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I confirm that I understand my coursework needs to be submitted online via My Second Teacher under the relevant module page before the deadline in order for my assignment to be accepted and marked. I am fully aware that late submissions will be treated as non-submission and a mark of zero will be awarded.

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1. Introduction

'Gymify' is an innovative gym management solution proposed to transform the way gym centers operate, offering a seamless experience for owner, gym member and trainer. This mobile app includes personalized user profiles with Body Mass Index (BMI) tracking, attendance system and monitoring with smart door lock integration, workout and diet planning, class scheduling, real time communication with trainer and gamification features such as points system to motivate them to maintain their fitness streak. The app provides a platform for fitness enthusiasts to manage their fitness journey effectively, while gym owners and trainers can monitor client engagement through the admin website. After the subscription ends the users would be able to renew by paying from the app directly.

1.1. Problem Scenario and Project as a Solution

In today's busy world, people struggle to maintain a consistent workout routine and a balanced diet due to lack of time management issues, lack of motivation and absence of personalized guidance. Physical inactivity is the cause for 27% of diabetes and 30% of ischemic heart disease (World Health Organization, 2019). Physical activity is often performed during spare time in high-income countries but in cities of country like Nepal people find it difficult to manage their time for gym. The fitness sector has a turnover of 96.7 billion dollars worldwide, with a total of 184 million users spread over 210,000 fitness centers (IHRSA, 2020). Traditional gym management systems are outdated lacking integration with modern technologies and mainly computer is used to keep records only. (Suryawanshi, 2024) These systems fail to manage gym in an effective way. Trainers find it difficult to monitor the progress of their clients. It is reported that individuals who exercised with a trainer exercised harder than those who exercised alone but finding correct trainer and training time is difficult (Plante, 2010). The lack of integrated system for attendance, payment and communication has hampered the overall operational efficiency of gym leading to poor client engagement and retention. During COVID-19

pandemic, most gyms faced a huge financial loss as there were a little remote way which were not that much convenient (Rada, 2022). Without the proper tools to monitor food intake and to receive tailored diet suggestions, gym users struggle to balance their nutritional needs with their workout routines, hindering their overall progress (Calella, 2020).

In 2020, a total of 218 billion applications (apps) were downloaded in the world, with a total expenditure of 134 billion dollars (App Annie, 2021). People are using smartphones to obtain numerous information about fitness and nutrition. The proposed app 'Gymify' offers a comprehensive solution to challenges faces by gym owners, trainers and gym users. It combines personalized workout planning and diet planning, AI-driven (time permitting) nutrition recommendation, real time communication feature and gamification such as point system to keep users motivated and on track with their fitness goals. The app will provide gym owners with all the necessary statistics to make the management process effective. This app can monitor the consistency of user attendance in the gym, helping them track their adherence to their workout routine. Users will be able to take online guidance within the app. They will also be able to pay for gym subscriptions with the payment system integrated in the app itself.

1.2. Similar Projects

There are similar projects which has been takes as inspiration for this project. Some of them are:

i. Hevy - Gym Log Workout Tracker



Figure 1 Hevy

Hevy is a fitness relates mobile application which helps user to efficiently track workout, get gym logs and get statistics about their progress. It also has social media kind of community feature to follow friends and copy their workout routine.

ii. Delta Tech



Figure 2 Delta Tech

Delta Tech's Gym management software which provides features like user, membership, trainer and nutrition management.

1.3. Tools and Resources

With the use of modern technologies like React JS for front end development of admin website , Node JS for backend , Postgres as database, Socket IO for real time communication, and Firebase for authentication and notification, with a mobile component built on Flutter is to be used Gymify is set to redefine fitness management by introducing technology eradicating the use of traditional approach.

2. Aims and Objectives

2.1. Aims

- To provide a comprehensive digital platform that simplifies gym management for owners and enhances user engagement.
- To promote a healthy lifestyle by providing users with personalized workout and diet plans.
- To foster engagement through real-time communication, challenges, and gamification.
- To motivate fitness enthusiasts to keep track of fitness progress in simplified and managed way.

2.2. Objectives

- Develop a user-friendly interface that allows members to manage their fitness profiles, track progress, and achieve their goals.
- Implement a secure and automated attendance system by integrating with smart lock using RFID card.
- Develop workout tracking and planning feature for every gym user.
- Facilitate seamless communication between members and trainers through real-time chat or forum.
- Provide gym owners with actionable insights and reports to monitor client engagement, popular classes, and overall gym performance.

