DE LA SALLE UNIVERSITY - MANILA

PACMAN: Payroll Automation and Calculation Management Application Network

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A Term Project

Presented to Sir. Ramon Stephen L. Ruiz

In Partial Fulfillment of the

Requirements for the Course Programming Logic and Design (PROLOGI)

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by

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EQ3

Monday - Thursday, 12:45 PM - 1:45 PM

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I. Introduction

The PACMAN system allows companies, individuals, and organizations to be able to make their payroll system more efficient using this program. This is because this system will make payroll calculations easier and much more efficient and will have fewer errors than an organic payroll person computing the salaries of hundreds or even thousands of employees. The team will now discuss how PACMAN will do this.

A. Background of the Study

Having a payroll calculator in your organization can be highly beneficial since It saves the headache of calculating the necessary government deductions and taxes. And as stated by Ferguson (n.d.) one of the benefits of a payroll calculator is increased efficiency since as quoted by him "Your payroll staff is human, so mistakes are likely from time to time. However, habitual errors may foster mistrust in your employees and cause them to file a complaint against you to the labor department." from this quote the advantages of an automatic payroll calculator is clear in how it can not only make your payroll operations more efficient but also make it more trusted among employees and therefore fewer complaints to the labor department and another quote from Ferguson (n.d.) " Under federal and state law, you must compensate your employees by the established payday, so if you make payroll errors, resolve them promptly and effectively." That quote shows precisely why an automated payroll calculator will also be beneficial for the bottom line of the company since regular employee compensations due to incorrect payroll will surely add up. That is why the team thought of PACMAN or Payroll Automation and Calculation Management Application Network which is as stated an automatic payroll calculator that will ensure that payroll for your employees will be efficient and without error to reduce unnecessary compensations due to incorrect payroll.

B. Statement of the Problem

As stated in (The 7 Most Common Payroll Errors (and How to Avoid Them), n.d.) one of the main problems with payroll is the miss calculation of pay which can lead to hours even days of wasted time investigating what went wrong. To a business wasted hours or days are simply not affordable since to them every hour counts. Ideally, no business or organization should be wasting time ensuring that the payroll calculations are correct this is why the team created PACMAN.

C. Objectives

C.1 General Objective

The general objectives for this project were to make sure it is accurate, efficient, and user-friendly. First, accuracy. The payroll calculator must give accurate results. Second, it must be efficient and it can both calculate salaries, as well as its deductions at the same time. Lastly, it must be user friendly so that it could be easily used by companies.

C.2 Specific Objectives

PACMAN (Payroll Automation and Calculation Management Application Network) is a program designed to automate and simplify the process of calculating payroll for a company's employees. The program takes in information about each employee, such as their name, monthly salary, and number of dependents. Based on this information, the program calculates the government-mandated contributions for SSS, PhilHealth, and Pag-IBIG.

In addition to government-mandated contributions, the program calculates the taxable income of each employee based on the deductions made from their salary. The program then uses a tax table to calculate the tax amount for each employee, depending on their taxable income. The deductions from the

employee's salary include government-mandated contributions, as well as a fixed amount of PHP 250 per dependent.

Finally, the program calculates the net pay of each employee, which is their salary after all deductions have been made. The program saves the payroll information to a Pandas dataframe and optionally to an Excel file.

The objective of this project is to provide a reliable and efficient payroll calculation tool for a company. The program can handle multiple employees and significantly simplifies the payroll process, saving time and effort for the company. By automating the payroll process, the program reduces the likelihood of errors and improves the accuracy of the calculations, ensuring that employees are paid the correct amount on time.

D. Significance of the Project

The significance of this project lies in its ability to simplify and automate a company's payroll process. This program can reduce the likelihood of errors and save time for the company's HR department by automating the calculation of employee salaries, taxes, and deductions. Furthermore, by providing a comprehensive overview of each employee's payroll information, the program can assist the company in more efficiently keeping track of its financial records. Overall, the importance of this project lies in its potential to improve efficiency and accuracy in employee payroll management, which can lead to cost savings and increased productivity for the company.

