Sri Lanka Institute of Information Technology

Tea Factory Management System

Project Proposal

Information Technology Project – IT2080

2021

Project Group ID: ITP2021_S2_WE_G09

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Date Of Submission: 8/9/2021

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1. Introduction

1.1. Company Background

Kaley Tea' Co (PVT) Ltd supplies high quality tea to local and foreign markets through its tea factory. The tea factory has many employees who work under different units in the factory. There are managers, supervisors, and workers for each unit. The factory also provides a good payment for all employees. That is why the employees maintain a good attendance and enthusiastically give their best for the factory.

The tea factory collects large amounts of tea leaves daily from small and large-scale suppliers. Then the collected leaves are processed and stored in storerooms to be sold at the auction. All most all the tea produced by the factory are sold at the tea auction while the rest are sold at the factory outlet for local customers. The factory also has a large inventory that can cater to any demand. The factory has good transportation and market targets can be easily achieved through it.

1.2. Problems

The main problem here is that all the work in the factory is done by a manual. There is a need for a database to store the data in the system. Manual handling of time and storage tasks can lead to unavailability of supplies from suppliers on time, which can be time consuming and costly to store accurately. Using the system manually reduces the efficiency of the system and the reliability of the data. Considering an automated system, a large factory can never be controlled by human labor. Also, since there are more than 1 administrative staff member in a manual system, there may be some inconsistencies in their records. The use of manuals in maintaining important information and files that are essential to the factory cannot be held responsible for their safety. Unauthorized access can damage important data due to the lack of any monitoring mechanism to monitor access, and natural disasters can destroy data collected from those manuals. Also, problems in calculating money can cause losses to the factory. In addition, it is very difficult to find something very important suddenly through this manual system.

