End of Project Report

Group 7

Project name:	Waikirikiri Swim Centre Management System
Issue date:	15/09/2023
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1. Purpose of the Project

1.1 Background

The Waikirikiri Swim centre has approached Group 7.inc to design and implement a swim centre management system to address the operational challenges faced by the Waikirikiri Swim Centre, a facility catering to approximately one thousand members and ten swim instructors.

The Swim Centre seeks to efficiently track member information, monthly subscription payments, pool usage, and bookings for aqua aerobics classes and individual swimming lessons. Members pay a $70 monthly subscription fee, granting them access to pools and aqua aerobics classes. Additionally, individual swimming lessons, offered by instructors, are available for an extra fee ($44 for a 30-minute lesson and $80 for a 60-minute lesson). Aqua aerobics classes, managed by instructors, are scheduled seven days a week and accommodate up to 30 members per class.

The system must monitor three types of attendance: pool usage, individual swimming lessons, and participation in aqua aerobics classes, with members scanning their membership cards upon arrival. The project aims to streamline these processes, from member registration and payment to instructor management and attendance tracking.

1.2 Problems Faced

Group 7.inc interviewed Elizabeth from Waikirikiri Swim Center and discussed the challenges that the swim centre faced as its membership grew to over a thousand members, with ten instructors and administration staff.

- **Keeping track of Member, Instructor, Administration personal information**

The swim centre has an excel spreadsheet to keep track of all the members, instructors, and administration staff personal information. As the membership grew it became a full-time job managing the information kept on this spreadsheet.

- **Scheduling group aqua aerobics classes and swimming lessons**

The swim centre used a large whiteboard to schedule aqua aerobics classes and swimming lessons. This proved to be very tedious and once again we relied on an administrative staff member to manage.

- **Financial tracking**

The swim centre relies on bank statements to track member payments, and these must be married up with

subscription records to make sure they are current, reminders must also be sent out if a subscription has lapsed. Total revenue from subscriptions and individual swimming lessons must also be manually calculated and reports manually created.

- **Program Analytics**

Keeping track of Pool usage, class attendance and measuring the popularity of certain classes was just about impossible using a manual system. Furthermore, compiling this information into something useful was a job on its own.

- **Customer satisfaction**

As the membership grew, so did the number of complaints from customers. The manual-based management system meant that occasionally group classes could be overbooked, swimming lessons were double-booked, user information became outdated.

1.3 Project goals

Having understood the problems outlined by Waikirikiri swim center, Group 7.inc set about implementing a solution that would address these issues and prepare Waikirikiri swim center for the future. Our solution was to revolve around a central database driven by a Web application with three main user dashboards Administrators/Managers, Members, and Instructors.

- **Implementation of a system database**

The database is the engine of the whole solution as it is where all the user information is stored along with scheduling information, program analytics and financial records. This central database removes the need for manual processes such as excel spreadsheets and whiteboards.

- **Administrators/Managers**

Tracking member payments and generating revenue reports is made easy with a database and removes the need to cross reference bank statements, it allows for automatic generation of tailored financial reports. Likewise tracking the pool usage, class attendance and program popularity is made simple using a Group 7.inc database and web application.

The dashboard also allows Administrators/Managers to update member profiles, communicate with members via reminders and updates and keep tabs on scheduling and overall center management.

- **Members**

Storing the member information on the central database and allowing the member to update their personal information helped reduce the burden on the administration staff member having to maintain a spreadsheet. Giving the member the ability to book and pay for their own swimming lessons and aqua aerobics classes gave them a real time view of what was available and confirmation that they had been booked in, as well as removing the need for administration staff to manage this process.

The dashboard also allowed members to access subscription information and renewals, stay informed with news updates and have easy access to instructor information.

- **Instructors**

The primary goals for the instructors were for them to manage their personal profile and contact information, efficiently schedule their aqua aerobics classes and individual swimming lessons, and access essential information about their booked lessons and swim trainees'profiles.

