

Assignment 2: Project Management & Innovation.

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INTRODUCTION	3
TASK 1: PROJECT MANAGEMENT	3
<i>Q1: Project Management & Planning</i>	3
<i>Project Scope</i>	3
<i>Required Technologies</i>	3
<i>Human Resources</i>	3
<i>This project will require:</i>	3
<i>Technical resources</i>	3
<i>Financial resource</i>	4
<i>Project Timeline & Schedule</i>	4
<i>Constraints</i>	4
<i>Gantt Chart</i>	4
<i>Development Method</i>	4
<i>Q2: Project Design</i>	4
<i>ERD Diagram</i>	4
<i>Wireframe diagram</i>	5
TASK 2: ENTERPRISE & INNOVATION:	5
<i>T2 Enterprise</i>	5
<i>PEST</i>	5
<i>SWOT</i>	5
<i>Q2. Project Detail</i>	5
TASK 3: PROJECT REFLECTION	6
<i>How you intend to use this opportunity to develop new skills?</i>	6
<i>How could your project/new skills have a positive impact on and contribute to society? ...</i>	6
<i>Identify some risks/challenges your project could face and document what you can do to</i> <i>reduce/remove them.</i>	6
CONCLUSION	6
References	6
Appendix one.....	11

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Abstract

This report contains a project plan that uses agile methodologies and develops business design and structure.

Keywords BDA, IoT, fitness, health.

INTRODUCTION

This report highlights key aspects of a software development (SD) application including design, project planning and a fictitious company design. Discussed throughout are many development methods, design methods and business consideration.

TASK 1: PROJECT MANAGEMENT

Q1: Project Management & Planning

Project Scope

The project, built with the knowledge of Change Makers Creativity and Value Creation, is a fitness application that leverages internet of things (IoT), big data analytics (BDA), SD and social accountability to promote physical and mental health and wellbeing of users [1].

The problem this aims to provide a solution to is the lack of human connection between people who partake in fitness by adding a social aspect online and in person [2].

The idea for this project is that human connection and fitness can form a relationship in order to improve both aspects of a persons life [3] as well as improve physical and mental health.

The aim of the project is “to design and develop a digital fitness platform that integrates IoT wearables, BDA and gamification to enhance user motivation, promote physical and mental wellbeing and encourage social accountability in fitness participation” [1]. In addition to this, personal trainers can run their training plans from within.

Required Technologies

The required technologies for this project is heavily reliant on SD technologies. The leading technologies sit with Amazon Web Services (AWS), Microsoft and Google, especially when focusing on cloud computing and service [4]. The detailed technologies used are provided in Appendix one.

As these technology company all provide an appropriate solution, the chosen company will be selected based on the experience of the software developer selected for the project.

Human Resources

This project will require:

- A software development team of two full stack developers to build the applications front end, back end, network and cloud features. This is paired with Brooks’ law as discussed in constraints [5] [6]. Continuing, Marjan Hericko et al state that “bigger teams decrease productivity” in software development and “in theory, a team size of two” has the potential to “outperform” larger team sizes [6].
- A business analyst to convey project intentions in a format that brings value to users and stakeholders.
- A project manager to coordinate between the project plan and required people.

Technical resources

Once the two individual software developers are chosen, between both their skill stack a technical stack will be chosen to align as discussed in required technologies; either Google Cloud Platform (GCP), Amazon Web Services (AWS) or Microsoft Azure. Other technological resources would consist of GitHub, Microsoft Teams and this will be supported by a developer environment of Visual Studio Code and Android Studio.

The hardware for two developer computing devices, headsets for communication and a mobile device for testing purposes are required. Access to academic and industry literature on IoT via

internet, BDA and the psychology of behaviour is required. This will be provided with a stable source of internet and access to scientific databases such as ScienceDirect.

Financial resource

A funding solution and financial resource should be considered to pay individuals, purchase equipment and gain access to relevant locations, data and knowledge individuals. A funding solution is detailed in T2 Enterprise to gain this resource.

Project Timeline & Schedule

The project timeline, as derived from the objectives from Change Makers Creativity and Value Creation, is from 2025 to the end of 2026 [1]. Expanding on this, the full timeline ranges from the 17th of November 2025 to 1st of December 2026. This ensures a month remains before the end of the year 2026 to respect delays that may occur from this project without reducing “the quality of the outcome” that comes from a “lack of time” [7]. An evaluation will take place after this period.

The initial project timeline & schedule

The detailed project timeline and schedule are provided in Appendix I.

Constraints

To create an application with no human resource constraints would require a greater number of individuals on the application team. Ideally, additional people would be involved:

- a user interface and user experience (UI/UX) developer
- a front end developer,
- a back end developer,
- a quality assurance individual
- an Agile specialist

[8]

This would require an additional financial cost. A constraint of two people has been implemented to reduce cost. This has been reduced to mitigate this. Additionally, regarding Brooks’ law in relation to SD “adding manpower to a late software project makes it late” [5]. This applies a constraint of managing addition software developer into the project at a later date.

Another constraint consist of cost of cloud resource. If managed incorrectly, the cost will scale as the cloud platform grows. This will need to monitored and constrained to low cost or free methods.

Compliance with GDPR and ISO 27001 requires a necessary constraint of handling biometric data

correctly and ethically [9]. To align, anonymisation [10] and consent management methods should be practiced which increases complexity of the project.

Gantt Chart

Gantt charts are useful methods of project management within multiple sectors. The advantages of this method can prove a benefit to “manpower”, “the cost of a project” and can “save...time” [11]. Gantt chart principles shape the way projects are managed and are able to be applied to a variety of project work aspects [12]. The Gantt chart software I will use will be Microsoft’s Excel with a predefined format created by Microsoft [13]. See the detailed Gantt chart in appendix one Gantt chart.

Development Method

Agile methodology uses “iterative development, collaborating and adaptability” for the length of the project. Unlike the waterfall method, agile is available to “continually” be changed and updated to suit the project and “highest priority” stakeholders such as “customers”. Four aspects of the agile methodology are:

- “Individuals and interactions over processes and tools”.
- “Working software over comprehensive documentation”.
- “Customer collaboration over contract negotiation”.
- “Responding to change over following a plan”.

A form of agile methodology is the waterfall model which includes “sequential... development” of aspects related to SD such as “requirements definition to design creation, program implementation, system testing and delivery to the customer”. For more detail, view appendix one figure nine. An advantage to this method is the ease of implementation if “inexperienced project managers” are present. Disadvantages include the inflexibility, “slow and expensive” features of the method [14].

Additionally, “frequent integration” allows for “early and frequent feedback” on developments [15] which proves advantageous.

In conclusion, I will select agile methodology as the development method.

Q2: Project Design

ERD Diagram

To view the ERD diagram, see figure one in appendix one.

Wireframe diagram

To view the wireframe diagram, view figure two to figure seven.

TASK 2: ENTERPRISE & INNOVATION:

T2 Enterprise

Continuing forward, this section will analyse the technology company WHOOP. This company offers BDA for users in relation to their biometric data captured on a watch device.

PEST

In regards to political factors to WHOOP, a plethora of data protection regulations and frameworks become applicable to the company due to their operation: EU GDPR, UK Data Protection Act 2018, US HIPAA, CCPA [16]. They document how the company must legally comply when collecting, storing and transferring biometric data in an ethical way.

Regarding economic factors, the company has a subscription based model where users pay monthly or annually for services [17] which returns predictable income which supports the research behind the technology. WHOOP must follow advertising standards such as the ASA for the United Kingdom [18] and FTC for the United States of America [19]. To ensure the company remains ethical, WHOOP needs to understand the economic values of its users to not attract users into making poor financial decisions based off overstated health benefits and anxieties about health through marketing techniques.

In today's culture, the population is conscious to data driven health insights [20]. A societal factor to consider is the effect the product, data insights and reports may have on body dysmorphia [21] including promoting unrealistic lifestyles or body expectations. An additional social factor to consider is inclusivity and accessibility as "digital health solutions often are inaccessible for people with impairments" [22]. In the active countries for this company, anti discrimination laws require that no section of society can be restricted with differing functionality across users.

A technological factor to consider is cybersecurity. As the advancements in technology in recent years improves it is important to secure users data and is required by law. If cybersecurity measures do not continuously improve with "digital transformation" a data loss, by attack or other "disruptions caused by security", is likely to occur [23]. If a data breach occurs, this is an ethical consideration and liability

to the company. Under GDPR Article 33, breaches must be reported within 72 hours [24].

SWOT

A clear strength to WHOOP is their advanced BDA and data accuracy of physiological and recovery insights. Cybersecurity, GDPR and other laws and frameworks should legally be considered when handling user data to ensure "encryption, pseudonymization" and other security measures are implemented [10]. A subscription based model is a clear strength for their cashflow to remain through reoccurring payments [25]. Financial foresights can be extrapolated from this. This company has a strength of strong brand advertising and reputation in elite sports and studies within the fitness sector [26].

