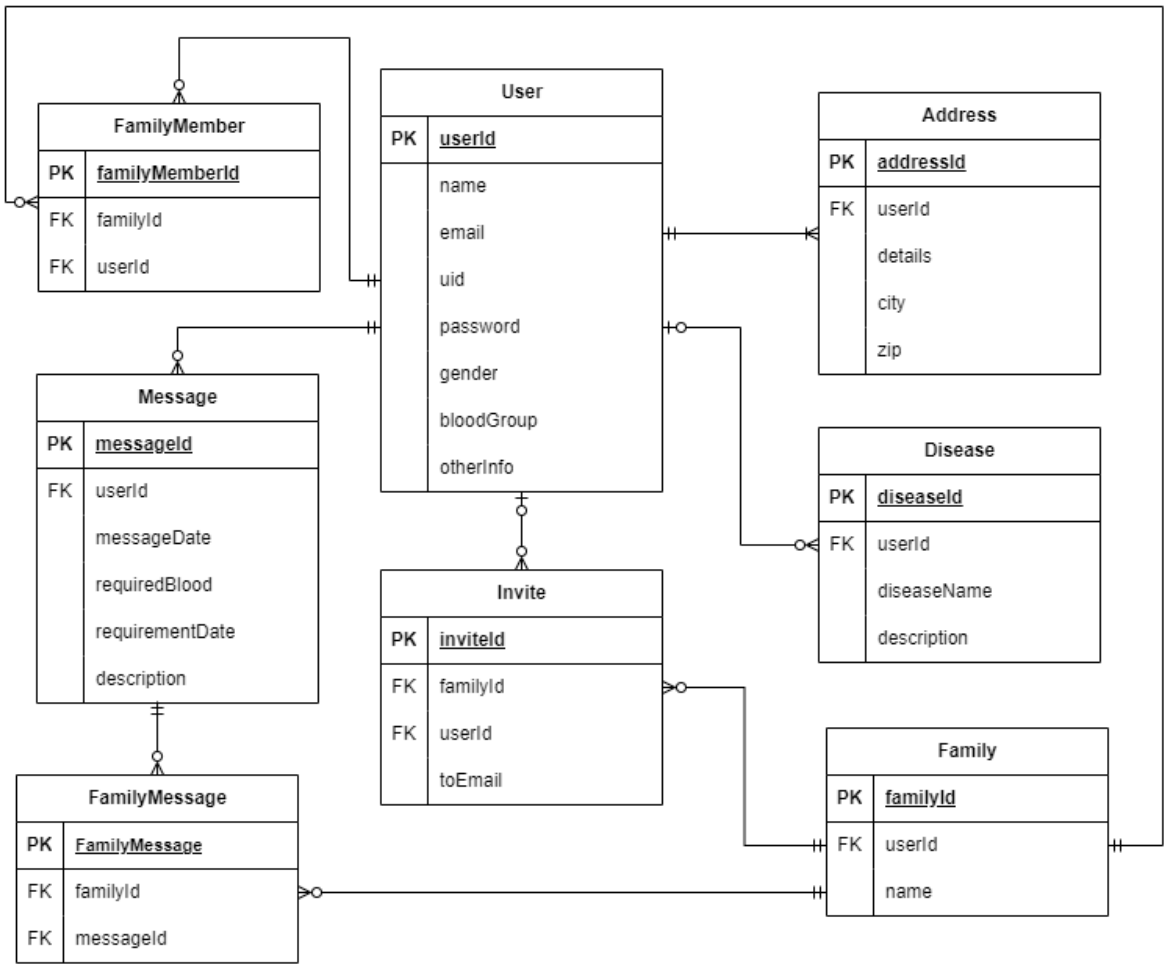


Figure 6: Entity Relationship Diagram

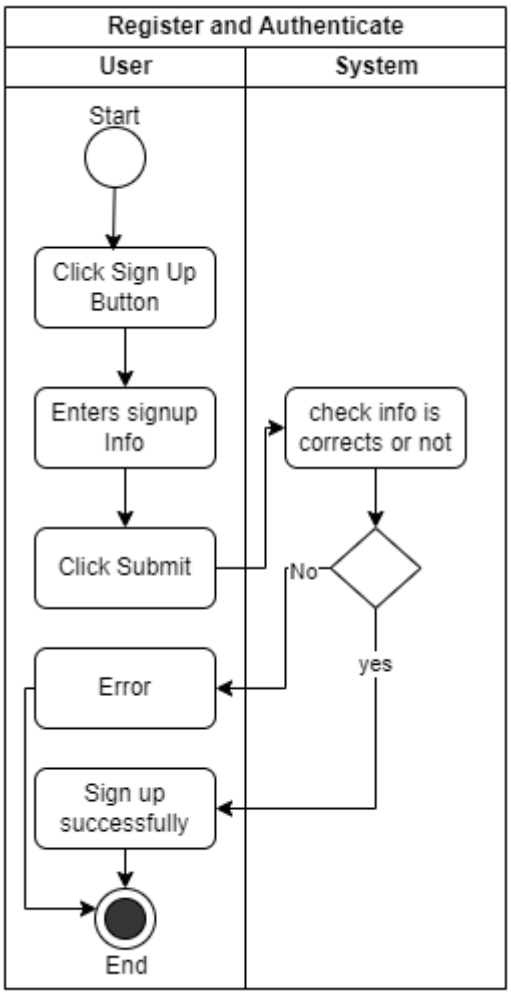


Figure 7: Activity diagram of User Registration

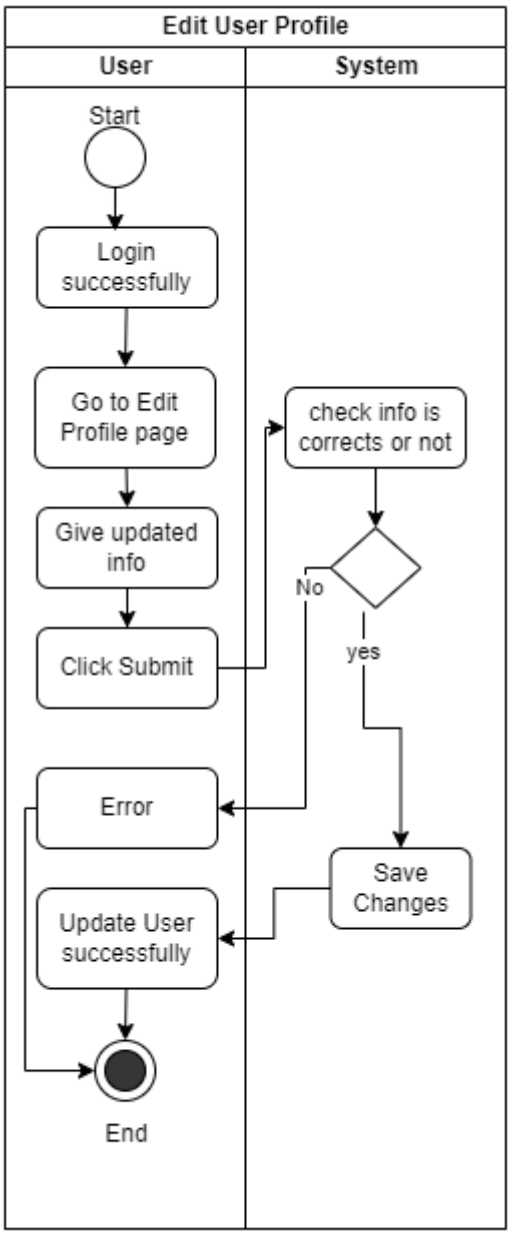


Figure 8: Activity diagram of Edit Profile

