

Financial Planning for Retirement by POP



Passapon Uparakool (63011241)
Puttipong Chewapitukpon (63011282)
Onnalin Satawaranon (63011393)

Bachelor of Engineering in
Financial Engineering
School of Engineering
King Mongkut's Institute of Technology Ladkrabang
Academic Year 2023



COPYRIGHT 2023
SCHOOL OF ENGINEERING
KING MONGKUTS INSTUTUTE TECHNOLOGY LADKRABANG

Thesis – Academic Year 2023

Bachelor of Engineering in Financial Engineering

School of Engineering

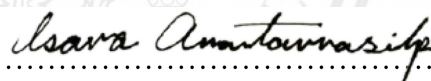
King Mongkut's Institute of Technology Ladkrabang

Title: Financial Planning for Retirement by POP

Authors

- | | |
|-----------------------------------|-----------------------------|
| 1. Passapon Uparakool. | Student ID: 63011241 |
| 2. Puttipong Chewapitukpon | Student ID: 63011282 |
| 3. Onnalin Satawaranon | Student ID: 63011393 |

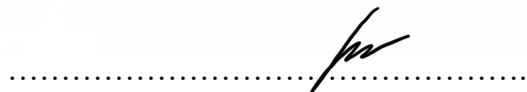
Approved for submission



(Associate Professor Dr. Isara Anantavrasilp)

Advisor

Date ..25.../...4.../..2024..



(Associate Professor Dr. Pariyada Sukchaaroensin)

Advisor

Date ..19.../...4.../..2024..

Acknowledgment

We extend our heartfelt gratitude to all those who contributed to the realization of this project, Financial Planning for Retirement by POP

First and foremost, we would like to express our deepest appreciation to our project supervisor Associate Professor Dr. Isara Anantavasilp, whose guidance, encouragement, and invaluable insights paved the way for the successful completion of this endeavor. Your unwavering support throughout the project has been instrumental in shaping our vision and refining our execution.

We are also immensely thankful to Associate Professor Dr. Pariyada Sukcharoensin, whose continuous support provided us with the necessary resources and environment to pursue this project with diligence and enthusiasm.

Our sincere gratitude goes to our fellow classmates and colleagues who generously shared their knowledge, expertise, and feedback, thereby enriching our understanding and enhancing the quality of our work.

Special thanks are due to the Thai Financial Planners Association (TFPA), whose collaboration and input were indispensable in understanding the practical requirements and real-world implications of financial retirement planning. Your engagement and cooperation significantly enriched our project experience.

Last but not least, we extend our appreciation to our families and friends for their unwavering encouragement, understanding, and patience throughout the duration of this project. Your support provided us with the strength and motivation to overcome challenges and strive for excellence.

Together, with the collective efforts and support of all involved, we have achieved a significant milestone in the realm of financial engineering, and we look forward to the impact and contributions our project will make in the field of financial retirement planning



Abstract

This project is about developing a website for financial planning for a secure and sustainable retirement. Tools and services will be created to help analyze a person's financial situation and create a financial plan that suits the individual's objectives and goals for retirement.

Our goal is to make a website for planning retirement. It'll help both financial planners and clients. We'll use VS Code to build it. The site will have four main parts: Excel to manage data, wireframe for visuals, database to store info, and UX/UI for how it looks and feels. By putting these together well, we want to make planning retirement easier.

On our website, each part plays an important role. Excel helps organize and understand financial data. Wireframe shows the plan visually, making it easier to understand. The database keeps all the info safe and easy to find. UX/UI makes sure the site is easy and enjoyable to use. We want RetireWeb to be simple and helpful for everyone, no matter their experience.

The website's main aim is to make planning retirement less confusing. We want it to be easy to use and understand. By working together, we hope to make planning retirement something anyone can do with confidence.

Table of Contents

Chapter 1 Introduction	1
1.1 Motivation	1
1.2 Objectives	2
1.3 Scope of Work	2
1.4 Thesis Structure	3
Chapter 2 Literature Review	4
2.1 VS CODE	4
2.2 FIGMA	5
2.3 Excel	6
2.3.1 Excel Input	7
2.3.2 Excel output	7
2.3.3 Excel Calculation Formula	8
Chapter 3 Background Knowledge	13
3.1 Sitemap	13
3.2 Wireframe	15
3.4 Coding	17
Chapter 4 Results and Discussion	20

4.1 Popsicle Retirement Website	20
4.1.1 Homepage	20
4.1.2 About Us	21
4.1.3 TFPA	22
4.1.4 Features	22
4.1.5 Q&A	23
4.1.6 Contact Us	23
4.1.7 Login	24
4.2 Planner_Popsicle Website	25
4.2.1 Planner Login	25
4.2.2 Planner Register	25
4.2.3 Planner Dashboard Homepage	26
4.2.4 Planner Dashboard Client Information	27
4.2.5 Planner Dashboard Client Information: Main, Variables, and Additional Data	27
4.2.6 Planner Dashboard Client Information: Income, Expenses, and Pensions Data	28
4.2.7 Planner Dashboard Client Information: Insurance, Investment, and Other Data	29
4.2.8 Planner Dashboard Client Information: Report	29
4.2.9 Planner Dashboard Overall	31
4.2.10 Planner Dashboard Schedule	32
4.3 Client_Popsicle Website	32
4.3.1 Client Login	32
4.3.2 Client Register	33
4.3.3 Client Dashboard Homepage	34
4.3.4 Client Dashboard Client Information	34
4.3.5 Client Dashboard Client Information: Main, Variables, and Additional Data	35
4.3.6 Client Dashboard Client Information: Income, Expenses, and Pensions Data	36
4.3.8 Client Dashboard Client Information: Report	37
4.3.9 Client Dashboard Overall	38
4.2.10 Client Dashboard Schedule	39
4.4 SQL Retirement_Database	40

4.4.1 Current_Schedule Table	41
4.4.2 Profile Table	42
4.4.3 Customer_Email_Information Table	45
4.4.4 Association_Email_Information Table	46
4.4.5 Pension_N Table	47
4.4.6 Pension_1 Table	48
4.4.9 Post_Retirement_Expenses_Additional Table	54
4.4.10 Post_Retirement_Income_Additional Table	55
4.4.11 Investment_Assets Table	56
Chapter 5	58
Conclusion and Recommendations	58
5.1 Financial-Planner Development Recommendation	58
5.2 Client Development Recommendation	58
5.3 Database Development Recommendation	59
Bibliography	60

List of Figures

Figure 2. 1 Visual Studio Code	5
Figure 2. 2 Figma	6
Figure 2. 3.1 Excel Input	Error! Bookmark not defined.
Figure 2.3. 1 Excel Input	10
Figure 2.3. 2 . Excel Output	11
Figure 2.3. 3 Excel Calculation Formula	12
Figure 3. 1 Sitemap	14
Figure 3. 2 Wireframe	16
Figure 3. 3 Database	17
Figure 3. 4 Coding	18
Figure 3. 5 Computation	19
Figure 4.1. 1 Homepage	21
Figure 4.1. 2 About Us	21
Figure 4.1. 3 TFPA	22
Figure 4.1. 4 Features	22
Figure 4.1. 5 Q&A	23

Figure 4.1. 6 Contact Us	24
Figure 4.1. 7 Login	24
Figure 4.2. 1 Planner Login	25
Figure 4.2. 2 Planner Register	26
Figure 4.2. 3 Planner Dashboard Homepage	26
Figure 4.2. 4 Planner Dashboard Client Information	27
Figure 4.2. 5 Planner Dashboard Client Information: Main, Variables, and Additional Data	28
Figure 4.2. 6 Planner Dashboard Client Information: Income, Expenses, and Pensions Data	28
Figure 4.2. 7 Planner Dashboard Client Information: Insurance, Investment, and Other Data	29
Figure 4.2.8. 1 Planner Dashboard ClientInformation: Report	30
Figure 4.2.8. 2 Planner Dashboard ClientInformation: Report	30
Figure 4.2.8. 3 Planner Dashboard ClientInformation: Report	31
Figure_4.2.9. 1 Planner Dashboard Overall	31
Figure 4.2.10. 1 Planner Dashboard Schedule	32
Figure 4.2.10. 1 Planner Dashboard Schedule	32
Figure 4.3. 1 Client Login	33

Figure 4.3. 2 Client Register	33
Figure 4.3. 3 Client Dashboard Homepage	34
Figure 4.3. 4 Client Dashboard Homepage	35
Figure 4.3. 5 Client Dashboard Client Information: Main, Variables, and Additional Data	35
Figure 4.3. 6 Client Dashboard Client Information: Income, Expenses, and Pensions Data	36
Figure 4.3. 7 Client Dashboard Client Information: Insurance, Investment, and Other Data	37
Figure 4.3. 8 Client Dashboard Client Information: Report	37
Figure 4.3.8. 1 Client Dashboard Client Information: Report	38
Figure 4.3.8. 2 Client Dashboard Client Information: Report	38
Figure 4.3. 9 Client Dashboard Overall	39
Figure 4.3. 10 Client Dashboard Schedule	39
Figure 4.4.0. 1 Retirement_Database	41
Figure 4.4. 1 Current_Schedule Table	42
Figure 4.4.11. 1 Investment_Assets Table	57
Figure 4.4.2. 1 <i>Profile Table</i>	44
Figure 4.4.2. 2 Profile Table	44

Figure 4.4.3. 1 Customer_Email_Information Table	45
Figure 4.4. 1 Current_Schedule Table	42
Figure 4.4.4. 1 Association_Email_Information Table	46
Figure 4.4.5. 1 Pension_N Table	48
Figure 4.4.6. 1 Pension_1 Table	49
Figure 4.4.7. 1 Insurance Table	50
Figure 4.4.8. 1 Report Table	53
Figure 4.4.8. 2 Report Table	53
Figure 4.4.8. 3 Report Table	54
Figure 4.4.9. 1 9 Post_Retirement_Expenses_Additional Table	55

Chapter 1

Introduction

1.1 Motivation

In light of the challenges identified by the Thai Financial Planners Association or TFPA, we understand the pressing need, for an efficient solution to tackle the time-consuming process of collecting data and the complexities involved in generating advice. The current issues, such as the data collection process and the challenges faced in providing automated recommendations considering factors highlight an urgent call for an innovative approach.

Our drive for the Financial Engineering Project emerges from a dedication to revolutionizing the retirement planning experience. We envision a solution that not only eases the burden of collecting data but also facilitates advice generation seamlessly considering various factors. Our goal is to empower users to implement their retirement plans allowing for adjustments and easy modifications of visual representations.

The ultimate aim is to develop a platform that efficiently executes plans offering users flexibility in customizing and modifying representations without any hassle. By incorporating a database, we can view financial data without relying on tedious manual input. Addressing these pain points will enable us to offer planners and users alike a tool that simplifies the planning process promoting a well-informed approach to retirement preparation.

In conclusion, our motivation is fueled by our desire to transform existing challenges into opportunities, for innovation and efficiency.

We see the Financial Engineering Project as a force, for bringing about transformation, in the field of retirement planning. Our ultimate goal is to improve the well-being and boost the confidence of individuals.

1.2 Objectives

1. To develop the full-function websites for retirement planning proposed for both financial planners and clients:
2. To create the SQL database to store the data input and output from the user:
3. To construct the financial equations necessary for retirement planning as proposed in the project framework:
4. To create a comprehensive report summarizing the financial status and retirement prospects of users based on their data:
5. To design and Implement an intuitive dashboard interface that allows users to visualize and track their retirement savings, investments, and goals:
6. To enable efficient collaboration between financial planners and clients by providing a comprehensive platform where they can interact and plan for retirement:
7. To educate users about key retirement planning concepts, strategies, and best practices through recommendation reports:

1.3 Scope of Work

The scope of this project can be listed as follows:

1. To develop a user-friendly website for both financial planners and clients. This must include the visualization and analysis of user data using PHP, CSS, HTML, and JavaScript on Visual Studio Code. There are three websites:

“Popsicle_Retirement” for common users, “Planner_Popsicle” for financial planners, and “Client_Popsicle” for clients.

2. To create the SQL database structure to store data from every financial planner and client.
3. To construct financial equations in Microsoft Excel and then reconstruct them in Visual Studio Code.
4. To design an interactive financial retirement dashboard for both financial planners and clients.
5. To generate a customized Financial Retirement Report that gives unique advice to users based on their financial circumstances.

1.4 Thesis Structure

This thesis consists of five chapters which are arranged as follows:

- Chapter 1 Introduction - refers to the motivation, objectives, scope of work, and thesis structure of this thesis.
- Chapter 2 Literature Review – proposes the Literature survey that are relevant to this project, and comparison.
- Chapter 3 Research Methodology – explains the methods that we use to conduct our research.
- Chapter 4 Results and Discussion – shows the results obtained from our research and also discusses those results.
- Chapter 5 Conclusion and Recommendations – concludes what we have done and what we have found, and also gives some recommendations for related to the use of our research results.

Chapter 2

Literature Review

Retirement planning websites are favored for coding with VS Code due to its versatility. Figma streamlines design tasks with its collaborative features. Excel's robust functions make it ideal for calculations. These tools offer efficient solutions for managing finances and investments.

2.1 VS CODE

Visual Studio Code (VS Code) is a popular choice for writing code due to its versatility, cross-platform compatibility, and rich feature set. Developers can leverage VS Code's intuitive interface, extensive language support, and integrated development environment features to write and debug code efficiently. The ability to customize settings, install extensions, and collaborate with team members makes VS Code an ideal tool for coding tasks related to retirement planning, ensuring a seamless development experience.

consistent and scalable designs for retirement planning websites, ensuring a cohesive user experience across different devices and screen sizes.

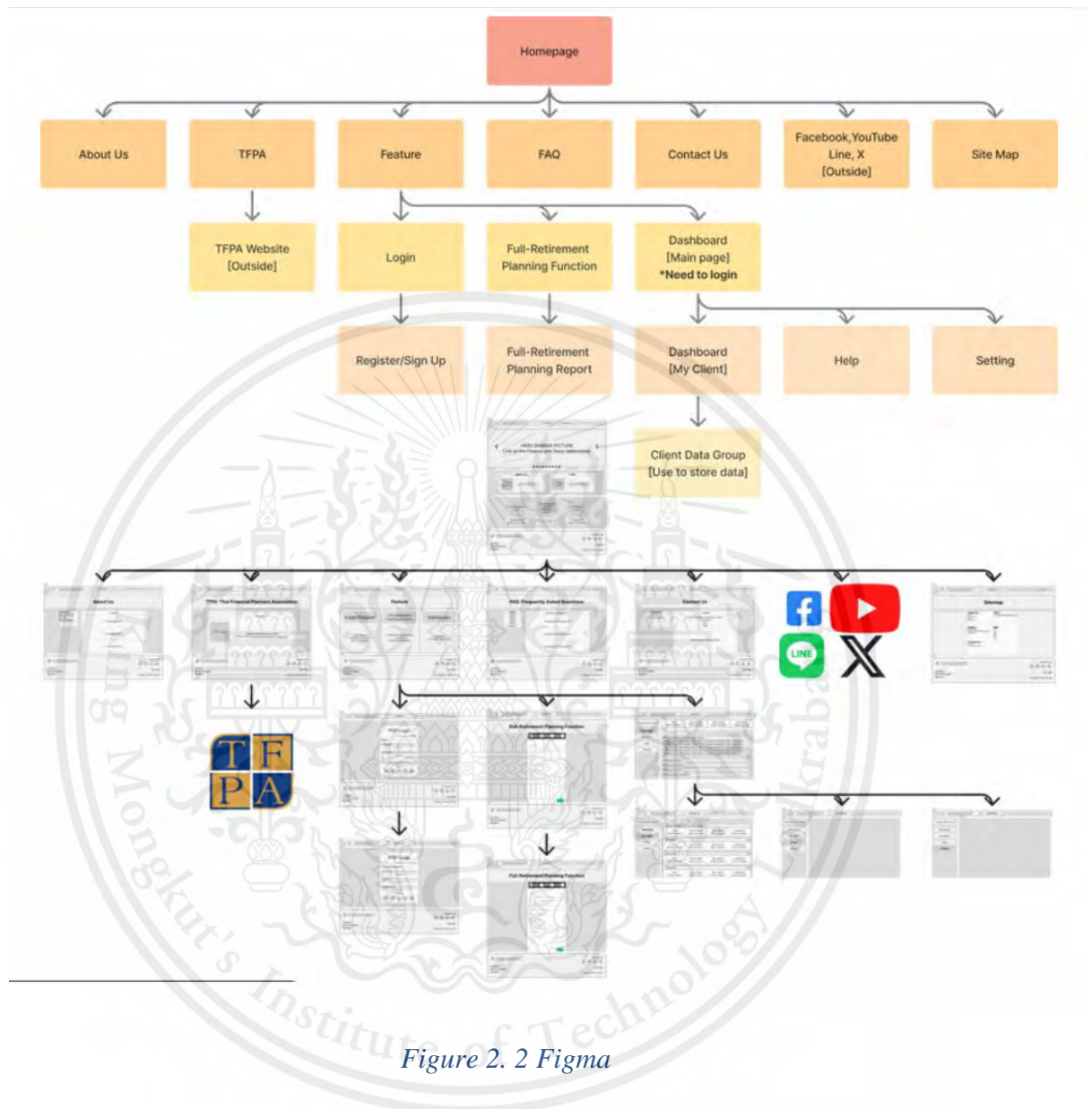


Figure 2. 2 Figma

2.3 Excel

Excel is a powerful tool for financial calculations and analysis, making it a natural choice for handling numerical data related to retirement planning. Users can leverage Excel's built-in functions, formulas, and visualization tools to create detailed financial

models, projections, and budget plans. Excel's flexibility allows users to customize calculations based on various retirement scenarios, investment strategies, and financial goals. With features like data validation, conditional formatting, and pivot tables, Excel enables users to analyze and track their retirement savings, expenses, and investment performance effectively. Its familiarity and widespread use make Excel a convenient tool for managing and organizing financial data in the context of retirement planning.

2.3.1 Excel Input

The Excel input for retirement planning encompasses six main sections, each serving a crucial role in compiling and analyzing financial data. The first section, "Personal Information," collects essential personal details such as name, age, and contact information. Following this, the "Income" section records sources of income, including salary, bonuses, and any other earnings. Conversely, the "Expenses" section documents various expenditures, ranging from daily expenses to recurring bills and loan payments. The "Benefits/Retirement" section focuses on benefits and retirement contributions, detailing any employer contributions or voluntary retirement savings. In the "Insurance/Investments" section, users input information about insurance policies, investment accounts, and other financial assets. Finally, the "Miscellaneous" section allows for additional details or notes pertinent to the retirement planning process. By organizing financial information into these distinct sections, users can systematically analyze their financial status and make informed decisions regarding retirement planning strategies.