3. Expected Outcomes and Deliverables

3.1. Expected Outcomes

- **User-Friendly Mobile App:**

The Gym App will provide a mobile interface designed for ease of use, ensuring a seamless and intuitive experience for all both beginners and experienced gym-goers to navigate the features effortlessly.

- **Fitness Tracking and Goal Setting:**

App will provide features for monitoring fitness related indices such as age, gender, weight etc. to allow them to set personalized goals, track progress and provide comprehensive view of their fitness journey.

- **Workout Selection and Customization:**

Users can select predefined workout as well as create custom workout plan according to their needs, also they can seek workout recommendations from trainer.

- **Calorie Calculation and Diet Recommendations:**

The app will have tools for calculating food calories, manage diet, ask recommendation either from trainer or from AI offering expert guidance.

- **Communication with Trainers and Other Users:**

Chat feature which will allow users to communicate with trainer for advice and support, also community feature to chat with other users to challenge them.

- **Trainer Client Management via Web App:**

Trainer can access to an admin panel within the web app to manage client list, monitor progress, and provide personalized training plans.

- **Comprehensive Gym Management for Owners:**

Gym owners will benefit from tools designed to monitor gym attendance, manage payment processing, and oversee the overall management of their gym facilities ensuring smooth gym management.

- **Detailed Analytics and Reporting:**

The app will offer robust analytic tools, providing detailed reports on user progress, engagement, and other key metrics. These insights will help users stay motivated and allow trainers and gym owners to optimize their offerings based on real-time data.

- **Gamification For Enhanced Engagement:**

The app will include gamification elements such as challenges, leaderboards, and rewards which will encourage users to stay active, achieve their goals, and engage more deeply with the app's community.

3.2. Deliverables

Following things are to be delivered after project completion.

- **Project Artefacts** – Weekly evidence according to methodology steps
- **Log Sheets** – Weekly Log sheets signed by Supervisors.
- **Project Development Code** : Contains development code for both mobile application and web application. Also, database schema is included.
- **Webapp and Mobile Application**
- **Report** : Report contains the following

Project Proposal

Interim Report

Final Report

4. Project Risks, Threat, and Contingency Plans

Aspect	Summary
Risks	Delays due to unfamiliarity with new technologies, inaccurate time estimates, poor user adoption, privacy concerns, unrealistic goals, and potential miscommunication.
Threats	Project delays, low user engagement, privacy hesitations, user frustration, and ineffective workouts or diets.
Contingency Plan	Allocate learning time, conduct research, engage in user testing, ensure data security, provide expert-backed guidance, and secure communication channels.

Table 1 Project Risks, Threat and Contingency Plans

5. Methodology

Software development is a process or series of processes used in software development (Alliance Software, 2022). There are many software methodologies which are used to develop a software in an organized and efficient manner.

5.1. Methodology Overview

The popular ones are:

i. Waterfall Methodology

In this software development process, we must complete progress phase before moving to the next. It is linear and rigid. The methodology relies heavily on the requirements and should be planned beforehand. The methodology comes from computer scientist Winston Royce's 1970 research paper on software development (Atlassian, 2023).

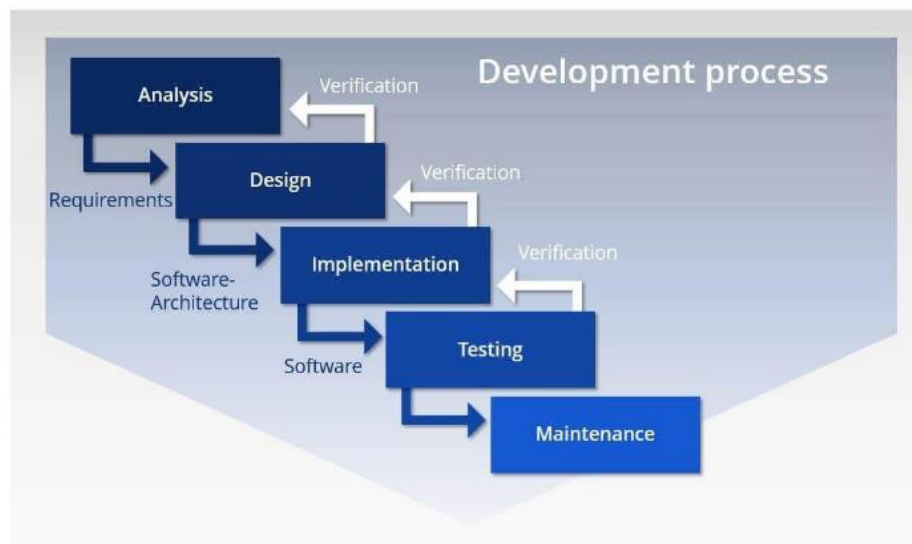


Figure 3 Waterfall Methodology (IONOS, 2019)

ii. Prototype Methodology

The prototype methodology is a software development technique where the prototype is used to provide as overview of the system and allows user to see the system and customize it accordingly (Mulyani, 2016) .

