**IMPLEMENTATION OF A WEB-BASED GYM MANAGEMENT SYSTEM WITH AN ACCOUNTABILITY PARTNER FEATURE**

**BY**

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**A project submitted to the department of computer and information sciences, college of science and technology, covenant university Ota, Ogun state.**

**In partial fulfilment of the requirements for the award of the Bachelor of Science (honors) degree in computer science.**

**APRIL 2023**

# **CERTIFICATION**

I hereby certify that this project work titled **IMPLEMENTATION OF A WEB-BASED GYM MANAGEMENT SYSTEM** **WITH AN ACCOUNTABILITY FEATURE** is a bona fide work carried out by **Modupe-Samuel Michael Olanrewaju Uchenna (19CH026516)** submitted to the Department of Computer and Information Sciences, College of Science and Technology, Covenant University, Ota.

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**DEDICATION**

With utmost gratitude, I would like to express that this project, which stands as a testament to my hard work and determination, is dedicated to the divine and omnipotent God Almighty. I attribute my success and resilience throughout this journey to His unwavering support and guidance. Even during moments of self-doubt and discouragement, God has been my unwavering source of strength and inspiration. Without Him, this endeavor would have been insurmountable. Thus, I humbly extend my sincerest thanks to the Lord for His constant presence and love that has enabled me to accomplish this feat.

**ACKNOWLEDGEMENT**

I am grateful to God for granting me the ability to complete this phase of my project and program, as well as for guiding me through my undergraduate studies at Covenant University. His oversight and leadership have enabled me to fulfill my obligations and receive blessings, and I acknowledge that I am powerless without Him. I will forever be thankful.

Furthermore, I would like to extend my appreciation to my siblings and friends for their unwavering love and support throughout the years. Their presence in my life has made my journey thus far less challenging, and I am truly grateful for them.

I also want to express my gratitude to my parents and extended family, both near and far, for their care and support during my research and undergraduate education. They have been a significant source of motivation for me during my time at Covenant University.

Lastly, I am deeply grateful to Dr. Azubuike Ezenwoke for his guidance and assistance in overcoming the challenges I faced during my endeavor. Thank you so much for your support.

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# **CHAPTER ONE**

# **INTRODUCTION**

## **1.1 BACKGROUND OF STUDY**

Covenant University Fitness Gym is one of the many gyms located at various universities across Nigeria. The fitness center was established in Covenant University's ultra-modern sports complex which was officially commissioned on Wednesday, December 5, 2007, and it has managed to register quite a good number of students over the years. The gym manages to receive a few new members every month due to the low cost of registration and being the only gym operating in the area. Covenant University Fitness Gym provides exercise equipment for gym members and gym visitors to practice fitness and exercise routines. Other than that, the fitness center also provides personal trainer services for members that want to train personally to certified personal trainers(Covenant, 2009).

A web-based gym management system with an accountability partner aims to address the problems with traditional gym management by providing a more efficient and convenient way for gym-goers to manage their fitness goals and track their progress. The main problem with traditional gym management is that it can be difficult for individuals to stay motivated and on track with their fitness goals. Having an accountability partner can help to solve this problem by providing individuals with someone to hold them accountable and keep them motivated.

Existing work that has been done to solve this problem includes the development of fitness-tracking apps and online workout programs. However, these solutions may not provide the same level of accountability and motivation as having a real-life accountability partner.

An accountability partner can motivate individuals to work out by providing them with someone to share their fitness journey with, providing regular check-ins and support, and holding them accountable for their actions. This can help individuals to stay on track with their fitness goals and achieve their desired results(Heath, 2020).

In the design and implementation of a web-based gym management system with an accountability partner, it is important to consider factors such as user interface design, data security, and integration with fitness tracking devices to ensure that the system is easy to use and provides accurate and secure tracking of progress. The services will include training, fitness, nutrition, health advice, and consultation. Lastly, the fitness center also involves giving lectures about the right foods to eat and supplements to take to attain fitness goals. Despite all the services being provided at Covenant University's Fitness Gym, which are modern and updated, the system that is being used by the firm is still done traditionally. As for registration for membership, booking of personal trainers, and lectures on health supplements, visitors must go there by themselves, and the process will be done manually. To resolve the issue, a web-based system is proposed to be developed to ease the gym management in handling all the services provided.