2.3.2 Excel output

The Excel output for retirement planning provides comprehensive information, divided into two main categories: personal data and financial details. In the personal data section, essential personal information such as name, age are displayed. Moving to the financial details section, users can access a breakdown of their financial situation. This includes expenses for the first year of retirement, average monthly expenses, and investments from other sources such as social security benefits and legal compensations. Additionally, users can view their investment portfolio and savings at

age 60, including projected amounts and desired increases. The output features a dashboard for easy comparison and visualization of key financial metrics. Moreover, it includes a section for financial health recommendations, providing users with guidance on improving their financial well-being.

2.3.3 Excel Calculation Formula

The Excel calculation formulas for retirement planning encompass various financial aspects crucial for analyzing and projecting retirement funds. These formulas are designed to compute different parameters, ensuring a comprehensive understanding of one's financial situation and retirement readiness.

The calculation for monthly living expenses in the first year involves multiplying the monthly income by the percentage of income earmarked for expenses, adjusted for inflation over the retirement period.

To estimate the retirement fund needed for sustaining living expenses, a present value formula is used, factoring in post-retirement returns and inflation, along with the estimated lifespan post-retirement.

The total retirement corpus comprises the present value of living expenses, other post-retirement expenses, health insurance premiums, and other one-time retirement expenses, factoring in post-retirement returns and inflation.

The formula for average monthly expenses calculates the annuity required to sustain post-retirement living expenses, considering post-retirement returns and inflation over the retirement period.

Social security benefits are computed using the present value formula, considering the post-retirement returns, inflation, and the contribution period to social security.

The retirement income is projected based on the initial income, with an adjustment for annual increases in income over the working years.

The value of compensation funds is calculated as the monthly retirement income multiplied by the compensation rate per month.

The statutory compensation is determined by subtracting the tax from the total compensation funds, adjusted for the number of years worked.

The retirement fund is computed using the present value formula, considering post-retirement returns, inflation, and the desired fund amount.

The one-time retirement income after retirement age is computed based on the initial retirement income and the net present value of post-retirement returns.

Other income after retirement includes the initial retirement income and the net present value of post-retirement returns for other sources of income.

The current investment portfolio value is the sum of all investment assets.

The acceptable risk level is determined based on the user's risk tolerance.

The continuous investment is calculated by summing all ongoing investment contributions.

The future portfolio value is projected using the future value formula, considering the expected returns and investment period for each asset.

The expected retirement funds comprise the existing investment amount compounded by the expected returns over the retirement period, along with other income sources like social security and compensation funds.

The total retirement funds required are calculated by subtracting the expected retirement funds from the desired retirement corpus.

The monthly disposable income is computed using the annuity formula, considering the desired retirement fund, post-retirement returns, and inflation.

The desired retirement corpus is the present value of estimated post-retirement living expenses, other expenses, and health insurance premiums, considering post-retirement returns and inflation.

The gap in retirement funding is determined by subtracting the expected retirement funds from the desired retirement corpus.

The recommended amount is equivalent to the desired retirement corpus.

The current situation is the total investment portfolio value.

The monthly company contribution is computed based on the percentage of income earmarked for retirement savings and the current monthly income.

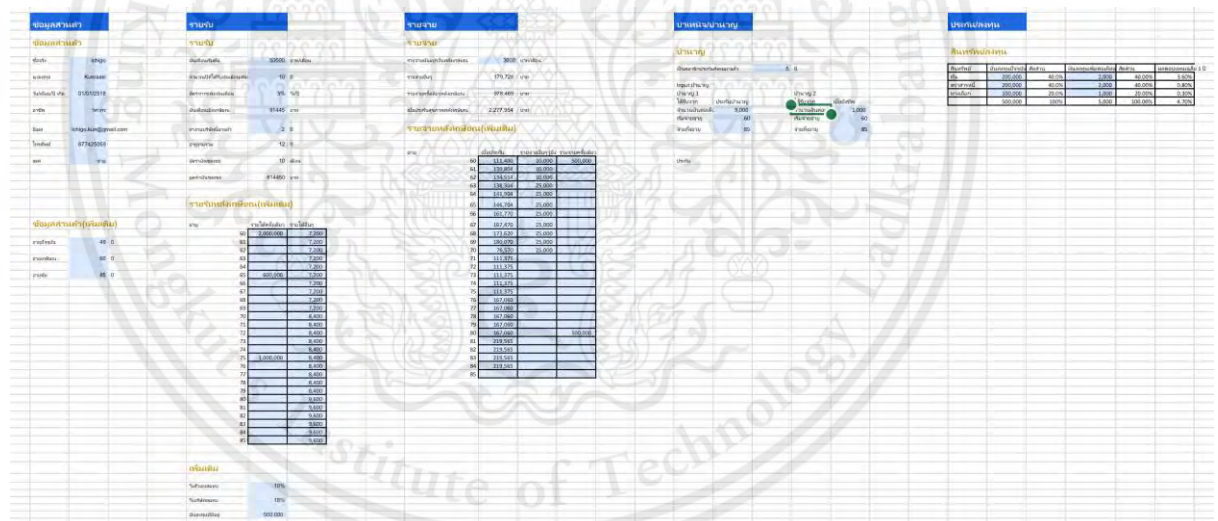


Figure 2.3. 1 Excel Input

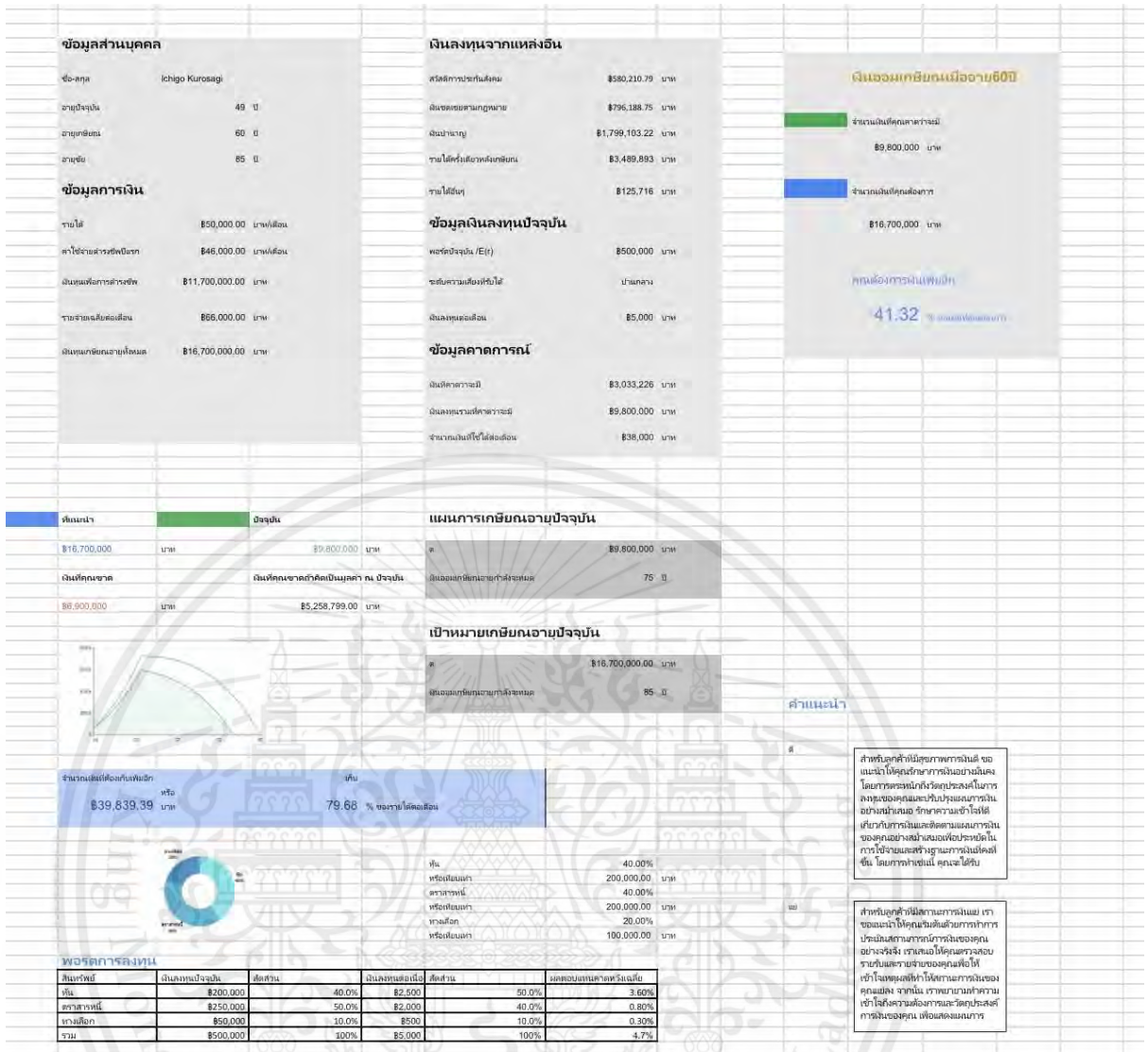


Figure 2.3. 2 . Excel Output

สูตรคำนวณ
ค่าใช้ชำระค่าเช่าปีแรกคือ = รายได้ต่อเดือน*สัดส่วนรายได้%*(1+เงินเฟ้อเงินบาท)*(อายุเกษียณ-อายุปัจจุบัน)
เงินลงทุนเพื่อการชำระหนี้ = $-PV(((1+\text{ผลตอบแทนหลังเกษียณ})/(1+\text{เงินเฟ้อหลังเกษียณ}))^{-1}, \text{อายุช้อ-อายุเกษียณ}, \text{ค่าใช้ชำระค่าเช่าปีแรกต่อเดือน} * 12, 1)$
เงินลงทุนเกษียณอายุทั้งหมด = $-PV(((1+\text{ผลตอบแทนหลังเกษียณ})/(1+\text{เงินเฟ้อหลังเกษียณ}))^{-1}, \text{อายุช้อ-อายุเกษียณ}, \text{ค่าใช้ชำระค่าเช่าปีแรกต่อเดือน} * 12, 1) + (-PV(((1+\text{ผลตอบแทนหลังเกษียณ})/(1+\text{เงินเฟ้อหลังเกษียณ}))^{-1}, \text{อายุช้อ-อายุเกษียณ}, \text{รายจ่ายเงินบำนาญหลังเกษียณ} * 12, 1)) + \text{เบี้ยประกันสุขภาพหลังเกษียณ} + \text{รายจ่ายอื่นๆ} + \text{รายจ่ายครีမ်เดียนหลังเกษียณ} * 5$
รายจ่ายต่อเดือน = $(PMT(((1+\text{ผลตอบแทนหลังเกษียณ})/(1+\text{เงินเฟ้อหลังเกษียณ}))^{-1}, 12, (\text{อายุช้อ-อายุเกษียณ}) * 12, -\text{เงินลงทุนเกษียณอายุทั้งหมด}, 1))$
ผลตอบแทน = รวมผลตอบแทนเฉลี่ย 10 ปีแรก
สวัสดิการบำนาญสังคม = $PV(\text{ผลตอบแทนหลังเกษียณ}/12, (\text{อายุช้อ-อายุเกษียณ}) * 12, -((15000 * (((\text{เป็นสมาชิกประกันสังคมมาเท่า} * (\text{อายุเกษียณ-อายุปัจจุบัน}) / 12) - 180) / 12 * 1.5) + 20) / 100) / 12))$
เงินเดือนเมื่อเกษียณ = $\text{เงินเดือนเริ่มต้น} * ((1 + \% \text{เงินเฟ้อเพิ่ม})^{(\text{อายุเกษียณ-อายุปัจจุบัน}-1)})$
มูลค่าของเงินชดเชย = $(\text{เงินเดือนเมื่อเกษียณ} * \text{อัตราเงินชดเชย (เดือน)})$
เงินชดเชยตามกฎหมาย = $(\text{มูลค่าของเงินชดเชย} - (\text{มูลค่าเงินชดเชย} * 7000 * \text{อายุงาน} + (\text{มูลค่าเงินชดเชย} * 7000 * \text{อายุงาน}) / 2)) * \% \text{ภาษี}$
เงินบำนาญ = $PV(\text{ผลตอบแทนหลังเกษียณ}/12, (\text{รับครั้งแรก} - \text{รับครั้งแรก}) * 12, -\text{จำนวนเงิน})$ รวมของผลลดเงิน
รายได้ขั้นเดียวหลังเกษียณ = $\text{รายได้ครั้งแรกหลังเกษียณ} + NPV(\text{ผลตอบแทนหลังเกษียณ}, \text{รายได้ขั้นเดียวรวมหลังเกษียณ})$
รายได้เงิน = $\text{รายได้เงินครั้งแรกหลังเกษียณ} + NPV(\text{ผลตอบแทนหลังเกษียณ}, \text{รายได้เงินรวมหลังเกษียณ})$
ทรัพย์สินปัจจุบัน = รวมสินทรัพย์ทั้งหมด
รวมค่ารวมเงินเฟ้อ = $\text{ส่วนที่นำออก} * \text{ลูกค้า}$
การคงทุนต่อเดือน = รวมลงทุนต่อเดือนทั้งหมด
เงินที่คาดว่าจะมี = $(\text{เงินลงทุนเริ่มมี} * (1 + \% \text{ผลตอบแทน})^{(\text{อายุเกษียณ-อายุปัจจุบัน})}) + (\text{รายได้ต่อเดือน} * 12) * (\% \text{ตัวกรองสมทบ} * \% \text{เงินที่สมทบ}) * (((1 + \% \text{ผลตอบแทน})^{(\text{อายุเกษียณ-อายุปัจจุบัน})} - 1) / (\% \text{เงินเฟ้อหลังเกษียณ})) + (\text{ผลตอบแทน} * \% \text{เงินเฟ้อหลังเกษียณ}) * (1 + \% \text{ผลตอบแทน})^{(\text{อายุเกษียณ-อายุปัจจุบัน})} / (2)$
เงินลงทุนรวมที่คาดว่าจะมี = $\text{เงินลงทุนรวมที่คาดว่าจะมี} + \text{ทรัพย์สินปัจจุบัน} + \text{เงินชดเชยตามกฎหมาย} + \text{เงินบำนาญ} + (\text{รายได้ขั้นเดียวรวมหลังเกษียณครั้งแรก} + NPV(\text{ผลตอบแทนหลังเกษียณ}, \text{รวมรายได้ขั้นเดียวรวมหลังเกษียณ}))$
รายได้ขั้นเดียว
จำนวนเงินที่ใช้ได้ต่อเดือน = $PMT(((1+\text{ผลตอบแทนหลังเกษียณ})/(1+\text{เงินเฟ้อหลังเกษียณ}))^{-1}, 12, (\text{อายุช้อ-อายุเกษียณ}) * 12, -\text{เงินลงทุนเพื่อการ}, 1) * -3$
จำนวนเงินที่เหลือต่อการ = $-PV(((1+\text{ผลตอบแทนหลังเกษียณ})/(1+\text{เงินเฟ้อหลังเกษียณ}))^{-1}, \text{อายุช้อ-อายุเกษียณ}, \text{ค่าใช้ชำระค่าเช่าปีแรกต่อเดือน} * 12, 1) + \text{รายจ่ายเงินบำนาญหลังเกษียณ} * 5 + \text{เบี้ยประกันสุขภาพหลังเกษียณ} + \text{รายจ่ายครีမ်เดียนหลังเกษียณ} * 5$
มูลค่าการประเมินเพิ่ม = $((\text{เงินลงทุนเพื่อการ} - \text{เงินที่คาดว่าจะมี}) / \text{เงินที่คาดว่าจะมี}) * 100$
ที่แนะนำ = จำนวนเงินที่เหลือต่อการ
ปัจจุบัน = เงินลงทุนรวมที่คาดว่าจะมี
ส่วนต่าง = เงินที่เหลือต่อการ-เงินที่คาดว่าจะมี
เงินสมทบรายเดือน = $((100 - \% \text{ส่วนรายได้}) * \text{เงินเดือน}) / 100$

Figure 2.3. 3 Excel Calculation Formula

Chapter 3

Background Knowledge

Background knowledge for this project involves understanding the objectives, scope, and key components involved in building a retirement planning website. To work on this project, you need to know what the goals are, what the project covers, and the important parts of making a retirement website. It's about making a website that's easy to use and helpful for people to plan their retirement well

In this chapter, relevant background knowledge is described in order to get a better understanding of the project, which can be divided into 2 parts.

3.1 Sitemap

The sitemap for the website serves as a foundational structure, delineating the various pages and sections that will comprise the platform. The "About Us" page provides users with insight into the purpose, mission, and team behind the website, establishing credibility and fostering trust. The "Features" page highlights the array of tools, calculators, and resources available to users for comprehensive retirement planning. Here, users can explore the functionalities and benefits offered by the website, helping them make informed decisions about their financial future. The "FAQ" section addresses common queries and concerns that users may have regarding the website's features, functionalities, and retirement planning strategies. By providing clear and concise answers to frequently asked questions, this section aims to alleviate user uncertainties and facilitate a smooth user experience. Lastly, the "Contact" page offers

users a direct means of communication to reach out for support, inquiries, or feedback. This page serves as a vital point of interaction between users and the website's administrators, enabling seamless communication and fostering user engagement.

However, there is something to point out that the sitemap created at the beginning of the project may undergo revisions and changes throughout the development process. These changes can arise due to various factors, such as evolving project requirements, user feedback, technological constraints, or new insights gained during the development phase. In the context of building a retirement planning website, changes to the sitemap may be necessary to accommodate additional features, refine the user experience, or better align with the project's objectives and target audience preferences. Therefore, while the initial sitemap provides a starting point and direction for the project, it should be viewed as a dynamic document that may evolve as the website progresses through different stages of development. By remaining flexible and open to adjustments, the project team can ensure that the final product effectively meets the needs and expectations of its users, even if there are deviations from the original sitemap created during the early stages of the project.