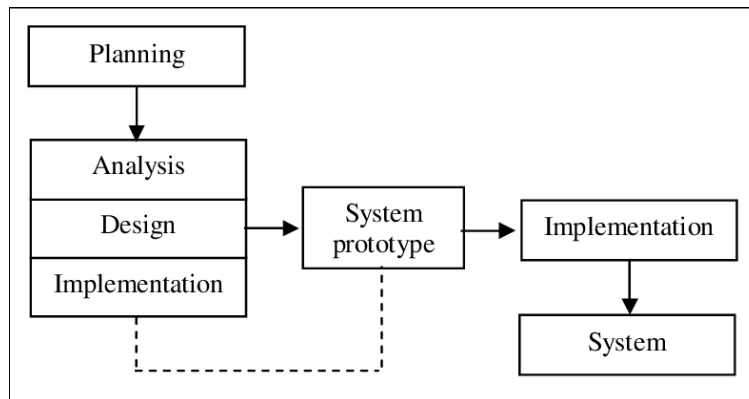


Figure 4 Prototype Methodology (Wahab, 2009)

iii. Iterative Model

The iterative model is a software development life cycle (SDLC) technique wherein fundamental requirements are well-stated and beginning development work is carried out. Subsequent upgrades are added to this base piece of software through iterations until the final system is constructed (Kumar, 2023).



Figure 5 Iterative Model

iv. Agile Methodology

The Agile technique is a project management style that prioritizes ongoing communication and improvement while segmenting the work into manageable chunks. Teams work in cycles of planning, carrying out, and reviewing. (Atlassian, 2023).



Figure 6 Agile Methodology

v. Incremental Methodology

An alternative to the waterfall paradigm is the incremental model in software development. Each iteration of the smaller cycles, which include requirements, design, development, and testing, results in a software prototype. The preceding prototype is enhanced or expanded upon in later versions (Ganney, 2020).

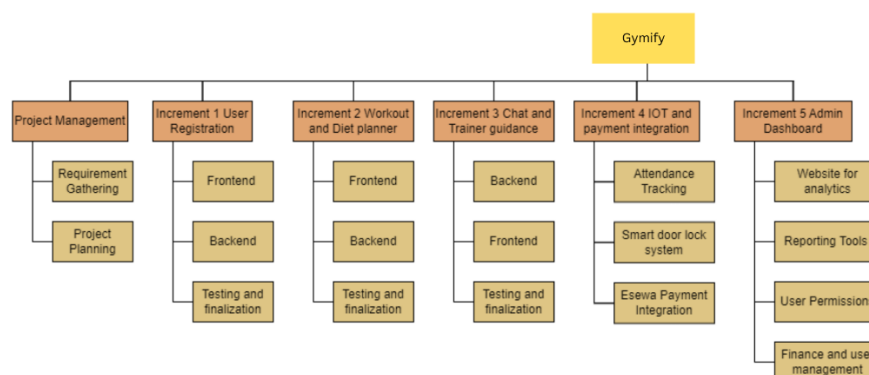


Figure 7 Incremental Model for Gymify

5.2. Chosen Methodology

I have chosen Incremental model in software development as it allows for phased development and early delivery of functional components. Incremental methodology refers to building the product in increments, one piece at a time. Once all the increments are completed, the entire product is completed. Given the complexity of my app which includes features like user profile, workout and diet planners, attendance system integration, and chat tools, breaking the projects into smaller, manageable increments makes it easier to develop and test each part separately. Also, this approach helps us to get early user feedback ensuring that key features are working while others are still in progress. It also allows for iterative improvements based on user interactions, helping to refine the app in alignment with user needs.

By making the app in small increments, potential issues can be identified and fixed early. Key features can be utilized, ensuring they are ready to use even though other features are taking extended period. As I will do this along with my learning process, breaking down this project will help me do the development process in a managed way.

6. Resource Requirements

For completion of this project different tools and resources are required. The major selected tools and resources are listed below:

Visual Studio Code

Visual Studio Code is one of the most used code editor refined and optimized for building modern web and cloud applications. It is free and got many features which would be handy for efficient development of my project.