A weakness about the company is their high pricing [17]. This pricing must comply with fair trading laws to be legal [27]. This may be deemed as unethical as it excludes lower income society members [28].

WHOOP could leverage the recent artificial intelligence (AI) public interest into an opportunity by using AI to deliver proactive and predictive analytics towards health risk modelling. A current AI coach feature can relay insight based on sleep, recovery and other health features. However, an opportunity of developing health risk modelling to inform about conditions, current and developing, could provide user benefit.

A threat for WHOOP is the competition from other companies.

These analyses will be considered in my project.

Q2. Project Detail

This project will include a start up name. The potential name will be Ambition as it directly relates to fitness endeavours.

The logo can be found in appendix one as figure eight.

The legal business type will be a limited liability company (Ltd) as this format eradicates personal liability formed from sole trading [29]. Additionally, the company will have an tax benefits organising in this format [30].

The company vision is to become a leading digital health platform that uses BDA, wearable technology and software development to promote mental and physical transformations and performance through data.

The mission is to promote science backed health insights through data and academically peer reviewed and proven research paired with user biometric data.

Much like WHOOP, the chosen revenue model will be a subscription method where user purchase a device alongside the accompanying software. Funding opportunities will include of start up grants and other grants, crowdfunding [31] and a small bank loan [32].

TASK 3: PROJECT REFLECTION

How you intend to use this opportunity to develop new skills?

This project aligns with my hobby of SD. By leveraging this skill with the discussed project I aim to focus on the new skill of AI and machine learning paired with BDA to generate health and wellbeing insights through data. I lack experience in full stack development, with my previous focus being front end development. By integrating hardware sensors collecting data, cloud storage for that data and various API calls I will advance with the skill of full stack development. Agile is a new development method that will be developed as a skill. I will strengthen my project management by integrating agile development and operations with advantages of “better knowledge transfer”, a customer focus, and increased project “quality” [15]

This will prove an advantageous skill as a software developer. Another new skill forms a part of full stack development: data ethics, laws and transparency to the user. From this project, I should gain the understanding of handling user data, storing data in compliance with relevant laws and frameworks and relaying transparency to the user through ethical decision making. This project consists of three development teams. A new skill developed through working with these teams is communication and teamwork.

How could your project/new skills have a positive impact on and contribute to society?

These new skills should inform my decisions making on software related projects and will protect society in the form of securing user data from cybersecurity threats, data breaches and individuals. Society will benefit from the projects ability to withdraw insights from large amounts of biometric data to smaller and easier to interpret data. The premise behind the application and project is to promote physical and mental health. If successful, this will improve the quality of life of users in society.

Identify some risks/challenges your project could face and document what you can do to reduce/remove them.

A clear risk of influencing users to be more active is possibility of injury and fatality. To reduce this risk, academic fitness sources will be cited and promoted in the application. Continuing, a variety of risk is present when handling user data. For example, GDPR and cybersecurity regulations could be breached. To prevent this, data will be encrypted where possible and reputable and secure companies such as GCP, AWS and Microsoft Azure will be used to develop products with data: “securing data in cloud environments is paramount for organizations to protect sensitive information, comply with regulations, and maintain trust“ [33]. A final risk can be related to a negative public attitude towards biometric data. This can be rectified by creating a publicly accessible policy on data usage for transparency which includes a “right to withdraw” feature to remove all instances of user data [34].

CONCLUSION

This project has highlighted the full lifecycle of a SD application for an application in the fitness industry focusing on BDA, IoT wearables, SD and a range of business planning, design and development. An analysis of a company in the same field proves useful as a guideline in what is possible in the industry. By carrying out this project I will have strengthened many skills including those relating to SD, teamwork, agile methodology, ethical and legal awareness skills.

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Appendix one

Required technologies

The required technologies for the discussed project:

- 1) A database management system (DBMS) to store user profiles, fitness and session metrics securely. Suitable options include:
 - a. Amazon Relational Database Service (RDS) for structured SQL storage.
 - b. Azure SQL Database for managing relational data.
 - c. Google Cloud Firestore for scalable NoSQL data handling.
- 2) A SD technology stack supporting desktop, mobile and web environments.
 - a. A front end stack that will include React Native in order to be compatible with Android, IOS and desktop websites.
 - b. A back end stack that can includes Node.js, .NET Core hosted on AWS Elastic Beanstalk, Azure App Service or Google App Engine.
- 3) A cloud solution for hosting, deployment and infrastructure for scalability, reliability and global performance.
 - a. For elastic compute capacity [35]
 - i. Amazon EC2
 - ii. Azure Virtual Machines
 - iii. Google Compute Engine
 - b. For serverless computing:
 - i. AWS Lambda.
 - ii. Azure Functions.
 - iii. Google Cloud Run Functions
 - c. For media and analytics storage and output:
 - i. AWS S3.
 - ii. Azure Blob Storage.
 - iii. Google Cloud Storage.
 - d. For performance insights with cloud monitoring:
 - i. Amazon CloudWatch.
 - ii. Azure Monitor.
 - iii. Google Operations Suite
- 4) IoT integration layer such as APIs and software development kits (SDKs) from third party fitness applications.
 - a. Apple HealthKit SDK, Google Fit SDK, Fitbit Web API, and Garmin Connect API for biometric data capture.
 - b. Using AWS IoT Core, Azure IoT hub, or Google Cloud IoT for ingestion and event processing.
- 5) BDA and machines learning tools for data insights.
 - a. For data pipelines, AWS Glue, Azure Data Factory, or Google Cloud Dataflow.

- b. For data warehousing, Amazon Redshift, Azure Synapse Analytics, or BigQuery.
 - c. For machine learning: Amazon SageMaker, Azure Machine Learning Studio, or Google Vertex AI.
 - d. For data visualisation: Power BI, AWS QuickSight, or Looker Studio.
- 6) Cybersecurity and encryption to protect user data.
 - a. Security controls will follow ISO 27001 and GDPR including encryption [36] “in transit and at rest” [37], multi factor authentication (MFA) through Azure Active Directory and AWS Cognito.
 - b. Anonymisation and pseudonymisation techniques [38] of sensitive data.
 - c. Continuous auditing and threat detection using AWS GuardDuty, Azure Security Center, or Google Security Command Center.
- 7) Project management software to manage objectives, tasks and details of project.
 - a. Microsoft Teams or Google Workspace for discussions planning and organisation with skilled professionals.
 - b. GitHub for version control with GitHub Actions, AWS CodingPipeline or Azure Pipelines.
- 8) Testing and deployment frameworks to assure quality and ensure reliability.
 - a. Selenium, Postman and Junit/PyTest for API testing.
 - b. AWS Device Farm, Azure Test Plans or Firebase Test Lab for mobile testing.
- 9) Ethical and Data Governance Tools
 - a. Consent management, anonymisation and hashing techniques and protocols embedded in application.
 - b. For compliance monitoring:
 - i. Azure Policy.
 - ii. AWS Config.
 - iii. Google Cloud Policy Intelligence.

[39] [40] [41] [42] [43]

Project Timeline & Schedule

Stage	Activity Detail	Duration (Weeks)	People Required	Dates	Deliverables
Preparation	Literature review, data gathering, benchmarking against existing digital health and wellbeing platforms, device and software development environment setup, requirements gathering through surveys/interviews, identify ethical considerations and create a data handling policy	2	Software team, Business analyst, Project manager.	17-30 Nov 2025	Confirmed project scope and objectives. Research summary and reference list. Initial risk and ethics summary in a register. Project repository created and version control initiated.
Planning	Define project strategy, success metrics and Key Performance Indicators. Select cloud platform and outline computing architecture. Determine data model, APIs and analytics pipeline. Produce high level Gantt chart and sprint plan. Discuss and plan person responsibilities and ensure communication between teams is initiated. Draft data policies: security, privacy and backup policies	4	Software team, Business analyst, Project manager.	1 Dec - 15 Dec 2025	Approved project plan and milestone roadmap. Technical architecture diagram. Updated risk and ethics register. Communication & governance plan. Signed off requirements specification.
Design	Create UI/UX wireframes. Map user journeys and navigation flow. Design entity relationship diagram (ERD) for database schema. Develop API endpoint specification and data flow diagrams. Prototype dashboard layouts for analytics. Conduct stakeholder design review and accessibility audit.	4	Business analyst, Project manager.	16 Dec - 31 Jan 2026	Approved design documentation. Clickable prototype. UI style guide. ERD and data flow diagram. Accessibility compliance report. Usability test feedback.
Development	Build back end services using Node.js / Python / .NET. Implement front end in React Native, Flutter, or .NET MAUI. Configure databases (RDS, Firestore, Azure SQL). Develop authentication and user management modules. Implement gamification engine (points, leaderboards, achievements). Integrate analytics event tracking. Set up continuous integration pipeline (GitHub Actions / Azure Pipelines). Conduct internal code reviews and peer testing.	16	Software team, Business analyst, Project manager.	Feb - May 2026	Minimum viable product (MVP). API documentation and developer guide. Functional modules with unit tests. Version 1.0 deployment to staging server. Change log and code review records.