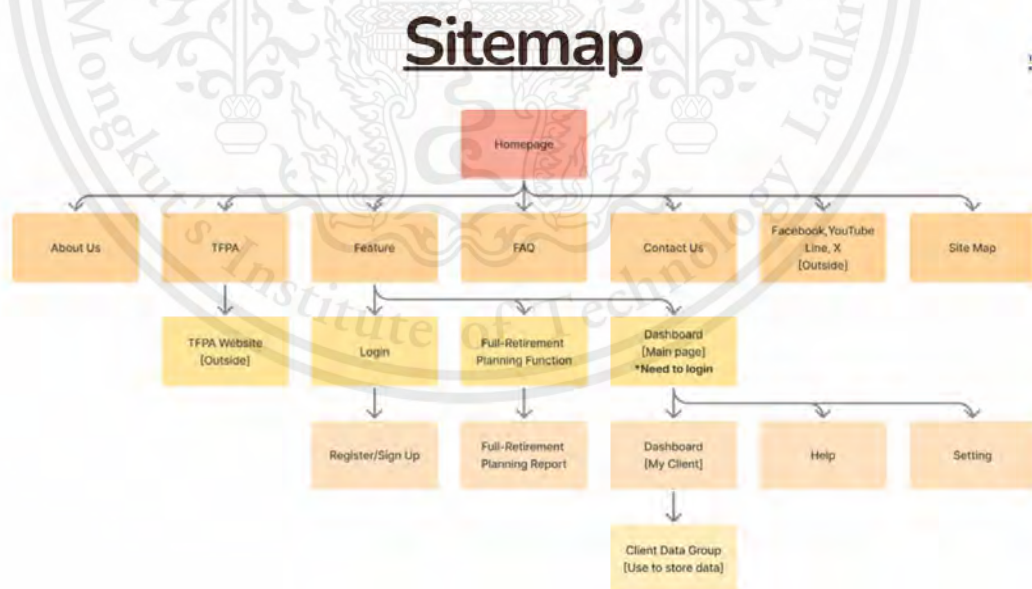


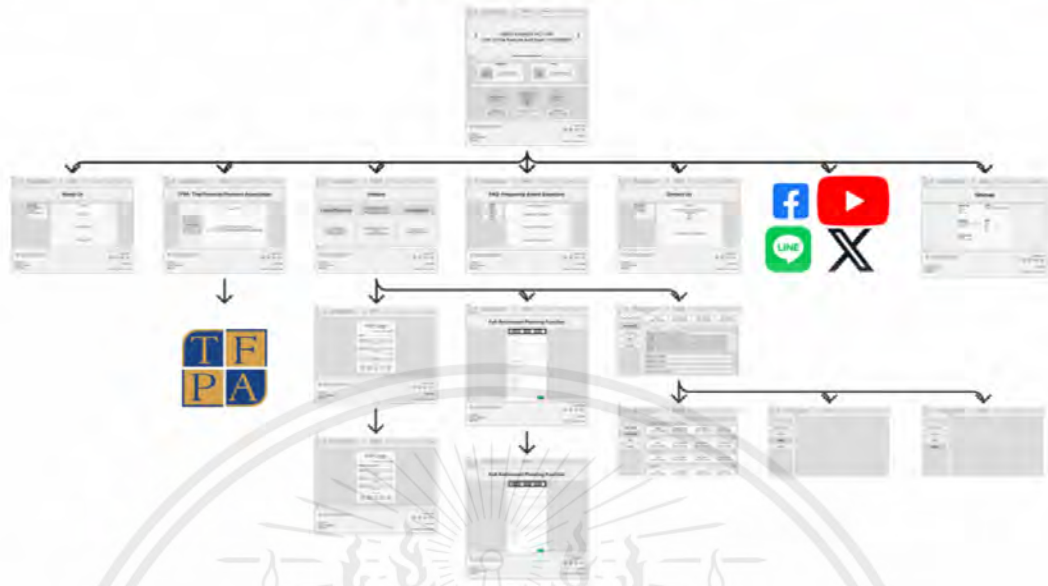
Figure 3. 1 Sitemap

3.2 Wireframe

In addition to defining the sitemap, creating wireframes for each page is instrumental in visualizing the layout, structure, and content placement of the website. Wireframes act as blueprints, outlining the arrangement of key elements such as navigation menus, headers, content sections, and call-to-action buttons. By meticulously crafting wireframes for each page, designers can ensure consistency in design and functionality across the entire website, ultimately enhancing the user experience and usability of the retirement planning platform. These wireframes serve as a vital reference for developers and designers throughout the website's development process, guiding the implementation of design elements and ensuring alignment with the project's objectives and user needs.

Wireframes are like sketches that show how each page of a website will look. But just like sketches, they can change as we work on the website. In the first part of the project, we made wireframes to plan out how each page would be laid out and what would go where, like where the buttons and text would be. But as we continued working on the website in the second part of the project, we realized that some things needed to be different. For example, we decided to add new features like a separate section for TFPA , and we made it so users could edit and save information on each page. These changes meant we had to adjust the wireframes to fit the new features and make sure everything still looked good and worked well. So, while the wireframes gave us a good starting point, the final website might look a bit different because we made improvements and added new features along the way.

Wireframe



12

Figure 3.2 Wireframe

3.3 Database

Background knowledge about databases involves understanding their role in storing and managing data effectively, often using Structured Query Language (SQL) for data manipulation and retrieval. SQL is a standardized language used to interact with relational databases, allowing users to create, modify, and query data stored in tables.

One common tool for managing databases is phpMyAdmin, a web-based application used for administering MySQL databases. It provides a graphical interface to perform various database operations, such as creating and modifying tables, executing SQL queries, importing and exporting data, and managing user privileges. phpMyAdmin simplifies database management tasks, making it accessible to users without extensive technical knowledge.

When working with databases locally, we use a local server environment such as localhost to run and test our applications. Localhost refers to the local computer where the server software is installed, allowing us to develop and test our applications offline before deploying them to a live server. By running a local server environment,

16

developers can test database interactions and troubleshoot issues without affecting the live application.

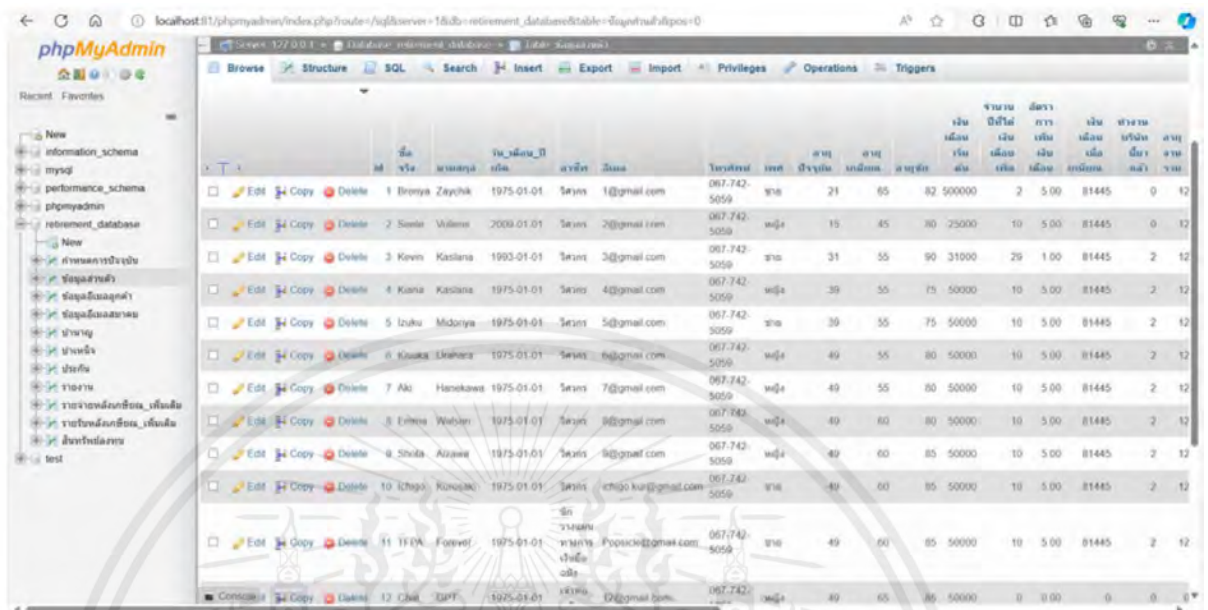


Figure 3. 3 Database

3.4 Coding

Coding plays a pivotal role in shaping the functionality and features of the retirement planning platform. Visual Studio Code (VS Code) serves as the primary Integrated Development Environment (IDE) for writing and editing code, providing a streamlined interface and a plethora of extensions to enhance productivity. Within VS Code, developers write code in various programming languages, including SQL for database management and manipulation. SQL queries are utilized to create and interact with the database, defining the structure of tables, inserting, updating, and retrieving data as needed.

The codebase is organized into distinct classes, each responsible for specific functionalities within the website. For instance, classes may be dedicated to user authentication and management, financial calculations, data validation, and interaction

structuring and performing computations, providing a user-friendly interface and powerful formula capabilities. Initially, important formulas and algorithms are received from the Thai Financial Planner Association (TFPA) team, encompassing calculations for estimating retirement funds, projecting investment returns, and determining optimal financial strategies.

These formulas are then structured and implemented within Excel to create comprehensive models that simulate various financial scenarios and retirement plans. Excel's functionality allows for dynamic inputs, enabling users to adjust parameters such as savings rate, retirement age, investment allocation, and expected returns to tailor the calculations to their specific circumstances. The structured Excel models serve as a valuable resource for users to gain insights into their retirement goals and make informed decisions about their financial future.

Subsequently, the structured computations and formulas are translated into code using Visual Studio Code (VS Code), our chosen Integrated Development Environment (IDE). Developers write code in languages such as JavaScript, HTML, and CSS to implement the computations within the website's backend infrastructure. This involves creating classes and functions to handle user inputs, perform calculations, and generate personalized retirement planning insights dynamically.

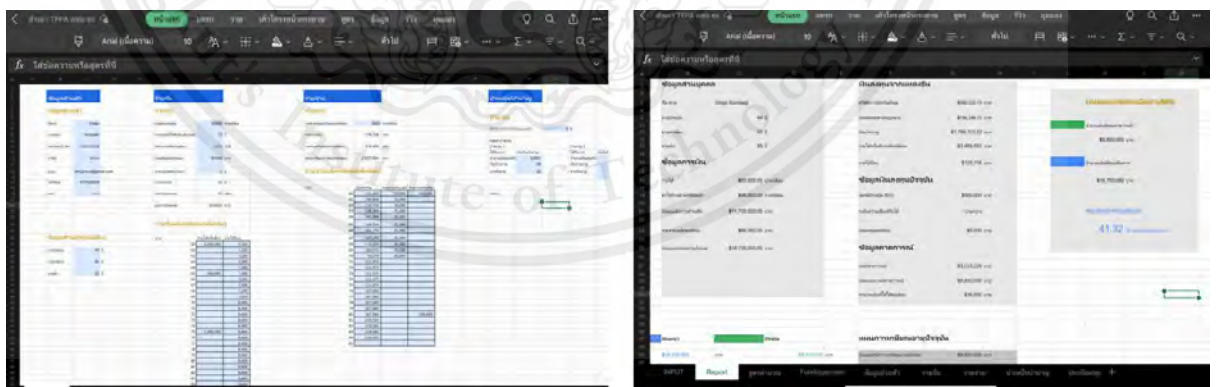


Figure 3. 5 Computation

Chapter 4

Results and Discussion

Following the seamless integration of the latest website version with the SQL database, we are thrilled to announce that the final product not only meets but exceeds our expectations. The calculation model and UX/UI design have undergone meticulous refinement to precisely cater to the needs of both financial planners and clients. It's worth noting that every website in this project is written in PHP, CSS, HTML, and Javascript within Visual Studio Code.

4.1 Popsicle Retirement Website

“Popsicle Retirement Website” serves as our inaugural website, acting as the primary introduction for both financial planners and clients.

4.1.1 Homepage

The “Homepage” serves as the initial landing page of our website, providing users with a concise overview of its contents and offerings.



Figure 4.1. 1 Homepage

4.1.2 About Us

The “About Us” page serves as a platform to convey essential information about our organization and our role as the creators of the website.



Figure 4.1. 2 About Us

4.1.3 TFPA

The “TFPA” page serves as a comprehensive resource to provide users with vital information about the Thai Financial Planners Association (TFPA).



Figure 4.1. 3 TFPA

4.1.4 Features

The “Features” page provides users with a detailed overview of the functionalities and capabilities offered by our website.

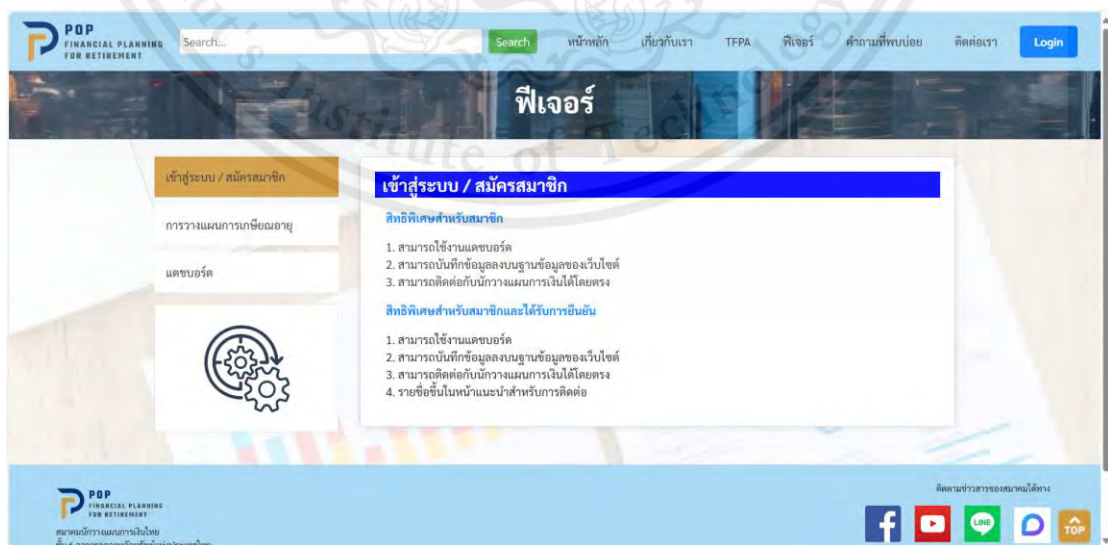


Figure 4.1. 4 Features

4.1.5 Q&A

The “Q&A” page offers users comprehensive answers to common questions they may have about our website or retirement, addressing their inquiries in detail.

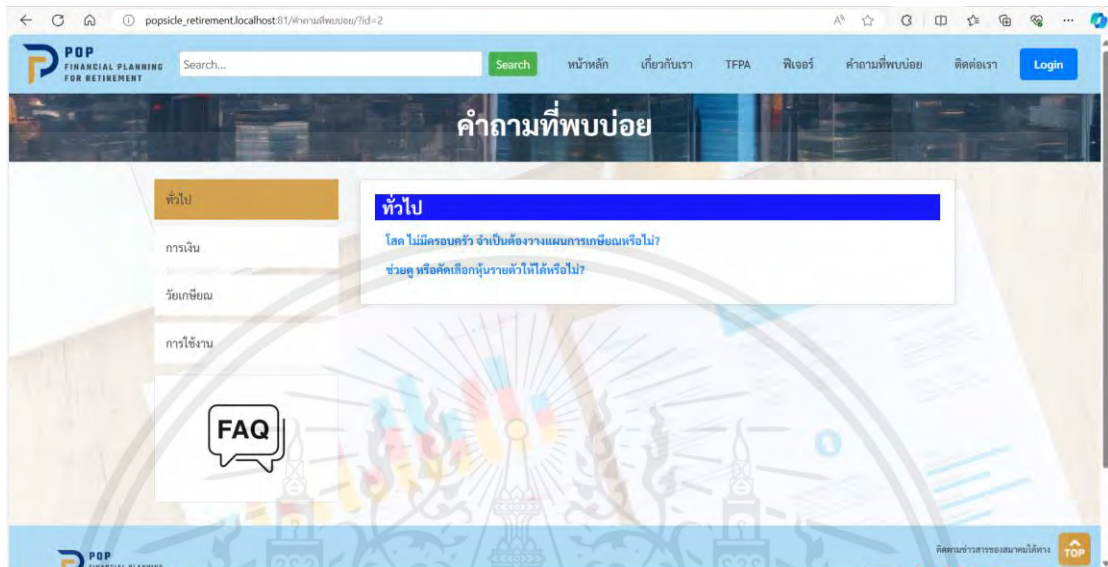


Figure 4.1. 5 Q&A

4.1.6 Contact Us

The “Contact Us” page provides users with various means to get in touch with us or the Thai Financial Planners Association. This includes options for online communication via email or virtual meetings, as well as the possibility of face-to-face meetings in person.

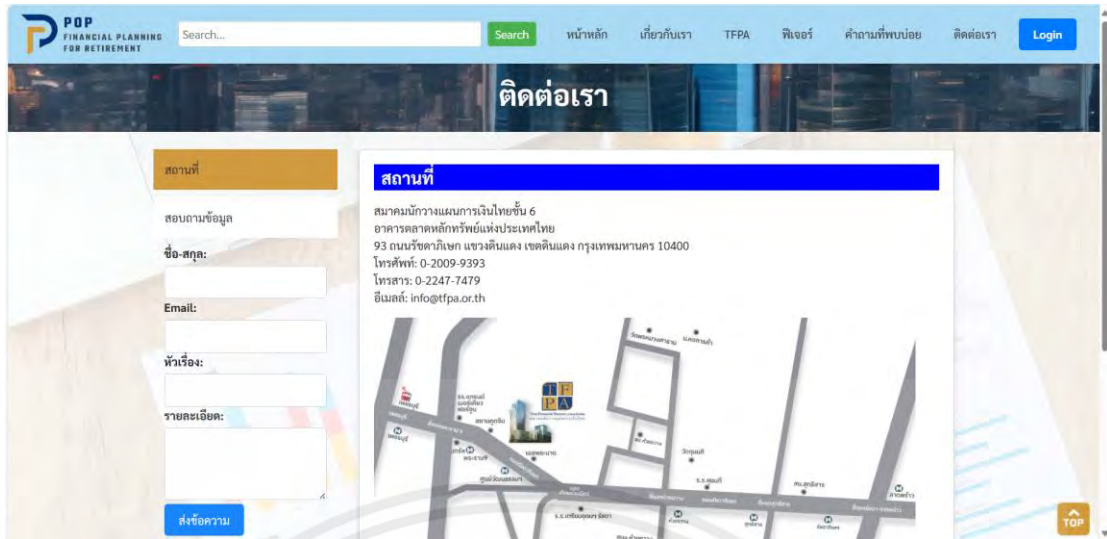


Figure 4.1. 6 Contact Us

4.1.7 Login

The “Login” page serves as the gateway to the other two websites within this project. “Planner_Popsicle Website” caters to financial planners, while “Client_Popsicle Website” is tailored for clients.