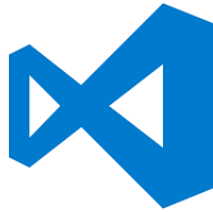


Figure 8 Visual Studio Code

Microsoft Word

Microsoft Word is a text editor application made by Microsoft in which all the documentation works such as proposal, report, srs etc is done.



Figure 9 Microsoft Word logo

Figma

Figma is the most popular collaborative design tool mostly used for UI designing on tech field. To create UI for my mobile application and website, I prefer Figma as it is free and easy to use.



Figure 10 Figma logo

Flutter

Flutter is used to build mobile apps on iOS and Android platforms helping me to make Gymify successful.



Figure 11 Flutter logo

React JS

React JS is used to make frontend for seamless user experience in admin website.

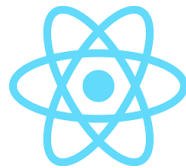


Figure 12 React JS logo

Node JS

Node Js, with its Express framework, is used for back-end development.



Figure 13 Node JS logo

Firebase

Firebase is used to authentication and push notifications, keeping users engaged with reminders and alerts.



Figure 14 Firebase Logo

PostgreSQL

PostgreSQL is a powerful, open-source object-relational data system that is popular for its robustness features and performance which is beneficial for handling complex operations like tracking workouts and managing diets.



Figure 15 PostgreSQL

eSewa.

eSewa is a mobile financial solution where we can make payment online which will be used for gym as most users use this platform.



Figure 16 eSewa Logo

Postman

Postman is used for comprehensive API testing tool that makes it easy to set up automated tests



Figure 17 Postman Logo

7. Work Breakdown Structure (WBS)

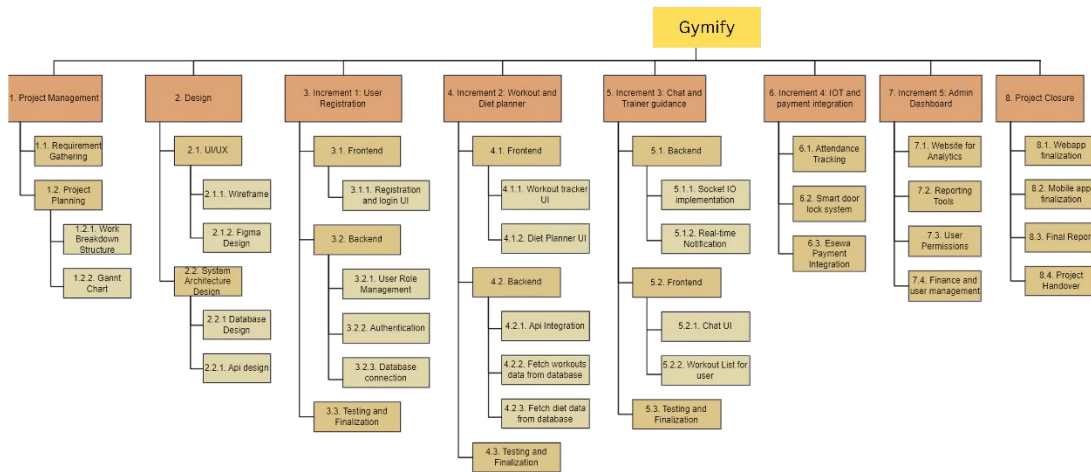


Figure 18 Work Breakdown Structure

The project is divided into numerous subtasks with multiple increments. The WBS outlines the critical phases and tasks required for successful project completion. The first task is Project management which includes requirement gathering, making Work Breakdown Structure and Gantt Chart. The Design phase follows, UI/UX development of both mobile and web app such as making wireframe and Figma design, along with system architecture for databases and APIs. The project is divided into several increments: Front end User interface and Back-end authentication, Workout/Diet planner with Data integration, Guidance with trainer and Chat application using socket IO and chat UI, attendance using IOT device with door lock, payment gateways, and reporting, analytics and management dashboard. Project integration involves the final stages of the project known as the Project Closure where the final web and mobile apps are developed, the final report with major findings is written and the project is passed over.

8. Milestones



Figure 19 Milestone Listing

Each milestone in the above figure represents a significant phase in the project development process, with clear deadlines for completion. The order of milestones reflects the sequential stages from initial proposal submission to the final project submission making me determined to complete a certain feature in decided time. The major essential feature of my project is listed as milestones with their completion date accordingly.