II. Review of Related Literature

Every company needs to process payroll accurately and on time to ensure employees receive their salaries and benefits. This is a crucial task for our business, and as our organization grows, so do the responsibilities and workload. Hiring more employees may become necessary, but this also means calculating salaries for a larger number of individuals, which can be time-consuming and increase the risk of errors (Kawwale et al, 2018).

An employer pays an employee a regular amount of money for their work, which is known as a salary. Salaries are often paid monthly, but can also be annual. The amount paid is usually based on what other people in similar roles earn in the same region and industry. Many large employers have a system of pay rates and salary ranges that are linked to an employee's level in the hierarchy and their length of service (Nordqvist, 2013).

The payroll system involves a sequence of business tasks that involve ongoing data processing. The payroll information system can automatically calculate employee salaries using important components such as basic salary, overtime, leave, and attendance data. These factors are crucial in determining an employee's wages in an organization. (Soegoto, 2019).

As stated by Ahmed et al (2023), managing employee salaries can be a challenging and time-consuming task due to the large volume of payroll data and calculations involved. In many developing regions and countries, including the Kurdistan Region of Iraq, the process of accounting for salaries is done manually.

This results in slow calculation of deductions and allowances, increased likelihood of errors, difficulty in maintaining salary records from previous months, reduced efficiency, and delayed report generation. As a solution, a web-based payroll management system (WPMS) was developed. This system can accurately and efficiently calculate employee salaries on a monthly and yearly basis, while also maintaining records of their pay, allowances, and deductions in a data mart.

A reliable accounting system, particularly the payroll accounting system, and proper management of employee wages can help prevent fraudulent activity within a company. A robust accounting system can also enhance internal control measures, as stated by Munandar (2022). Calculating employee pay manually can be a laborious and time-consuming task, particularly for large organizations. Therefore, automating the process can be advantageous as it saves time and effort while ensuring accurate salary calculation. Additionally, this system allows for multiple users to access the data.

Every user, such as employees, HR, or admins, can access the software by entering their unique username and password assigned by the company. The software is designed to track employee hours and maintain accurate records of their pay, allowances, deductions, and taxes on a monthly basis. This ensures that new changes are reflected in the system from the current month onward while preserving past data. (Mahajan et al, 2015).

Ensuring employees are paid accurately and on time, and effectively monitoring paycheck amounts, tax withholdings, and benefit deductions are crucial elements of payroll management. An ideal payroll system should be comprehensive without being overly complicated or burdensome, and it should be carefully designed to operate efficiently with minimal supervision. A well-designed payroll system is beneficial for employees, business owners, and HR personnel, as noted by Singh (2014). It is important for a payroll system to be cost-effective by performing calculations efficiently.