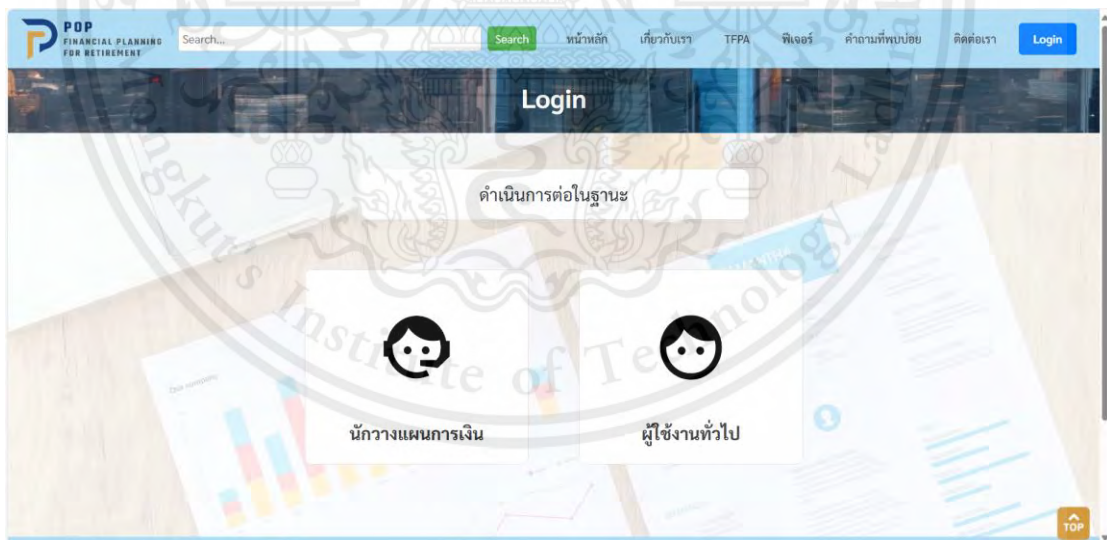


Figure 4.1. 7 Login

4.2 Planner_Popsicle Website

The “Planner_Popsicle Website” is exclusively designed for financial planners, providing them with comprehensive access to both overall and detailed financial information and data of all clients.

4.2.1 Planner Login

The “Planner Login” page functions as the entry point for financial planners, allowing them to securely log in using their planner email and password for user authentication.

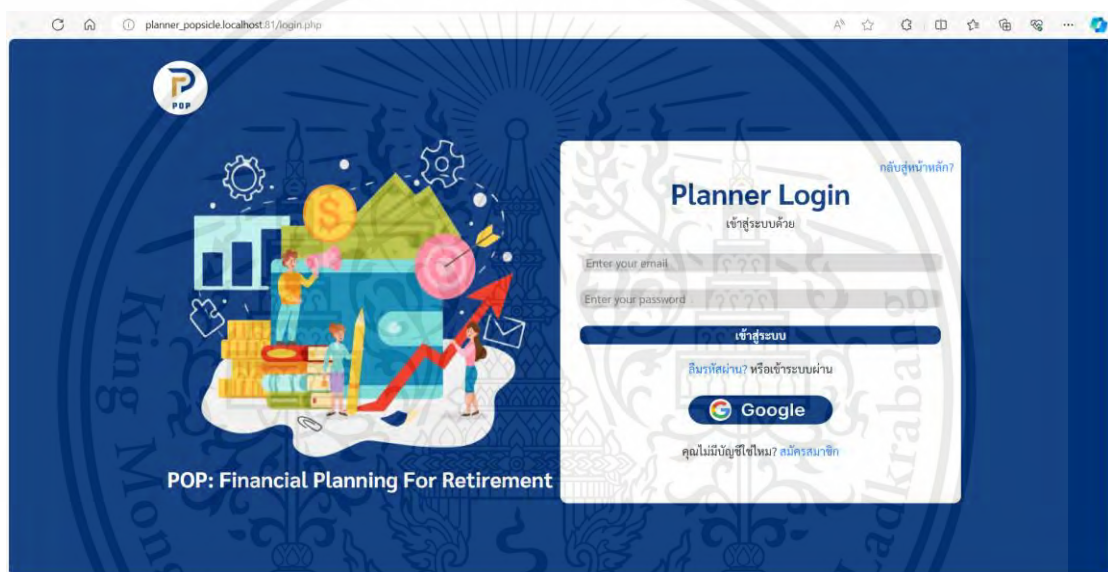


Figure 4.2. 1 Planner Login

4.2.2 Planner Register

The “Planner Register” page serves as the initial step for financial planners to create an account, enabling them to register by providing their email and password for user authentication.

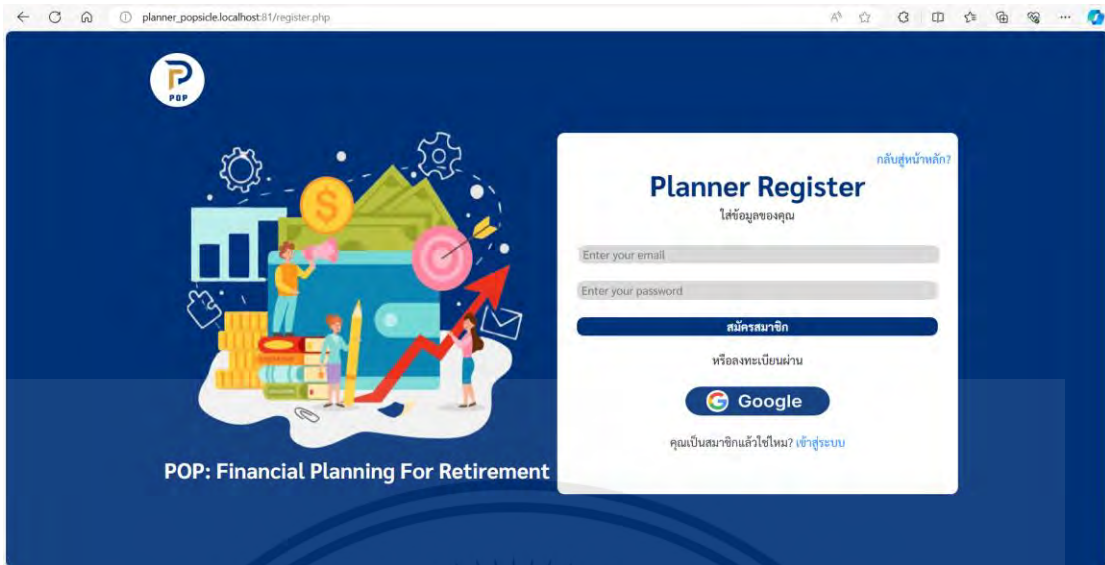


Figure 4.2. 2 Planner Register

4.2.3 Planner Dashboard Homepage

The “Planner Dashboard Homepage” page acts as the central hub of the dashboard, displaying crucial notifications such as meeting schedules and providing an overview of client data.

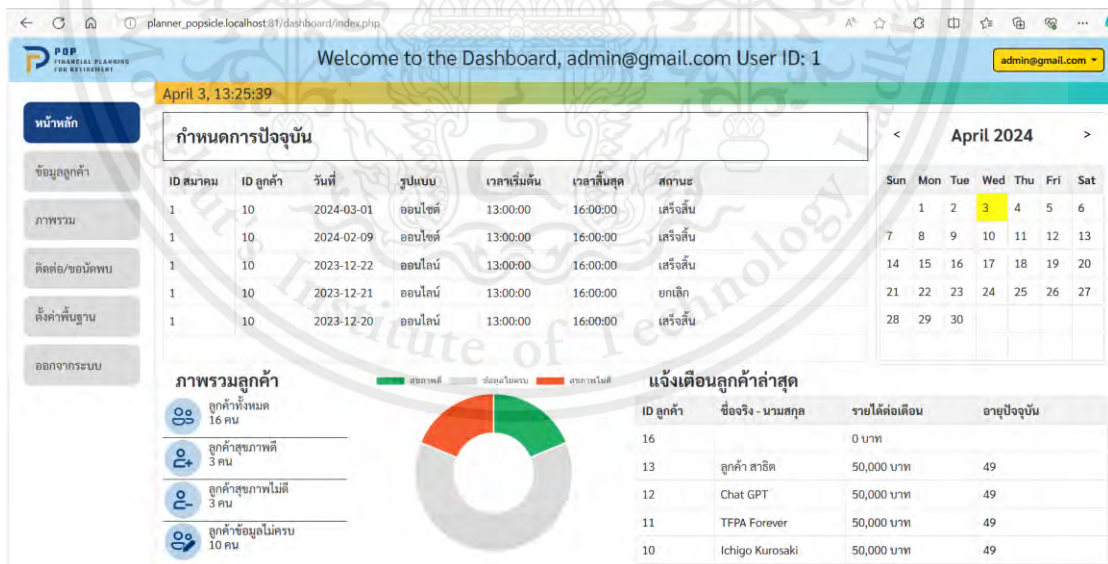
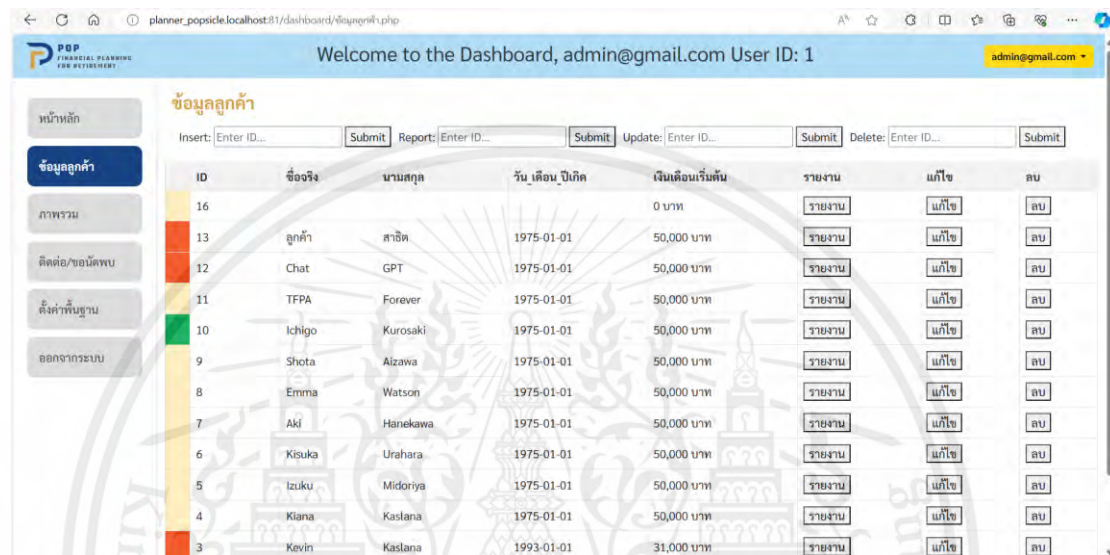


Figure 4.2. 3 Planner Dashboard Homepage

4.2.4 Planner Dashboard Client Information

The “Planner Dashboard Client Information” page serves as a comprehensive display of important data of all clients in a structured table format. From here, planners can navigate to individual client profiles to view their reports, edit data, or delete client entries as needed.



ID	ชื่อจริง	นามสกุล	วัน เดือน ปีเกิด	เงินเดือนเริ่มต้น	รายงาน	แก้ไข	ลบ
16				0 บาท	รายงาน	แก้ไข	ลบ
13	ลูกคำ	สาธิต	1975-01-01	50,000 บาท	รายงาน	แก้ไข	ลบ
12	Chat	GPT	1975-01-01	50,000 บาท	รายงาน	แก้ไข	ลบ
11	TFPA	Forever	1975-01-01	50,000 บาท	รายงาน	แก้ไข	ลบ
10	Ichigo	Kurosaki	1975-01-01	50,000 บาท	รายงาน	แก้ไข	ลบ
9	Shota	Aizawa	1975-01-01	50,000 บาท	รายงาน	แก้ไข	ลบ
8	Emma	Watson	1975-01-01	50,000 บาท	รายงาน	แก้ไข	ลบ
7	Aki	Hanekawa	1975-01-01	50,000 บาท	รายงาน	แก้ไข	ลบ
6	Kisuka	Urahara	1975-01-01	50,000 บาท	รายงาน	แก้ไข	ลบ
5	Izuku	Midoriya	1975-01-01	50,000 บาท	รายงาน	แก้ไข	ลบ
4	Kiana	Kaslana	1975-01-01	50,000 บาท	รายงาน	แก้ไข	ลบ
3	Kevin	Kaslana	1993-01-01	31,000 บาท	รายงาน	แก้ไข	ลบ

Figure 4.2. 4 Planner Dashboard Client Information

4.2.5 Planner Dashboard Client Information: Main, Variables, and Additional Data

The “Planner Dashboard Client Information: Main, Variables, and Additional Data” page provides planners with a platform to edit information related to the main, variables, and additional data of the selected client.

The screenshot shows a web dashboard for 'PDP FINANCIAL PLANNING FOR RETIREMENT'. The user is 'admin@gmail.com' with 'User ID: 1'. The page is titled 'ข้อมูลหลัก / ข้อมูลตัวแปร / ข้อมูลเพิ่มเติม' (Main / Variables / Additional Data). It features three main sections: 'ข้อมูลหลัก' (Main Information), 'ข้อมูลตัวแปร' (Variables), and 'เพิ่มเติม' (Additional Data). Each section contains various input fields for client details, and a 'Submit' button is located at the bottom right of the 'เพิ่มเติม' section.

Figure 4.2. 5 Planner Dashboard Client Information: Main, Variables, and Additional Data

4.2.6 Planner Dashboard Client Information: Income, Expenses, and Pensions Data

The “Planner Dashboard Client Information: Income, Expenses, and Pensions Data” page provides planners with a platform to edit information related to the income, expenses, and pension data of the selected client.

The screenshot shows the 'รายรับ / รายจ่าย / บำเหน็จ / บำนาญ' (Income / Expenses / Pension / Annuity) section of the dashboard. It contains several input fields for financial data, a 'Submit' button, and a table for 'สมาชิกประกันสังคม' (Social Security Members). The table has columns for 'รายการ' (Item), 'จำนวนเงิน' (Amount), 'รับครั้งแรก' (First Received), 'รับครั้งสุดท้าย' (Last Received), 'ความถี่' (Frequency), 'Update', and 'Delete'.

รายการ	จำนวนเงิน	รับครั้งแรก	รับครั้งสุดท้าย	ความถี่	Update	Delete
รายรับครั้งเดียว	2000000	01/01/2035	mm/dd/yyyy	ครั้งเดียว	Update	Delete
รายรับครั้งเดียว	600000	01/01/2040	mm/dd/yyyy	ครั้งเดียว	Update	Delete

Figure 4.2. 6 Planner Dashboard Client Information: Income, Expenses, and Pensions Data

4.2.7 Planner Dashboard Client Information: Insurance, Investment, and Other Data

The “Planner Dashboard Client Information: Insurance, Investment, and Other Data” page provides planners with a platform to edit information related to the insurance, investment, and other data such as investment return and inflation of the selected client.

ประเภท	จำนวนเงิน	รับครั้งแรก	รับครั้งสุดท้าย	ความถี่	กรรมกรรณเลขที่	Update	Delete
ประกันทั่วไป	1000000	01/01/2035	mm/dd/yyyy	ครั้งเดียว	1	Update	Delete
ประกันทั่วไป		04/03/2024	04/03/2024	รายปี		Insert+	

ชนิดสินทรัพย์	เงินลงทุนปัจจุบัน	สัดส่วนปัจจุบัน	เงินลงทุนต่อเนื่อง	สัดส่วนต่อเนื่อง	ผลตอบแทนเฉลี่ย 1 ปี	Update	Delete
หุ้น	200000	40.00 %	2000	50.00 %	3.60	Update	Delete
ตราสารหนี้	200000	40.00 %	1000	25.00 %	0.80	Update	Delete
ทางเลือก	100000	20.00 %	1000	25.00 %	0.30	Update	Delete
หุ้น						Insert+	

Figure 4.2. 7 Planner Dashboard Client Information: Insurance, Investment, and Other Data

4.2.8 Planner Dashboard Client Information: Report

The “Planner Dashboard Client Information: Report” page empowers planners to review the results of calculations based on every input provided by the selected client. The report displays output information in both text-based and infographic formats for clear visualization and analysis.