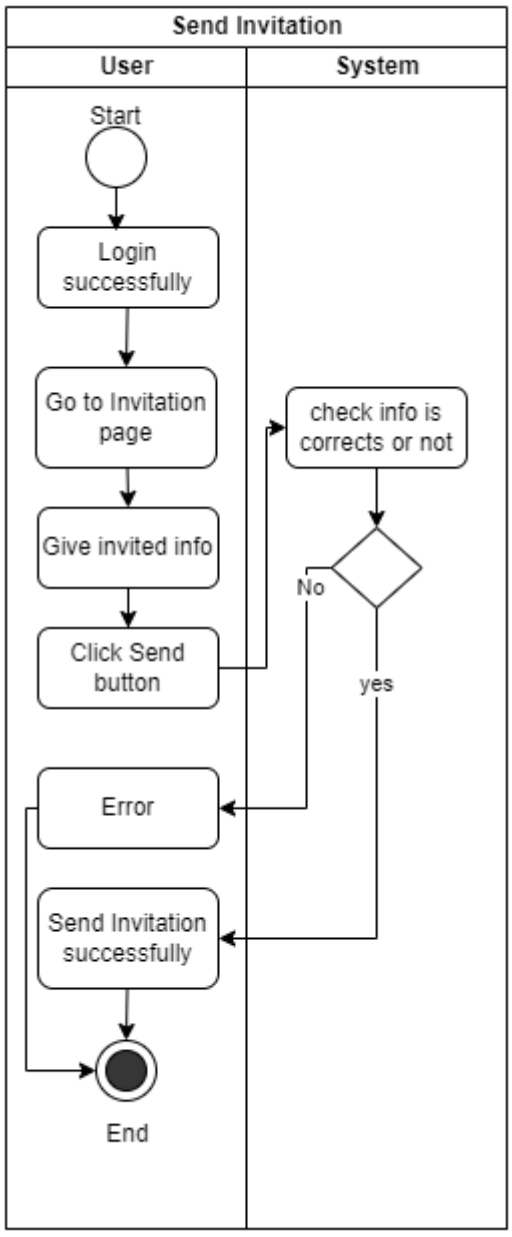


Figure 9: Activity diagram of Send Invitation

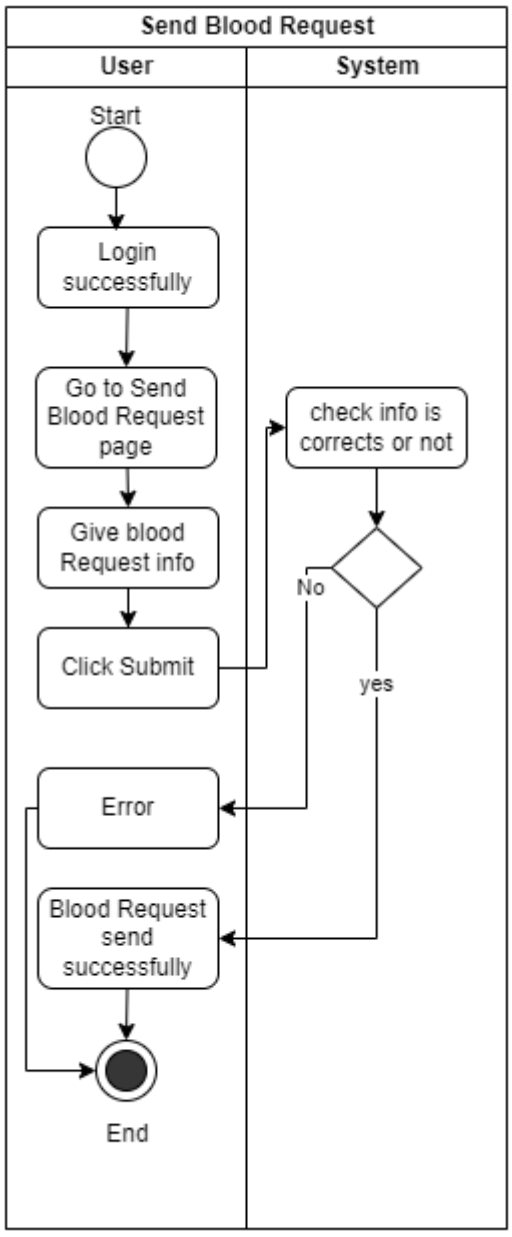


Figure 10: Activity Diagram of Blood Request

5.5 Implementation

Focus is placed on the technical components involved in developing and launching FamiPlasma during the implementation phase. To do this, the design and requirements must be translated into

a usable and effective software solution. Included are two representative screenshots, one showing database design and the other code.