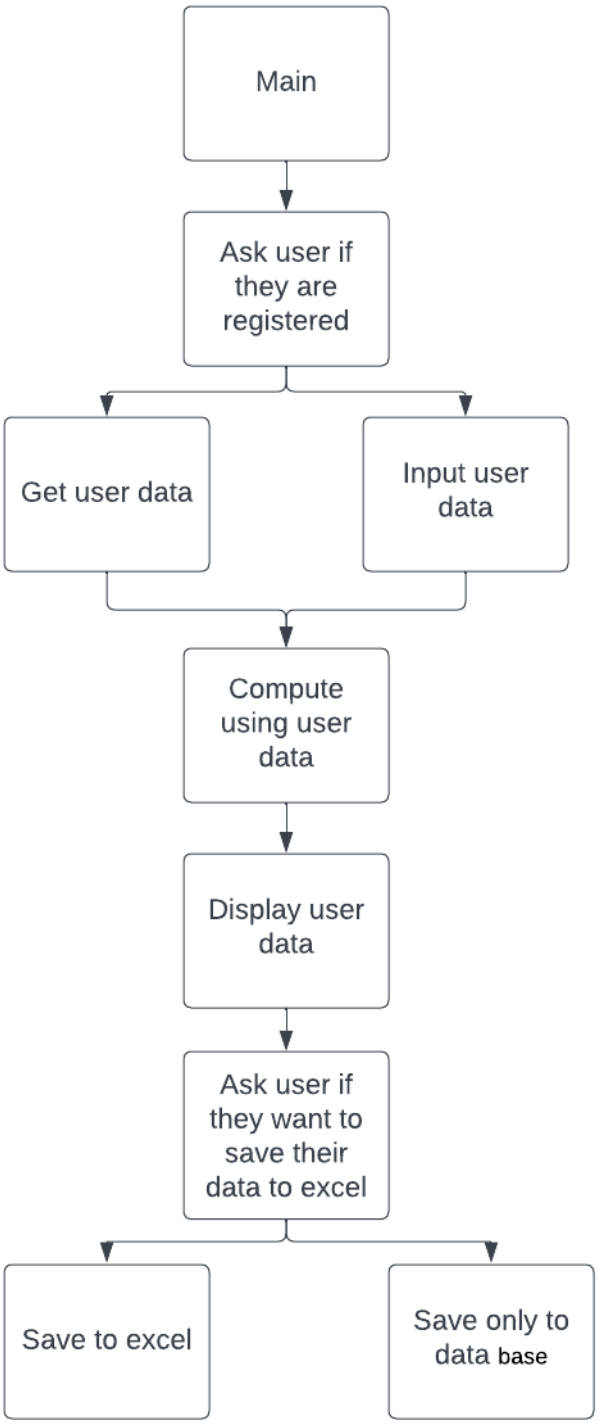
According to Alfandi and Nuzula (2014), implementing a payroll accounting system can help minimize the occurrence of intentional or unintentional fraud and errors that can lead to financial losses for a company. The payroll accounting system can serve as an internal control mechanism for a company. By using the payroll accounting system, a company can effectively manage employee payment transactions, ensuring that employees receive fair compensation that is commensurate with their performance.

III. Methodology

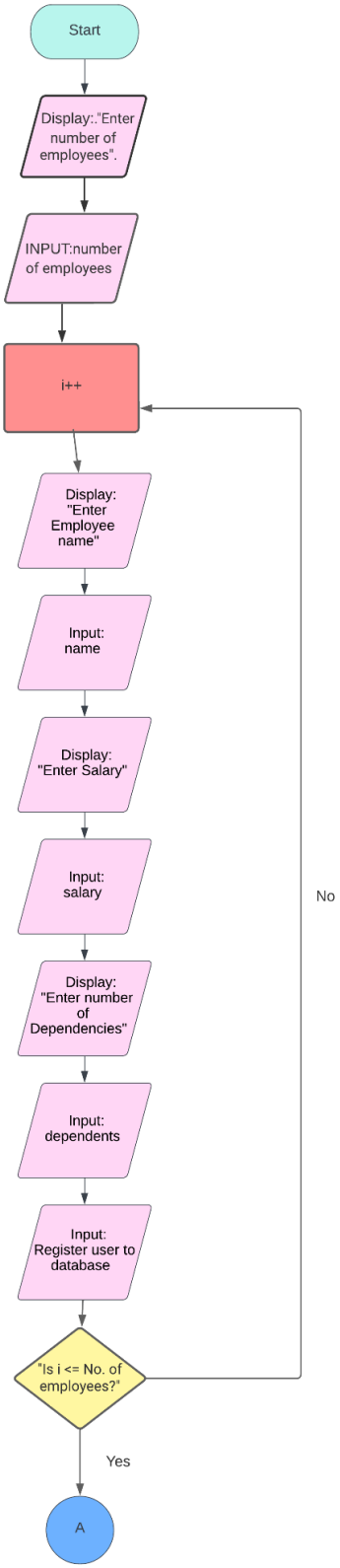
1. Conceptual Framework – IPO Chart (Input-Process-Output-Chart)