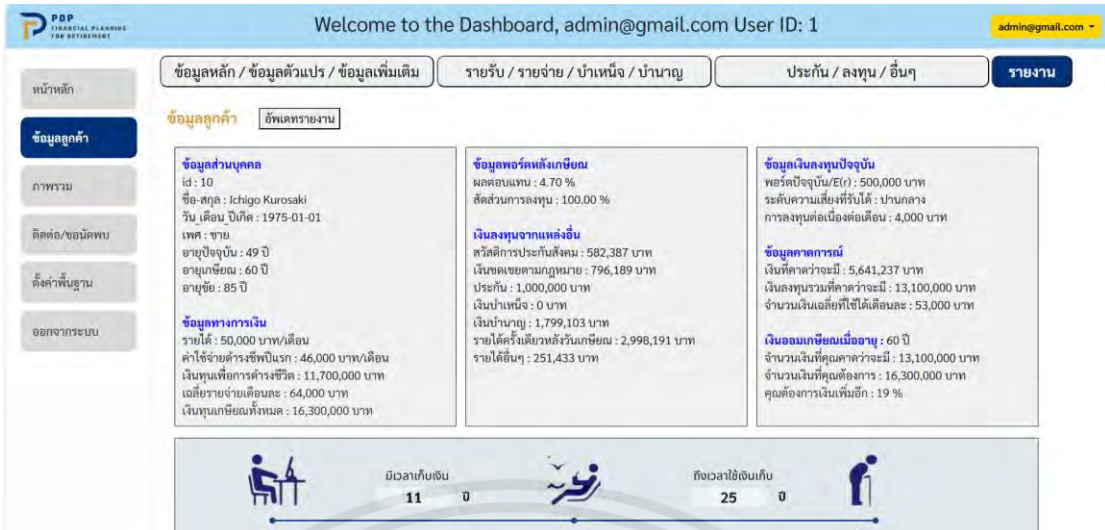


Figure 4.2.8. 1 Planner Dashboard Client Information: Report

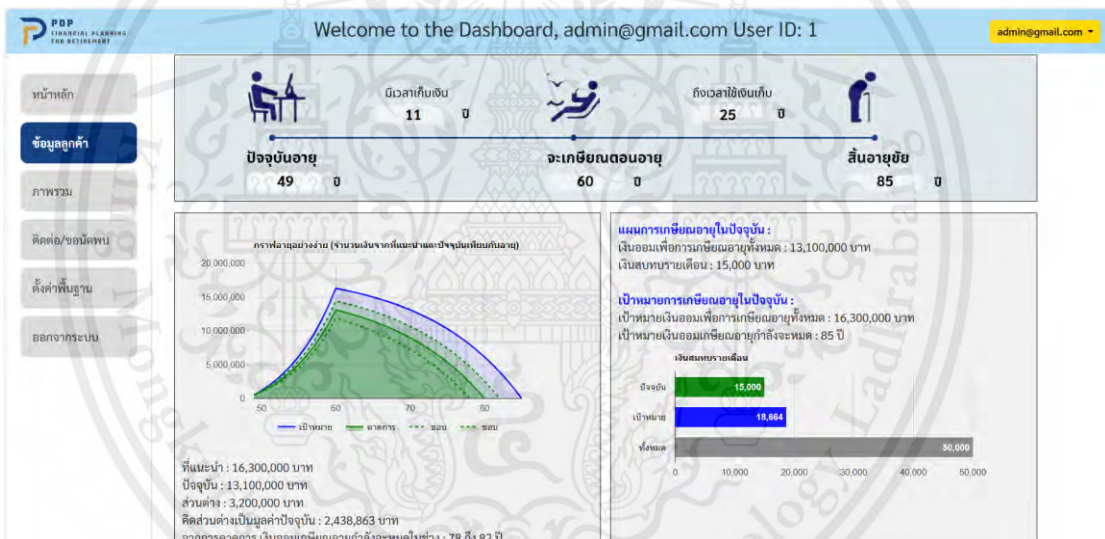


Figure 4.2.8. 2 Planner Dashboard Client Information: Report

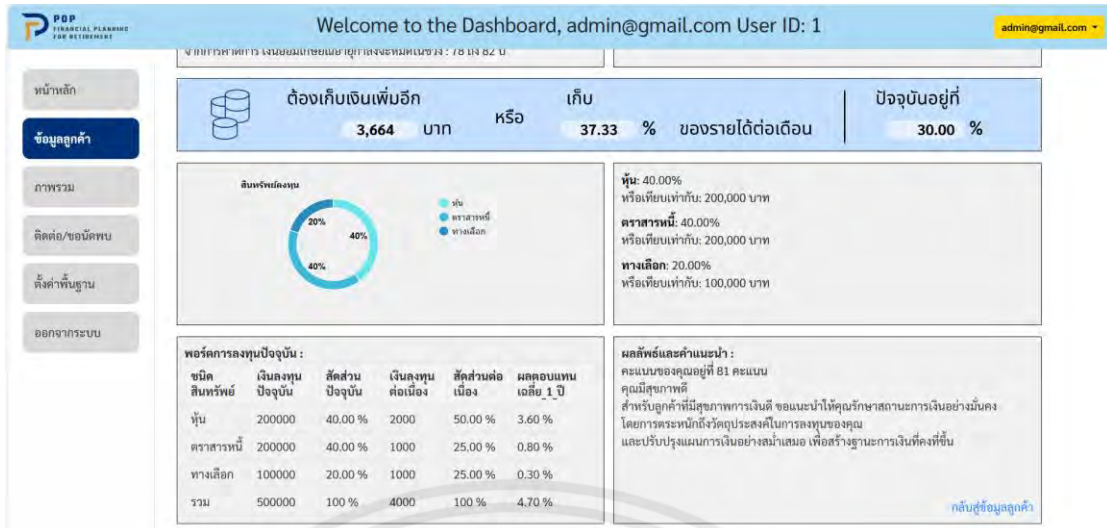
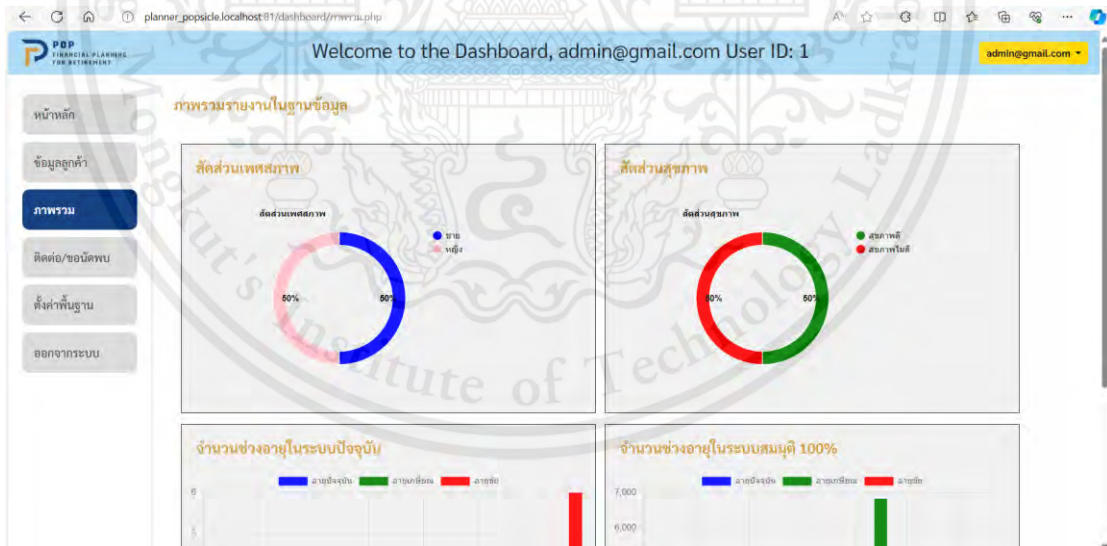


Figure 4.2.8. 3 Planner Dashboard Client Information: Report

4.2.9 Planner Dashboard Overall

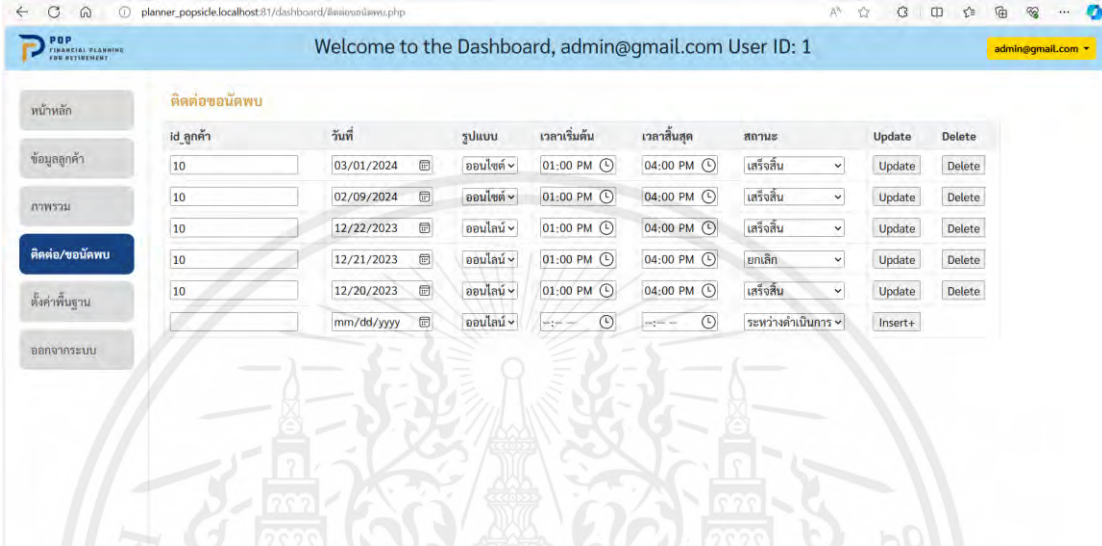
The “Planner Dashboard Overall” page aims to present an overview of all clients, displaying data such as client gender and health. This feature is currently under development and will be available in future updates.



4.2.9. 1 Planner Dashboard Overall

4.2.10 Planner Dashboard Schedule

The “Planner Dashboard Schedule” page will display the meeting times of financial planners and indicate whether the meetings are conducted online or onsite. Only financial planners will have the authority to edit or delete entries on this page.



id ลูกค้า	วันที่	รูปแบบ	เวลาเริ่มต้น	เวลาสิ้นสุด	สถานะ	Update	Delete
10	03/01/2024	ออนไลน์	01:00 PM	04:00 PM	เสร็จสิ้น	Update	Delete
10	02/09/2024	ออนไลน์	01:00 PM	04:00 PM	เสร็จสิ้น	Update	Delete
10	12/22/2023	ออนไลน์	01:00 PM	04:00 PM	เสร็จสิ้น	Update	Delete
10	12/21/2023	ออนไลน์	01:00 PM	04:00 PM	ยกเลิก	Update	Delete
10	12/20/2023	ออนไลน์	01:00 PM	04:00 PM	เสร็จสิ้น	Update	Delete
	mm/dd/yyyy	ออนไลน์	--:--	--:--	ระหว่างดำเนินการ	Insert+	

Figure 4.2.10. 1 Planner Dashboard Schedule

4.3 Client_Popsicle Website

The “Client_Popsicle Website” is an exclusive platform tailored for clients, empowering them to input their financial information and data. It facilitates the calculation of financial assistance and enables interaction with financial planners.

4.3.1 Client Login

The “Client Login” page functions as the entry point for the client, allowing them to securely log in using their planner email and password for user authentication.

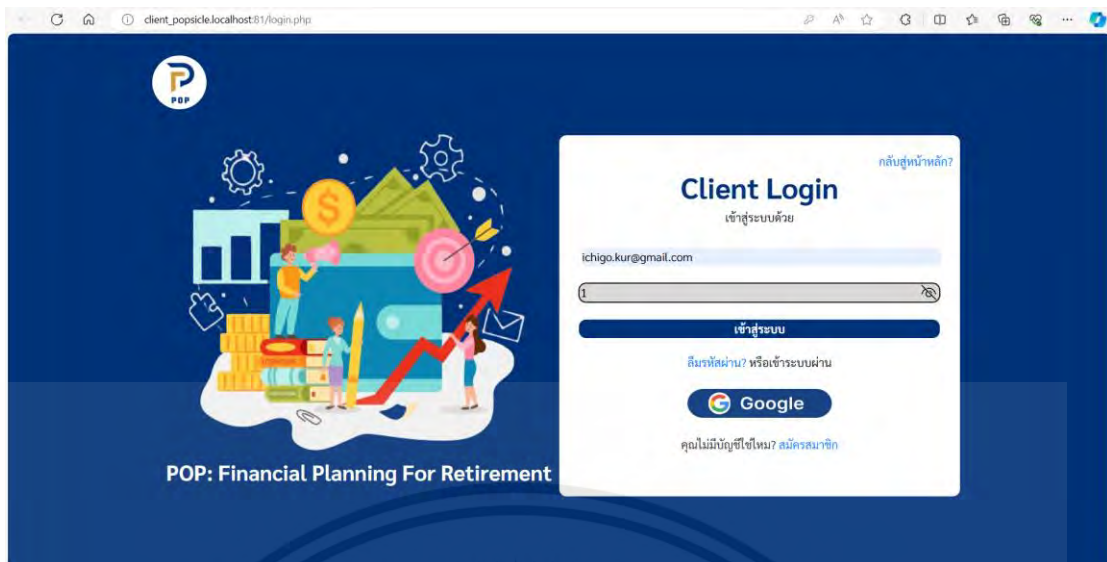


Figure 4.3. 1 Client Login

4.3.2 Client Register

The “Client Register” page serves as the initial step for financial planners to create an account, enabling them to register by providing their email and password for user authentication.



Figure 4.3. 2 Client Register

4.3.3 Client Dashboard Homepage

The “Client Dashboard Homepage” page acts as the central hub of the dashboard, displaying crucial notifications such as meeting schedules and providing an overview of the client at the individual level.

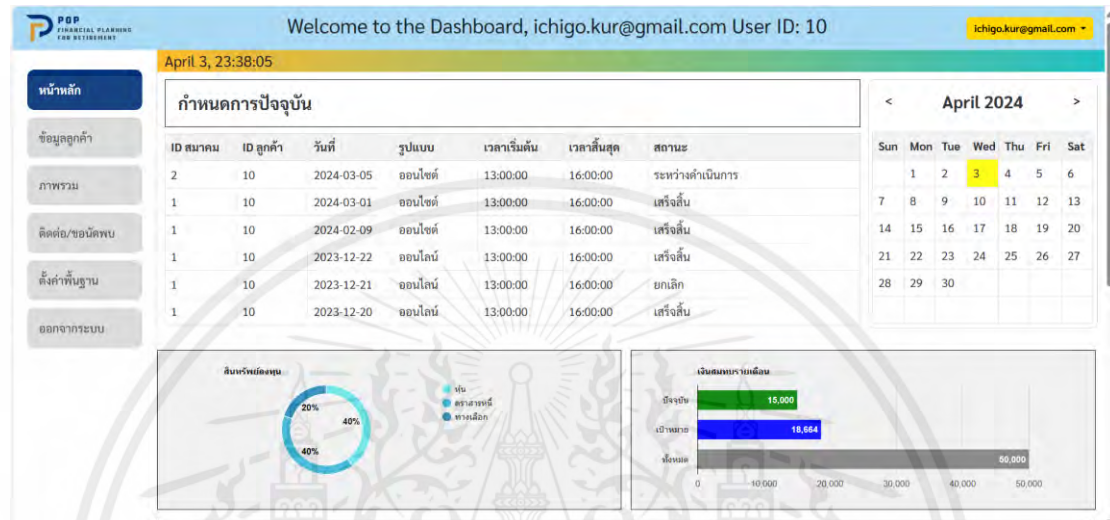


Figure 4.3. 3 Client Dashboard Homepage

4.3.4 Client Dashboard Client Information

The “Client Dashboard Client Information” page acts as a comprehensive display of essential client data, providing clients with the ability to view their reports, edit information, or delete entries as necessary.

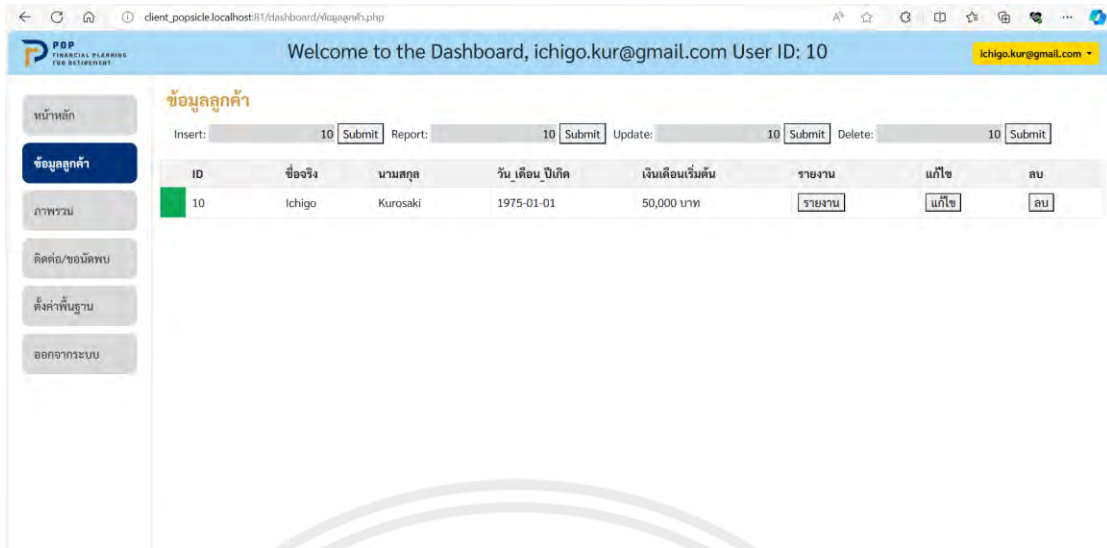


Figure 4.3. 4 Client Dashboard Homepage

4.3.5 Client Dashboard Client Information: Main, Variables, and Additional Data

The “Client Dashboard Client Information: Main, Variables, and Additional Data” page provides the client with a platform to edit information related to the main, variables, and additional data on their own.

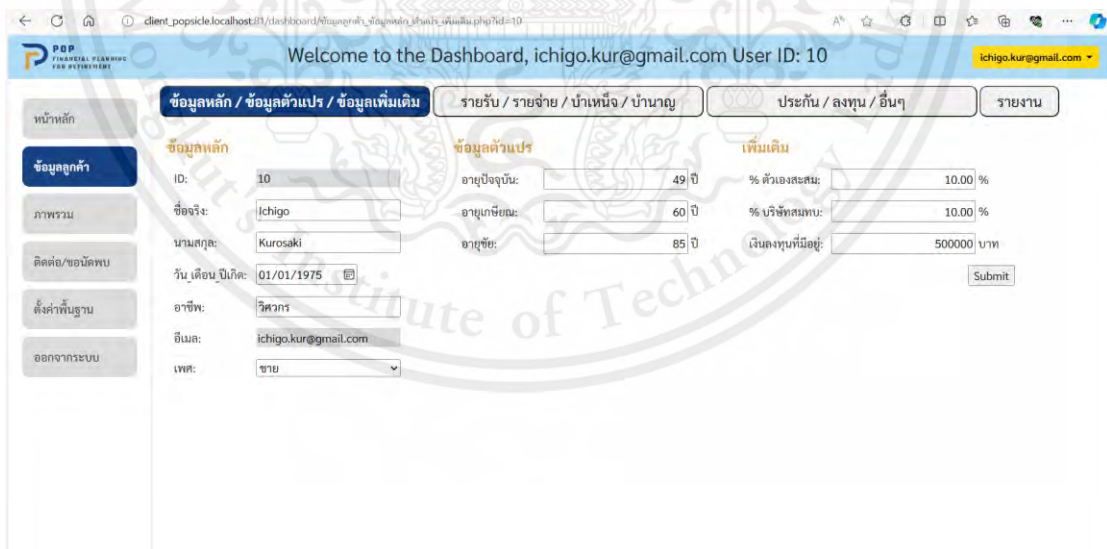


Figure 4.3. 5 Client Dashboard Client Information: Main, Variables, and Additional Data

4.3.6 Client Dashboard Client Information: Income, Expenses, and Pensions Data

The “Client Dashboard Client Information: Income, Expenses, and Pensions Data” page provides the client with a platform to edit information related to income, expenses, and pension data on their own.

รายการ	จำนวนเงิน	รับครั้งแรก	รับครั้งสุดท้าย	ความถี่	Update	Delete
รายรับครั้งเดียว	2000000	01/01/2035	mm/dd/yyyy	ครั้งเดียว	Update	Delete
รายรับครั้งเดียว	600000	01/01/2040	mm/dd/yyyy	ครั้งเดียว	Update	Delete

Figure 4.3. 6 Client Dashboard Client Information: Income, Expenses, and Pensions Data

4.3.7 Client Dashboard Client Information: Insurance, Investment, and Other Data

The “Client Dashboard Client Information: Insurance, Investment, and Other Data” page provides the client with a platform to edit information related to insurance, investment, and other data such as investment return and inflation on their own.

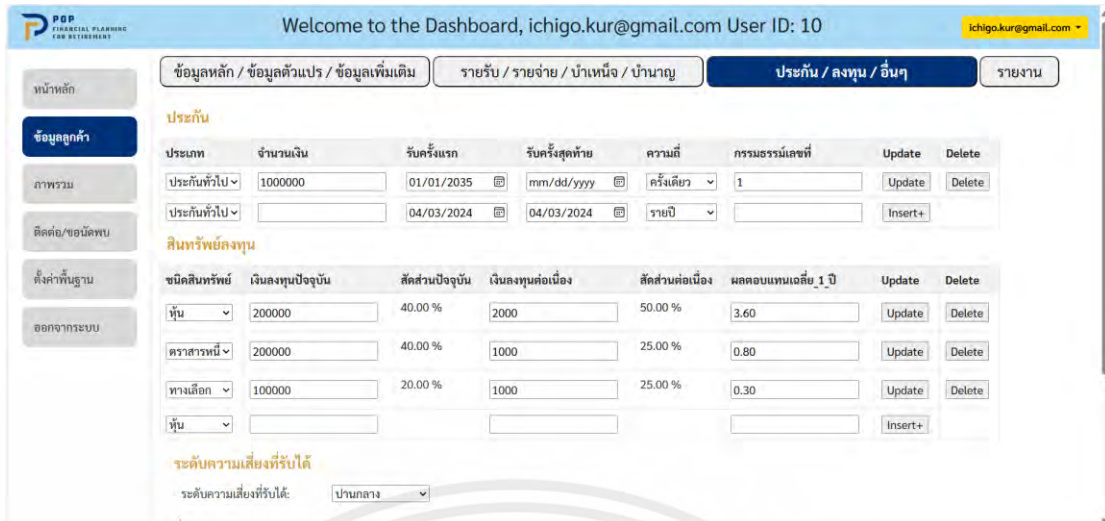


Figure 4.3. 7 Client Dashboard Client Information: Insurance, Investment, and Other Data

4.3.8 Client Dashboard Client Information: Report

The “Client Dashboard Client Information: Report” page empowers Clients to review the results of calculations based on every input provided on their own. The report displays output information in both text-based and infographic formats for clear visualization and analysis.