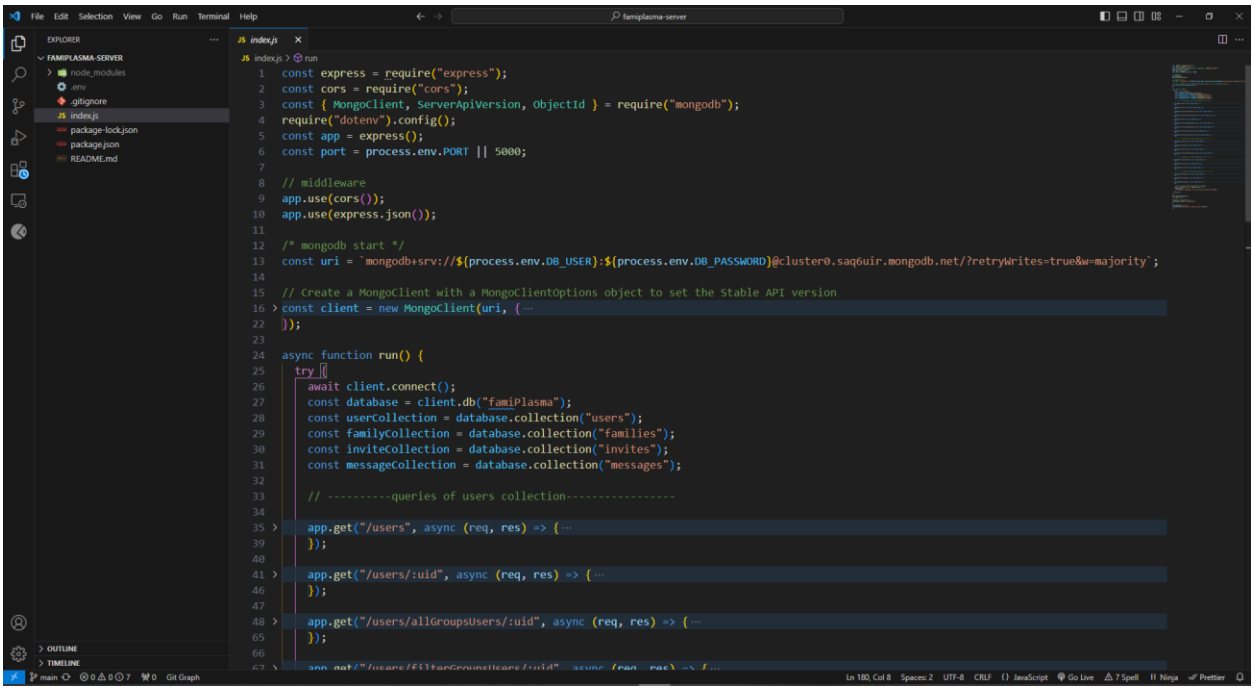


Figure 11: Programming Screenshot

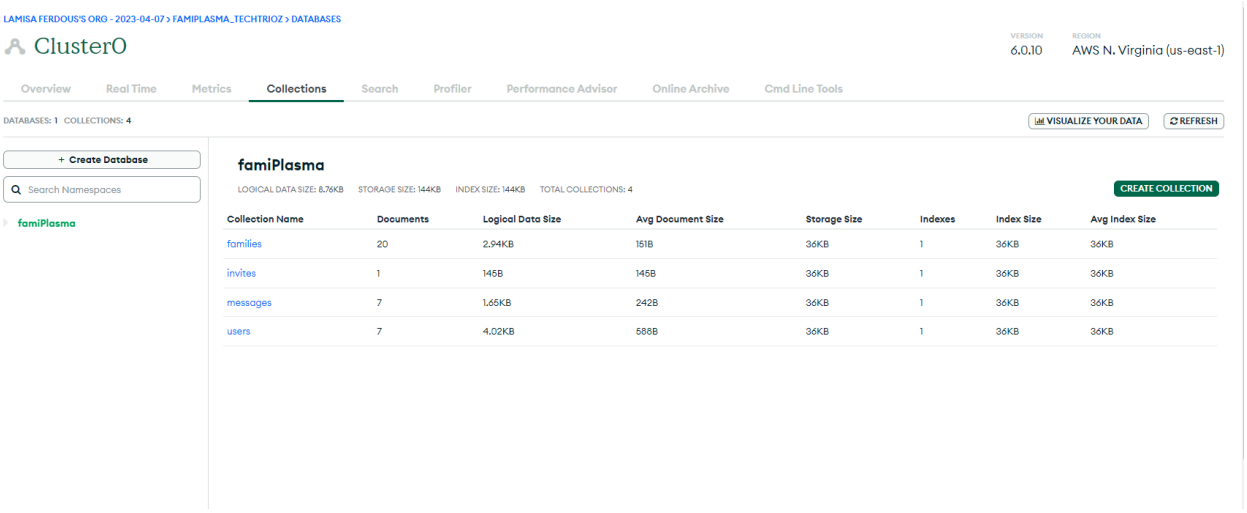


Figure 12: Database Screenshot

5.6 Testing

The FamiPlasma platform's testing phase, which is crucial to the development process, makes sure that the system works as intended, complies with all requirements, and provides superior user

experience. To comprehensively confirm its functionality, performance, security, and usability, the FamiPlasma platform's testing method includes a variety of levels and types of testing.

5.6.1 Input

Table 3: Input table with fields

Test Case ID	**Test Scenario**	**Test Inputs**
TC001	Registration	User first name, last name, email, city, gender, blood group, password, confirm password
TC002	Login	User email, password
TC003	Registration/login through Gmail	Choose logged in google account
TC004	Update profile	Fields to be updated such as username, email, contact, address, city, zip code, password, date of birth, weight, gender, blood group, number of times donated blood, date of last donation, eligibility to donate, health issue and its reason.
TC005	Create family group	Family name
TC006	Invite	Family group, email

5.6.2 Output

Table 4: Output table with fields

Test Case ID	**Test Scenario**	**Test Outputs**
TC001	Registration	Successful registration message
TC002	Login	Successful login message and redirect to home page
TC003	Registration/login through Gmail	Successful registration/login message and redirect to home page
TC004	Update profile	Successful update message
TC005	Create family group	Successful group created message and new group seen

TC006	Invite	Successful invite message and email sent

5.6.3 Designing Test Cases

Table 5: Design Test Cases with Input/Output with Pass/Fail

Test Case ID	**Test Scenario**	**Test Inputs**	**Test Outputs**	**Pass/Fail**
TC001	Registration	User first name, last name, email, city, gender, blood group, password, confirm password	Successful registration message	Pass
TC002	Login	User email, password	Error: Invalid password	Fail
TC003	Registration/login through Gmail	Choose logged in google account	Successful registration/login message and redirect to home page	Pass