IoT Integration & Analytics	Connect wearable SDKs (Apple HealthKit, Google Fit, Fitbit). Configure IoT data ingestion via AWS IoT Core / Azure IoT Hub / Google Cloud IoT. Develop big data pipeline (Glue, Data Factory, Dataflow). Build analytics dashboards (Power BI, Looker Studio). Train ML models for activity prediction and user motivation scoring. Conduct data accuracy and latency testing. Optimise database queries and API performance. Document ethical safeguards for biometric data use.	12	Software team, Business analyst, Project manager.	Jun - Aug 2026	Functional IoT integration. Operational analytics dashboard. ML model performance report. Data pipeline documentation. Security and privacy validation report.
Testing, Optimising & Incorporate User Feedback	Perform unit, integration, and system testing. Gather pilot user feedback through survey and interviews. Implement bug fixes and performance improvements. Evaluate KPIs and success metrics. Prepare release notes and updated user manual.	8	Software team, Business analyst, Project manager.	Sep - Oct 2026	Stable beta version. Test case log and bug register. User feedback summary. Performance benchmark report. Refined documentation and training materials.
Deployment	Deploy a final version to production cloud environment. Register and publish mobile app to Google Play Store and Apple App Store. Conduct production environment penetration testing. Set up backup and disaster recovery procedures. Deliver training sessions for administrators and test users. Transition to operational support phase.	4	Software team, Business analyst, Project manager.	Nov - 1 Dec 2026	Live system deployed on cloud. App published to stores. Deployment checklist completed. Training guide and handover documentation. Backup schedule and disaster plan. Created backup
Evaluation	Collect final usage analytics and performance metrics. Assess user adoption and satisfaction levels. Compare outcomes to original project objectives. Conduct post implementation review. Prepare academic report, reflection, and recommendations for improvement. Archive project data and final deliverables.	2	Project manager.	2 Dec 2026 -18 Dec 2026	Comprehensive evaluation report. Reflective analysis report. Presentation data slide pack for final review with all teams. Recommendations for future enhancements.

ERD diagram (0)

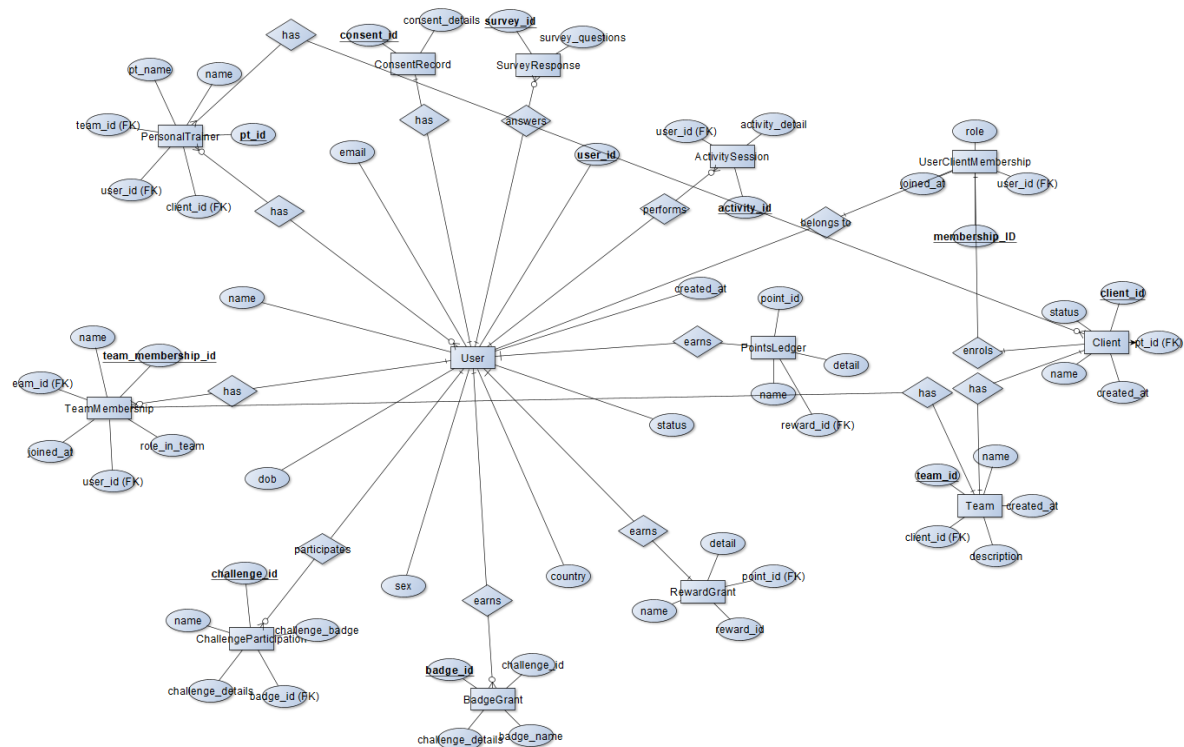
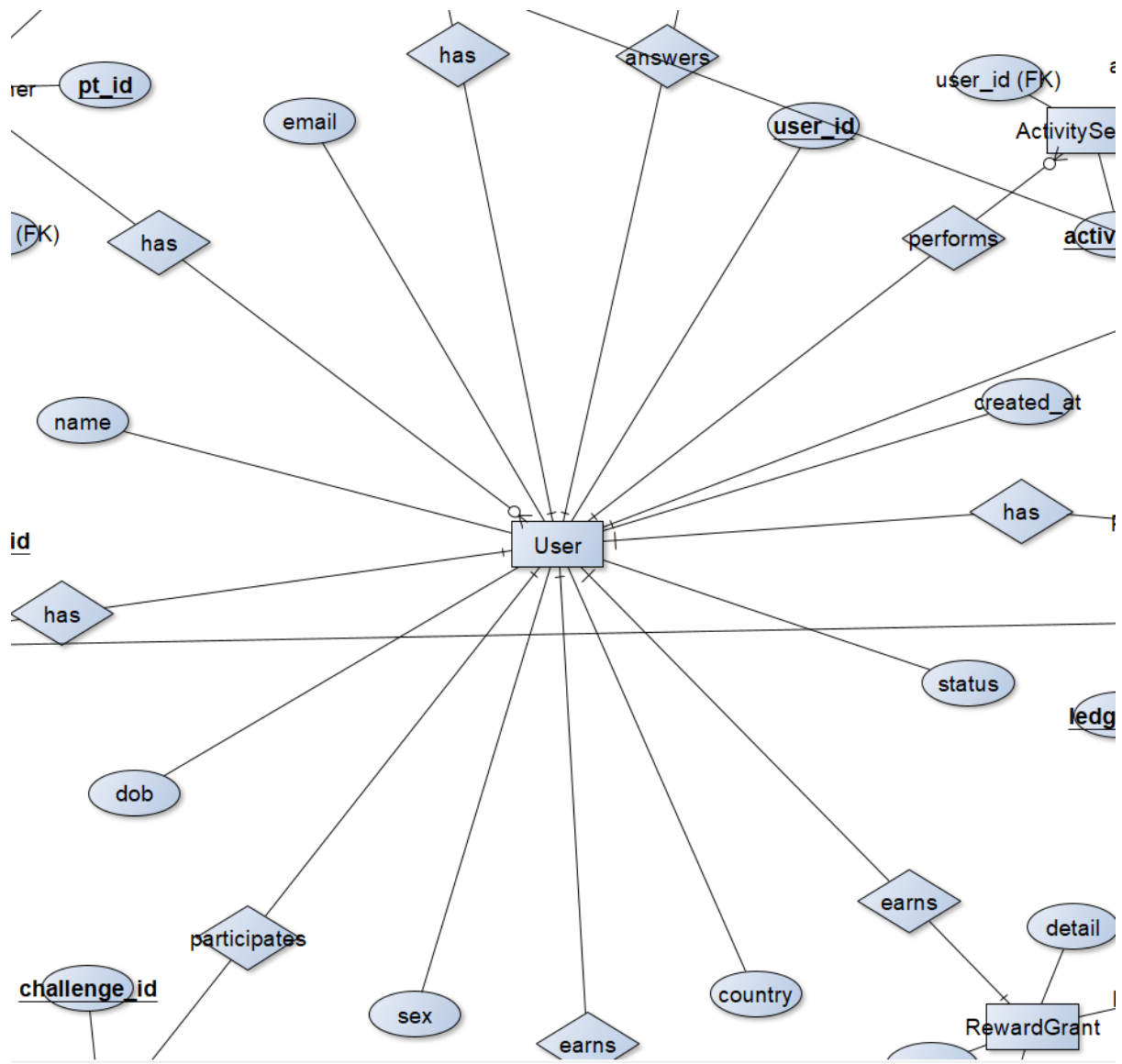
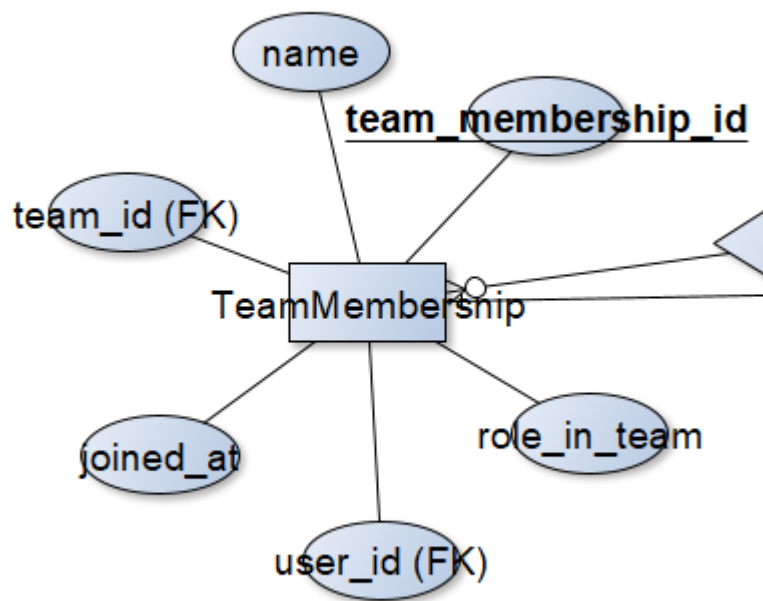