2. Product Backlog (User Stories)

A list of all the user stories planned at the beginning of the project and all of them have been completed.

- As an Admin/Manager, I want to be able to update the users' own profile, so that I can keep my profile current and accurate.

- As a user, I want to have a dashboard, so that I can easily navigate to my profile applications.

- As a user, I want to login, so that I can view my dashboard.

- As an Instructor, I want to view and update my own profile, so I can keep my information accurate and up to date.

- As a member, I want to view and update my own profile, so I can keep my information updated.

- As a User, I want to be able to logout, so that I can securely end my session and protect my personal information.

- As an Instructor, I want to view the schedule of aqua aerobics classes that I am running, so I can be aware of my teaching commitments

- As a user, I want to be able to register as a member, instructor, or admin so that I can access the platform with the appropriate privileges and contribute according to my role.

- As an Admin/ Manager, I want to be able to add, update or delete member profiles, so that I can keep member details current.

- As an Admin/ Manager, I want to be able to view the weekly schedule of aqua aerobics classes, so that we can accurate information about class timings.

- As a member, I want to view the weekly schedule of aqua aerobics classes so that I can book it.

- As an Admin/ Manager, I want to be able to view schedule of instructors individual swimming lessons, so that I can decide which lessons to choose.

- As a member, I want to view the available times for individual swimming lessons with instructors, so I know which swimming lesson I want to choose.

- As a member, I want to view swim instructors, so I know their information.

- As a member, I want to book an aqua aerobics class, so that I can attend the class.

- As a member, I want to book an individual swimming lesson, so that I can reserve the instructor's time for personalised instruction.

- As an Instructor, I want to view the individual swim lesson bookings and the swim trainees' profile information, so I can prepare for each lesson accordingly.

- As an Instructor, I want to schedule my available times for individual swimming lessons, so that members can book lessons with me.

- As a member, I want to make a payment to my subscription, so that I can keep using the service.

- As an Admin/Manager, I want to track payments from members, so that I can make sure memberships are not in arrears.

- As an Admin/Manager, I want to be able view members attendance with a breakdown of the different types of attendance, so that I can see which areas/ activities are most/least popular with members and track their participation.

- As an Admin/Manager, I want to be able to view report of the most popular aqua aerobics classes, so that I can plan classes better for next year.

- As a member, I want to view subscription details, so that I can see when my subscriptions will be due.

- As an Admin/Manager, I want to be able to generate financial reports, so that I can keep track of the financial situation of the centre.

- As a member, I want to pay for the individual swimming lesson, so that I can secure the instructor's time slot.

- As an Admin/Manager, I want to be able to send on-screen news/updates to members, so that I can effectively communicate with members.

- As a member, I want to view all my bookings for classes and swimming lessons, so that I know which class or lesson is upcoming.

- As an Admin/Manager, I want to be able to send on-screen reminders to members when their subscription is due, so that I can encourage them to continue with their subscription.

- As an Admin/Manager, I want to be able to view the subscription status of our members, so that we can actively assist members with their subscriptions.

3. Solution

3.1 Data Model

The data model for the swim centre consists of 12 entities with various relationships to efficiently manage the centre's operations. These relationships are designed to streamline processes and improve data management.

The data model is structured as such to maintain data integrity and streamline processes. One-to-one relationships ensure unique associations, while one-to-many relationships facilitate efficient data retrieval and reporting. This design optimizes the swim centre's ability to manage users, courses, activities, and financial transactions, ultimately enhancing the overall operation and user experience.

Please refer to Figure 1: Entity Relationship Diagram in the appendix for a visual representation of the data model."

3.2 GUI Design

In the context of the swim centre system's GUI design, key design decisions have been made to ensure optimal user experience, which encompass aspects such as the chosen colour scheme, the navigation structure, the user flow, and the overall layout of the interface.

