Sri Lanka Institute of Information Technology

Gym Management System for Dream Fitness Gym

Group Details

Batch – Y2.S1.WD.IT.02.02.

Group Number – T29

Topic - Gym Management System for Dream Fitness Gym

	Name with Initials	Registration Number	Contact Phone Number	Email
1.	Jayasinghe.J.A.P.M	IT21225406	0719986708	it21225406@mysliit.lk
2.	Thalangama.T.P	IT21223594	0723572147	it21223594@mysliit.lk
3.	Sulakkana H.D.S.R	IT21224348	0705032964	it21224348@mysliit.lk
4.	Kannangara S.D.R.Y.L	IT21225710	0771587216	it21225710@my.sliit.lk
5.	Weerage S.W.Y.W	IT21225260	0712993662	it21225260@my.sliit.lk
6.	De Silva S.J.W.	IT21228612	0719516868	it21228612@my.sliit.lk
7.	Fernando N.D.H.	IT21222986	0767670044	it21222986@my.sliit.lk
8.	Karunarthne D.H.	IT21228858	0766041100	it21228858@my.sliit.lk

Contents

1. Background

Dream Fitness is a premier fitness destination located in Kothalawala, Malabe, Sri Lanka. The gym is designed to cater to the needs of fitness enthusiasts of all levels, from beginners to advanced athletes. The Dream Fitness provides the latest in fitness equipment, alongside personalized training and coaching from their team of well-experienced instructors.

The Dream Fitness has been in business since 2020 and has a client base of 500 - 600 people. But the number of active users is around 400 - 450 people. Majority of The Gym's client base are university students and young office workers. Remaining client base include local teenagers and middle-aged people. Working hours of the gym are 5AM – 10PM on weekdays and 6AM - 10PM on the weekend. Peak hours of the gym are 6PM - 8PM on weekdays and 5PM – 9:30PM on weekends. The gym staff consists of a manager who is also a professional trainer and 3 instructors.

The gym has membership plans for 1 month, 3 months, 6 months and 12 months. Their prices are 5000, 7 500, 10 000 and 14 000 rupees respectively. The gym's annul income is 5.4 million rupees approximately. The gym's annual expenses are about 3 million rupees approximately.

The gym doesn't have existing computerized system for managing purposes. All the Gym's managing processes are manually done by gym staff. The gym currently use spreadsheets for accounting and membership management. But, with problems that the gym faces because of their manual processes, the gym's management is currently searching for new IT solutions to accommodate their needs.

2. Problem and Motivation

1. **Time wastage –**

Dream Fitness was performing administrative tasks like recruiting members, managing their details manually with physical documents. They were storing all the applications and other official documents in a physical file-based system. Performing these tasks all manually with physical documents consumed a considerable amount of their valuable time. Also, report generation was also a time-consuming process and administrative staff were wasting a lot of time on creating reports by hand which were needed for their business.

- Motivation –

If this problem is addressed , gym administrators will be able to save their time by performing administrative tasks and doing the above-mentioned tasks much more efficiently.

2. **Risk of losing data –**

Because of storing all the documents physically, there is a potential threat of losing valuable data due to natural incidents such as fungi, humidity and uncontrollable events including pests induce incidents [1]. If the data is lost or corrupted due to the above reasons, it will interrupt their operations, thus damaging their customer intimacy and even the brand name. Therefore, as a reputed and responsible gym center, Dream Fitness considers its data valuable for their operations.

- Motivation -

If this problem is addressed with a proper systematic solution, not only can they preserve their data with consistency, but they can also continue working with their operation without interruptions.

3. **Cost of managing a physical storage system –**

Since the Dream Fitness was conducting administrative tasks with a physical document storage system, necessary additional measures such as pest control methods were needed to protect the physical documents from being destroyed. These measures are considered costly and sometimes

these measurements itself prone to destroy some heat-sensitive material such as photographs and documents.[1]

- Motivation –

If this problem is addressed, they will be able to cut off many of the added expenses such as pest and humidity control cost.

4. **Exceeding demand on instructors during peak hours –**

Apart from the administrative staff, gym members were also experiencing some difficulties when it comes to working out during rush hours, because almost all the instructors were occupied during rush hours to accommodate the needs of gym members. So, the other gym members had to wait till the instructors are free to get instructions on their workouts, exercise forms, and diet plans. Gym administration has identified that this issue discourages gym members from getting much-needed instructions from the instructors, leading to lesser overall progress and even causing injuries while working out. Dream Fitness has identified that such issues could force valuable gym members to leave the gym due to unpleasant user experience.

- Motivation –

If this problem is addressed, gym members will be able to have an uninterrupted and pleasant user experience during and after their workout routines without having to wait for the instructors. Also, as an added benefit, this will help the Dream Fitness to improve their customer intimacy to a new level, giving them a competitive advantage over the other gym centers in the area.