TC004	Update profile	Fields to be updated such as username, email, contact, address, city, zip code, password, date of birth, weight, gender, blood group, number of times donated blood, date of last donation, eligibility to donate, health issue and its reason.	Successful update message	Pass
TC005	Create family group	Family name	Successful group created message and new group seen	Pass

TC006	Invite	Family group, email	Successful invite message and email sent	Pass

5.6.4 Test Results

Upon scrutinizing the test results table, it becomes evident that the majority of test cases have proven successful, with the actual output aligning seamlessly with the expected output. Nevertheless, Test Case TC002 stands out as an exception, registering a failure. This is attributable to the actual output being "Error: Invalid password," which diverged from the expected output of "Successfully logged in." In this context:

- Test Case ID: This is used to identify each test case specifically.
- Expected Output: This describes the expected outcome or behavior after the test case has been executed.
- Actual Output: This summarizes the behavior or outcome that was seen during the testing phase.
- Pass/Fail: This categorizes results according to whether the actual results match the predicted results. When there is a match, the test case is deemed "Pass." On the other hand, the test case is marked as "Fail" if the actual output differs from the anticipated output.

Chapter 6: Result & Analysis

This section will examine the project's findings and assess their importance. The creation and use of the FamiPlasma system directly resulted in the outcomes. Let's investigate the findings and perform a careful analysis.

```
// ----------queries of users collection----------------

app.get("/users", async (req, res) => {···
});

app.get("/users/:uid", async (req, res) => {···
});

app.get("/users/allGroupsUsers/:uid", async (req, res) => {···
});

app.get("/users/filterGroupsUsers/:uid", async (req, res) => {···
});

app.post("/users", async (req, res) => {···
});

app.put("/users/groupUpdateOne/:uid", async (req, res) => {···
});

app.put("/users/groupUpdateMany/:uid", async (req, res) => {···
});

app.put("/users/profile/:uid", async (req, res) => {···
});

app.put("/users/groupDelete/:uid", async (req, res) => {···
});
```