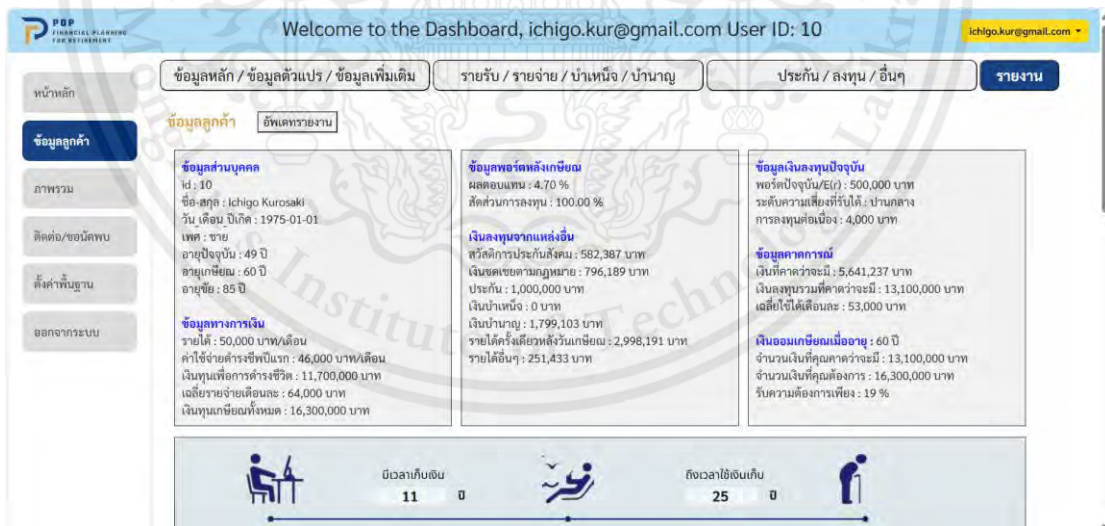


Figure 4.3. 8 Client Dashboard Client Information: Report

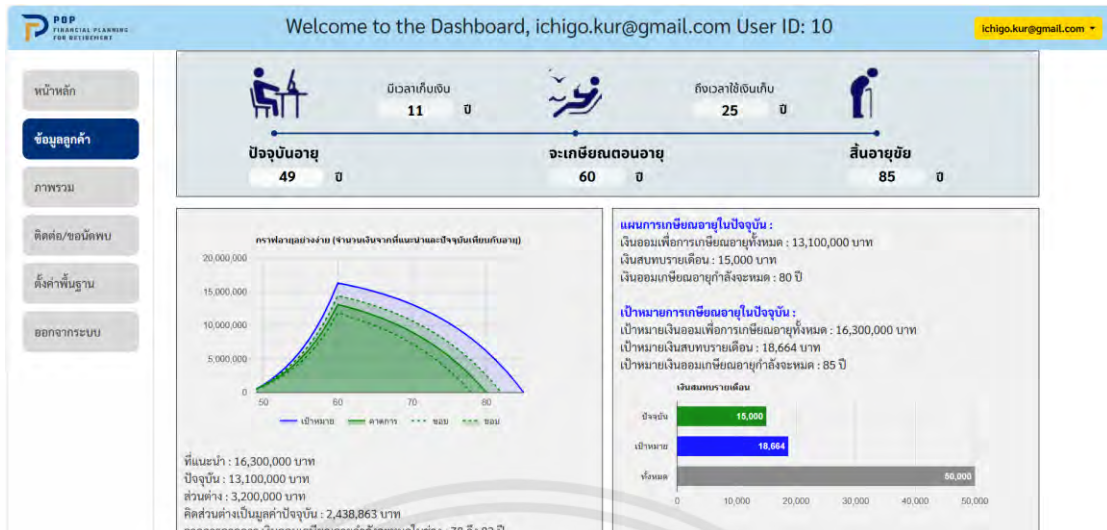


Figure 4.3.8. 1 Client Dashboard Client Information: Report



Figure 4.3.8. 2 Client Dashboard Client Information: Report

4.3.9 Client Dashboard Overall

The “Client Dashboard Overall” page is intended to provide clients with an overview of all clients, including data such as client gender and health. However, please note that this feature is currently under development and may have limitations compared to the depth of information available to financial planners. The content displayed to clients will depend on our objectives and what we want them to see.

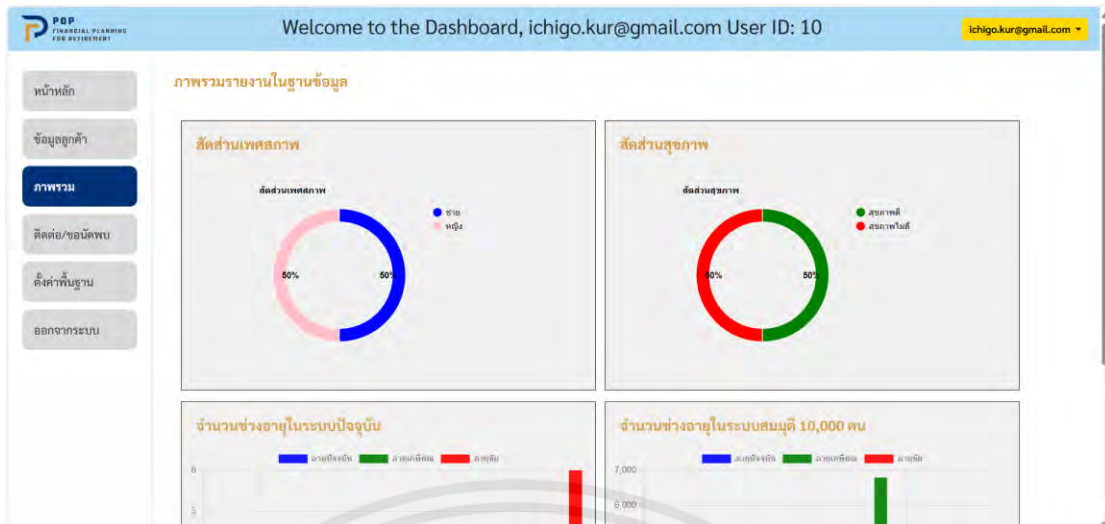


Figure 4.3. 9 Client Dashboard Overall

4.2.10 Client Dashboard Schedule

The “Client Dashboard Schedule” page will display the meeting times of financial planners, indicating whether the meetings are conducted online or onsite. Clients will only have the authority to view their entries on this page.

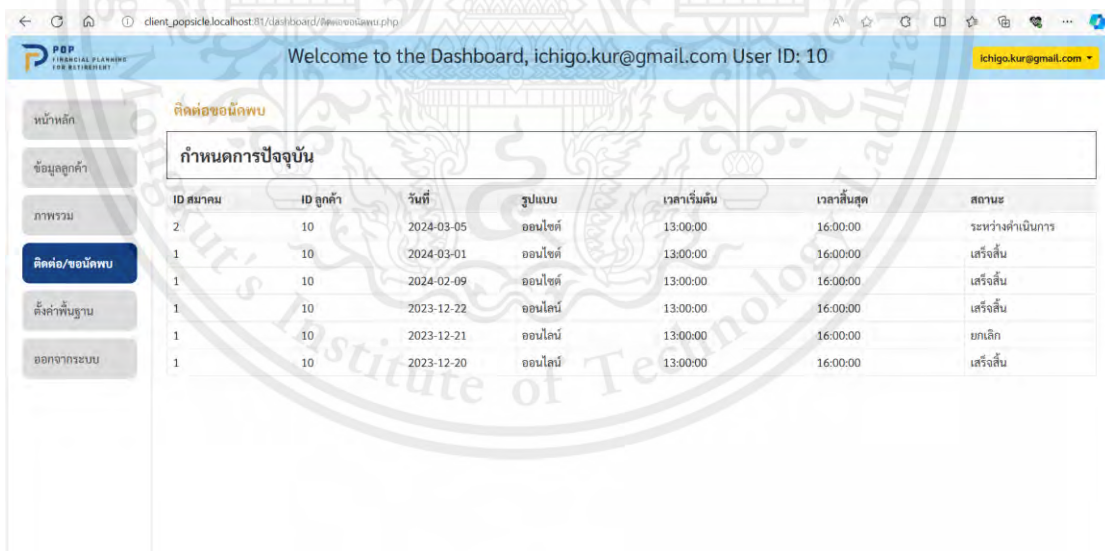


Figure 4.3. 10 Client Dashboard Schedule

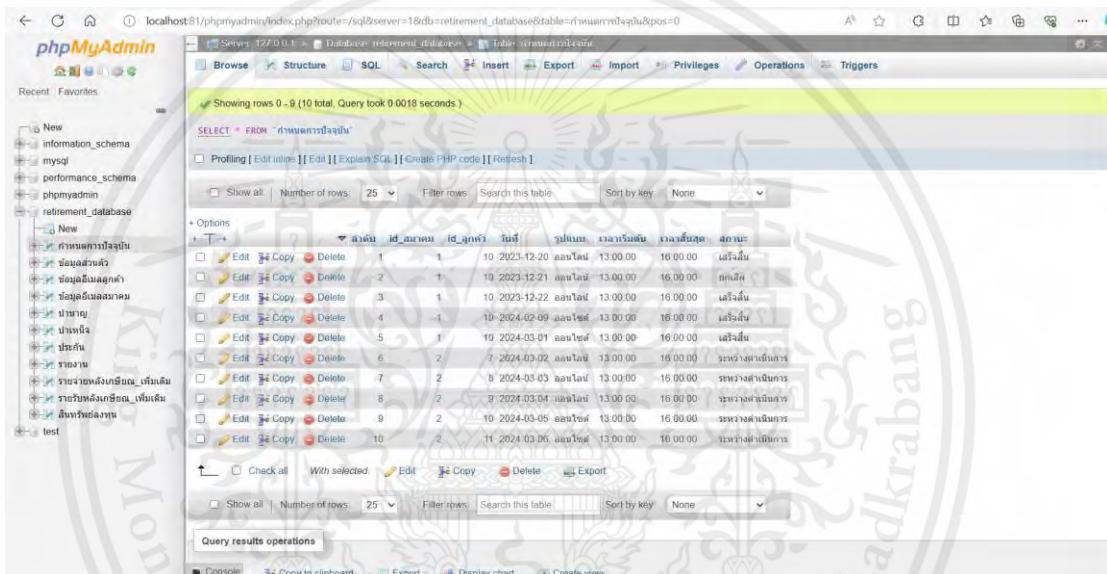
4.4 SQL Retirement_Database

For both the “Planner_Popsicle Website” and the “Client_Popsicle Website” we utilize SQL to store data in the “Retirement Database”. This approach enables efficient and structured storage of information about retirement planning for both financial planners and clients. Within this database, there are 11 tables designed to store various types of data from both financial planners and clients, ensuring comprehensive and organized data management which are:

1. Current_Schedule Table
2. Profile Table
3. Customer_Email_Information Table
4. Association_Email_Information Table
5. Pension_1 Table
6. Pension_N Table
7. Insurance Table
8. Report Table
9. Post_Retirement_Expenses_Additional Table
10. Post_Retirement_Income_Additional Table
11. Investment_Assets Table

Indexes:

1. "Order" serves as the primary key, uniquely identifying each entry in the table.
2. "ID_Association" is a foreign key referencing the "Id" field from the Association_Email_Information Table, indicating the unique identifier of the financial planner associated with the schedule.
3. "ID_Client" is a foreign key referencing the "Id" field from the Customer_Email_Information Table, indicating the unique identifier of the client associated with the schedule.



The screenshot shows the phpMyAdmin interface for a database named 'retirement_database'. The 'Current_Schedule' table is selected, and its structure and data are displayed. The table has 10 rows of data. The columns are: id, id_association, id_client, birth_date, real_name, last_name, day_month_year_of_birth_date, careers, and status.

id	id_association	id_client	birth_date	real_name	last_name	day_month_year_of_birth_date	careers	status
1	1	1	10-2023-12-20	สมชาย	สมชาย	13:00:00	16:00:00	เสิร์ฟ
2	1	1	10-2023-12-21	สมชาย	สมชาย	13:00:00	16:00:00	เสิร์ฟ
3	1	1	10-2023-12-22	สมชาย	สมชาย	13:00:00	16:00:00	เสิร์ฟ
4	1	1	10-2024-02-09	สมชาย	สมชาย	13:00:00	16:00:00	เสิร์ฟ
5	1	1	10-2024-03-01	สมชาย	สมชาย	13:00:00	16:00:00	เสิร์ฟ
6	2	2	7-2024-03-02	สมชาย	สมชาย	13:00:00	16:00:00	เสิร์ฟ
7	2	2	8-2024-03-03	สมชาย	สมชาย	13:00:00	16:00:00	เสิร์ฟ
8	2	2	9-2024-03-04	สมชาย	สมชาย	13:00:00	16:00:00	เสิร์ฟ
9	2	2	10-2024-03-05	สมชาย	สมชาย	13:00:00	16:00:00	เสิร์ฟ
10	2	2	11-2024-03-06	สมชาย	สมชาย	13:00:00	16:00:00	เสิร์ฟ

Figure 4.4. 1 Current_Schedule Table

4.4.2 Profile Table

The "Profile" table is structured to store comprehensive information about clients for retirement planning purposes. Here's the breakdown of its fields:

1. Id (Primary Key): Unique identifier for each record.
2. Real_Name: First name of the client.
3. Last_Name: Last name of the client.
4. Day_Month_Year_of_Birth_Date: Date of birth of the client.
5. Careers: Career or occupation of the client.

6. Email: Email address of the client.
7. Phone: Phone number of the client.
8. Gender: Gender of the client.
9. Current_Age: Current age of the client.
10. Retirement_Age: Planned retirement age of the client.
11. Life_Expectancy: Estimated life expectancy of the client.
12. Starting_Salary: Initial salary of the client.
13. Number_of_Years_Receiving_Additional_Salary: Number of years receiving additional salary.
14. Salary_Increase_Rate: Rate at which salary increases over time.
15. Salary_Upon_Retirement: Expected salary upon retirement.
16. Have_Worked_For_This_Company: Whether the individual has worked for the current company.
17. Total_Years_of_work: Total number of years worked.
18. Compensation_Rate: Rate of compensation.
19. Value_of_Compensation: Value of compensation received.
20. Self_Accumulate: Amount accumulated by the client.
21. Companies_Contribute: Contributions made by companies.
22. Available_Investments: Investments available for retirement planning.
23. Other_Variable_Expenses_After_Retirement: Other variable expenses after retirement.
24. Other_Expenses: Other expenses to consider.
25. One_Time_Expenses_After_Retirement: One-time expenses after retirement.
26. Health_Insurance_Premiums: Premiums for health insurance.
27. Total_Years_Already_Be_Member_of_Social_Security: Total years already a member of Social Security.
28. Acceptable_Risk_Level: Acceptable level of risk for investments.
29. Inflation_Before_Retirement: Inflation rate before retirement.
30. Inflation_After_Retirement: Inflation rate after retirement.
31. Return_Before_Retirement: Expected return on investments before retirement.
32. Return_After_retirement: Expected return on investments after retirement.
33. Proportion_of_Income: Proportion of income allocated for retirement planning.

4.4.3 Customer_Email_Information Table

The “Customer_Email_Information” table stores essential information related to client authentication and identification. Here's the breakdown of its fields:

1. Id (Primary Key): Unique identifier for each client record.
2. Email: The unique email address of the client, serves as the primary means of identification.
3. Password: The unique password associated with the client's email, ensuring secure access to the system.

This structure enables secure and reliable authentication for clients accessing the system, with email addresses and passwords serving as unique identifiers.

Indexes:

1. “Id” serves as the primary key, uniquely identifying each record.

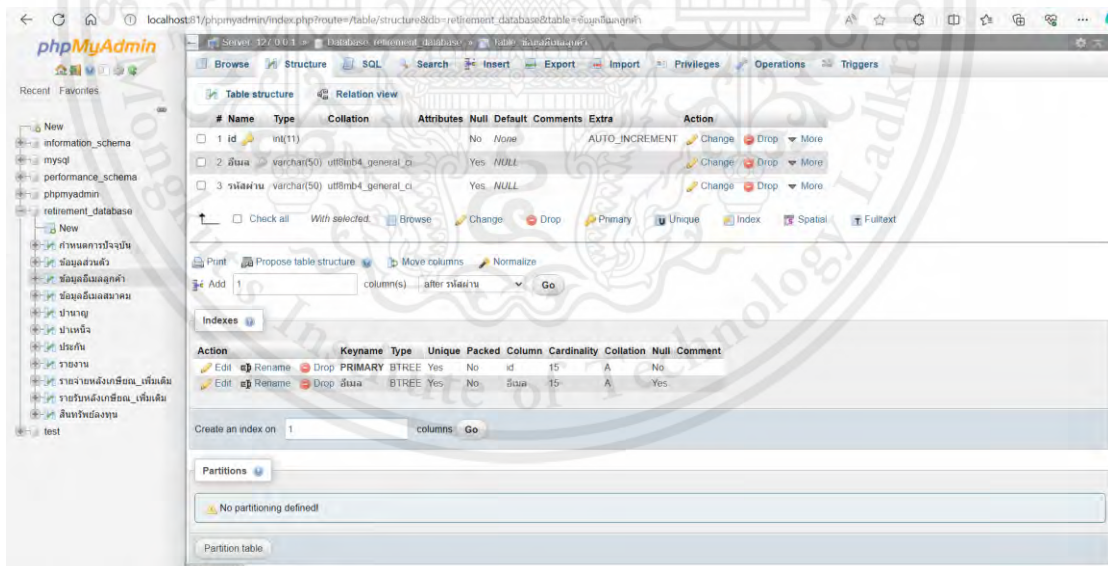


Figure 4.4.3. 1 Customer_Email_Information Table

4.4.4 Association_Email_Information Table

The “Association_Email_Information” table is structured to store information related to financial planners. Here's the breakdown of its fields:

1. Id (Primary Key): Unique identifier for each financial planner.
2. Real_Name: First name of the financial planner.
3. Last_Name: Last name of the financial planner.
4. Email: Unique email address of the financial planner.
5. Password: Unique password of the financial planner.