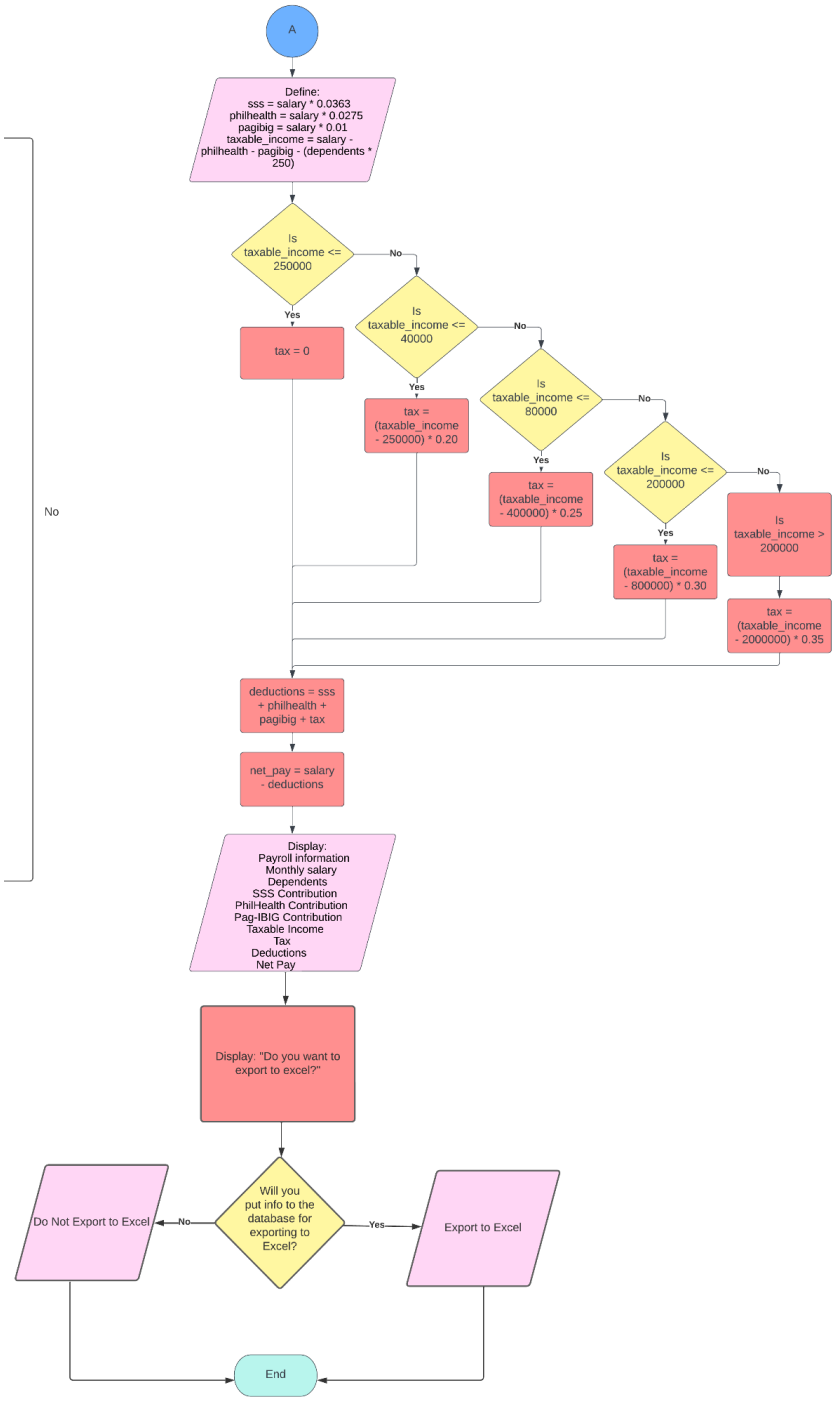
Input	· User registration/log in · Number of employees · Employee information · Deductibles chosen
Process	· The system will first ask the user if they have an existing account if not, they will create a new one · After that user will enter employee information such as salary and dependencies and select which deductibles to include · The program will then compute the remaining salary of the employees and display them. · Additionally, the program will ask if the user wants to save the data to an excel file
Output	· Salary of employees · Excel file with employee salary