Figure one: ERD diagram of fitness application.

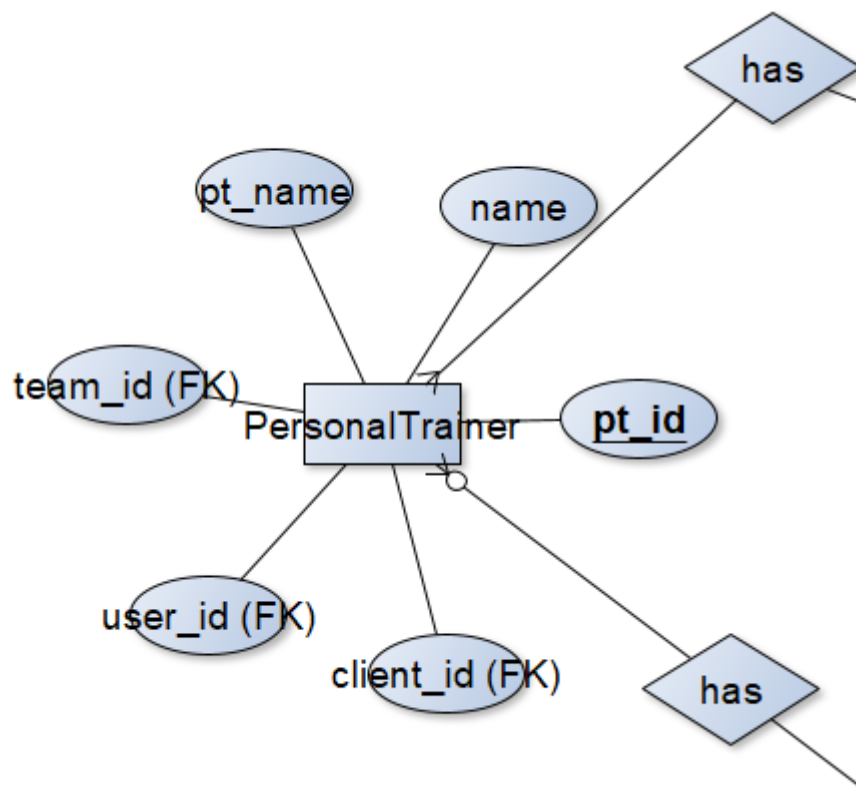
ERD diagram (1)



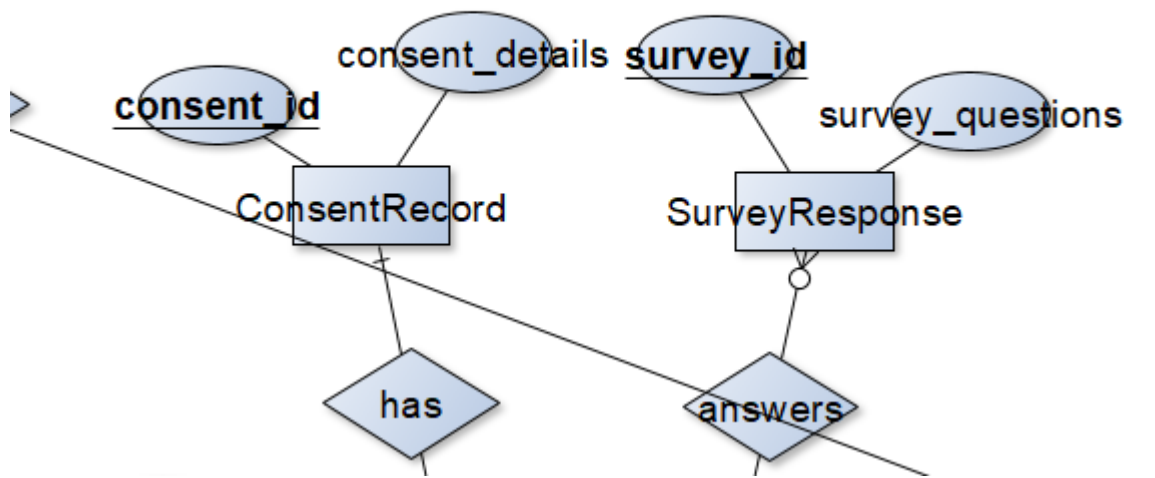
ERD diagram (2)



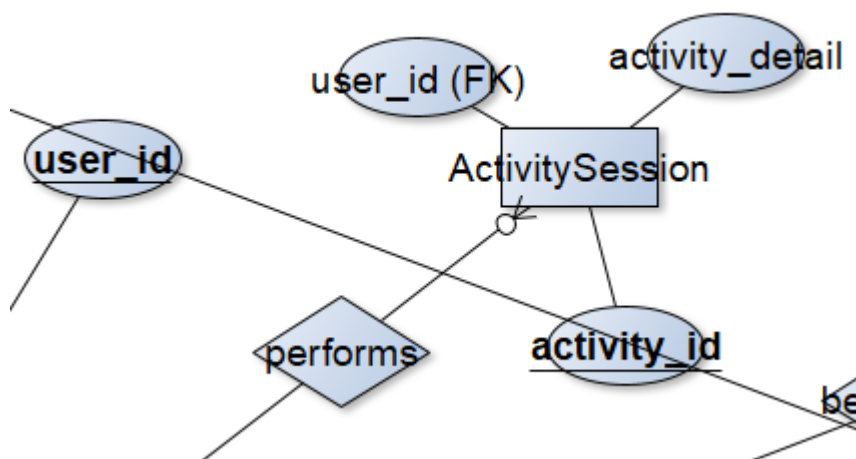
ERD diagram (3)



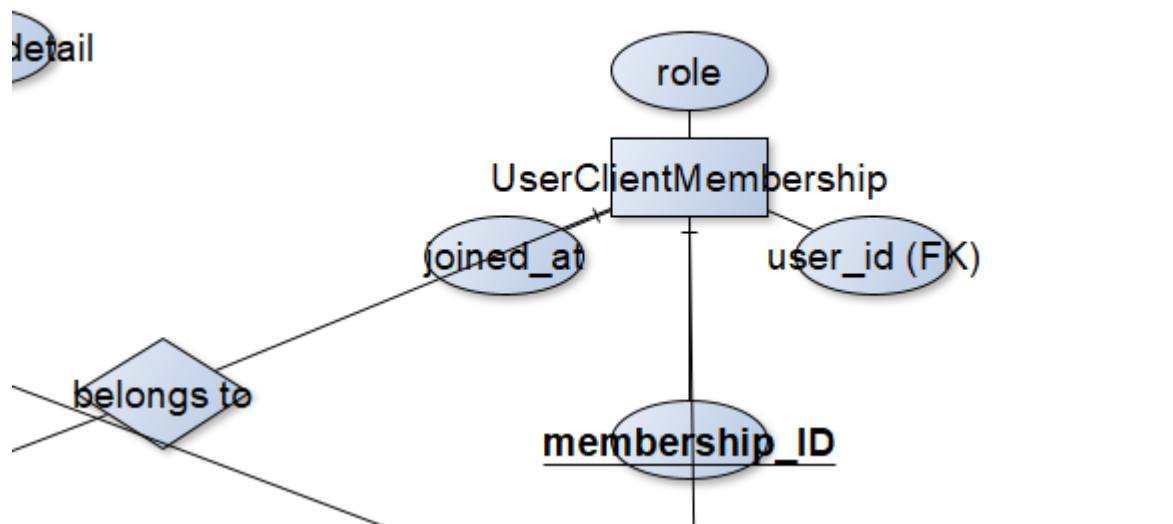
ERD diagram (4)