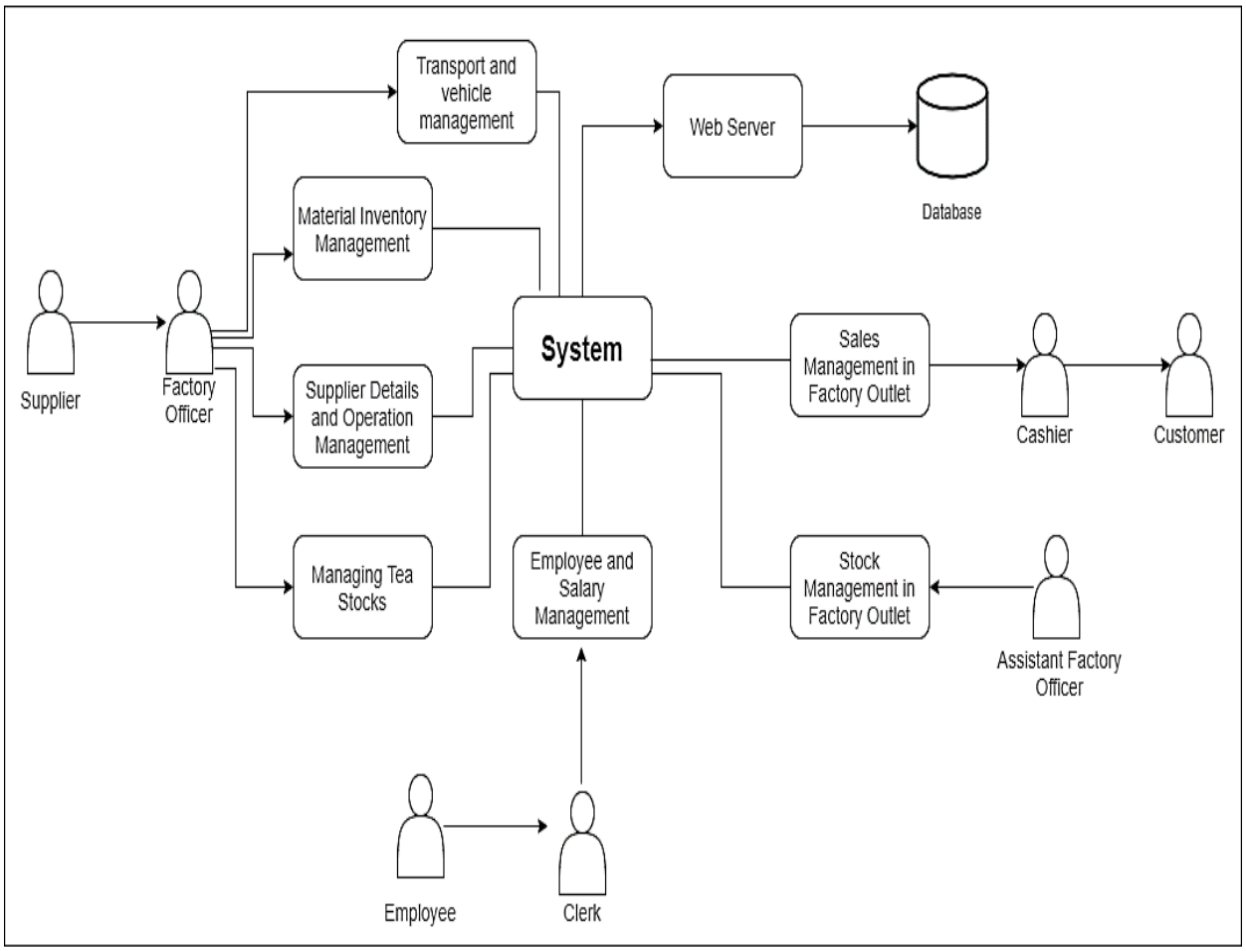
1.3. Solutions

As a solution to the above problems, we decided to move the factory to an automated system. This allows the system to handle any stock of supplies at any given time in the required categories and to easily store, store and retrieve them in a very convenient manner. Selecting a web application rather than a desktop application makes it easier for clients and staff to access the system and search for relevant information. It allows access to the system via the Internet from anywhere. Another advantage of automating the system is that it reduces the number of errors caused by manual methods and increases the efficiency of the system. It facilitates transactions, enables storage, supply and delivery of the required inventory in the factory, manages the daily wages of the employees in the factory and can properly mark their daily attendance. Therefore, this proposed process will enable staff members to carry out their work more accurately and efficiently.

1.4. Benefits of the System

- Real-time data
    - Tea factory can take a reliable decision from real-time data
- Available
    - Data can access from anywhere at anytime
- Easy and Accurate
    - Accurate data can be accessed easily
- Helps to reduce cost
    - No need to spend much on files handling and store previous records
- Administrator can take decisions easily
    - Make decisions using generated reports
- Data security
    - Data can be backed up
- Proper management
    - Employee (attendance, salary), suppliers, sales and stock, vehicle and transport
- Less manual records and reports
- Improve the effectiveness and productivity