9. Project Gannt Chart

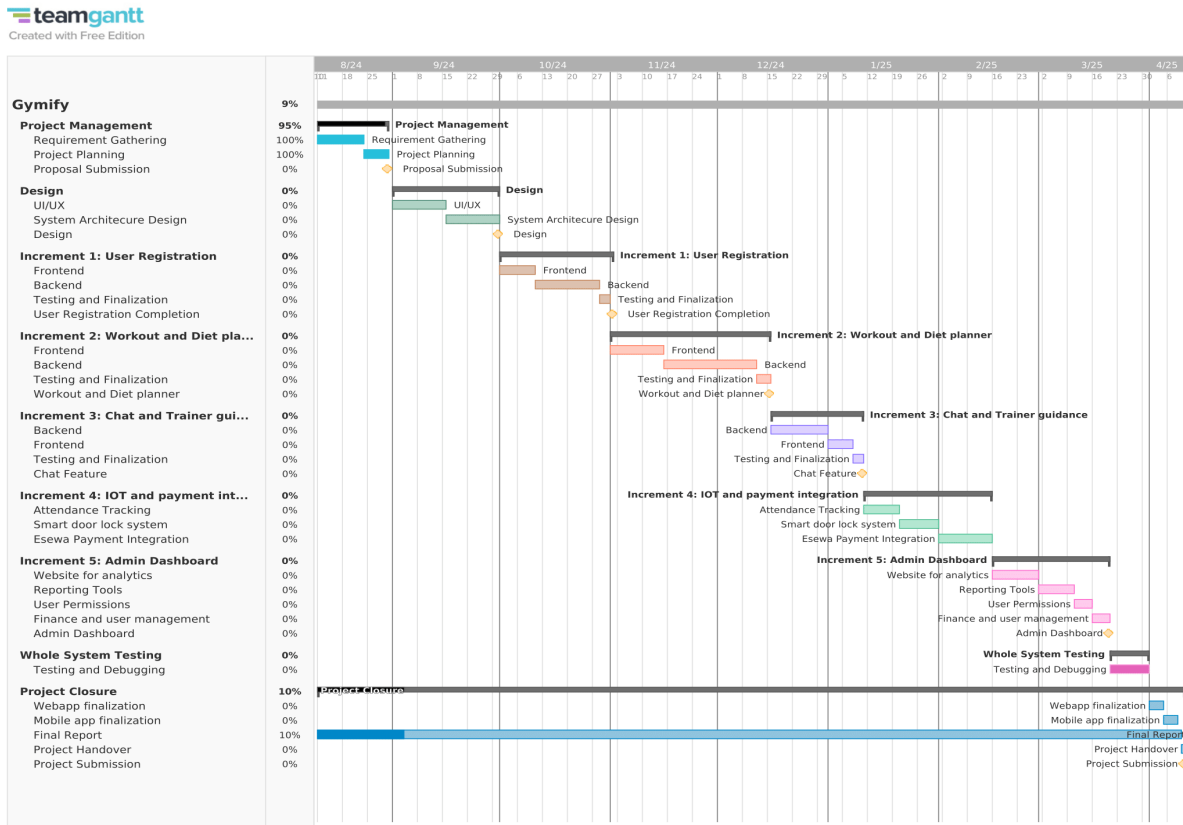


Figure 20 Project Gannt Chart

The project “Gymify” gym management app is divided into multiple phases and tasks inside each phase. The project begins in August 2024 with initial planning and design, moving into development phases that cover user registration, workout and diet planners, chat and trainer guidance, IoT integration, payment systems, and an admin dashboard. There are multiple increments which includes frontend and backend development, testing, and finalization, ensuring that each feature is fully functional before moving on to the next. Milestones throughout the project mark the completion of major deliverables, such as proposal submission, feature finalizations, and system-wide testing. The entire project is to be completed by April 2025, with tasks focused on system testing, debugging, and final report preparation. This systematic planning by making a Gannt Chart will help in creating a polished and user-friendly project.

10. Conclusion

The proposal report shows the detailed plan of completion of my final year project called “Gymify” designed to enhance user experience, accumulate gym management, and provide valuable insights through analytics. The project is planned with a clear timeline and structured phases to ensure delivery of a functional and robust application by April 2025. If the project progressed faster than expected, additional time is dedicated to testing and improvement. Conversely, if unforeseen challenges arise and the project completion is to be delayed, certain features maybe be removed or scaled back to meet the submission deadline. Through this project, I will seek guidance from my supervisors, seniors, and online resources to overcome complex challenges which may arise to ensure the project stays on track. By balancing development, testing and report preparation, I am committed to delivering a polished and user-friendly application that meets the needs of gym users and administrators alike.

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