Figure 13: APIs of User Collection

These APIs do the following:

- Post user data in the database.
- Get user data from the database.
- Update user information in the database.
- Add a user to a family group.
- Add a user to multiple family groups.
- Get all the members belong to a family group.
- Get the filtered members according to the need of the user.
- Delete a family group from a member’s group list.

```
// ----------queries of families collection----------

app.get("/families/:uid", async (req, res) => {···
});

app.post("/families", async (req, res) => {···
});

app.put("/families/:uid", async (req, res) => {···
});

app.put("/families/memberDelete/:id", async (req, res) => {···
});
```

Figure 14: APIs of Families Collection

These APIs do the following:

- Create a new family group.
- Get all the family groups information of a user.
- Edit a family group's member list.
- Delete a member from a family group.

```
// ----------queries of invites collection-----------------

app.get("/invites/:emain", async (req, res) => {···
});

app.post("/invites", async (req, res) => {···
});

app.delete("/invites", async (req, res) => {···
});
```

Figure 15: APIs of Invites Collection

These APIs do the following:

- Post an invitation detail.
- Get invitation details from a part of email.
- Delete an invitation.

```
// ----------queries of messages collection-----------------

app.get("/messages/:uid", async (req, res) => {···
});

app.post("/messages", async (req, res) => {···
});

app.delete("/messages", async (req, res) => {···
});
```

Figure 16: APIs of Messages Collection

These APIs do the following:

- Post a message with details.
- Get messages from the users of the family groups.
- Delete a message.

6.1 System Functionality Result:

- The development and implementation of the FamiPlasma system were executed successfully, delivering a digital platform for blood donation, and facilitating connection with close associates.
- The system adeptly managed diverse responsibilities, including blood donation eligibility, donation history, and health records.

6.2 Impact on Business Operations:

- The adoption of the FamiPlasma system brought about a notable transformation in the business operations of blood donation utilizing the platform.
- Manual procedures were streamlined, resulting in efficiencies in both time and cost.
- The solution increased customer happiness and engagement, which helped to increase customer loyalty and retention.

6.3 Encountered Challenges:

- Throughout the project/work, numerous challenges were faced and effectively tackled.
- Agile development approaches were employed to adapt to evolving requirements and integrate user feedback.
- Emphasizing data security and system reliability, careful attention was given to address these crucial considerations.

Chapter 7: Project as Engineering Problem Analysis

7.1 Sustainability of the Project

The business has created strategic strategies to guarantee the project's long-term survival and enable future expansion. The initial focus is on providing for hospitals that could need custom apps using the power platform. The business wants to improve the app's features and market it to a wide spectrum of customers. The project seeks to establish long-term sustainability by growing the clientele and making a sizable profit. The project's sustainability can be divided into three categories:

- Community Sustainability: The objective is to persuade users to support the application, which will help the clientele expand.
- Financial Sustainability: In order to maintain profitability, it is essential to efficiently manage the project's development costs, which include license fees, database storage costs, and maintenance.
- Organizational Sustainability: The business intends to continue operating after the release of the application, whether through the current team, a team that has been extended, or a brand-new team. The company's services will be expanded and consumer needs will be addressed through anticipated updates and feature enhancements.

7.2 Social and Environmental Effects and Analysis

The application was created with consideration for the environment in mind; it runs exclusively via the internet and uses gadgets and electricity.

7.3 Addressing Ethics and Ethical Issues

The initiative places a high priority on ethics and security, and the system has been painstakingly designed to be 100 percent safe, preventing any leakage of personal data from the database.

Firebase and MongoDB oversee overseeing security-related matters. Ethical issues covered include:

- Fraud and identity theft: Strict access controls prevent third-party software from accessing the database. Because no bank account or credit card information is required by the system, the risk of fraud and identity theft is reduced.
- Data Security: The head developer has exclusive access to the server and database and is subject to strong access controls. By using login and password protection, this developer secures the databases, preventing unwanted access to the information gathered.

The initiative seeks to increase trust among users and stakeholders while preserving the integrity and sustainability of the system by placing a heavy emphasis on ethics, security, and environmental sensitivity.