## **1.2 STATEMENT OF THE PROBLEM**

The management of Covenant University's fitness center is still done manually at the moment. New members are registered by filling out a registration form on paper. Despite the growing number of gym members, the management team still records each member's information using paper and files. The traditional method's application is ineffective since it will make it difficult for the staff to maintain track of the records of their members. Additionally, it will make it more difficult for the staff to update members' files throughout the membership renewal process because they will need to look for those files (Farzana, 2019). The same processes apply to booking personal trainer services, whereby a personal trainer must be reserved personally at the counter because management does not offer an online booking system. Overall, the gym's manual management approach is ineffective because it did not make the management of the facility a seamless process. Because of poor operations, many extra procedures are required to complete any process that might be simply resolved with a more appropriate and better system (Gamage, 2017).

## **1.3 SCOPE**

The purpose or objective of this system is to digitalize and create an automated system. The system will perform tasks like adding a new member to the gym, removing the member, keeping the payments records, generating an accountability partner or group, and other stuff required in managing the gym properly. The present scenario in gyms is that the records are kept by writing in a file on paper. Every management task is done manually. This creates a system unreliable and confusing to keep correct track of the records. The maintenance of a system like this is hardly required until it needs to change any part of the system. The information about the various things contained in the system like members, trainers, the equipment can get with just a few clicks unlike paper documents required serious reading for such information. It helps in creating the various batch according to their preference or if they want a particular trainer.

## **1.4 AIMS AND OBJECTIVES OF STUDY**

A gym management system for Covenant University aims to automate and simplify administrative tasks like member registration, billing, and attendance tracking, improve member engagement and retention, increase productivity and efficiency, improve customer service, increase revenue, monitor and manage staff and equipment, provide insights and analytics for informed decision making, generate an accountability partner or group for motivation, and provide a platform for members to book and schedule workouts. It also intends to give gym operators access to real-time data on gym performance and usage, which can assist them in making data-driven decisions and enhancing the general efficiency and profitability of their facility.

The objectives of the work include:

1. **Requirements Gathering**: Gather and identify the fitness needs, preferences, and payment options of Covenant University students, faculty and staff and every other stakeholder.
2. **System Design**: Design a user-friendly and scalable web-based gym management system that provides different fitness plans and a secure payment gateway through the use of various UML diagrams.
3. **Implementation and Integration**: Develop and integrate the web-based gym management system with different devices, browsers, and payment options.
4. **Testing and Evaluation**: Thoroughly test and evaluate the web-based gym management system to ensure that the system is fully functional and meets the needs of its users while also evaluating the effectiveness of the accountability partner feature.

## **1.5 RESEARCH METHODOLOGY**

To achieve a well-working web-based gym management system for students, the following steps can be taken:

### **Objective 1: Requirements gathering.**

1. Define the scope and requirements of the system by understanding the needs of gym members and owners.
2. Conduct surveys and interviews to get feedback on what features are needed.

### **Objective 2: System design.**

1. Create a high-level design of the system, including the user interface and the backend architecture.
2. Determine the technology stack that will be used for development.
3. The use of UML diagrams like use case diagrams, activity diagrams and sequence diagrams cases to design a user-friendly and scalable web-based gym management systems.

### **Objective 3: Implementation and integration.**

1. Use appropriate software development methodologies, such as agile or waterfall, to develop the web-based gym management system.
2. Integrate the service with different devices, browsers, and payment options to ensure compatibility and accessibility.

### **Objective 4: Testing and evaluation.**

1. Testing the system’s accountability partner feature using a variety of metrics, such as user engagement, progress tracking, and goal achievement
2. Develop a comprehensive test plan that outlines the testing strategy, test cases, and acceptance criteria.
3. Conduct various types of testing, including functional testing, security testing, performance testing, and user acceptance testing, to ensure the service is bug-free, meets the requirements of students and faculty members, and is reliable, fast, and scalable.

## **1.6 SIGNIFICANCE OF STUDY**

A web-based gym management system can provide numerous advantages for Covenant University's gym, benefiting both students and gym staff. This system offers increased efficiency by automating tasks such as student registration, class scheduling, and billing, reducing errors and saving time. It also improves communication through an integrated messaging system, allowing students to easily access information about classes and schedules and communicate with staff. The system provides convenience for students, enabling them to access it from anywhere to book classes, update personal information, and pay for their membership online.

Furthermore, a web-based gym management system enhances data management by storing and organizing data on students, class schedules, and billing in a centralized location, facilitating decision-making and forecasting. It also enables better financial management by automating billing and membership renewals and tracking revenue and expenses, leading to increased profitability. The system is cost-effective as it eliminates the need for hardware and software installations and reduces maintenance costs. Additionally, it is accessible from anywhere with an internet connection, making it easy for gym staff to manage the gym from remote locations.