This table serves to store essential details about financial planners, including their names, email addresses, and passwords, facilitating user authentication and management within the system.

Indexes:

1. “Id” is this table's primary key. It uniquely identifies each record in the table and serves as the primary means of referencing and retrieving information about individual financial planners.

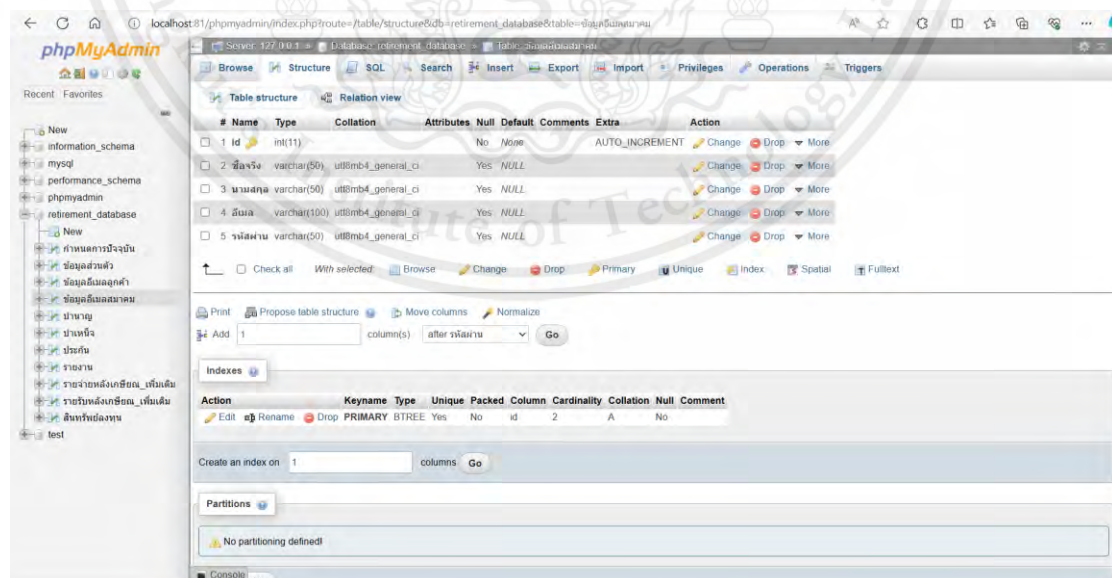


Figure 4.4.4. 1 Association_Email_Information Table

4.4.5 Pension_N Table

The "Pension_N" table is structured to store information related to pensions received by clients. Here's the breakdown of its fields:

1. Order (Primary Key): A sequential identifier for each entry in the table.
2. Id (Foreign key): The unique identifier of the client associated with the Pension_N Table.
3. Pension_N: Name of the pension.
4. Amount: The amount of money per period.
5. First_Receive_Date: Date of the first receipt.
6. Last_Receive_Date: Date of the last receipt.
7. Frequencies: Frequency of receiving the pension amount.

This table facilitates the storage of detailed information about pensions received by clients, including the name of the pension, the amount received per period, and the frequency of receipt. Additionally, it captures the dates of the first and last receipt for each pension.

Indexes:

1. "Order" serves as the primary key, uniquely identifying each record.
2. "Id" is a foreign key referencing the "Id" field from the "Customer_Email_Information" table, linking each pension entry to a specific client's information.

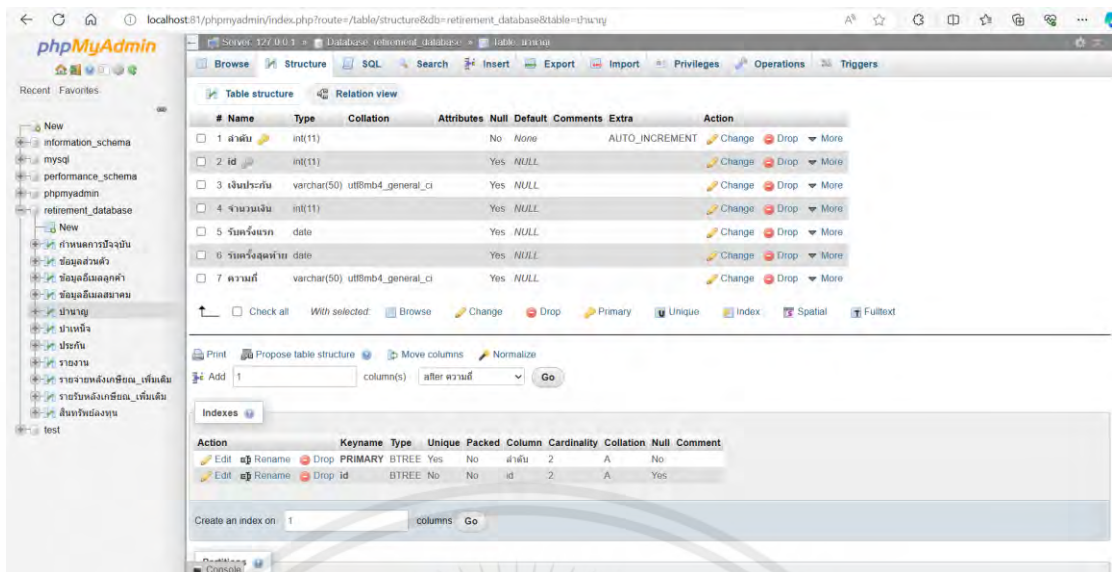


Figure 4.4.5. 1 Pension_N Table

4.4.6 Pension_1 Table

The "Pension_1" table is structured to store information related to a specific pension received by clients. Here's the breakdown of its fields:

1. Order (Primary Key): A sequential identifier for each entry in the table.
2. Id (Foreign key): The unique identifier of the client associated with the Pension_1 Table.
3. Pension_1: Name of the pension.
4. Amount: The amount of money received.
5. Date: Date of the receipt.

This table allows for the storage of detailed information about a particular pension received by clients, including the name of the pension, the amount received, and the date of receipt. Each entry in the table is uniquely identified by the Order field, serving as its primary key. Additionally, the Id field establishes a relationship with the corresponding client's information through a foreign key constraint.

Indexes:

1. "Order" serves as the primary key, uniquely identifying each record.

2. "Id" is a foreign key referencing the "Id" field from the "Customer_Email_Information" table, linking each pension entry to a specific client's information.

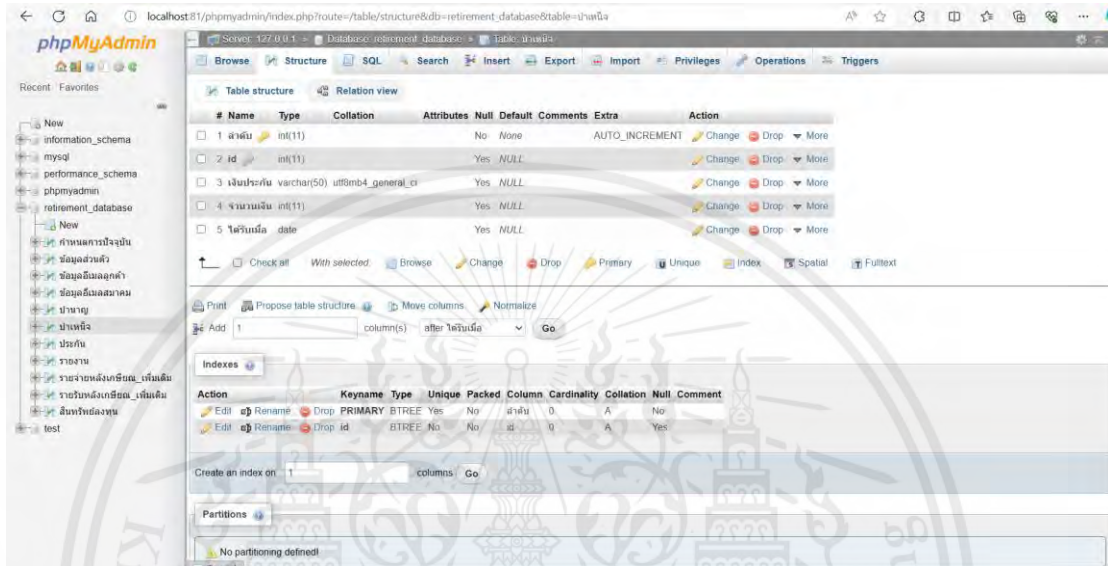


Figure 4.4.6. 1 Pension_1 Table

4.4.7 Insurance Table

The "Insurance" table serves as a repository for various details pertaining to insurance information. Here's a breakdown of its structure:

1. Order (Primary Key): A sequential identifier for each entry in the table.
2. Id (Foreign key): The unique identifier of the client associated with the Insurance Table.
3. Type: Type of the insurance.
4. Insurance: Name of the insurance.
5. Amount: The amount of money per period.
6. First_Receive_Date: Date of the first receipt.
7. Last_Receive_Date: Date of the last receipt.
8. Frequencies: Frequency of receiving the insurance amount.

9. Policy_Number: Policy number associated with the insurance.

Indexes:

1. "Order" serves as the primary key, uniquely identifying each record.
2. "Id" is a foreign key referencing the "Id" field from the "Customer_Email_Information" table, linking each pension entry to a specific client's information.

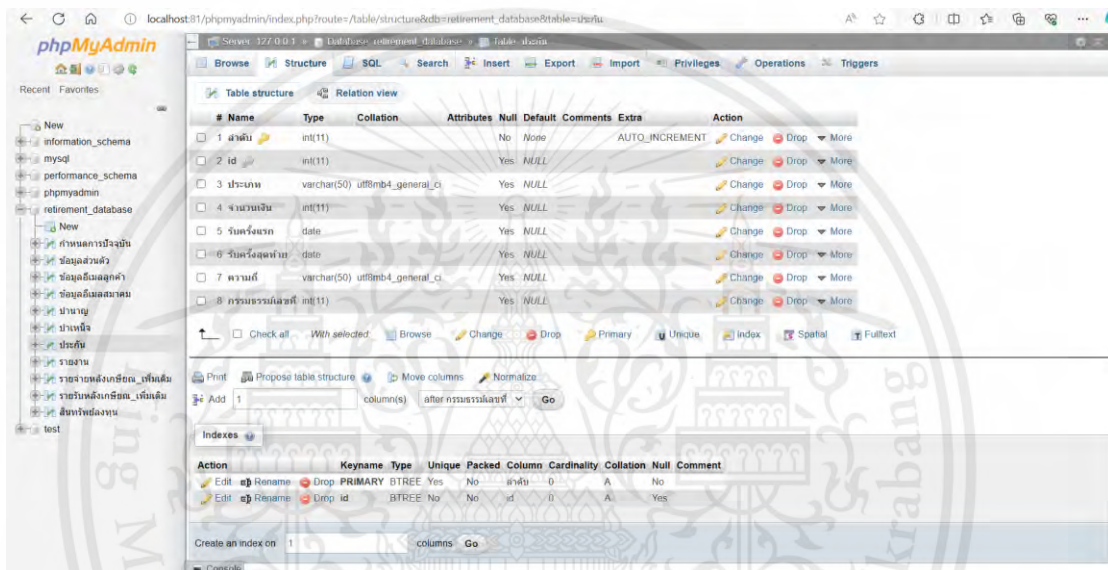


Figure 4.4.7. 1 Insurance Table

4.4.8 Report Table

The "Report" table is structured to capture comprehensive information related to the financial status and retirement planning of clients. Below is a detailed description of its fields:

Indexes:

1. Id (Primary Key): Unique identifier of the client associated with the report.
2. Real_Name: First name of the client.
3. Last_Name: Last name of the client.
4. Day_Month_Year_of_Birth_Date: Date of birth of the client.

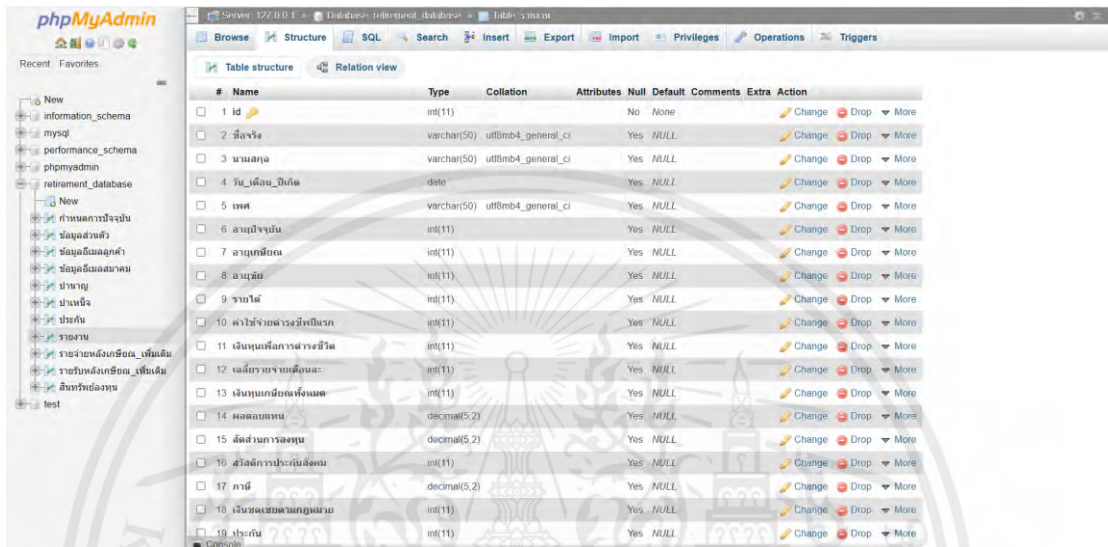
5. Gender: Gender of the client.
6. Current_Age: Current age of the client.
7. Retirement_Age: Planned retirement age of the client.
8. Life_Expectancy: Estimated life expectancy of the client.
9. Income: Income of the client.
10. Living_Expenses_For_the_First_Year: Living expenses for the first year of retirement.
11. Living_Funds: Funds allocated for living expenses during retirement.
12. Average_Monthly_Expenses: Average monthly expenses during retirement.
13. Total_Retirement_Funds: Total funds available for retirement.
14. Returns: Returns per year in percentage.
15. Investment_Proportion: Proportion of retirement funds allocated for investment.
16. Social_Security_Benefits: The net amount of social security benefits.
17. Tax: Tax rate in percentage.
18. Legal_Compensation: The net amount of legal compensation.
19. Insurance: The net amount of insurance.
20. Pension_1: The net amount of Pension 1.
21. Pension_N: The net amount of other pensions.
22. One_Time_Income_After_Retirement: The net amount of one-time income after retirement.
23. Other_Income: The net amount of other income sources.
24. Current_Portfolio: Net amount in the current investment portfolio.
25. Acceptable_Risk_Level: Acceptable level of risk for investments.
26. Continuous_Investment: Continuous investment in assets.
27. Expected_Money: Anticipated net amount of money at retirement age.
28. Expected_Total_Investment: Projected total investment amount at retirement age.
29. Average_Can_Be_Used_Per_Month: Average amount that can be used per month.
30. The_Amount_You_Need: Amount needed for retirement.
31. Only_Receive: Net amount received.

32. Time_To_Save_Money: Time required to save money.
33. Time_To_Use_Money: Time to use money.
34. Recommended: Recommended amount of money needed.
35. Present: The current amount of money.
36. Difference: The difference between the recommended and present values.
37. Calculate_The_Difference_As_The_Present_Value: Discount the difference value to the present year.
38. Total_Retirement_Savings: Current total retirement savings.
39. Monthly_Contribution: Current monthly contribution.
40. Retirement_Savings_Are_Running_Out: The age when the savings run out.
41. All_Retirement_Savings_Goals: Saving target.
42. Monthly_Contribution_Goal: Monthly contribution goal.
43. Retirement_Savings_Goal_is_Running_Out: The age when the savings run out according to retirement goal.
44. Need_More: Additional monthly contribution required.
45. Saving: Goal percentage of saving per month.
46. The_Currently_At: Current percentage of savings per month.
47. Equivalent_To_Stocks: Stocks value equivalent to money.
48. Equivalent_To_Debt_Instruments: Debt instruments value equivalent to money.
49. Equivalent_To_Other_Assets: Other Assets value equivalent to money.
50. All_Investment_Assets: All investment assets value equivalent to money.
51. Stocks: Stocks percentage from all investment assets.
52. Debt_Instruments: Debt instruments percentage from all investment assets.
53. Other_Assets: Other Assets percentage from all investment assets.
54. Score: The client's financial health score.
55. Health: The client's health according to the score.

This table provides a comprehensive overview of each client's financial status, retirement planning, and investment analysis, facilitating informed decision-making and tailored financial advice.

Indexes:

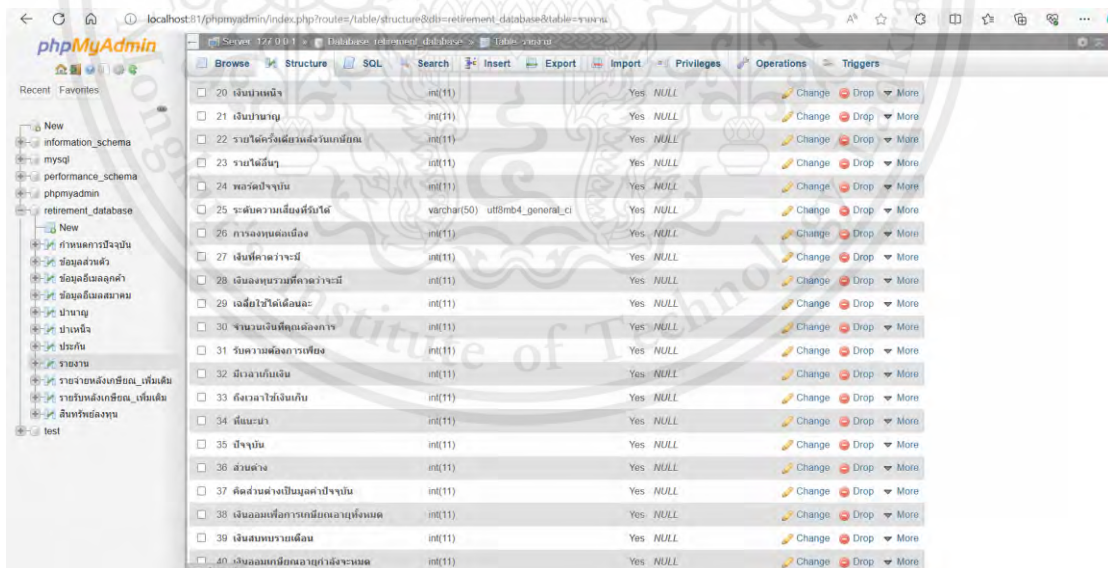
1. The "Id" field in this table serves as the primary key and must correspond to the unique identifier of the client. It ensures the association of each record with the respective client's information.