5. **Gym members getting advice from non-subject experts -**

It has been elicited that gym members are relying on non-subject experts to get advice due to the unavailability of the subject-expert instructors during rush hours. This issue has a potential hazard involving physical injuries which can negatively affect their brand name.

- Motivation -

If this problem is addressed, gym members will be able to contact subject-expert instructors anytime from anywhere to get the necessary advice without any delay.

6. **Lack of an effective notification method -**

After gathering client's requirements, it has been identified that there is a severe issue of communication between gym members and gym administrators. This issue could affect the proposed system's efficiency and proper execution. Also, this issue has been affecting customer intimacy with the gym negatively. The gym administrators have been unable to identify this issue by themselves.

- Motivation -

If this problem is addressed, gym members and administrators can stay updated on the latest notifications and increase the system's efficiency. As an added benefit, customer intimacy will also improve to a new level.

3. Aim and Objectives

Aim -

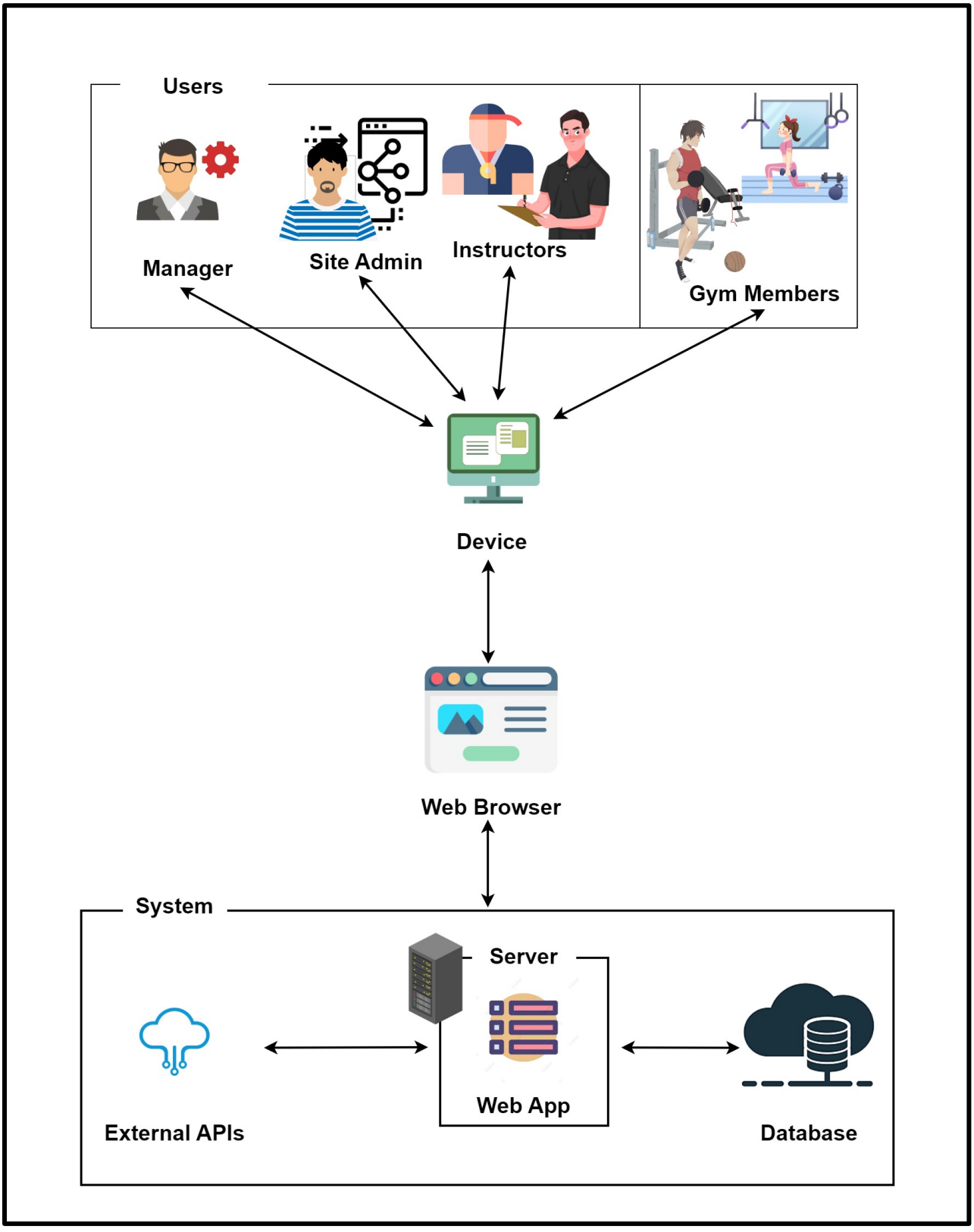
After investigating about the problems that the client had, It was figured out that there is a need for an automated computer system to perform administrative tasks efficiently. Moreover, the physical storage problems that the client is currently experiencing were evaluated, and it was decided that the proposed IT system should include a computerized storage system to mitigate the issues caused by current data storage methods. Additionally, it was identified that the storage system should be implemented online to prevent the data loss in an event of physical damage to the system server. The client's concerns about the gym's current issues, including the exceeding demand on instructors during peak hours, were investigated, and a potential solution was proposed.