2. Hierarchy Chart



3. Flowchart


Start
Display:."Enter number of employees".
INPUT:number of employees
i++
Display: "Enter Employee name"
Input: name
Display: "Enter Salary"
Input: salary
Display: "Enter number of Dependencies"
Input: dependents
Input: Register user to database
"Is i <= No. of employees?"
No
Yes
A


A
Define:
sss = salary * 0.0363
philhealth = salary * 0.0275
pagibig = salary * 0.01
taxable_income = salary - philhealth - pagibig - (dependents * 250)
Is taxable_income <= 250000
No
Yes
tax = 0
Is taxable_income <= 40000
No
Yes
tax = (taxable_income - 250000) * 0.20
Is taxable_income <= 80000
No
Yes
tax = (taxable_income - 400000) * 0.25
Is taxable_income <= 200000
No
Yes
tax = (taxable_income - 800000) * 0.30
Is taxable_income > 200000
tax = (taxable_income - 2000000) * 0.35
No
deductions = sss + philhealth + pagibig + tax
net_pay = salary - deductions
Display:
Payroll information
Monthly salary
Dependents
SSS Contribution
PhilHealth Contribution
Pag-IBIG Contribution
Taxable Income
Tax
Deductions
Net Pay
Display: "Do you want to export to excel?"
Will you put info to the database for exporting to Excel?
No
Do Not Export to Excel
Yes
Export to Excel
End

4. Pseudocode

1. Import the pandas module for data manipulation and analysis

2. Print a welcome message to the user

3. Ask the user to input the number of employees

4. Create an empty DataFrame called 'payroll' with columns for employee information

5. Loop through the range of the number of employees

6. Ask the user to input employee information such as name, salary, and number of dependents

7. Ask the user to choose deductible options (SSS, PhilHealth, and Pag-IBIG) and calculate the contributions

8. Calculate the taxable income and tax using the tax brackets

9. Calculate the deductions and net pay of the employee

10. Append the employee's payroll information to the 'payroll' DataFrame

11. Print the payroll information to the user

12. Ask the user if they want to save the payroll information to an Excel file

13. If yes, ask the user to input a filename and save the 'payroll' DataFrame as an Excel file

14. If no, print a message indicating that the payroll information was not saved

IV. Results

```
Welcome to PACMAN (Payroll Automation and Calculation Management Application Network)
Enter the number of employees: 2

Employee #1
Enter employee name: John
Enter employee monthly salary: 40000
Enter number of dependents: 3

Choose deductible options:
1. SSS
2. PhilHealth
3. Pag-IBIG
Enter comma-separated options: 1,2,3



Employee #2
Enter employee name: Lauren
Enter employee monthly salary: 400000
Enter number of dependents: 3

Choose deductible options:
1. SSS
2. PhilHealth
3. Pag-IBIG
Enter comma-separated options: 1,2,3



Payroll Information:
     Name    Salary Dependents  SSS Contribution  PhilHealth Contribution  \
0    John   40000.0          3            1452.0                   1100.0
1  Lauren  400000.0          3           14520.0                  11000.0

   Pag-IBIG Contribution  Taxable Income      Tax  Deductions   Net Pay
0                  400.0         36298.0        0      2952.0   37048.0
1                 4000.0        369730.0  23946.0     53466.0  346534.0
Would you like to save the payroll information to an Excel file? (y/n) n
Payroll information not saved.
```

V. Discussion of Results

The program works as how it was intended to and the calculations that the program makes are accurate to what Philippine laws mandate. The program is also able to save in an Excel file although in the screenshot the option to not save it was used.

VI. Analysis, Conclusion, and Future Directives

The payroll calculator system the researchers created is a helpful tool for firms to manage employee wages and deductions based on the information given.