2. System Overview Diagram



3. System Functions

3.1. Employee Management System

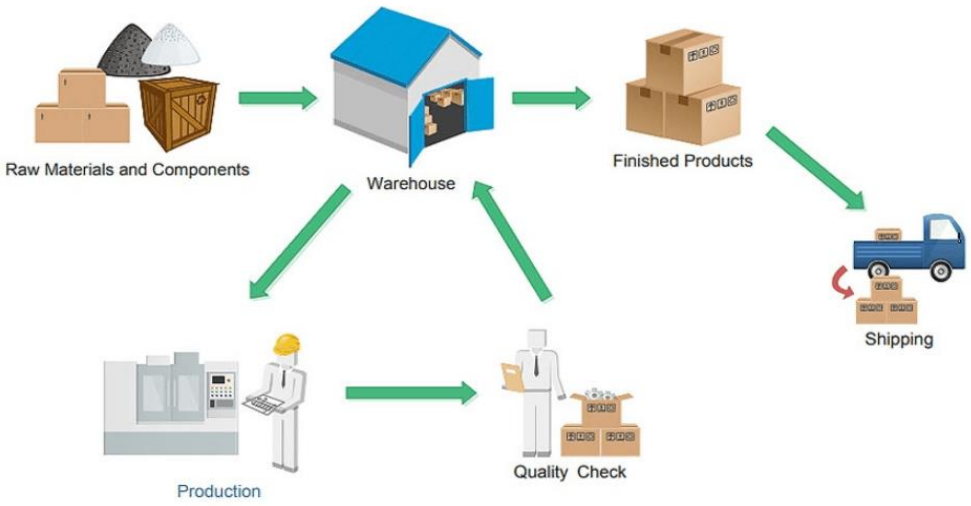
This function comes under the main function “Employee Management System”. The clerk has to get details from the workers and enter their details and **register** them as the workers of the factory When registering following details are collected.

1. **Name**
2. **Date of Birth**
3. **NIC Number**
4. **Contact Details**
5. **EPF/ETF**

If a worker is new to the factory, he/she will become a temporary worker for 3 months. After completing 3 months of his/her work, the system will display an alert to upgrade as a permanent worker. This is required because when calculating the salary after 3 months, additional features like EPF, ETF were added to the salary and the employer was provided with an EPF number. Therefore, the system must Update them. And can Remove employees when they resigned from the job
The payroll system of the workers who work inside the factory are based on the total number of working days throughout the month. So, their daily attendance will be managed and calculated at the end of the month by the system.

The management staff of the factory face a huge difficulty in finding past records of the workers. So, it is important to maintain a profile for each worker including their basic details and working days. If a worker asks for financial assistance, the clerk can Search for the worker and take a decision.

3.2. Inventory Management System



Inventory is a critical point for the strategic management of any organization. This enables us to easily track the ordering, sales, and distribution of the Inventory Management System. The main function of the inventory management system is to meet the demand of the customers. Inventory management software enables us to increase productivity and efficiency by implementing automated daily manual tasks. This will assist you to maximize the growth of your business. The software saves uncountable hours and gives the opportunity to print shipping labels, process, and dispatch orders, manage stock, create, and update the listing on the system.

In this case, the fresh tea leaves received from the suppliers are properly managed after they reach the factory. Here the waste is removed and then stored in large trays for drying. Here 2.5 kg of tea leaves per square foot of tray is identified. After drying the fresh tea leaves, their average weight is about 1/4 of the original size.

First, as soon as the supplier delivers the fresh tea leaves, the date and time of adding the

- supplier's identity card
- fresh tea leaves to the tray
- temperature
- humidity
- tray id, the date and time of sending to the machine to start production, etc.

should be set correctly.

When fresh tea leaves are brought in by another supplier, the above key details should be updated when adding them to the tray. During this drying process, the tea leaves take some time to dry to the optimum level. The time and date are always recorded in the inventory when stored. The rate of wilting of tea leaves varies depending on the temperature and humidity of the storage room. Therefore, the system must be set up to balance the incoming rate and the factors of temperature and humidity must be recorded in the system. A small alert warns you that when you fill one disk, you must go back to the new one.

When it comes to maintaining the balance sheet of inventories and its management, it is a difficult and challenging task to handle. Case of less stock leads to stock-out which not only disrupt customer relation but cause a possible loss whereas in case of over-stock its storage creates a problem. With inventory management software installed, you can set a limit for re-ordering so that stock when drops it gets automatically re-ordered.

Once the tea leaves have dried to the required size, they are inspected by a system supervisor and sent to a tea leaf shredder for final processing. As a final product, fresh tea leaves are harvested and a report containing the following details is prepared. Time to pile up fresh tea leaves.

- Weight of tea leaves
- Weight of desired product
- Weight of packaging
- Types of final tea products and their burrs, etc.