Moreover, a web-based gym management system is scalable, making it a good long-term solution as it can easily accommodate the growth of the gym. Finally, it offers greater security than traditional systems as it can be accessed through encrypted connections and designed with multiple layers of security.

In summary, a web-based gym management system can help Covenant University's gym increase efficiency, improve communication and data management, provide cost-effective solutions for financial management and member engagement, and ensure better scalability and security.

## **1.7 PROJECT OUTLINE**

This research is outlined in this order, Chapter one contains a general introduction, the problem statement, the aim and objectives of the work, the project’s significance, the methodology used, and the limitations of the project. The second chapter contains a critical review of existing literature and systems related to web-based gym management systems. The Third chapter describes the analysis and design of the system. Chapter Four presents the system implementation, it contains screenshots of the system when implemented. Chapter Five shows the results of the system, the conclusion, summary and further recommendations.

# **CHAPTER TWO**

# **LITERATURE REVIEW**

## **2.1 INTRODUCTION**

The fitness industry has grown substantially in recent years, leading to a surge in the number of gyms and fitness centers. Consequently, efficient gym management systems have become necessary to manage the increasing workload. Traditional gym management systems are limited in functionality and have several limitations, such as the inability to manage customer information effectively (Farzana, 2019).

However, with the rise of web-based technologies, gym management systems have become more accessible, efficient, and effective. These web-based systems offer several advantages over traditional systems, such as the ability to manage memberships, class schedules, and payment processing online. Additionally, incorporating an accountability partner into a gym management system can be an excellent way to keep individuals motivated, on track, and achieve their fitness goals (Heath, 2020).

In this literature review, we will explore both traditional and web-based gym management systems and review various existing systems. We will also examine how web-based gym management systems have become more popular due to their ability to provide a more efficient and seamless gym management experience. We will also explore how incorporating an accountability partner into gym management systems can help individuals stay motivated and achieve their fitness goals.

Overall, gym management systems are crucial for managing the increasing workload and demands of gyms and fitness centers. Through this review, we aim to highlight the importance of gym management systems, particularly web-based systems, and their benefits in managing fitness centers effectively. Additionally, we will examine how incorporating an accountability partner into these systems can help individuals stay on track and achieve their fitness goals.

## **2.2 REVIEW OF TRADITIONAL AND WEB-BASED GYM MANAGEMENT SYSTEMS**

Gym management systems have come a long way since the traditional paper-based systems. As technology evolved, computerized gym management systems were developed to automate gym operations such as billing, class scheduling, equipment management, and data analysis (Gamage, 2017). However, these systems required a significant investment in hardware and software, which limited their accessibility to gym owners.

The advent of web-based gym management systems has revolutionized the gym management industry, allowing gym owners and managers to manage gym operations from anywhere, anytime, and on any device with an internet connection. Unlike traditional gym management systems that involve manual processes such as paper records, spreadsheets, and basic software programs, web-based gym management systems are cloud-based systems designed to automate gym operations and provide a seamless gym management experience (Weller, 2021).

Web-based gym management systems offer numerous advantages over traditional gym management systems. Firstly, they provide gym owners with the ability to track member attendance and payments, schedule classes and appointments, manage inventory, and track equipment maintenance, among other functionalities. Secondly, they eliminate the need for significant hardware and software investments and physical storage, as they are accessed through the cloud. Lastly, web-based gym management systems provide gym owners with complete control over their gym at their fingertips, allowing them to manage their gym from their smartphones, tablets, or laptops (Weller, 2021).

In conclusion, web-based gym management systems have transformed the gym management industry by providing gym owners with more accessible and efficient ways to manage their gyms. With the ability to automate gym operations, track member attendance and payments, schedule classes and appointments manage inventory, and track equipment maintenance, gym owners can streamline their gym management processes and focus on providing a better gym experience for their members (Weller, 2021).

## **2.3 REVIEW OF EXISTING WEB-BASED GYM MANAGEMENT SYSTEMS WITH AN ACCOUNTABILITY PARTNER**

There are various web-based gym management systems available in the market today that incorporate accountability partners. An accountability partner is a coach or a peer who provides motivation, support, and encouragement to individuals to help them achieve their fitness goals. Below are some examples of existing web-based gym management systems with an accountability partner:

* + 1. **Trainerize:**

Trainerize is a popular fitness app that has gained significant popularity in recent years. The app offers a variety of features that help users achieve their fitness goals. Some of the key features of Trainerize include personalized workout plans, nutrition tracking, progress tracking, and virtual coaching. The app is designed to cater to the needs of users at different fitness levels, from beginners to advanced athletes.