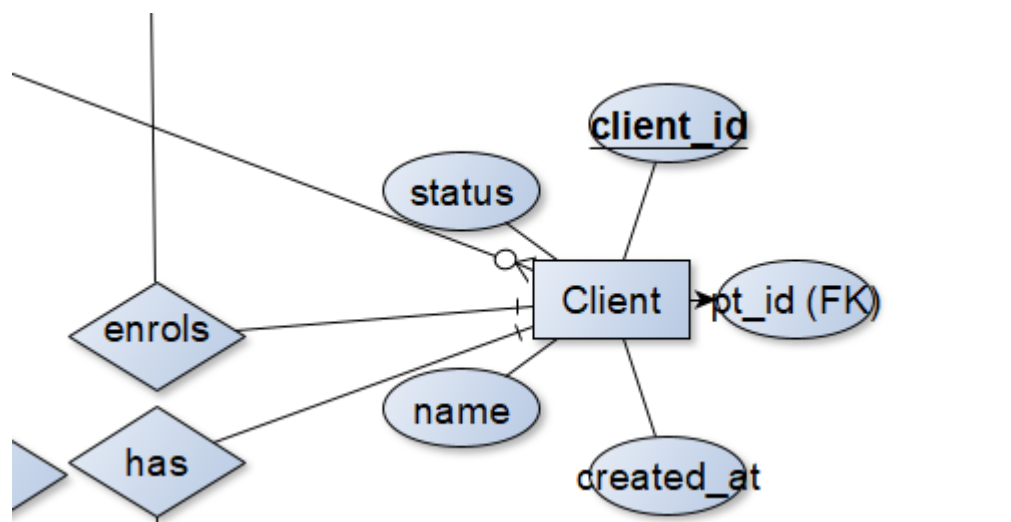
ERD diagram (5)



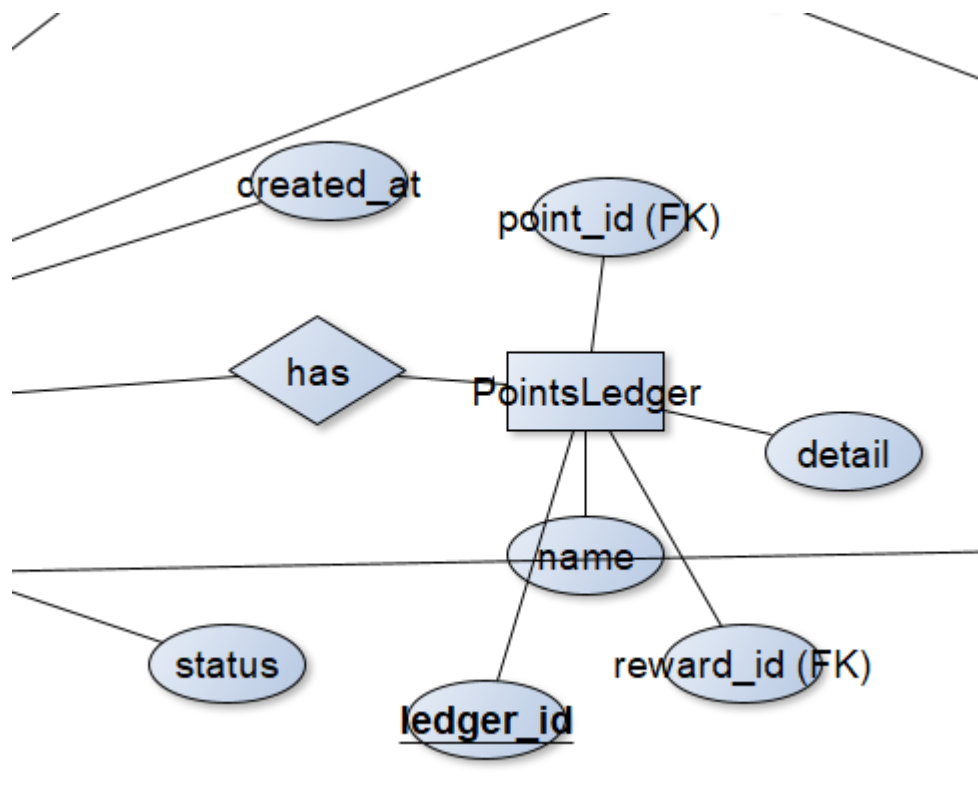
ERD diagram (6)



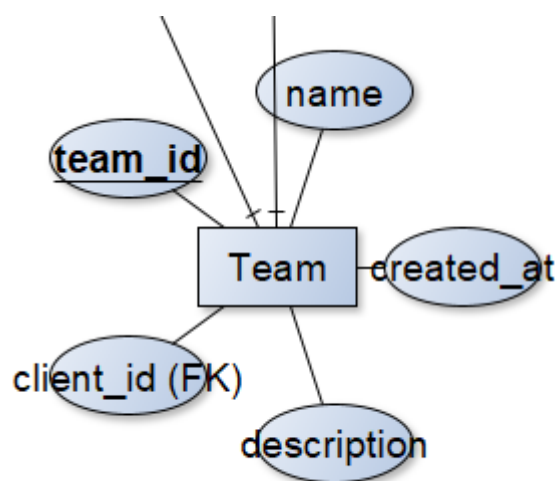
ERD diagram (7)



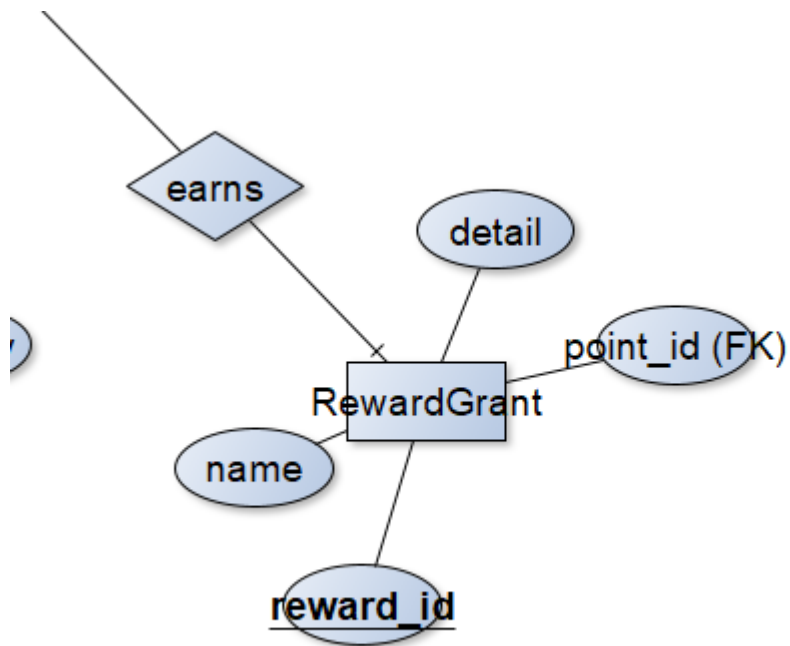
ERD diagram (8)



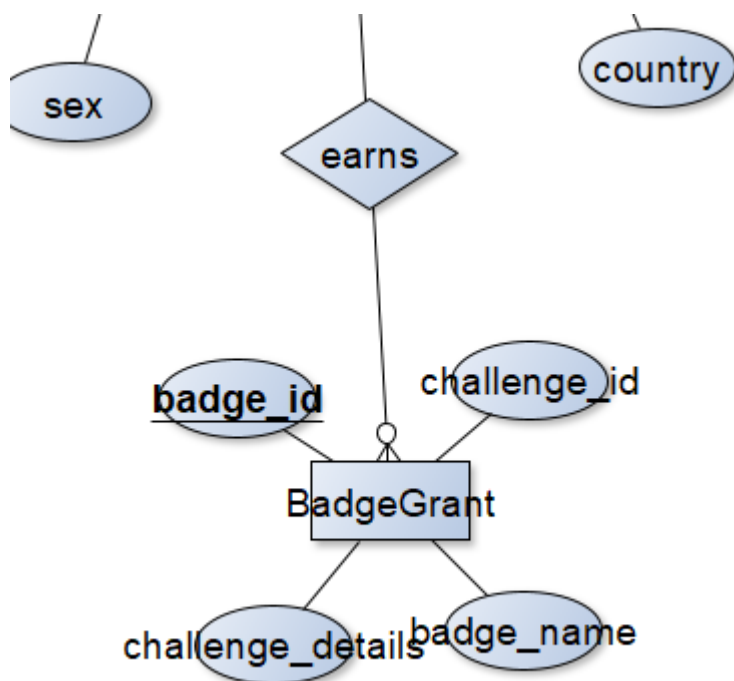
ERD diagram (9)