Finally, Inventory tracking is the most beneficial function and feature of inventory management software. The software keeps the track of unlimited serial numbers from when the inventory is received until the time it is issued. after all the reports have been processed, they are sent to the database. The software is meant to generate automated reports. You can get any report such as a low stock report, inventory validation report, inventory forecast report.

3.3. Transport and Vehicle Repair Management

This task is about the vehicles in a tea factory. The main purpose of this event is to create an easy way to automate vehicle registration and their details, as is usually the case in the industry with vehicle registration books. All vehicles must be registered to the system.

These vehicles travel daily to collect tea leaves from suppliers and before and after each trip, meter readings are recorded to measure distance and calculate fuel consumption. It allows the factory to calculate the cost of fuel for their month.

When they send the vehicle to the repairs, they have to set the expenditure for them monthly and when they send vehicle parts like tires for repairs, they send all the tires and keep them in store. So, the sent stock and available stock should be updated

When registering the vehicles, the employee should be able to ADD vehicle details to the system such as,

- **Vehicle number**
- **Date**
- **Driver name**
- **Meter readings**
- **Number of kilometers driven**
- **Year**
- **Month**
- **Description**

The system can **Retrieve** and **Update** the vehicle details by using the read and update function. If the management staff wants to remove vehicle details from the system **Delete** function will lead to that**.**

3.4. Salary Management System

The employees in the factory can be categorized into several categories.

- Main office employees
- Shop employees
- Factory employees
- Factory workers

Factory workers are paid a daily wage which depends on their daily attendance and the number of hours they work. The factory manager has the manual control of the wages paid.

All the other employees are paid a basic salary relevant to their position. But the final salary will be calculated by taking several allowances into account.

- EPF/ETF calculations
- Overtime payments
- Bonuses
- Employee advances
- Employee loans

The EPF/ETF calculations are done according to the government regulations and company policies. Overtime pays are calculated according to the individual attendance of the employee. Overtime payments and bonuses are added, while the advances and loans are deducted when calculating the final salary.

3.5. Supply Details & Operation Management

This functional is created to administer the suppliers' details of the factory. Initially, suppliers register through the system. This data must be provided at supplier registration,

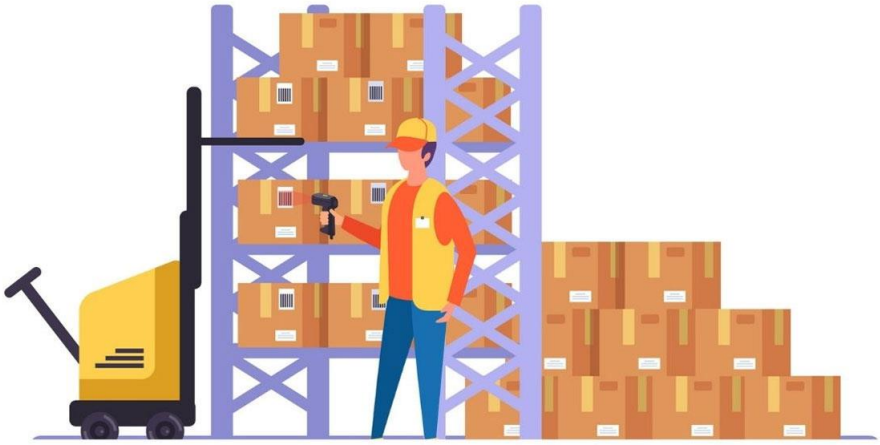
- Supplier name
- NIC Number
- Contact number
- Address of tea estate
- Bank details

Supplier Manager who is responsible for administration this functional. Supplier can get a supplier ID after the successful registration. After the successful registration, suppliers can supply their crops to factory. While the suppling crops these data collect by supplier manager daily,

- Supplier ID
- Weight of crops
- Received time & date of crops

The supplier manager will take those stock details and he or she can add or update suppliers stock details. Supplier manager will give a stock ID for every stock. If a supplier resigns, that person's records will be deleted. Suppliers will be paid according to the weight of the monthly tea leaves. Payments are done monthly, and payments can be sent to Suppliers' bank accounts, or they can collect them as cash or a cheque from the factory main office. Monthly salary invoice is Generated for each supplier through the system.