3.2.1 Colour Scheme

The chosen colour scheme for the swim centre system comprises five main colours. The anti-flash white (#f1f1f1), platinum (#dfdfdf), and cadet grey (#9ba0a5) provide a good background contrast against the text and content, ensuring readability and visual comfort. The two accent colours, brandies blue (#0d6efd) and dark red (#8b0100), contrast well with the background, enhancing visual appeal and ensuring elements stand out effectively.

Please refer to Figure 2: Colour Scheme in the appendix

To ensure both readability and visual comfort, careful attention has been paid not only to colour contrast but also to factors such as text sizes and font weights. As a result, the overall interface aligns with the WCAG standards.

3.2.2 Navigation

The navigation framework of the swim centre system employs a combination of elements to provide users with an intuitive and efficient way to move around the interface.

At the top of the interface, there is a persistent navigation bar. It serves as a primary navigation hub, offering users

quick access to essential sections and functions. Dropdown menus are integrated into the top navigation bar, providing users with hierarchical access to specific functionalities or sub-sections within the system.

The inclusion of a back button is a valuable addition to the navigation framework. It allows users to retrace their steps and return to the previous page or view, enhancing user control and navigation flexibility.

In the middle section of the interface, buttons and links are strategically placed to guide users to perform specific actions or access detailed information.

The swim centre system's navigation framework is thoughtfully designed to facilitate user interactions. The top navigation bar, dropdown menus, back button, and strategically placed buttons and links collectively contribute to a user-friendly interface that enables users to explore and utilize the system's features with ease and efficiency.

3.2.3 User Flow

The swim centre system is designed to provide a seamless experience for users with distinct roles. It intends to ensure that users can easily navigate to the functionalities relevant to their roles, enhancing their experience and ensuring efficient access to the features they need. This structure simplifies user interactions, provides a personalized experience, and optimizes the system's usability.

Please refer to Figure 3: User Flow Diagram in the appendix

3.2.4 Overall Interface Layout

The overall layout of the swim centre system's interface follows a structured and user-friendly design.

The header section contains the swim centre's logo and the top navigation bar, which provides access to essential sections and functionalities.

The main content area occupies the central portion of the interface. This is where the core information, functionalities, and user interactions are displayed, including buttons, forms, and links that allow users to perform actions, view content, or access various system features.

The footer contains a short message of the design team information.

Overall, the system aims to provide a clear and organized structure that enables users, including members, admins, and instructors, to interact with the system seamlessly and access the information and functionalities they require.

3.3 Testing

The swim centre application employs a combination of functional testing and usability testing to effectively meet user acceptance criteria for each user story and adhere to the requirements specification. This integrated approach ensures not only that the system functions correctly but also that it delivers a user-friendly and satisfactory experience.

Functional testing is a fundamental component of the testing process. It verifies that the application's functionalities align with the specified requirements. In the swim centre application, individual components and functions, integrations between different components, and the application are meticulously tested.

Usability testing is equally vital, focusing on the user experience and the application's user interface design. Users are placed at the centre of the evaluation process, with feedback gathered within the design team, potential users, and the product owner. This feedback informs iterative design changes to enhance the user experience.

By combining functional testing and usability testing, the swim centre application not only verifies that it meets technical requirements but also ensures that it is user-friendly and aligns with the expectations and criteria defined by end-users and stakeholders.

4. Review of the Web Application

The web applications have several functionalities to meet the requirements of the three types of users: Admin/Manager, Member, and Instructor. To achieve these functionalities, this web application equipped with robust database management, user-friendly interfaces, secure payment integration, effective communication channels to send reminders and updates to members, and reporting capabilities for both financial and operational insights. It provides four key features to users: 1. features for all users, 2. features for Administrators/Managers, 3. features for Members, and 4. features for Instructors. Here are the highlights of these features:

4.1 Features for all users

- Registration: all new member users can register for the system. The registration process includes getting necessary personal information, contact details, and payment for the first month's subscription.