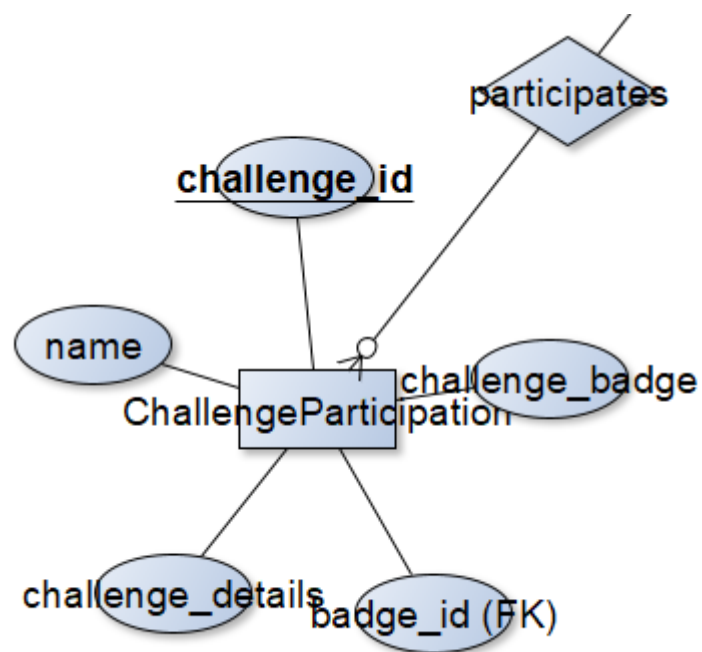
ERD diagram (10)



ERD diagram (11)



ERD diagram (12)



Wireframe diagram

Log in.

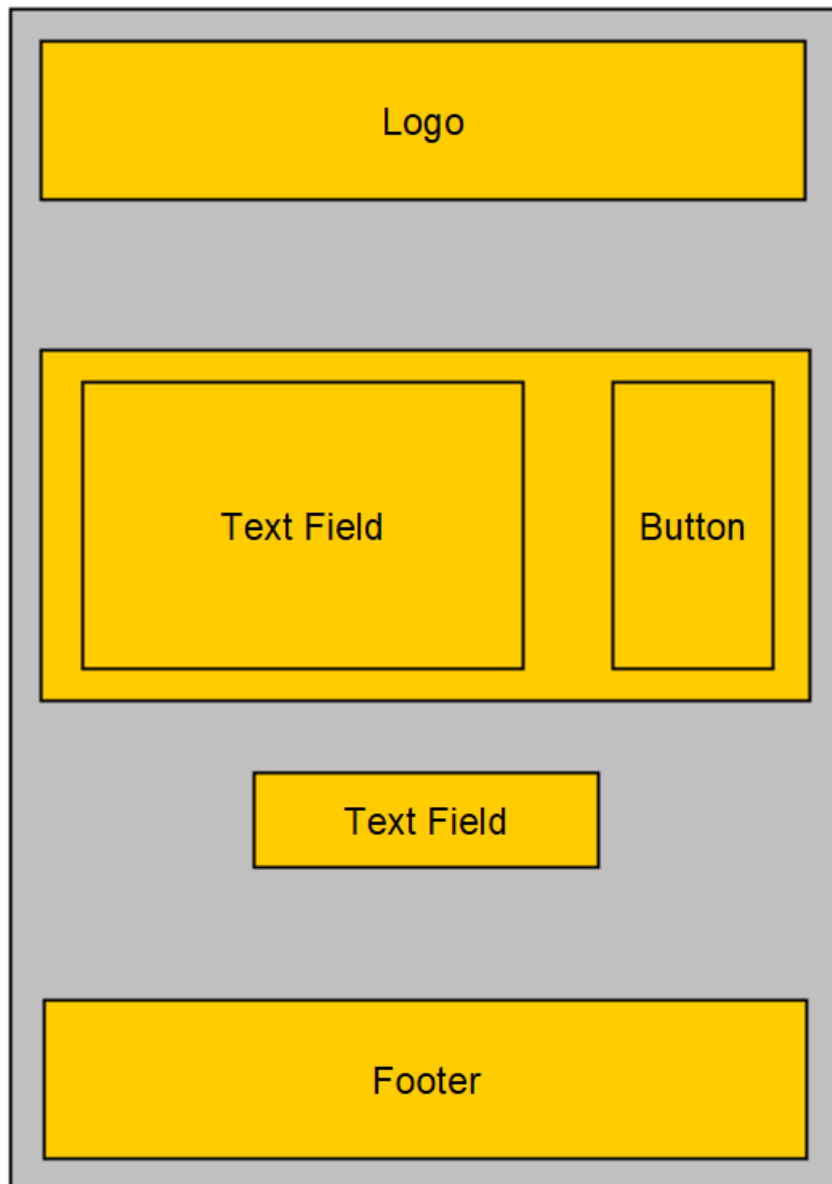


Figure two: fitness application log in wireframe design.

Activity & Detail Page

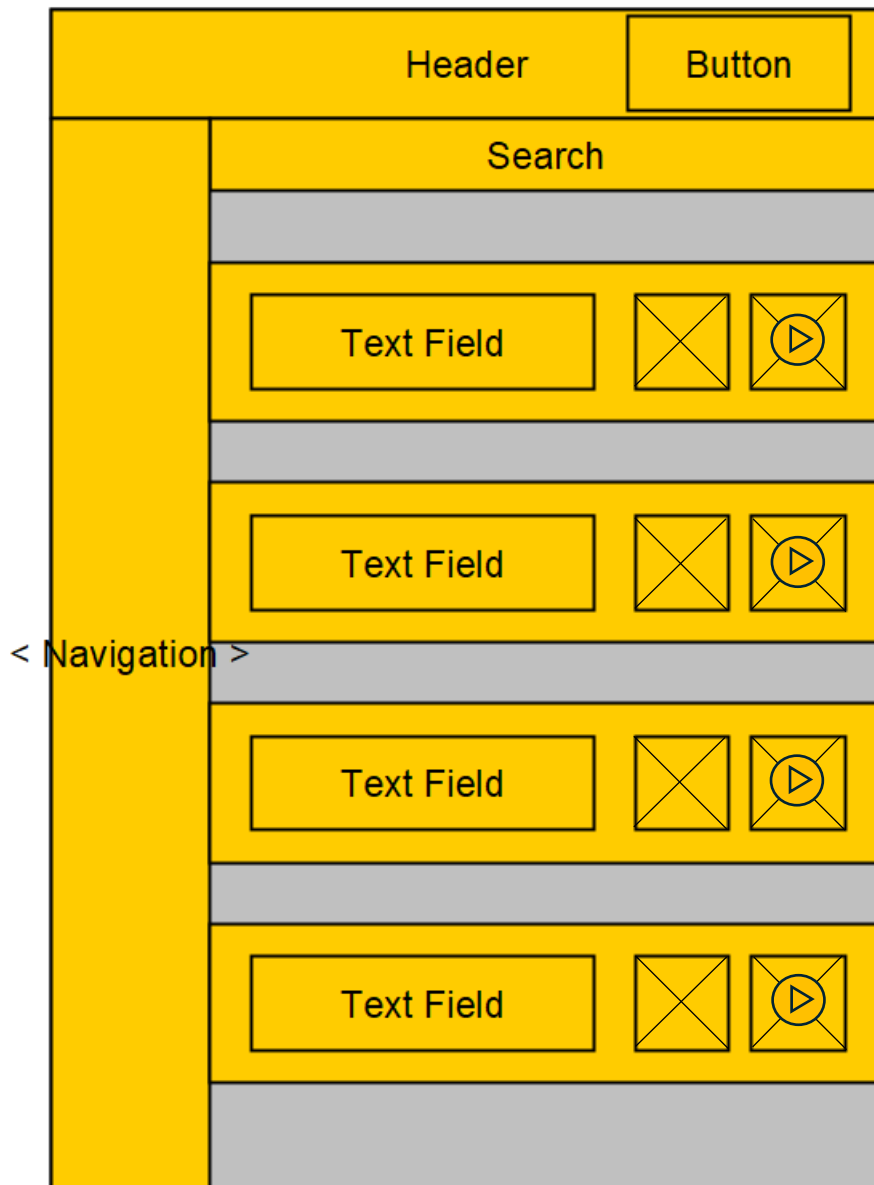


Figure three: posted activity and detail page wireframe design.