One of the significant advantages of Trainerize is the personalized workout plans it offers. The app allows users to customize their workouts based on their fitness goals, current fitness level, and available equipment. The app also provides instructional videos and animations to ensure users perform exercises correctly, minimizing the risk of injury. This feature is backed up by research that suggests personalized workout plans can significantly improve adherence and motivation to exercise (Sun *et al.*, 2021).

Another key feature of Trainerize is its nutrition tracking capabilities. The app allows users to track their food intake, monitor their calorie consumption, and set nutritional goals. This feature is essential for individuals looking to lose weight or maintain a healthy diet. Research has shown that tracking food intake can improve dietary adherence and lead to successful weight loss (Burke, Wang and Sevick, 2011).

The progress tracking feature of Trainerize is also highly beneficial. The app allows users to track their progress, including weight loss, muscle gain, and other fitness metrics. This feature is crucial in helping users stay motivated and on track with their fitness goals. Research has shown that progress tracking can improve adherence to exercise programs (Sniehotta *et al.*, 2005).

Trainerize also offers virtual coaching, which is highly beneficial for individuals who prefer remote training sessions. The app allows users to connect with certified personal trainers who can provide personalized guidance and support. Research has shown that virtual coaching can be just as effective as in-person coaching (IJsselsteijn *et al.*, 2006)

While Trainerize offers several advantages, it also has some shortcomings. One of the main drawbacks of the app is its cost. The app requires a monthly subscription fee, which can be a barrier for some users. Additionally, the app may not be suitable for individuals who prefer in-person coaching and need hands-on guidance.

In conclusion, Trainerize is an excellent fitness app that offers several advantages, including personalized workout plans, nutrition tracking, progress tracking, and virtual coaching. The app's features are backed up by research that suggests they can significantly improve adherence and motivation to exercise. However, the app's cost and remote coaching may not be suitable for everyone. Overall, Trainerize is an effective tool for individuals looking to achieve their fitness goals.

* + 1. **MyFitnessPal:**

MyFitnessPal is a popular fitness app that has gained popularity among people looking to improve their health and fitness. The app is designed to help users track their daily food intake, monitor their exercise activities, and set fitness goals. MyFitnessPal's database of over 11 million foods makes it easy for users to log and track their meals, while the app's barcode scanner allows for quick input of packaged foods.

One of the key features of MyFitnessPal is its ability to track macronutrients and micronutrients. Users can set customized goals for their daily intake of calories, protein, fat, and carbohydrates, and the app will provide feedback on whether those goals are being met. This feature can be especially helpful for individuals with specific dietary needs, such as athletes or those with chronic health conditions.

Another advantage of MyFitnessPal is its integration with other fitness tracking devices, such as Fitbit and Apple Watch. This allows users to see a more comprehensive view of their overall health and fitness, including daily step counts, heart rate, and sleep patterns.

However, one of the main shortcomings of MyFitnessPal is that it relies heavily on user input, which can be time-consuming and error-prone. Users must manually enter all of their meals and exercises, which can be a daunting task for some. Additionally, MyFitnessPal does not account for individual differences in metabolism, body composition, or other physiological factors that can impact weight loss and fitness goals.

Research has shown that tracking food intake and exercise can be an effective tool for weight loss and improving overall health. A study published in the Journal of Medical Internet Research found that using a mobile app for self-monitoring diet and exercise was associated with greater weight loss and improved dietary habits in overweight and obese individuals (Wang *et al.*, 2020). Another study published in the Journal of Nutrition Education and Behavior found that using a mobile app to track food intake and exercise was associated with improved dietary quality and increased physical activity (LeRouge and Wickramasinghe, 2013).

MyFitnessPal is a powerful tool for individuals looking to improve their health and fitness. Its ability to track macronutrients and micronutrients, integrate with other fitness tracking devices, and provide personalized feedback on fitness goals makes it a valuable resource for anyone looking to improve their health. However, its reliance on user input and limitations in accounting for individual differences in physiology highlight the need for further research and development in this area.