- Login: the system implements a secure login system to ensure that only authorized users can access, and to see the dashboard based on their roles.

- Profile Management: Users can view and update personal information, including contact details, email, password, username and health information if provided.

4.2 Features for Admin/Manager:

- Members Management: Users can create, update and delete member accounts.

- Schedules: Users can view schedules for aqua aerobics classes and instructors' individual swimming lessons and tracking the booking status.

- Payment Tracking: Users can view member subscription status, subscription dates, payment history.

- Attendance Report: Users can access attendance records for both individual members and the entire group, organized by month(s), and view usage statistics for the pool, aqua aerobics, and swimming activities.

- Popularity Report: Users can access reports detailing the popularity of aqua aerobics classes, available for both monthly and all-time analysis.

- Financial Report: Users have the option to view either an all-time report or a monthly breakdown, enabling them to monitor total subscriptions, swimming lesson tuition, and overall revenue.

- Subscription Reminders: Users can send on-screen reminders to members when their subscriptions are due.

- News/Updates: Users can send on-screen news and updates to members.

4.3 Features for Member:

- Booking System: Users can browse and reserve available aqua aerobics classes, as well as select suitable time slots for one-on-one swimming lessons with instructors. Users can make aqua aerobics class bookings based on their own availability and schedule lessons according to instructors' free slots. Additionally, users have the option to cancel aqua aerobics class reservations and make payments for individual lessons when making bookings.

- View Instructor Information: Users can access a list of swim instructors and their profiles.

- Booking History: Users can access a comprehensive record of their bookings, organized in a Sunday-to-Monday order for classes and sorted with the most recent bookings displayed at the top for individual lessons.

- Subscription Details: View subscription status and expiry date. Make subscription payments, including the ability to pay for multiple months in advance.

4.3 Features for Instructors:

- Class Schedules: Users can access schedules for aqua aerobics classes that the instructor is running.

- Lesson Scheduling: Users can schedule available times for individual swimming lessons.

- Booking Information: Users can view individual swimming lesson bookings and swim trainees' profile information.

5. Team Performance and Collaboration

Over the period of three sprints, there have been a significant development on team performance and collaboration, reflected by the following aspects.

- **Tailored Task Allocation**

Understanding each team member's strengths and weaknesses is crucial for effective task allocation. As the team members got to know each other better, we were able to allocate tasks more efficiently. This practice not only improves individual satisfaction but also contributes to the overall productivity of the team.

- **Open-mindedness**

At the very beginning of the project, some members struggle to accept other members having a different way of doing and thinking as themselves, which results in a large amount of time to be used for communicating and explaining. Being open to different ideas and ways of thinking is a valuable trait in the team. It is natural for team members to have different perspectives and approaches. Learning to embrace this diversity can lead to more creative solutions and smoother collaboration in the long term. It is a process of learning to collaborate with others and we are glad that we experienced this at an early stage, and we know that it will get better as we work together as a team.

- **Regular Feedback**

We have maintained a culture of open communication and feedback, which encourages team members to provide constructive feedback to each other. This helps identify areas for further improvement for the application and ensure continuous growth.

- **Productivity Growth**

We agree that each sprint was more productive than the last sprint. As we resolved initial challenges and improved communication, it allowed everyone to work more effectively, benefiting the team's overall productivity. The growth of productivity is also a strong indicator of the team's ability to learn from past experiences and adapt.

6. Challenges and Lessons Learned

6.1 Challenges and Solutions

Over the course of the three sprints, our team encountered several challenges and successfully implemented solutions to address them.

- GitHub and App Structuring

Initially, we faced issues with GitHub collaboration due to having only one app.py file containing all views and functions. This resulted in frequent overwriting problems when pushing and pulling from the repository.

At the beginning of the second sprint, we revamped our app's structure by implementing the Blueprint method to modularize views and functions. Additionally, we adopted the use of branching and merging strategies, which have significantly reduced conflicts and ensured smoother collaboration.