Specifically, it was suggested that the gym should be equipped with a robust and automated system capable of providing gym members with workout schedules, diet plans, and exercise demonstrations. After evaluating all the facts mentioned above, it was determined that the development of an online gym management system would be a proper IT solution for the client. Therefore, the aim of this project is to develop and deploy an online gym management system, which can address all the discussed issues and requirements.

Objectives –

1. Interview the clients
2. Note down client's requirements/problems (requirements gathering)
3. Requirements engineering
4. Compartmentalizing the requirements into main functions
5. Analyze and refine those functions
6. Assigning a function for each member
7. Make Wire frames for the identified functions
8. Analyze and refine the wire frames
9. Design the Database structure
10. Release a prototype
11. Implement back-end
12. Implement front-end
13. Get feedback for the prototype
14. Address the newly found bugs and problems which identified after the prototype release
15. Integrate the system modules
16. Do evaluations and testing for the system
17. Get feedback and results from evaluations and tests
18. Address the newly found bugs and problems which identified after the evaluations and tests
19. Present the final system to the client

4. System Overview and System Diagram



Proposed system is made up of 8 main functional modules. Those are,

1. User management
2. Workout scheduler
3. Exercise library
4. Instructor library
5. Diet planner
6. Progress tracker
7. Frequently Asked Questions (FAQ)
8. Feedback and Notification

Functional requirements

Each module has different functional requirements from different users. **Functional Requirements** of the system are analyzed below module wise.

1. User management

This function will manage account creation and deletion , login , logout , passwords , purchasing memberships and approving memberships.

1. System must allow users to register to the system using email and password or using social media account.
2. System must validate user account details (e.g. - via OTP to the email) when a new account is created.
3. System should maintain the details of all the customers.
4. System should allow members to purchase gym membership packages online.
5. System must allow users to cancel their membership and delete their accounts online.
6. System should allow authorized persons to view customer details.
7. System should allow authorized person to approve membership requests manually.
8. System must provide a registration number for each membership request.
9. System must allow users to sign in and sign out from the system at any time.
10. System must provide a notepad option in the customer account.
11. System must notify users to renew memberships when needed.

2. Workout scheduler

The workout schedule function creates a special workout plan for each customer based on their physical details and fitness goals. It uses the information that the customer has already provided in their profile to suggest the best exercise routine for them. The customer can pick from many different workout options that match their goals. This feature helps customers get a workout plan that's just right for them and their goals.

12. System must automatically generate workout schedules for each customer.
13. System must allow customers to change their schedule according to their preference.
14. System must allow authorized persons to approve a workout schedule when a customer changes their schedule.

3. Exercise Demonstrator

Exercise demonstrator function will show the gym users how to do their exercises precisely without the help of coaches/instructors. This function will demonstrate exercises to gym users by including description of the exercise in text and video/gif/step-by-step pictures.
Advantage of having this function in the application is that gym users don't have to ask from the gym coaches about how to do the exercises. It will save the time of coaches and make them more available.

15. System must maintain an exercise library which include description and pictures of exercises.
16. Authorized persons should be able to add, edit, delete, and view the exercises in the exercise library.
17. Customers should be able to view all the exercises in the exercise library.
18. Customers should be able to search for exercises.
19. There should be a button for each exercise in a customer's gym schedule to open and view that particular exercise in the exercise library.

4. Instructor library

The instructor/trainer/coach management function is a feature that enables administrators to effectively manage the instructors working at the gym. This function will display instructors and their details to the customers. Advantage of having this function is customers can decide which trainer that they should contact based on their goal (specialty).

20. System must maintain a gym instructors library which include details about the instructors.
21. Authorized persons should be able to add, edit, delete and view the instructors in the instructor library.
22. system must store the specialties of each instructor in the gym instructors library.

5. Diet planning

Diet planning function calculates burned calories according to users' workout schedule. Then it calculates the daily need of calories and nutrition according to their fitness goals. This function will suggest various foods and intake amounts according to the daily need of calories and nutrients of each customer.

23. System should generate a diet plan for each customer.
24. System should provide alternative foods in the diet plan.
25. Customer should be able to add alternative foods to diet plan.

6. Progress tracker

Progress tracking function enables user to get an idea about their progress. By evaluating the progress, users can discuss it with their instructor and take decisions about their workout schedule or about their diet plan.