The screenshot shows the phpMyAdmin interface with the table structure for 'รายงาน' (Report) in the 'retirement_database'. The table has 19 columns. The first column, 'id', is the primary key. The columns are:

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	id	int(11)			No	None			Change Drop More
2	ชื่อจริง	varchar(50)	utf8mb4_general_ci		Yes	NULL			Change Drop More
3	นามสกุล	varchar(50)	utf8mb4_general_ci		Yes	NULL			Change Drop More
4	วันเดือนปีเกิด	date			Yes	NULL			Change Drop More
5	เพศ	varchar(50)	utf8mb4_general_ci		Yes	NULL			Change Drop More
6	อายุปัจจุบัน	int(11)			Yes	NULL			Change Drop More
7	อายุเกษียณ	int(11)			Yes	NULL			Change Drop More
8	อายุขัย	int(11)			Yes	NULL			Change Drop More
9	รายได้	int(11)			Yes	NULL			Change Drop More
10	ค่าใช้จ่ายรายเดือนรวม	int(11)			Yes	NULL			Change Drop More
11	เงินทุนเพื่อการเกษียณ	int(11)			Yes	NULL			Change Drop More
12	เงินออมรายเดือน	int(11)			Yes	NULL			Change Drop More
13	เงินทุนก้อนที่สอง	int(11)			Yes	NULL			Change Drop More
14	ผลตอบแทน	decimal(5,2)			Yes	NULL			Change Drop More
15	สัดส่วนการลงทุน	decimal(5,2)			Yes	NULL			Change Drop More
16	สวัสดิการประกันสังคม	int(11)			Yes	NULL			Change Drop More
17	ภาษี	decimal(5,2)			Yes	NULL			Change Drop More
18	เงินผลประโยชน์ทดแทน	int(11)			Yes	NULL			Change Drop More
19	ประกัน	int(11)			Yes	NULL			Change Drop More

Figure 4.4.8. 1 Report Table



The screenshot shows the phpMyAdmin interface with the table structure for 'รายงาน' (Report) in the 'retirement_database'. The table has 20 columns. The columns are:

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
20	เงินบำนาญ	int(11)			Yes	NULL			Change Drop More
21	เงินบำนาญ	int(11)			Yes	NULL			Change Drop More
22	รายได้ครึ่งเดือนรวมเกษียณ	int(11)			Yes	NULL			Change Drop More
23	รายได้สิ้นอายุ	int(11)			Yes	NULL			Change Drop More
24	พรรคปัจจุบัน	int(11)			Yes	NULL			Change Drop More
25	ระดับความเสี่ยงที่รับได้	varchar(50)	utf8mb4_general_ci		Yes	NULL			Change Drop More
26	การลงทุนต่อเนื่อง	int(11)			Yes	NULL			Change Drop More
27	เงินที่คาดว่าจะมี	int(11)			Yes	NULL			Change Drop More
28	เงินออมรวมที่คาดว่าจะมี	int(11)			Yes	NULL			Change Drop More
29	เงินที่คาดว่าจะมี	int(11)			Yes	NULL			Change Drop More
30	จำนวนเงินที่ถอนออก	int(11)			Yes	NULL			Change Drop More
31	วันเวลาเลิกการทำงาน	int(11)			Yes	NULL			Change Drop More
32	มีเวลาเกษียณ	int(11)			Yes	NULL			Change Drop More
33	ค่าสวัสดิการประกัน	int(11)			Yes	NULL			Change Drop More
34	สถานะ	int(11)			Yes	NULL			Change Drop More
35	ปัจจุบัน	int(11)			Yes	NULL			Change Drop More
36	ส่วนต่าง	int(11)			Yes	NULL			Change Drop More
37	สัดส่วนค่าที่เป็นมูลค่าปัจจุบัน	int(11)			Yes	NULL			Change Drop More
38	เงินออมเพื่อการเกษียณที่ถอนออก	int(11)			Yes	NULL			Change Drop More
39	เงินสมทบรายเดือน	int(11)			Yes	NULL			Change Drop More
40	เงินสมทบก้อนสุดท้ายที่จะถอน	int(11)			Yes	NULL			Change Drop More

Figure 4.4.8. 2 Report Table

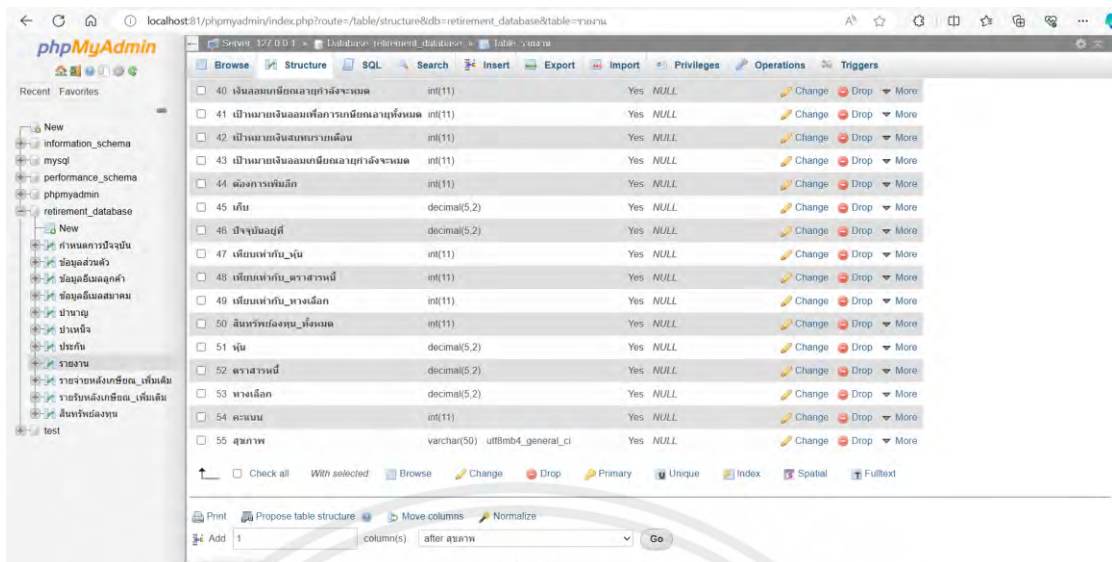


Figure 4.4.8. 3 Report Table

4.4.9 Post_Retirement_Expenses_Additional Table

The “Post_Retirement_Expenses_Additional” table is structured to capture additional expenses incurred by clients after retirement. Here’s a breakdown of its fields:

1. Order (Primary Key): A sequential identifier for each entry in the table.
2. Id (Foreign key): The unique identifier of the client associated with the Post_Retirement_Expenses_Additional Table.
3. Name: Name of the expense.
4. Amount: The amount of money per period.
5. First_Expense_Date: Date of the first expense.
6. Last_Expense_Date: Date of the last expense.
7. Frequencies: Frequency of the expense.

This table enables the recording of various additional expenses that clients may encounter after retirement, including their names, amounts, dates, and frequencies. Each entry in the table is uniquely identified by the Order field, serving as its primary key, and is associated with the client's information through the Id field as a foreign key.

Indexes:

1. “Order” serves as the primary key, uniquely identifying each record.
2. “Id” is a foreign key referencing the "Id" field from the "Customer_Email_Information" table, linking each pension entry to a specific client's information.

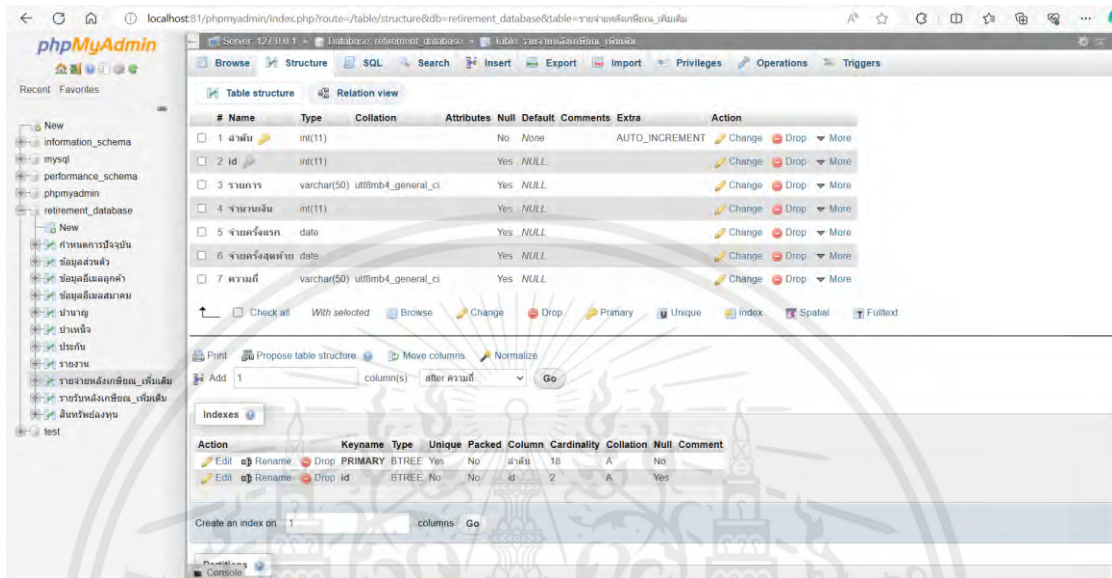


Figure 4.4.9. 19 Post_Retirement_Expenses_Additional Table

4.4.10 Post_Retirement_Income_Additional Table

The “Post_Retirement_Income_Additional” table is structured to store additional income sources received by clients after retirement. Below is a breakdown of its fields:

1. Order (Primary Key): A sequential identifier for each entry in the table.
2. Id (Foreign key): The unique identifier of the client associated with the Post_Retirement_Income_Additional Table.
3. Name: Name of the income source.
4. Amount: The amount of money per period.
5. First_Receive_Date: Date of the first receipt.
6. Last_Receive_Date: Date of the last receipt.
7. Frequencies: Frequency of the receipt.

This table facilitates the storage of various additional income streams that clients may receive after retirement, including their names, amounts, dates, and frequencies. Each entry in the table is uniquely identified by the Order field, serving as its primary key, and is associated with the client's information through the Id field as a foreign key.

Indexes:

1. “Order” serves as the primary key, uniquely identifying each record.
2. “Id” is a foreign key referencing the "Id" field from the "Customer_Email_Information" table, linking each pension entry to a specific client's information.

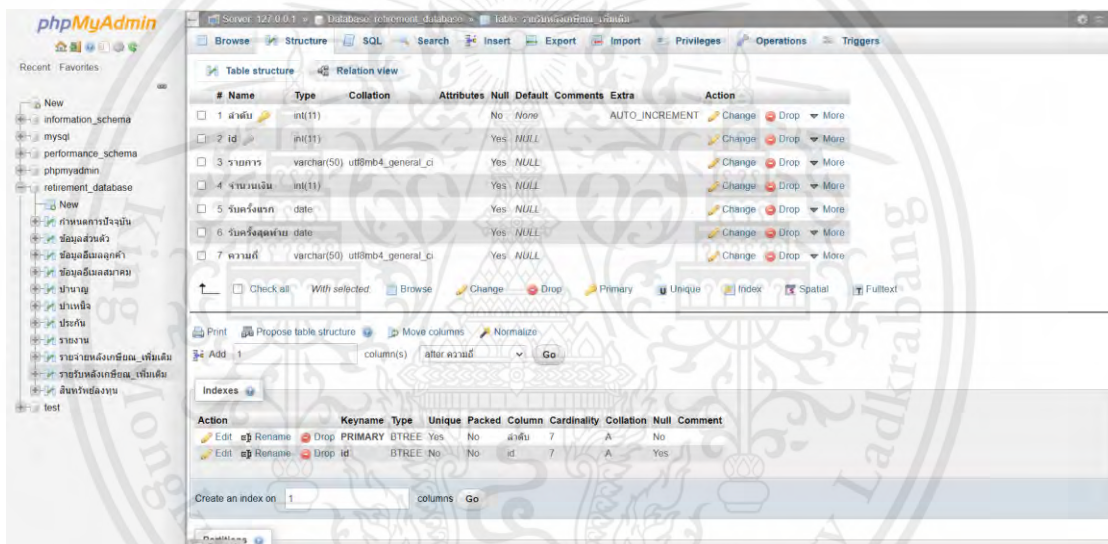


Figure 4.4.10. 1 Post_Retirement_Income_Additional Table

4.4.11 Investment_Assets Table

The “Investment_Assets” table is structured to store information related to investment assets owned by clients. Here's a breakdown of its fields:

1. Order (Primary Key): A sequential identifier for each entry in the table.
2. Id (Foreign key): The unique identifier of the client associated with the Investment_Assets Table.
3. Asset_Types: Type of the asset.

4. Current_Investment: Current investment in the asset.
5. Current_Proportion: Proportion of the current investment.
6. Continuous_Investment: Continuous investment in the asset.
7. Continuous_Proportion: Proportion of the continuous investment.
8. Average_Return_1_Year: Average return on investment over one year.

This table allows for the storage of detailed information about the investment assets owned by clients, including their types, current and continuous investments, proportions, and average returns over one year. Each entry in the table is uniquely identified by the Order field, serving as its primary key, and is associated with the client's information through the Id field as a foreign key.

Indexes:

1. "Order" serves as the primary key, uniquely identifying each record.
2. "Id" is a foreign key referencing the "Id" field from the "Customer_Email_Information" table, linking each pension entry to a specific client's information.

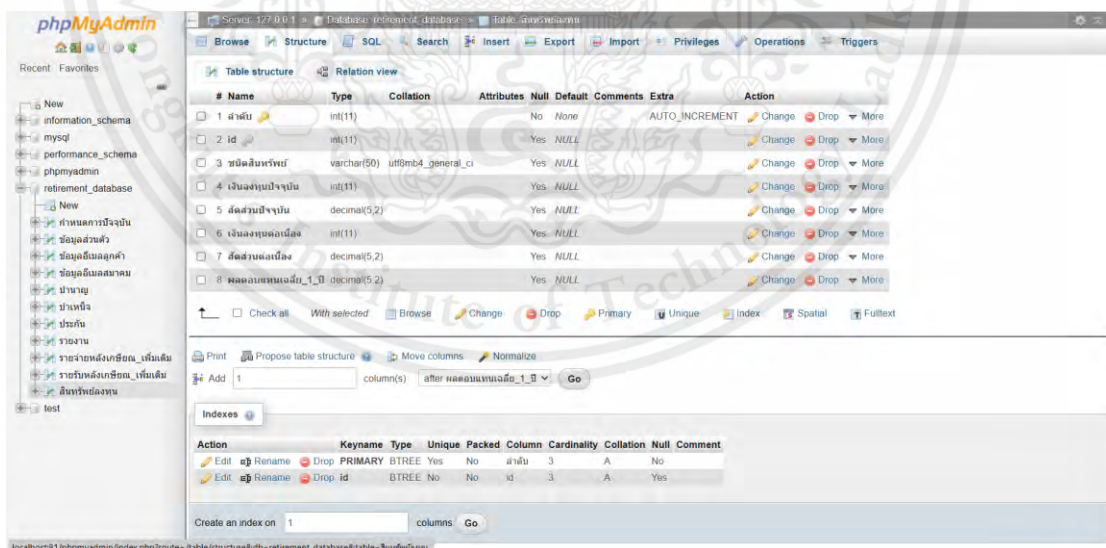


Figure 4.4.11. 1 Investment_Assets Table

Chapter 5

Conclusion and Recommendations

Although our website after the combination of UX/UI, financial equations, and SQL database goes beyond our initial objective in the one-semester timeframe. We find many shortcomings and recommendations to improve our website in 3 directions of recommendation.

5.1 Financial-Planner Development Recommendation

To improve your financial planner website, prioritize enhancing user experience through rigorous user testing and optimization for various devices. Ensure the accuracy and clarity of financial equations, potentially incorporating interactive tools for better engagement. Additionally, optimize the SQL database for both performance and security, implementing robust backup measures. Regular updates and soliciting user feedback will be pivotal in maintaining and improving the website's success.

5.2 Client Development Recommendation

Following the implementation of UX/UI improvements, financial equations refinement, and SQL database enhancements, focus on addressing identified shortcomings and implementing recommendations for client development. Emphasize user experience enhancement through thorough user testing and device optimization, while ensuring the accuracy and clarity of financial equations with the integration of interactive tools. Concurrently, optimize the SQL database for heightened performance and security, incorporating backup measures. Consistent updates and user feedback will be instrumental in ongoing improvement and success.

5.3 Database Development Recommendation

To elevate your website's database development post-implementation of UX/UI enhancements, financial equation refinement, and SQL database improvements, conduct a comprehensive performance audit. Optimize queries, introduce caching mechanisms, fortify data security measures, and strategize for scalability and redundancy. Additionally, consider leveraging cloud-based database services for enhanced reliability and efficiency. These recommendations aim to elevate the overall user experience and reliability of your financial planning platform by establishing a secure and efficient database management system.



Bibliography

- [1] Wattanaworakijkul, W. (2007, September 26). สมาคมนักวางแผนการเงินไทย. <https://www.tfpa.or.th/>
- [2] Carvin, M. (n.d.). Best retirement calculator (2023) - see how much you'll need. SmartAsset. <https://smartasset.com/retirement/retirement-calculator#ojXwXatfrj>
- [3] Chisholm, W. (2002). The world's most popular free online survey tool. SurveyMonkey. <https://www.surveymonkey.com/>
- [4] Admin, A. (2023, August 23). Retirement projection calculator. Ativa Interactive Corp. <https://ativa.com/retirement-calculator/>
- [5] Jiaravanont, C. (n.d.). Goal create. FINNOMENA. <https://port.finnomena.com/plan-select/plans/goal-based/create>
- [6] Thailand, T. S. E. of. (1975). The Stock Exchange of Thailand : ตลาดหลักทรัพย์แห่งประเทศไทย. <https://member.set.or.th/project/caltools/www/html/retirement.html>
- [7] Home. Calculator.net. (n.d.). <https://www.calculator.net/retirement-calculator.html?cagenow=35&cretireage=67&clifeexp=85&cincomenow=70%2C000&cincomeinc=3&cretinlevel=75&crilunit=p&cinvreturn=6&cinflation=3&cotherincome=0&csavingnow=30%2C000&cannualsave=10&csaveunit=p&ctype=1&x=C>
[alcula](#)

- [8] Gibson, J. (n.d.). Retirement calculator: Free estimate of how much you need. NerdWallet. <https://www.nerdwallet.com/calculator/retirement-calculator>
- [9] “เอฟดับบลิวดี ประเทศไทย | บริษัทประกันชีวิต ประกันสุขภาพ.” เอฟดับบลิวดี ประเทศไทย | บริษัทประกันชีวิต ประกันสุขภาพ, <https://www.fwd.co.th/>. Accessed 4 Apr. 2024.
- [10] “วางแผนเกษียณอย่างไร มีเงินใช้ไปทั้งชาติ - SET Investnow.” Welcome Page - SET Investnow, <https://www.setinvestnow.com/th/financialplanning/retirement-planning>. Accessed 4 Apr. 2024.