3.6. Final Tea Production Stock Management



This function is useful to manage tea production details of the factory. Mainly it contains Add / Update details of the production and calculate value of the tea production. Stock Manager records the production details daily, according to each tea category. There are many tea categories like OPA, OP, OP1, BOP, BOPF, etc. These categories have several kinds of values in the tea auction. Stock Manager prepares the tea stock every week according to the daily tea production to sell in the auction.

Sale Factory sells their final product in auction and these sales are done through samples of tea stock. The tea factory and the buyer are connected through a broker. These auction sales are done through a broker. It has several rules and regulations to manage each tea factory production in the county. Weekly total tea production has several types of tea categories (above mentioned), and each category is considered as a stock. The Stock Manager sends a sample of tea stock to the broker, and he sells the stock in the auction according to the tea sample details. Stock Manager records these production stock and broker details. After the auction, sale broker sends a report of sales details to the Stock Manager. The Stock Manager must record these production values and updates these values according to the auction sales. According to the broker's sales report Stock Manager calculates the total production value. Then he calculates the total profit of the factory earned monthly.

• Factory officer can Add daily production details to the system.

• According to the daily production details factory officer can prepare the weekly total production.

• Factory officer must Add broker details and tea sample details for each stock through the system before sending it to the auction.

• Then he needs to Update / Delete these stock details according to the brokers auction sales report. If the stock is not sold in the auction Stock Manager must resend a sample and wait until the broker's auction sales report.

• According to the broker's report details, the factory officer or clerk can Calculate the production value through the system.

• Total production cost value and total profit of the factory is calculated by the Stock Manager through the system at the end of the month. Also, the system generates total production reports, total profit reports and total production valuation reports.

3.7. Factory Outlet

3.7.1. Stock Management

In this function, users of this system will be able to add, delete, edit, and view tea stocks by tea category.

The user can input Tea category and weight when the tea shop receives 5% of the total production.

User can view the available stock by past records and then user can decide the number of packets which can be packed from the received categories by giving the priority to the fast-moving categories. After completing the packing, the system calculates tea packets of each category, the system will alert remaining tea amounts and the number of packets that can be produced using remains and displays it in the system.

Tea categories,

- BOP -1kg, 500g, 250g
- BOPF -1kg, 500g, 250g
- OPA -1kg, 500g, 250g
- OPA -1kg, 500g, 250g

Also, the system should allow the user to review the stock balance when making transactions.

The system should alert the user when the order level is reached. The system should generate monthly and annual reports for the user.

3.6.1. Sales Management

The factory outlet is where the extra products of the factory are sold to ordinary people. They are sold at retail price but with some discount. Usually, this factory produces about 5% more products than the required production limit. Currently they manage their sales manually. But with the growth of their business, the sales of the outlet have increased. So, there can be mistakes when handling their functionalities manually. Because of that they decided to automate their functionalities so they can manage the functionalities more effectively and accurately.

There are two main roles that want to access the system in sales management. Every role can view a pricelist of items that they are selling in the outlet. The salesperson can make a bill as for the customers' buying items. When the salesperson enters the items for the bill the total should be automatically calculated, and it should show on the screen. After placing the order salesperson can enter how much the customer gave. Then the balance will show that he/she wants to give back to the customer and the generated bill also print.

The sales manager can handle all the sales details in the outlet. He/she has access to view all the past details of orders. If the salesperson makes some mistake when entering the sales details, the sales manager can edit and update details or delete that data permanently. He/she also can get weekly/ monthly/ yearly reports about the sales of the outlet to analyze data and send them to the factory.