26. System must have a function to track customers progress
27. System should represent each customer's progress to them after a workout session graphically.
28. System should represent each customer's overall progress to them graphically.
29. System should get relevant input from customers after each workout session to track their progress.
30. Authorized persons should be able to view customers progress reports.
31. Customers should be able to alter/delete their progress reports.

7. Frequently Asked Questions (FAQ)

This function allows customers to solve their problems using Frequently asked questions and their answers. If the customer's question isn't in the FAQ section, they can directly contact the gym by filling the contact us form.

32. System must provide a function to add, edit, delete and view FAQs .
33. FAQs should be categorized and presented to the users.
34. System should provide a report on most viewed/asked FAQs.
35. System must provide a form option to contact a authorized person.

8. Feedback and Notification

This function allows users to give their feedbacks about the gym and view other customer's feedback. It also enables gym staff to analyze the positive and negative points of the gym from customer's perspective. In this function there a new feature which allows the gym staff to Advertise the transformation of some selected customers with the aim of attracting more customers.

36. System must allow registered customers to give feedback to the system.
37. System must allow registered customers to edit, delete feedback.
38. System should allow registered customers to provide a rating (stars/points) in their feedback.
39. System should allow anyone to view feedback.
40. System must provide an option to visually represent transformation of some selected customers.
41. System should generate a report on average rating of feedback per month.
42. System must allow users to up-vote/down-vote others' feedback.
43. There must be a notification system which delivers notifications to the users.

Non-Functional requirements

1. Performance

1. Email/phone number validation OTPs must be sent within 1 minute.
2. SMS notifications must be sent under 2 minutes.
3. Email notifications must be sent under 2 minutes.
4. All the pages in the system should be loaded within 2 seconds with all images and videos of the page in a 4G LTE connection.
5. System must be capable of getting any video, image formats and gifs as inputs.
6. Any changes in the system database must be updated in the whole system under 2 seconds.

2. Scalability

7. System should be able to handle 1500 registered users at a time.
8. System should be able to handle 100,000 user visits at the same time.

3. Portability and Compatibility

9. System should be able to be accessed through any type of device which has a internet browser.
10. System should be a responsive web design.

4. Availability

11. System should be available 24x7 .

5. Security

12. Admin UI must only be accessible to site admin, manager, and instructors.
13. Sensitive user data must be encrypted before storing them in the database.

6. Localization

14. Dates should be in the year : month : date format.

7. Usability

15. System must be user friendly.
16. All the main functions should be able to be accessed from the home page.
17. 15 exercises should be displayed per page as a list in the exercise library.

Technical requirements

1. User management system -

- Front end - React JS
- Back end - Express.js framework + node.js RTE
- Database - MongoDB atlas
- Document generating - React-PDF
- Email services - NodeMailer
- SMS gateway - WebSMS gateway
- Authentication - Jason Web Token (JWT)
- Security - bcrypt library
- Payment gateway - PayHere gateway

2. Workout scheduler –

- Fronted - React JS
- Back end - Express.js framework + node.js RTE
- Database - MongoDB atlas
- Document generating - React-PDF

3. Exercise demonstrator -

- Frontend - React JS
- Backend - Express.js framework + node.js RTE
- Database - MongoDB atlas

4. Instructor library -

- Frontend - React JS
- Backend - Express.js framework + node.js RTE
- Database - MongoDB atlas
- Document generating - React-PDF
- Email services - NodeMailer

5. Diet planner -

- Frontend - React JS
- Backend - Express.js framework + node.js RTE
- Database - MongoDB atlas
- Document generating - React-PDF

6. Progress tracker -

- Frontend - React JS
- Backend - Express.js framework + node.js RTE
- Database - MongoDB atlas
- Document generating - React-PDF
- Email services – NodeMailer
- graphics - Chart.js

7. FAQ -

- Frontend - React JS
- Backend - Express.js framework + node.js RTE
- Database - MongoDB atlas
- Document generating - React-PDF
- Email services - NodeMailer
- Chat service – Tidio

8. Feedback & notification system -

- Frontend - React JS
- Backend - Express.js framework + node.js RTE
- Database - MongoDB atlas
- Document generating - React-PDF
- Email services - NodeMailer
- SMS service - WebSMS gateway
- Internal communication - Socket.IO library

5. Literature review

I. Similar Solutions

a) Glofox

Glofox is a management software that helps to accelerate growth, work efficiently, and deliver a well-branded member experience. It takes the hassle out of managing a fitness business with powerful membership management, sales, marketing, and reporting functions that gives the tools to be successful.[2]

Pros –

- Booking system
- User management
- Payment system
- Customizable application
- Sales & marketing tools

Cons –

- No automated personalized workout schedules
- No automated diet planning
- No progress tracker
- No exercise demonstrator

b) Gymflow

Gymflow is a management software specifically designed for managing gyms. [3]