- Data Model Design

Creating an extensive data model proved challenging as we struggled to visualize the database's scope at the project's outset.

We adopted an incremental approach by dynamically expanding the database as needed. This allowed us to avoid committing to a comprehensive database from the start, focusing instead on creating a functional database and iteratively enhancing it with new features and requirements throughout each sprint.

- Interpretation of Requirements

There were instances where we interpreted certain requirements differently from the product owner, leading to potential misalignments in acceptance criteria and interface expectations.

To address this challenge, we prioritized open communication with the product owner. Regular discussions and clarifying questions helped us better understand the requirements, refine acceptance criteria, and ensure that our interpretation aligned with the project's goals.

6.2 Lessons Learned for Future Projects

These experiences have provided valuable lessons for our future projects.

● Early App Structuring

Start with a clear and modular app structure from the beginning of the project. Using Blueprints and branching strategies can prevent collaboration issues and streamline development.

● Incremental Database Development

Continue with an incremental database development approach. Begin with a minimum viable database and expand it as the project progresses. This allows flexibility in responding to changing requirements.

● Effective Communication

Maintain open and consistent communication with stakeholders, especially when interpreting requirements. Regular discussions and clarifications can prevent misunderstandings and keep everyone aligned.

By applying these lessons learned, future projects can benefit from improved collaboration, flexibility, and alignment with stakeholder expectations, ultimately leading to more successful outcomes.