Data in the Generated Bill

- Outlet name and address
- Date and time
- Name of the salesperson
- Item name
- Quantity
- Unit price
- Sub amount
- Total of the bill
- Discount
- Payment method
- Given cash amount

Data in the Generated Report

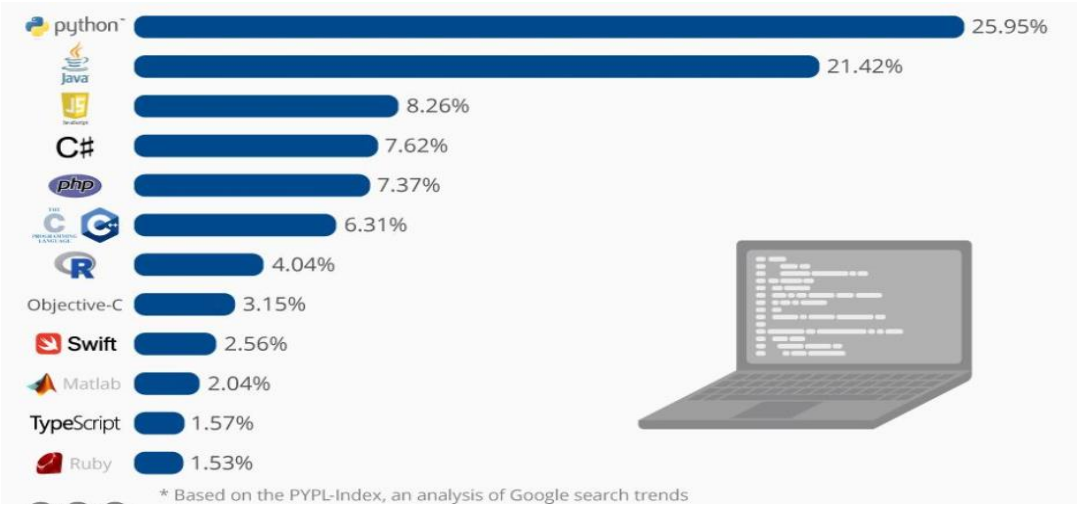
- Outlet name and address
- Generated date and time
- Name of the sales manager
- Time period
- Total amount of sales
- Number of sales
- Number of items sold
- Most sold item, least sold item
- Most sold date, least sold date
- Average number of items per order
- Average price of an order

4. Tools and Technologies

❖ Python

Python is a popular programming language. It was created by Guido van Rossum and released in 1991. Python is an open-source (free) programming language that is used in web programming, data science, artificial intelligence, and many scientific applications. Learning Python allows the programmer to focus on solving problems, rather than focusing on syntax.

Python allows developers to create scientific applications, system applications with graphics, games, command-line utilities, web applications, and many more options. In fact, Python has been considered as "the most popular coding language" for the past years.



It is Use for:

- Web Development (server-Side)
- Software Development
- System Scripting

What can we do with Python?

- Python can be used on a server to create web applications.
- Python can be used to alongside software to create workflows.
- Python can connect to database and can also read and modify files.
- Python can be used to handle big data and perform complex mathematics.

What are the famous web sites using with Python?

- Google
- Spotify
- Netflix
- Uber
- Pinterest
- Instagram

➢ Benefits

- Python is an Open-Source Language
- Easy to use and learn
- Support Multi-Tasking
- Build more functions with lesser coding.
- Has in built Libraries which can support the aue of AI in Web Development
- Easy to build prototypes
- Easy to test
- A strong Community supportive Language

❖Django

Django is a high-level Python web framework that enables rapid development of secure and maintainable websites. It is based on MVT (Model View Template) design pattern.

Built by experienced developers, Django takes care of much of the hassle of web development, so you can focus on writing your app without needing to reinvent the wheel. It is free and open source, has a thriving and active community, great documentation, and many options for free and paid-for support.