Pros –

- Booking system
- User management
- Payment system
- Task Management

- 3 separate apps for staff, members, and brand
- Reporting Dashboards

Cons –

- No automated personalized workout schedules
- No automated diet planning
- No progress tracker
- No exercise demonstrator

c) Gymdesk

Gymdesk is an excellent tool for any kind of membership-based business. From fitness and boutique gyms to martial arts schools, yoga studios, gymnastics gyms and membership clubs.[4]

Pros –

- Booking System
- Marketing solutions
- User management
- Billing solutions
- Financial reports
- SMS Notification system

Cons –

- No automated personalized workout schedules
- No automated diet planning
- No progress tracker
- No exercise demonstrator

II. Conclusion

All of the solutions mentioned above has common features like booking systems, user management, billing solutions and marketing solutions. But apart from that, the client wants to automate workout scheduling and diet planning because it will save their time and effort. The

proposed new system has all the common features mentioned above. Also, it enables automated workout scheduling and diet planning. In addition to that the proposed system has exercise demonstrating and a progress tracking function which will be very valuable gym's users.

In conclusion, the existing solutions can't address all the client's problems and needs. Therefore, the only remaining solution is to build a new system which can address all the client's problems.

6. Methodology

1. Development method – Agile Scrum

It is flexible, iterative approach that emphasizes collaboration and feedback between developers, customers and other stakeholders.[5]

Alternatives -

- **Waterfall** – It is a sequential approach where each stage of the development should be completed before moving to other stages.
- **Lean -** Lean software development is concept that emphasizes optimizing efficiency and minimizing waste in the software development process.

Reasons for choosing Agile Scrum -

- This method improves collaboration and communication between developers, customers and stakeholders, which ensure that everyone working for a common goal.
- This method is designed to be flexible and adaptable, which enables teams to respond quickly to changing requirement.
- This requirement engineering method mostly depends on delivering working software frequently, which enables to determine and mitigate risk early in the development process.
- Agile manifesto particularly based on customer involvement and feedback which make that the final products meet the requirement of the customer.

2. Requirement Engineering Method – Interviews

An interview is a procedure designed to obtain information from a person through oral responses to oral inquiries.[6]

Alternatives -

- **Questionnaires or Surveys –** This is a way to get information from many people. Those data can be used in two ways which are, to get statistical evidence for an assumption or to gather opinion and suggestion.
- **Brainstorm -** In this method people gather together, create a stimulation and focused atmosphere, specialty of this method is no one criticize any idea.
- **User observation -** User observation involves watching and listening carefully to users as they work with a product. Although it is possible to collect far more elaborate data, observing users is a quick way to obtain an objective view of a product. [7]

Reasons for choosing interviews -

- This method enables us to get detailed information about client's need, requirement, and expectation that might not be captured by other method such as surveys.
- Interviews provide chance to build relationship with stakeholder ,which is grate for building trust between stakeholders and developers.
- This method provides an opportunity to clarify and confirm requirements that might be ambiguous or unclear.

3. Development Tools

I. Visual Studio - Integrated Development Environment (IDE)

Visual Studio provides a range of tools and features for software development, which include coding, debugging, testing and project management.

Alternatives -

- **Sublime text -** Sublime Text is a user-friendly text editor with a customizable interface, powerful features, and a wide range of language support. Its built-in package manager and powerful search engine make it easy to find the exact syntax needed. [8]

- **Notepad ++ -** This is source code editor which include syntax highlighting, code folding and limited auto completion but not intelligent code completion or syntax checking.

- **Ultra-edit -** UltraEdit is a commercial text editor which include syntax highlighting, code folding and auto completion. In addition to that it includes advance search and replace capabilities.

Reasons for choosing Visual Studio –

- This provides wide range of features and tools for developers including code editing, debugging and testing. This supports HTML, CSS, JavaScript and many programming languages. As well as it includes intelligence code completion which speeds up the process of coding.
- This is highly extensible and customizable with the variety of third-party extension and tools which enables to customize IDE for our specific needs.
- Visual studio includes a GIT plug -in which allows us to work with GIT repositories directly within the IDE. Also include Pull request tool which enables us to easily create and manage pull request for changes made in repositories.

II. Application Programming Interfaces (API s)

An API, or application programming interface, is a set of defined rules that enable different applications to communicate with each other. It acts as an intermediary layer that processes data transfers between systems, letting companies open their application data and functionality to external third-party developers, business partners, and internal departments within their companies.[9]

Alternatives -

- Manually program the communication between application and external services .

Reasons for choosing API s –

- Doesn't need any knowledge on the internal workings of external services that are going to be used in the proposed system.
- Saves time and effort.
- Reduces the probability of having bugs and problems in the proposed system.