For record-keeping purposes, the system's ability to save data to an Excel file will definitely be useful.

In conclusion, for companies wishing to manage their payroll procedures, the payroll calculator may offer an effective and practical option.

First, by automating the process of determining employee compensation, the system may save companies a lot of time and work. Employers may save significant time by using the application to handle employee data more quickly and precisely than they could have done manually.

Second, the precision of the payroll calculator system helps to lower the possibility of mistakes, which may result in legal problems and disgruntled workers.

Third, users are guided by the application as they enter personnel data, choose deductibles, and produce compensation calculations.

For future researchers here are some of the features that the researchers recommend to add in order to enhance the project further.

Add support for additional deductions

The program currently supports SSS, PhilHealth, and Pag-IBIG contributions, but a company may want to track other deductions for their employees, such as health insurance or retirement savings plans. The program could become more versatile and useful by adding support for additional deductions.

Implement user authentication

If the program is used by a company to manage employee payroll information, it may be necessary to restrict access to and modification of the data to only authorized users. Implementing user authentication may aid in ensuring that the program is used securely.

Incorporate data visualization

Currently, the program saves payroll data to a Pandas dataframe and, optionally, an Excel file, but there may be ways to present the data more visually. The program, for example, could generate graphs or charts to assist users in visualizing trends in employee salaries, deductions, or net pay over time.

Integrate with other systems

The program could be integrated with other systems, such as HR management software or accounting software, depending on the needs of the company. This could aid in streamlining the payroll process and lowering the likelihood of errors or inconsistencies.

Add support for more complex tax systems

The program currently calculates taxes using a simple tax bracket system, but some countries or regions may have more complex tax systems that may necessitate additional assistance. The program could become more widely applicable by adding support for more complex tax systems.

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Appendices

A. User's Manual

1. Enter the number of employees:

You will be prompted to enter the number of employees for whom you want to calculate the payroll. Enter an integer value (e.g. 3)

2. Enter employee details: For each employee, you will be prompted to enter the following details:

- Name: Enter the name of the employee.
- Monthly salary: Enter the monthly salary of the employee as a floating-point number (e.g. 5000.00).
- Number of dependents: Enter the number of dependents of the employee as an integer (e.g. 2).

3. You will then be asked to choose which government deductions to apply to the employee's salary. You can choose from the following options:

- SSS (Social Security System)
- PhilHealth (Philippine Health Insurance Corporation)
- Pag-IBIG (Home Development Mutual Fund)

4. View payroll information: Once you have entered the details for all employees, the program will display the payroll information in a table.

5. Save payroll information to Excel: You will be prompted to save the payroll information to an Excel file. If you want to save the file, enter 'y' and then enter the desired filename (without the extension). The program will save the file in the same directory as the script with the '.xlsx' extension. If you do not want to save the file, enter 'n'.

That's it! You have successfully used the PACMAN (Payroll Automation and Calculation Management Application Network) to calculate and manage the payroll of your employees.