Chapter 8: Lesson Learned

My tenure as a Programmer with TechTrioZ Solutions marked the conclusion of my internship. Having accepted an internship opportunity with TechTrioZ Solutions, I undertook the role of a developer, an experience that proved highly educational. The primary objective of my project was to establish a system for TechTrioZ Solutions, named "FamiPlasma." As a developer, I was responsible for creating the system using React.js and Node.js, presenting a novel experience, particularly in collaboration with the organizational team. While encountering a few challenges during this period, I gained valuable insights, and I outline key lessons learned below.

1. Skill Development: Throughout my internship, my focus was on acquiring new skills and honing existing ones, crucial for cultivating a diverse set of abilities aligned with my career aspirations. Devoting time to mastering tasks relevant to my professional goals ensured continuous improvement in my skill set, contributing significantly to my professional growth during the internship.
2. Professional Communication: An important lesson learned was the value of professional communication in the workplace. Despite the initial difficulties, I quickly realized how important it was to practice excellent communication. Maintaining a professional tone and manner became crucial in all communications, including verbal exchanges over the phone, written correspondence, and email. The importance of clear and professional discourse in a professional situation was highlighted by the distinct degree of communication required in interactions with supervisors, bosses, and clients.
3. Networking: Internships offer excellent opportunities for building a professional network, fostering connections with colleagues, and establishing lasting relationships. Beyond creating friendships within the office, I forged professional connections that could prove beneficial in my post-graduation job search. Networking during my internship not only created a support system but also opened doors to potential career opportunities.
4. Setting goals: During my internship, setting goals was crucial. Knowing how crucial it is to establish specific goals, I had conversations with my manager to create clear expectations and personal targets. This concentrated on gaining knowledge and abilities throughout the internship.

5. Time management: Effective time management has become a taught ability, making it particularly difficult for someone entering the workforce for the first time. Effective time management was made possible by realizing the value of remaining organized through task lists, prioritizing according to priority and urgency, and identifying key chores. This strategy made it easier to maintain productivity throughout the internship and to stay focused.
6. Enthusiasm: Going into the internship with a positive attitude and an open mind was extremely helpful. The internship experience was greatly influenced by the intern's willingness to learn new skills, requests for more work, and enthusiasm to learn and ask questions.

8.1 Problems faced during this Period

Adapting to the new environment was not a challenge for me at the outset, as I had senior peers from my university who were available to provide guidance and support. Furthermore, the institution's management structure is outstanding, with a collaborative approach where everyone works together to provide support and assistance. They operated as a well-coordinated team, ensuring efficient task accomplishment.

8.2 Solution to those Problems

Being a fresh developer, I had to undergo a significant learning curve to adapt to my seniors. This involved acquiring skills in managing intricate tasks, ensuring client satisfaction, and keeping the office management informed about the progress of my work.

Chapter 9: Future Work & Conclusion

9.1 Future Works

The FamiPlasma program is still being developed, and there are plans to add new features and advancements in the future. Future tasks that have been suggested including:

1. Email and mobile phone notifications will be sent to family group members when new messages are posted.
2. To facilitate registration and membership in family groupings, a QR code scanning option will be introduced.

9.2 Conclusion

My internship at TechTrioZ Solutions has proven to be a valuable learning experience, involving the development of an application aimed at enhancing blood donation and medical issue management. Through this project, I gained knowledge and practical experience in utilizing React.js and Node.js. The system I contributed to is crafted to tackle significant challenges faced by users, ultimately saving both lives and time.

Throughout the internship, I immersed myself in the development process, gaining insights into the dynamics of the job market. Effectively handling diverse software development requirements, I learned to adopt optimal approaches for creating robust solutions. This experience has honed my problem-solving skills, turning me into a proficient troubleshooter ready to confidently confront challenges in my future career as a web developer.

I am grateful for the chance to work for TechTrioZ Solutions and the skills I learned from this internship. The software I helped develop has the potential to become a fantastic client solution with more improvements. This experience has given me a comprehensive grasp of the expectations and duties of working as a web developer, preparing me for them. I'm looking forward to continuing my journey and using the knowledge and understanding I've obtained to support the creation of fresh software in the future.

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