4. Technologies – MERN Stack

I. MongoDB – Database server

Mongo DB is a popular document oriented NOSQL database which is used to store and manage unstructured or semi structured data.

Alternatives -

- **Couchbase -** This is also distributed NOSQL database that is design for high performance and scalability.

- **Rethink Db –** Rethink is a free and open source, document oriented database which designed to facilitate pushing real time updates for query result for application.

- **Cassandra -** Cassandra is an open-source NoSQL distributed database that manages large amounts of data across commodity servers. It is a decentralized, scalable storage system designed to handle vast volumes of data across multiple commodity servers, providing high availability without a single point of failure. [10]

Reasons for choosing Mongo DB -

- This is developed for high performance and low latency which include such as in memory processing, automatic indexing and a query optimizer.
- This has large and active community members, with many resources available online to assist us learn and troubleshoot any issues.
- This is a document-oriented database, which is, it stores data is JSON like document that can have variety of structure. This makes it easy store and manage complex data.

II. Express – Server-side framework

Express is used as a web-application framework which provides set of tools and features for building backend of a web-application.

Alternatives -

- **Koa –** This is minimal and lightweight web application framework for Node.js. This is based on the concept of middleware.
- **Nest -** This is popular web application framework for building scalable and efficient server side.
- **Backbone JS -** This is a lightweight JavaScript that provide set of tools and features for building single page applications. And this is based on Model-View- Controller (MVC) architecture.

Reasons for choosing Express -

- This provides only the essential features needed to build web applications, and allows developers to customize and extend its functionality as needed.
- This compatible with wide range of other libraries and framework such as Mongo DB, REACT and many more. Which make easy to integrate with existing tools and technologies.
- This technology has large number of active developers who contribute to its development and provide support through forums, documentation and tutorials. Which makes it easy to find resources and help when we needed.
- It is easy to learn and use for people who has experience in Node.js or JavaScript.

III. React – Front end developing.

React is a free and open-source front-end JavaScript library for building user interfaces based on components. [11]

Alternatives -

- **Angular.js** – Angular.js is a JavaScript framework written in JavaScript, it is also distributed as a JavaScript file and can be added to web page.
- **Vue.js -** This is a front end JavaScript framework for building user interface and single page application.
- **Ember JS – Ember** is a component service framework that focuses on the overall web application development

Reasons for choosing React -

- This can be used for creating both simple and complex UI, from small components to entire application.
- Developers who have experience in JavaScript can easily learn React language.
- This has a large and active community, with many resources and libraries available to extend its functionality and solve common problems.

IV. Node JS – Express runnable environment

This open-source server side java script runtime environment that allows developers to run JavaScript code on the server side application. [12]

Alternatives -

- **METEOR** - Meteor is a full stack JavaScript framework that allows developers to build web applications using singe code base.
- **Deno** – This is a secure modern runtime for JavaScript . Created to address some of the limitation and issues with Node.js.

Reasons for choosing Node JS -

- Node.js has a large and active community of developers that provide a wide range of libraries, tools and framework for building web applications.
- This allows developers to write server-side code in JavaScript which make it easy to build web applications both client and the server side
- This is built on top of the V8 JavaScript engine from google, which makes it compatible with a wide range of operating System.

5. Integration Method – GitHub

This is a most popular resource for developers to share the code and work on project together.

Alternatives -

- **BitBucket** – Bitbucket cloud is a Git based code hosting and collaboration tool, built for teams.
- **Gitlab -** This is a web-based GIT repository manager that provide complete set of tools for software development.

Reasons for choosing GitHub -

- GitHub has a large and active community of open-source developers. They contribute to the code, offer support and share ideas.
- This provides a centralized platform for developers to collaborate on code and work together more efficiently. This helps us to speed up the development process.
- This provides a powerful version control system which enables developers to track changes to their code overtime .This can help to improve code quality.

6. Testing methods –

I. Postman – API testing platform

Postman offers variety of features for testing APIs and it has the ability to send requests, examine response and perform automated testing.

Alternatives -

- **Testfully** - Testfully is a cloud based "API integration testing" and "API monitoring" platform. Users define their test cases and run the test cases on demand or in background. [13]
- **Thunder client –** This is a lightweight REST API Client extension for visuals studio code.

Reason for choosing Postman -

- postman has a good user interface, which make it easy to create and manage API.
- This allows us to share collection and collaborate with the team members, making it easier to manage and maintain API tests.
- Postman provides range of tools for automating API test. It includes the ability to write test cases and run tests in bulks. That makes it easier to ensure that our APIs are working as expected.