B. Source Code

```
import pandas as pd


print("Welcome to PACMAN (Payroll Automation and Calculation Management Application Network)")



num_employees = int(input("Enter the number of employees: "))


payroll = pd.DataFrame(columns=['Name', 'Salary', 'Dependents', 'SSS Contribution', 'PhilHealth Contribution', 'Pag-IBIG Contribution', 'Taxable Income', 'Tax', 'Deductions', 'Net Pay'])


for i in range(num_employees):
    print(f"\nEmployee #{i+1}")


    #employee information
    name = input("Enter employee name: ")
    salary = float(input("Enter employee monthly salary: "))
    dependents = int(input("Enter number of dependents: "))


    # deductible options
    print("\nChoose deductible options:")
    print("1. SSS")
    print("2. PhilHealth")
    print("3. Pag-IBIG")
    deductible_options = input("Enter comma-separated options: ").split(',')


    # government deductions
    sss = 0
```

```
    philhealth = 0
    pagibig = 0
    for option in deductible_options:
        if option == '1':
            sss = salary * 0.0363
        elif option == '2':
            philhealth = salary * 0.0275
        elif option == '3':
            pagibig = salary * 0.01

    taxable_income = salary - sss - philhealth - pagibig - (dependents * 250)
    if taxable_income <= 250000:
        tax = 0
    elif taxable_income <= 400000:
        tax = (taxable_income - 250000) * 0.20
    elif taxable_income <= 800000:
        tax = 30000 + (taxable_income - 400000) * 0.25
    elif taxable_income <= 2000000:
        tax = 130000 + (taxable_income - 800000) * 0.30
    else:
        tax = 490000 + (taxable_income - 2000000) * 0.35

    #net pay
    deductions = sss + philhealth + pagibig + tax
    net_pay = salary - deductions

    # Add employee payroll information to dataframe
    payroll = payroll.append({'Name': name, 'Salary': salary, 'Dependents': dependents, 'SSS
Contribution': sss, 'PhilHealth Contribution': philhealth, 'Pag-IBIG Contribution': pagibig,
```

```
'Taxable Income': taxable_income, 'Tax': tax, 'Deductions': deductions, 'Net Pay': net_pay},
ignore_index=True)


print("\nPayroll Information:")
print(payroll)


#Excel file
save_option = input("Would you like to save the payroll information to an Excel file? (y/n) ")
if save_option.lower() == 'y':
    filename = input("Enter filename: ")
    payroll.to_excel(f"{filename}.xlsx", index=False)
    print(f"Payroll information saved to {filename}.xlsx")
else:
    print("Payroll information not saved.")
```

C. **Work breakdown**

Student Name	Tasks Assigned	Percentage of the Work Contribution
Ron Andrei L. Quijano	● Significance of the study ● Recommendation ● Specific Objective ● Manual ● 70% of the code	40%
Lauren Frances M. Salazar	● Review of Related Literature ● General Objectives ● Analysis ● Conclusion ● 15% of the code	30%
John Ray M. Cardeno	● Introduction ● Background of The Study ● Problem Statement ● Flowchart ● Results ● Discussion of results ● Hierarchy chart ● Source code input ● 15% of the code	30%

D. Personal Data Sheet

Student's Information Sheet

Subject: PROLOGI **Section:** EQ3 **Schedule:** 12:45 – 1:45

Tri-Academic Year: 1st **Professor:** Ramon Stephen L. Ruiz

Personal:

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Schools:

College:

2022 - Present	Bachelor of Science in Computer Engineering De La Salle University - Manila

Senior High School:

2020 - 2022	General Academic Strand Santa Cruz National High School

Junior High School:

2016 - 2020	Santa Cruz National High School

Elementary:

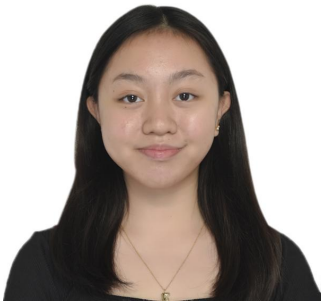
2010 - 2016 St. Martin Montessori School Inc.

Student's Information Sheet

Subject: PROLOGI **Section:** EQ3 **Schedule:** 12:45 – 1:45

Tri-Academic Year: 1st **Professor:** Ramon Stephen L. Ruiz

Personal:



Name: Lauren Frances M. Salazar

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Educational Background

College:

2022 - Present Bachelor of Science in Computer Engineering

De La Salle University - Manila

Senior High:

2020 - 2022 Science, Technology, Engineering and Mathematics

Tarlac Montessori School

Junior High:

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Elementary:

2014 - 2016 Tarlac Montessori School

2013 - 2014	Tarlac Christian College
2010 - 2013	Galilee Academy

Student's Information Sheet

Subject: PROLOGI **Section:** EQ3 **Schedule:** 12:45 – 1:45

Tri-Academic Year: 1st **Professor:** Ramon Stephen L. Ruiz

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Educational Background

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Elementary:

2010 - 2016	Camella School Inc.