Personal Trainer Selector Page

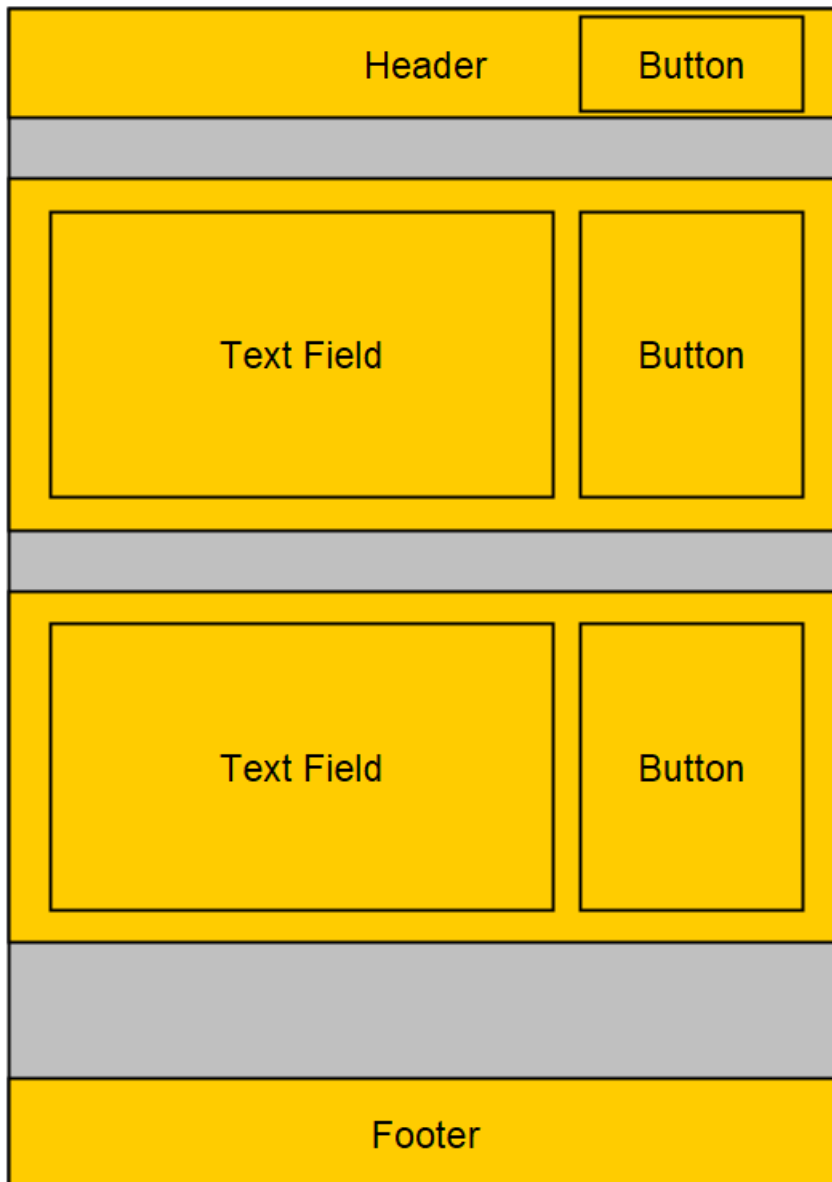


Figure four: personal trainer selection page wireframe design.

Challenge Selection Page

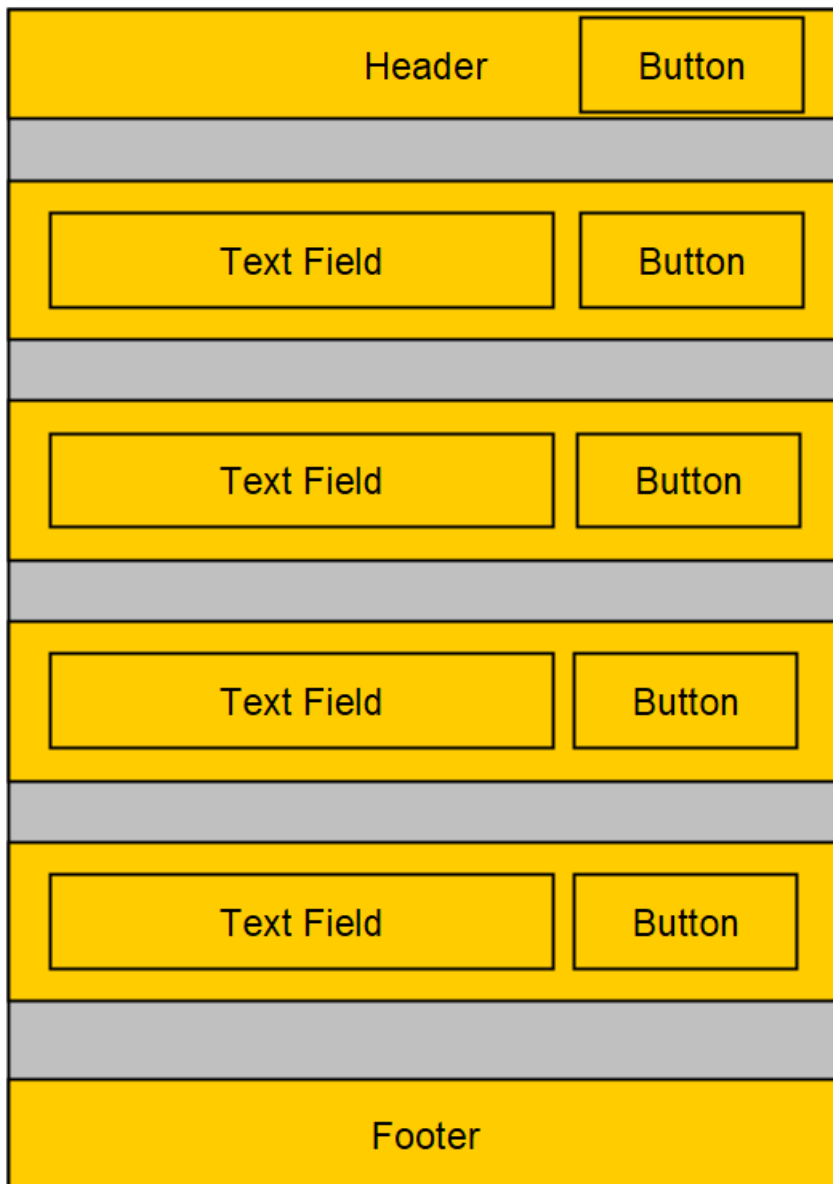


Figure five: challenge selection page wireframe design.

Activity Entry Page

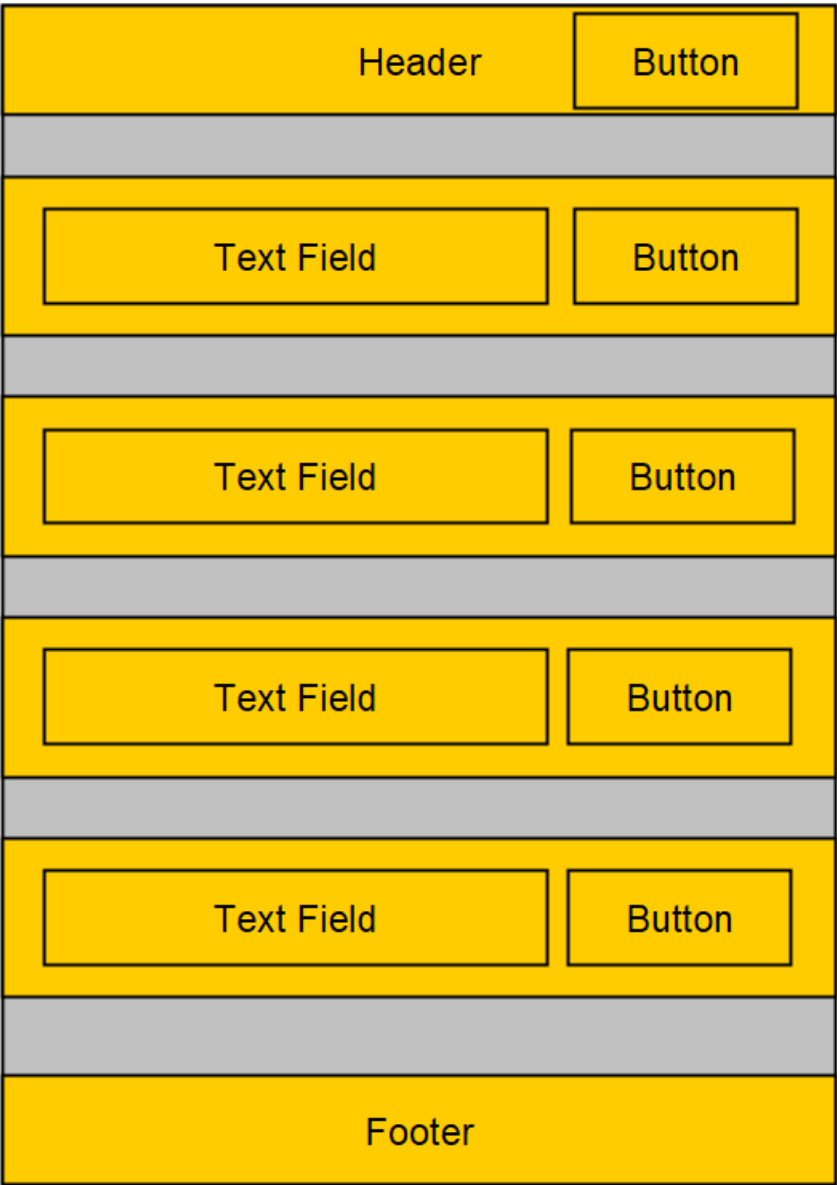


Figure six: activity entry page wireframe design.