II. Black Box Testing – Software testing method

The technique of testing without having any knowledge of the interior workings of the application is called black-box testing. The tester is oblivious to the system architecture and does not have access to the source code. Typically, while performing a black-box test, a tester will interact with the system's user interface by providing inputs and examining outputs without knowing how and where the inputs are worked upon.[14]

Alternatives –

- **White Box testing -** White-box testing is the detailed investigation of internal logic and structure of the code. White-box testing is also called glass testing or open-box testing. In order to perform white-box testing on an application, a tester needs to know the internal workings of the code.[14]

Reason for choosing Black Box Testing –

- Access for the source code is not required.
- Doesn't need the knowledge on internal workings and logics of the application.
- Any person can test the application by just providing inputs and examining the output.
- Saves the time.

III. Beta Testing – User acceptance testing method

Beta Testing is performed by real users of the software application in a real environment. Beta testing is one of the types of User Acceptance Testing. A Beta version of the software, whose feedback is needed, is released to a limited number of end-users of the product to obtain feedback on the product quality. Beta testing helps in minimization of product failure risks and it provides increased quality of the product through customer validation. [15]

Alternatives –

- **Alpha testing -** Alpha Testing is a type of software testing performed to identify bugs before releasing the product to real users or to the public. Alpha Testing is one of the user acceptance testings. This is referred to as alpha testing only because it is done early on, near the end of the development of the software. [16]

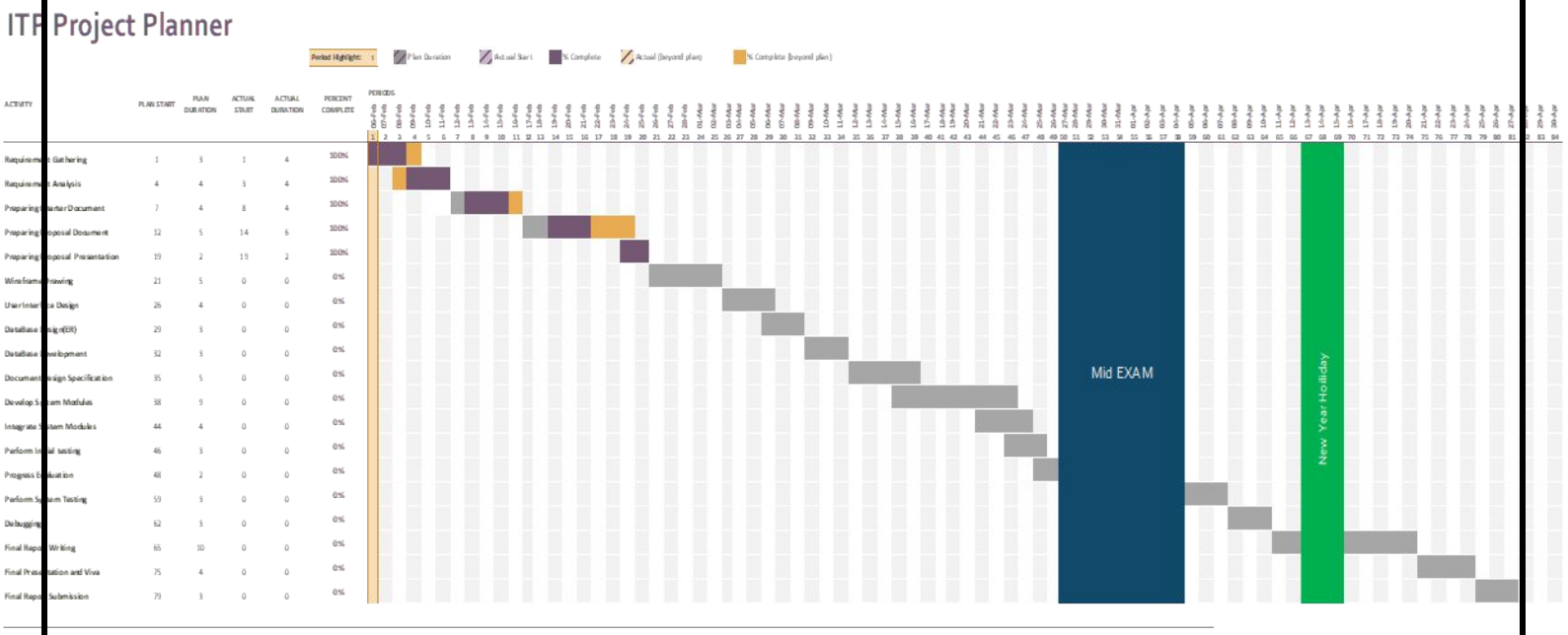
Reason for choosing Beta Testing –

- Beta testing provides the feedback from real system users.
- It creates goodwill with customers and increases customer satisfaction.
- Cost effective compared to alpha testing.