* + 1. **Fitocracy:**

Fitocracy is a fitness app that aims to gamify fitness and make exercise more engaging and enjoyable. The app offers a range of features designed to help users set and achieve fitness goals, track their progress, and connect with other fitness enthusiasts. However, the app also has some limitations that may make it less suitable for some users.

One of the key features of Fitocracy is its gamification approach to fitness. The app allows users to earn points and level up as they complete workouts and achieve fitness goals. This can be a powerful motivator for many people, as it taps into the human desire for achievement and recognition. Research has shown that gamification can be an effective tool for increasing engagement and adherence to fitness programs (Lu *et al.*, 2013).

Another important feature of Fitocracy is its social aspect. Users can connect with friends and other fitness enthusiasts on the app, sharing workout tips, encouragement, and support. This can be particularly valuable for people who are looking for accountability and motivation to stick to their fitness goals. Research has shown that social support can be a powerful factor in promoting physical activity and improving fitness outcomes (Sallis *et al.*, 2006).

Fitocracy also offers a range of tools for tracking and monitoring fitness progress. Users can log their workouts, set goals, and track their progress over time. The app also provides data on calorie burn, distance, and other metrics, allowing users to monitor their progress and make adjustments to their workout routines as needed. Research has shown that self-monitoring and goal-setting are effective strategies for promoting physical activity and achieving fitness goals (Burke *et al.,* 2011).

However, Fitocracy also has some limitations that may make it less appealing to some users. One potential drawback is the app's focus on strength training and weightlifting. While these activities can be valuable components of a fitness routine, they may not be suitable for everyone. Some users may prefer more cardio-focused workouts or may be looking for more variety in their exercise options.

Another limitation of Fitocracy is its premium membership model. While the basic version of the app is free, many of the most valuable features are only available to users who pay for a premium membership. This can be a barrier for some users who may not be In conclusion, Fitocracy is a fitness app with a range of valuable features, including gamification, social support, and tracking tools. These features align with research-supported strategies for promoting physical activity and achieving fitness goals. However, the app may not be suitable for everyone, particularly those who are not interested in strength training or who are unwilling or unable to pay for a premium membership.

* + 1. **TrueCoach:**

TrueCoach is a popular fitness app that aims to simplify the process of fitness coaching for trainers and clients alike. The app is designed to make it easier for trainers to create personalized workout plans for their clients, track their progress, and communicate with them in real-time. TrueCoach boasts several features that make it an attractive option for both trainers and clients.

One of the key features of TrueCoach is its ability to create customized workout plans for each client. Trainers can create workout plans based on a client's specific goals, fitness level, and preferences. This customization allows clients to achieve their fitness goals in a safe and efficient manner, and it also helps trainers to manage multiple clients simultaneously.

Another standout feature of TrueCoach is its easy-to-use interface. The app is designed to be user-friendly, with intuitive navigation and clear instructions. This makes it easy for clients to track their progress, log their workouts, and communicate with their trainers.

One potential shortcoming of TrueCoach is its reliance on technology. While the app is designed to simplify the process of fitness coaching, it may not be suitable for all clients. Some people may prefer more traditional coaching methods, such as in-person training sessions or phone calls.

Research suggests that fitness apps like TrueCoach can be effective tools for promoting physical activity and improving overall health outcomes. A 2017 systematic review of fitness apps found that they can be effective in increasing physical activity levels, improving adherence to exercise programs, and promoting weight loss (Direito *et al.*, 2017). Another study found that fitness apps can be effective in improving self-efficacy and motivation to exercise (Burke *et al.,* 2011).

Overall, TrueCoach is a robust fitness app that offers many features that make it an attractive option for both trainers and clients. While it may not be suitable for everyone, its customizable workout plans and user-friendly interface make it a valuable tool for promoting physical activity and achieving fitness goals for those willing or able to pay for a subscription.

# **CHAPTER THREE**

# **SYSTEMS ANALYSIS AND DESIGN**

## **3.1 PREAMBLE**

In this chapter, you will find a comprehensive description and design of the web-based gym management system. You will be presented with diagrammatic representations of the system's architecture, as well as the numerous approaches and steps that were taken to achieve the desired outcomes. Additionally, this chapter outlines the system's requirements and the design procedures that were used to meet those requirements. The key highlights of this section include the system's architecture, design, modules, and interfaces, all developed to satisfy user requirements.