The Django is very demanding due to its rapid development feature. It takes less time to build application after collecting client requirement.

Features Of Django:

- Secure
- Scalable
- Fully Loaded
- Versatile
- Open Source
- Rapid Development
- Support Community

➢ Benefits

- Easy to extends and scale.
- Written in Python
- Support MVC programming paradigm
- Compatible with major operating system and database
- Provide robust security features

5. Gantt Chart

	Plans	week 1	week 2	week 3	week 4	week 5	week 6	week 7	week 8	week 9	week 10	week 11	week 12
01	**Plan the project**												
02	**Create & submit project charter document**												
03	**Do proposal presentation and submit report**												
04	**Interface Designing**												
05	**Draw an ER Diagrams and create the database**												
06	**Develop Functions**												
07	**Do progress Presentation**												
08	**Test the System**												
09	**Present the system**												
10	**Fix system vulnerabilities and test the system**												
11	**Write a report**												
12	**Do final presentation and submit a report**												

This Gantt chart demonstrates our time allocation for this project. Information shown as project duration is 12 weeks. As illustrated in the figure, all the steps will be followed within the given period. First three steps we have already completed in addition to that, we have started interface designing. Remaining steps will be started soon. However, the first three steps we have completed successfully on time wherefore in the 12 weeks, our completed project will be deployed in the Tea Factory.

6. Work Breakdown Structure

No	Student ID	Name with initials	Work Distribution
01	IT20012724	Ananda R.S.R.G.J. N	**Employee Management System** • Add Employee Details to the system • Update Employee details • Delete resigned Employees • Retrieve Employee details and display as profile • Manage Daly attendance of workers • Generate report based on attendance
02	IT20146238	Jayathunga T.M.	**Inventory Management System** • Add Inventory Details. • Update Inventory Details. • Delete Inventory Details. • Update Daily and Monthly product Details. • Add and delete tea Grades. • Generate report about the inventory stocks & final product stocks.
03	IT20237240	Prabashwara U.K.A.L	**Transport and Vehicle Repair Management** • Add driver, Vehicle details • Add vehicle repair details • Update Driver details & repair details • Calculate daily travelled distance • Calculate Total meter reading monthly • Calculate total amount spent for vehicle maintenance • Generate meter reading reports • Generate Vehicle maintenance report

04	IT20005108	Edirisooriya N.W	**Salary Management System** • Add OT hours and advances to employees • • Update rates of salaries according to the government salary rates • • Retrieve full reports of all employee salaries monthly and annually • • Delete salary records of resigned employees • • Get all the daily attendance of workers and calculate the monthly salary
05	IT20211950	Amarasekara M.G.V.C	**Supply Details & Operating Management** • Add / Register suppliers to the System • Update supplier details • Delete resigned suppliers' details • Calculate suppliers' payments • Generate supplier payment invoices Leaf Stock Management • Add daily stock details • Delete false stock records
06	IT20272654	Rajapaksha R.P.S.V.	**Managing tea stocks (Final Production)** • Add daily tea production details, Tea stock sample details and broker details • Update stock details according to the broker's auction sales report, current stock details • Delete unwanted records • Calculate the production value according to the broker's auction selling report, daily/weekly/monthly production. • Generate reports according to the production details changes.

07	IT20090562	Nagahawatta S.S	**Stock management of the factory outlet** ● Add tea category, the weight and number of packets to the system, a new category (when needed) ● Update current stock, reorder level ● Delete unwanted records ● Generate reports of stocks ● Calculate stock balance
08	IT20208462	Gunaratne B.S.	**Sales Management of the factory outlet** • Add items to the bill and place an order • Edit and update inserted data if there are any mistake • Delete unwanted records • View all previous sales records • Generate bill • Generate sales report for weekly/ monthly/ yearly

References:

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- https://www.tutorialspoint.com/python/index.htm
- https://www.djangoproject.com/download/