Social Interaction Page

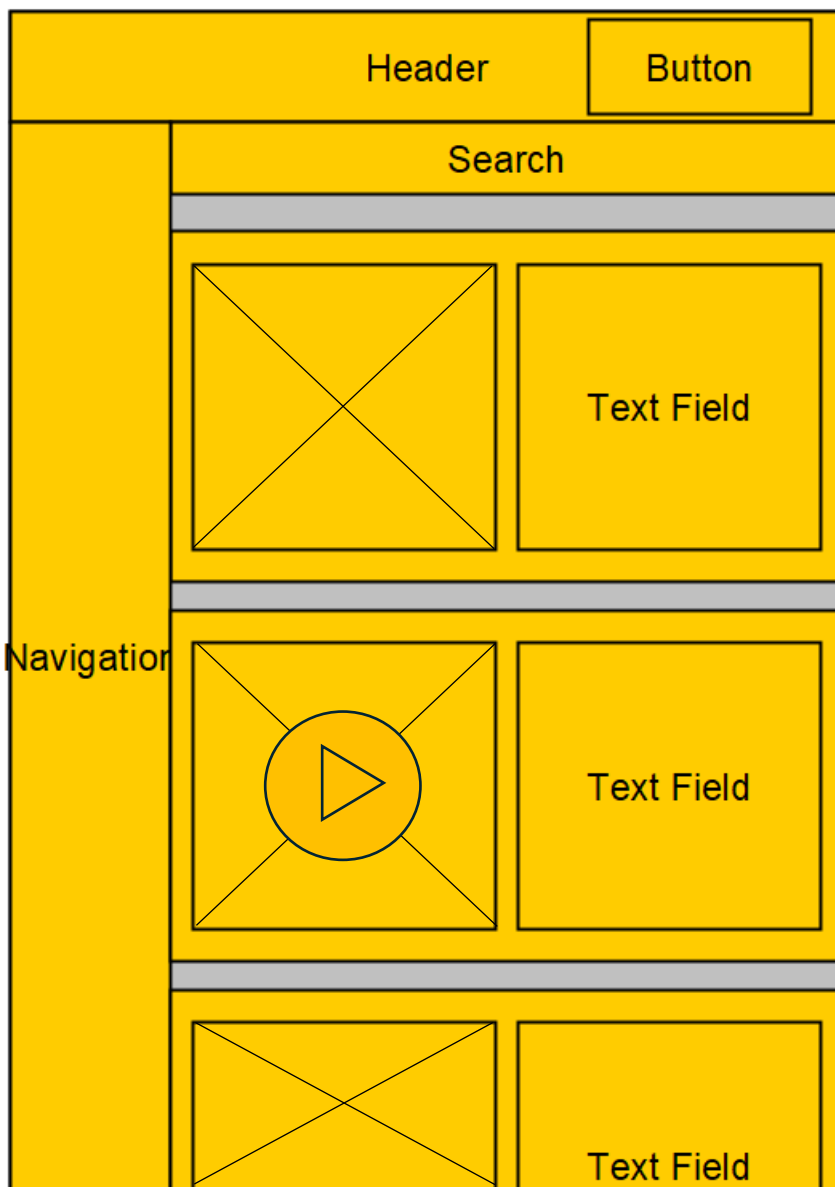


Figure seven: social interaction page wireframe design.

Logo



Figure eight: fitness application logo.

Images

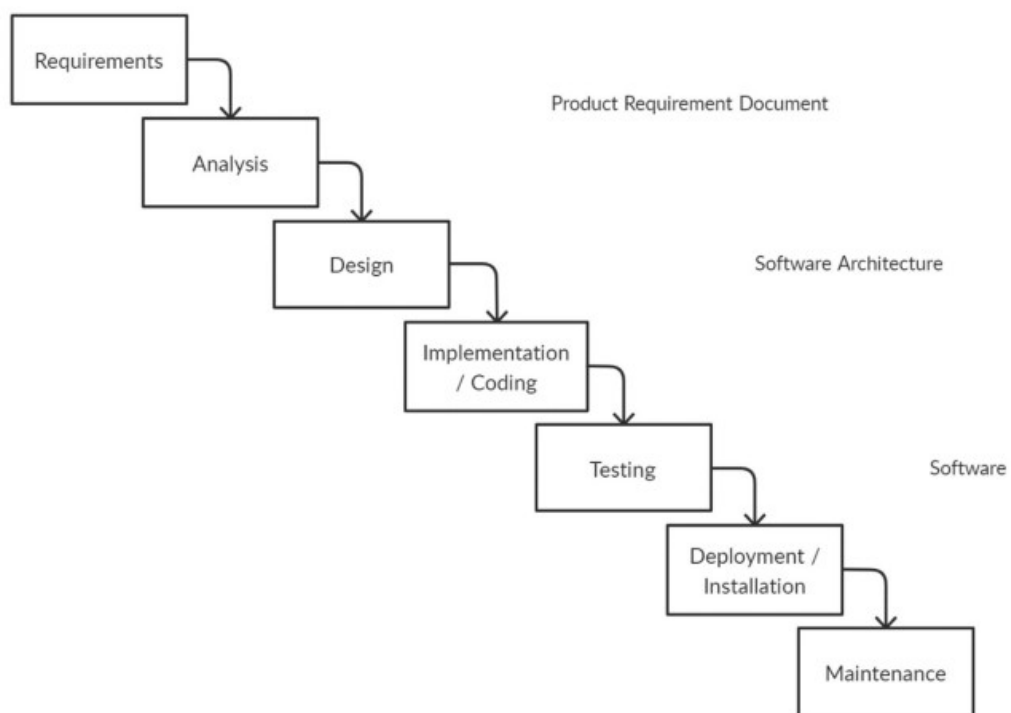


Figure nine: waterfall methodology in project management.

Gantt Chart

Ambition Project Gantt Chart

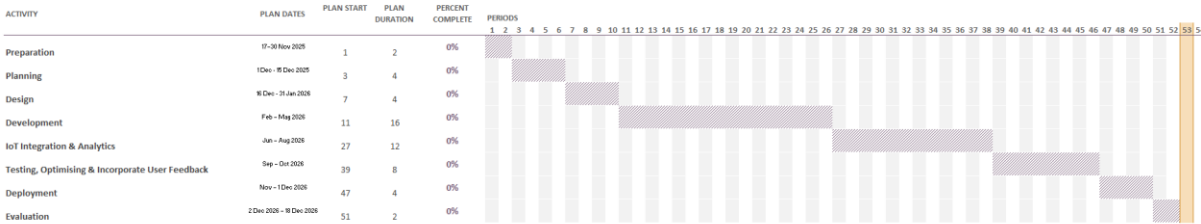


Figure ten: Ambition Gantt chart (1)

Ambition Project Gantt Chart

ACTIVITY	PLAN DATES	PLAN START	PLAN DURATION	PERCENT COMPLETE
Preparation	17–30 Nov 2025	1	2	0%
Planning	1 Dec - 15 Dec 2025	3	4	0%
Design	16 Dec - 31 Jan 2026	7	4	0%
Development	Feb – May 2026	11	16	0%
IoT Integration & Analytics	Jun – Aug 2026	27	12	0%
Testing, Optimising & Incorporate User Feedback	Sep – Oct 2026	39	8	0%
Deployment	Nov – 1 Dec 2026	47	4	0%
Evaluation	2 Dec 2026 – 18 Dec 2026	51	2	0%

Figure eleven: Ambition Gantt chart (2)

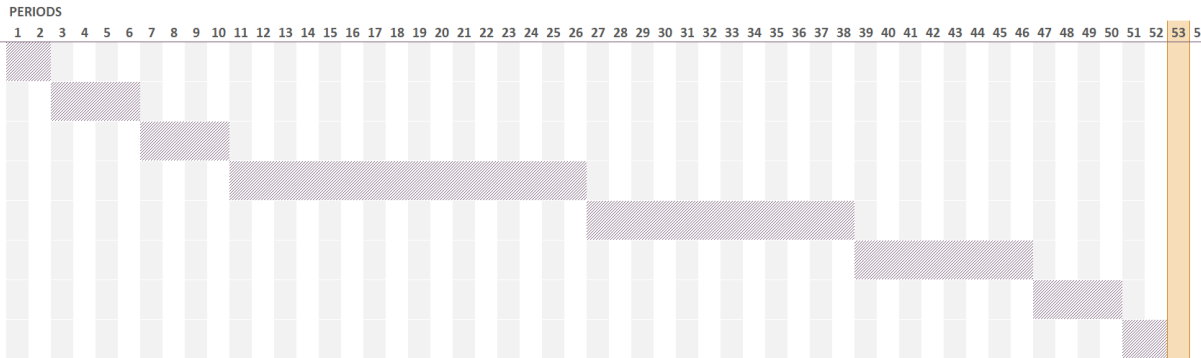


Figure twelve: Ambition Gantt chart (3)