## **3.2 REQUIREMENT ANALYSIS**

In Software Engineering, requirement analysis is the process of obtaining the expectations and needs of users for software to be created or modified. The task of eliciting requirements includes multiple stakeholders and various activities to ensure that product specifications are accurately and relevantly obtained. Software requirements are generally classified into functional and non-functional requirements. The requirements for this project are detailed in the following paragraph.

### **3.2.1 FUNCTIONAL REQUIREMENTS**

Functional requirements refer to the specific features and functionalities that a system or product must possess to meet the needs of its users. In the case of a web-based gym management system with an accountability partner, some of the functional requirements might include:

1. User Authentication: The system must have a secure login and registration system to allow users to create an account and authenticate themselves before accessing the system's features.
2. Workout Tracking: The system must allow users to log and track their workouts, including exercise types, sets, reps, and weights lifted.
3. Goal Setting: The system must allow users to set fitness goals, such as weight loss, muscle gain, or cardiovascular fitness, and track their progress toward those goals.
4. Accountability Partner Integration: The system must allow users to connect with an accountability partner, share their workout and goal progress, and receive feedback and encouragement.
5. Personalized Workout Recommendations: The system should analyse user data and provide personalized workout recommendations based on their fitness goals, previous workouts, and other relevant factors.
6. Schedule Management: The system must allow users to schedule and book gym sessions, classes, and personal training sessions.
7. Payment Processing: The system should provide a secure and reliable payment processing system to handle gym membership fees, personal training fees, and other charges.
8. Mobile Compatibility: The system should be accessible from mobile devices, allowing users to log workouts, track progress, and communicate with their accountability partner on the go.
9. Reporting and Analytics: The system should provide detailed reporting and analytics on user activity, such as workout frequency, progress toward goals, and engagement with the accountability partner feature.

### **3.2.2 NON-FUNCTIONAL REQUIREMENTS**

Non-functional requirements refer to the quality attributes that describe how well a system performs, rather than what the system does. In the case of a web-based gym management system with an accountability partner, some of the non-functional requirements might include:

1. Performance: The system must be able to handle high levels of user traffic and activity without slowing down or crashing.
2. Reliability: The system must be reliable and available at all times, with minimal downtime for maintenance or updates.
3. Security: The system must be secure, with strong encryption, password policies, and user authentication mechanisms to protect user data.
4. Scalability: The system must be scalable, allowing for easy expansion and growth as the user base grows and new features are added.
5. Usability: The system must be user-friendly and easy to use, with intuitive interfaces and clear instructions for all features and functions.
6. Accessibility: The system should be accessible to users with disabilities, with features like screen reader compatibility and keyboard navigation.
7. Compatibility: The system must be compatible with a wide range of devices and web browsers, including both desktop and mobile platforms.
8. Maintainability: The system must be easy to maintain and update, with clear documentation and well-organized code.
9. Performance Monitoring: The system should have performance monitoring tools in place to track system health, identify performance bottlenecks, and optimize system performance.

## **3.3 SYSTEM ARCHITECTURE**

System Architecture is a high-level design that describes the structure and behavior of a system as well as the relationships between the various components comprising the system.

## **3.4 SYSTEM DESIGN**

System design is a critical part of the software development process that describes the process of implementing the objective of a system to be built. Various aspects of system design to be considered include conceptual design, logical design, physical design, and architectural design.

### **3.4.1 Logical Design**

Logical design involves detailing the flow of data in and out of a software system. It includes identifying all input and output sources and destinations as well as the data stores and flows concerning the system. The logical design of this Web-based gym management system is described using data flow diagrams.

### **3.4.2 Data Flow Diagram**

A data flow diagram is a visual map that shows the channels of flow of information among processes in a system. This diagram uses different symbols and notations to signify various parts of a system through which information flows, including processes, external entities and data stores.

## **3.5 PHYSICAL DESIGN**

Physical design involves creating visual representations of the actual processes of a system, ranging from data entry and verification to output. It details the workings of the system by specifying the precise actions/ functions that the system can perform and how they are operated. This phase of design factors in the user and helps give a holistic overview of the system's functionality.

### **3.5.1 Use Case Diagram**

Use case diagrams describe how users may interact with the system using various anticipated use cases. Use cases are represented majorly using circles or ellipses. The Web-based gym management system built in this project has the following use cases.

### **3.5.2 Activity Diagram**

An activity diagram is used to depict the dynamic parts of a software system. It is similar to a flow chart but models the flow of activities in the system from one process to the next. The activity diagram for the Web-based gym management system in this project is detailed below.

### **3.5.3 Sequence Design**

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