7. Work Breakdown Structure –

TASK ID	TASK DESCRIPTION
1	**Requirement Analyzis**
1.1	Requirement Discovery
1.1.1	User Story
1.1.2	Interviews
1.2	Requirement Clasification
1.2.1	Functional Requirement
1.2.2	Non Functional Requirement
1.2.3	Technical Requirement
1.3	Requirement Specification
1.3.1	Usecase Diagram
1.3.2	Activity Diagram
2	**Documentation**
2.1	Project Charter
2.2	Project Proposal
2.3	Proposal presentation
3	**Design**
3.1	wireframe Design
3.2	UI/Ux Design
3.3	DataBase Design
3.3.1	Conceptual Database Design
3.3.2	Logicle Database Design
3.3.3	Schema Refinment
3.3.4	Physical Database Design
3.3.5	Sequrity Design
3.4	Prototype Release
4	**Implmentation**
4.1	Develop System Modules
4.1.1	User Management
4.1.2	Workout Schedular
4.1.3	Exercise Library
4.1.4	Instructor Library
4.1.5	Diet Planner
4.1.6	Progress Tracker
4.1.7	Frequently Asked Question
4.1.8	Feedback
4.2	Integrate System Modules
5	Testing
5.1	Unit Testing
5.2	Integrataed Testing
5.3	System Testing
5.4	Acceptance Testing
5.4.1	Alpha Testing
5.4.2	Beta Testing

8. Gantt Chart –



7. Evaluation Method

Evaluation of the proposed system will be done in 4 ways.

1. **Compare with similar systems -**

The system will be compared with other gym management systems in the industry. All the features of the proposed system will be compared against other similar systems. This will be done in the requirements gathering and analyzing phase and final testing phase.

2. **Prototype testing -**

A prototype of the proposed system will be released to a randomly selected group of customers of the Gym. Their feedback will be collected through an online survey.

3. **Testing non-functional requirements -**

Testing non-functional requirements like performance, scalability, security, portability, and compatibility will be done using free online tools. For example, Load and stress testing will be done using k6 [15].

4. **Get user feedback from a beta release -**

Real customer experience and the potential bugs will be tested with a beta release. Beta testing will be done by releasing a beta version to a randomly selected group of customers of the Gym. Their feedback will be collected through an online survey.

8. References

[1] "MANAGING PESTS in paper-based collections Managing pests in paper-based collections," 2012. Accessed: Mar. 01, 2023. [Online]. Available: https://www.bl.uk/britishlibrary/~/media/bl/global/conservation/pdf-guides/managing-pests-in-paper-based-collections-guide.pdf

[2] "Welcome to Glofox: The #1 fitness management software," Boutique Fitness and Gym Management Software - Glofox. https://www.glofox.com/main-page-1036-v2/

[3] "Gymflow - Modern club management software," *www.gymflow.io*. https://www.gymflow.io/

[4] "Modern Gym Management Software," Gymdesk. https://gymdesk.com/

[5] Agile Alliance. What is agile [Online]. Available: https://www.agilealliance.org/agile101/

[6] I Edu Note. Interview: Definition, Meaning, Types of Interview [Online]. Available: https://www.iedunote.com/interview

[7] Kathleen Gomoll & Anne Nicol, "Discussion of guidelines for user observation," User Observation: Guidelines for Apple Developers [Online], January 1990. Available: https://courses.cs.washington.edu/courses/cse440/08au/readings_files/gomoll.html#:~:text=User%20observation%20involves%20watching%20and,objective%20view%20of%20a%20product.

[8] SoftwareAdvice. Sublime Text [Online]. Available: https://www.softwareadvice.com/app-development/sublime-text-profile/reviews/

[9] IBM. What is an API (application programming interface)? [Online]. Available: https://www.ibm.com/topics/api

[10] spiceworks. What Is Cassandra? Meaning, Working, Features, and Uses [Online]. Available:https://www.spiceworks.com/tech/big-data/articles/what-is-

cassandra/#:~:text=Cassandra%20is%20an%20open%2Dsource%20NoSQL%20distributed%20database%20that%20manages,a%20single%20point%20of%20failure.

[11] Wikipedia. React (JavaScript library) [Online]. Available: https://en.wikipedia.org/wiki/React_(JavaScript_library)

[12] George Ornbo. . (2022, Jan. 25) . Writing cross-platform Node.js [Online]. Available: https://shapeshed.com/writing-cross-platform-node/

[13] Testfully. Introduction to Testfully, API Testing & Monitoring Platform [Online]. Available: https://testfully.io/blog/01.introduction-to-testfully/

[14] tutorialspoint. Software Testing - Methods [Online]. Available: https://www.tutorialspoint.com/software_testing/software_testing_methods.htm

[15] geeksforgeeks. Beta Testing | Software Testing [Online]. Available: https://www.geeksforgeeks.org/beta-testing-software-testing/

[16] geeksforgeeks. Alpha Testing | Software Testing [Online]. Available: https://www.geeksforgeeks.org/alpha-testing-software-testing/

9. Appendix