7. Project Links

7.1 Python anywhere address and github

http://nanyuexie.pythonanywhere.com/

https://github.com/LUMasterOfAppliedComputing2023S2/COMP639_group_7_project1

7.2 Log-in details

- Admin password/username: admin1/admin1

- Instructor password/username: instructor1/ instructor1

- Member password/username: member1/ member1

8. Appendix

8.1 Figure 1: Entity Relationship Diagram.
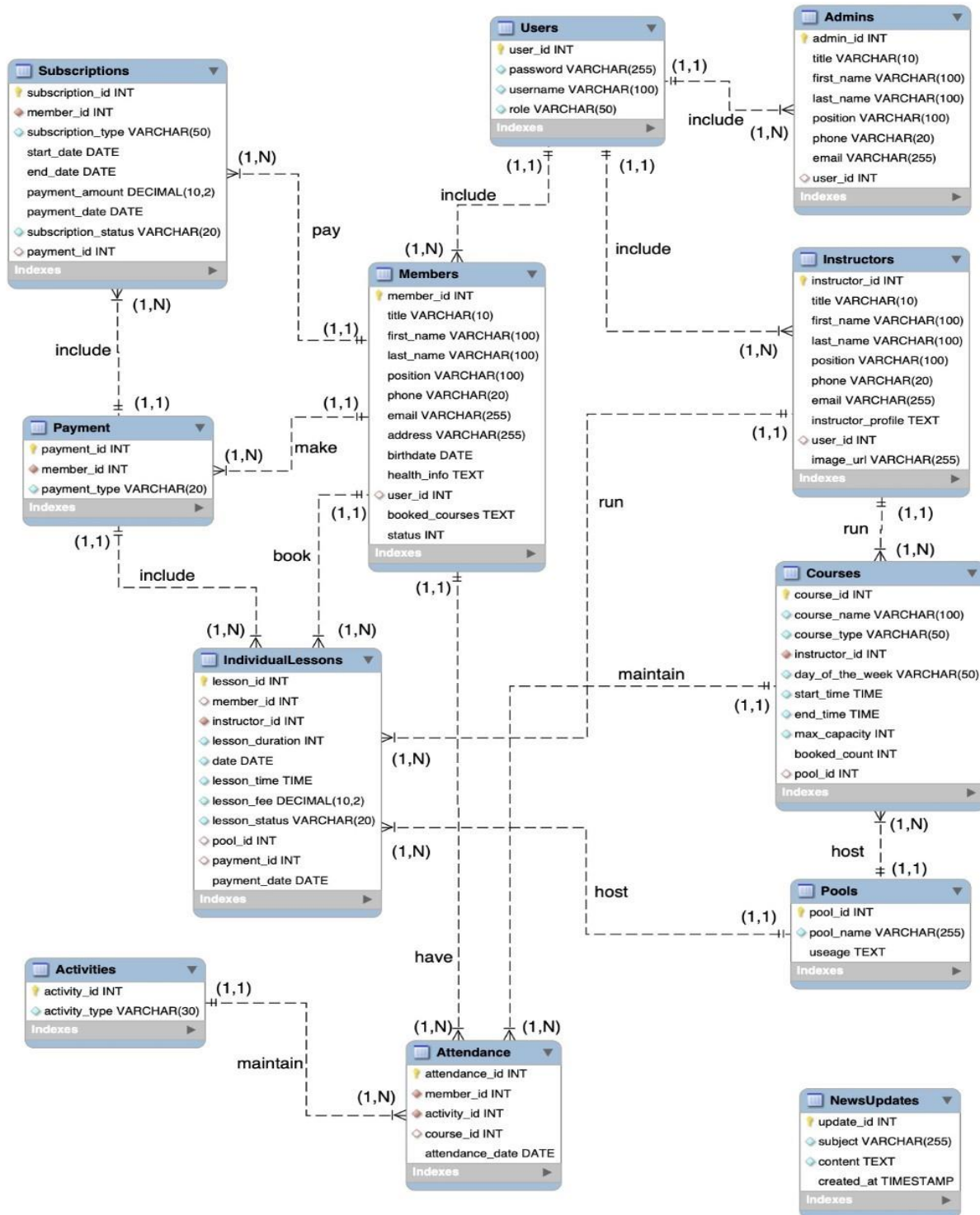
8.2 Figure 2: Colour Scheme.

Aqua Aerobics Weekly Schedule

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
Aqua Fit Instructor: Michael Williams Pool: Hydrotherapy Book Now	**Poolside Pilates** Instructor: Emily Davis Pool: Hydrotherapy Book Now				
		Water Zumba Instructor: Jessica Brown Pool: Hydrotherapy Fully Booked			**Aqua Yoga** Instructor: Jessica Brown Pool: Hydrotherapy Book Now

F1F1F1	DFDFDF	0D6EFD	8B0100	9BA0A5
Anti-flash white	Platinum	Brandeis blue	Dark red	Cadet gray

8.3 Figure 3: User Flow Diagram.


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                        ┌──────────────┐
                        │ Register New │
                        │   Member     │
                        └──────────────┘
                               ▲
                               │
                        ┌──────────────┐
                        │  Home Page   │
                        └──────────────┘
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                               ▼
                        ┌──────────────┐
   ◀────────────────────│    Login     │────────────────────▶
                        └──────────────┘
          Member                │              Administrator
          Dashboard             ▼              Dashboard
                        ┌──────────────┐
                        │  Instructor  │
                        │  Dashboard   │
                        └──────────────┘
```

Member Dashboard:
- Weekly aqua aerobics class schedule. View and book.
- Fortnightly private swimming lessons. View and book.
- View my bookings.
- View swim instructors.
- Renew Subscription.
- Check messages and updates.
- Update member profile.

Administrator Dashboard:
- Manage members. View and update.
- View aqua aerobics class schedule. View only.
- Fortnightly private swimming lessons. View only.
- Member subscription status. View only.
- Payment History. Search and view.
- Financial report. View only.
- Attendance report. Search and view.
- Aqua aerobics attendance report. Search and view.
- Send members news/updates.
- Update admininstrator profile.

Instructor Dashboard:
- Weekly aqua aerobics class schedule. View only.
- Upcoming private swiming lessons. View only.
- Manage private swimming lesson slots. View and update.
- Update instructor profile.