Information Technology Project
(IT2080)

Human Resources Management System for AGIO Tobacco

MALABE 1.1
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Project Proposal Document

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Background

Scandinavian Tobacco Group(STG) is a leading tobacco manufacturing company which is number one in fine cut tobacco in Denmark and the US. Their vision to be achieved by 2025 is "Be the undisputed, global leader in cigars." To achieve this goal, they have made the below mentioned plan.

According to the given image the "must-win-battles" point emphasizes on the aspects they need to fulfill by 2025. "IT and Data capabilities and infrastructure" are one of the tasks they need to fulfill by 2025 [1]. (Refer Appendix A, for the diagram)

Their Sri Lankan branch is located at Biyagama free trade zone. Currently there are two thousand employees working in the Sri Lankan branch which includes ten employees belonging to the Human Resource department. Most of their work are still conducted manually therefore they need to digitalize their tasks to do their work efficiently. Its Human resource department hierarchy is as follows,

1. Human Resources Manager
2. Data and process lead
3. Data and process coordinator
4. Peoples service lead
5. Peoples service coordinator
6. Nurse
7. Human resource clerk.
   (Refer Appendix B, for the hierarchy diagram)

They currently have an HRM system, and the client is not at all satisfied with its functionality. It has lot of limitations and failures; hence, we were asked to build an HRM system comprising of a computerized system for leave management, transport management, payroll management, inventory management, attendance management, employee skill metric management, health and benefit management and employee detail management.

Problems and motivation

Human Resources of STG has been managing most of their system in an automated manner, but still, there are several sections of their management system that they do manually. They are also certain functions that have encountered errors. These errors have resulted in significant setbacks, especially when managing over two thousand daily working employees. Some problems can be easily solved using automated functions, but some need to be adjusted with proper coding and design. Below are the issues that the company faces.

Every day, when an employee enters the premises, they should get their attendance using a face detection camera at the entrance of the building. Attendance is gathered without errors only if employees enter and leave the facility during their relevant shifts. But this is not practical, and it has resulted in odd clocking. Another issue related to attendance is that some employees are identified incorrectly, resulting in odd clocking. Odd clocking directly causes errors in payroll management as well.

Currently, the leaves of employees are managed manually using leave cards. This is a very ineffective method since it takes a lot of time because there can be several employees requesting

leaves and the management must listen to all their reasons and accept or reject their request. There is also no way for employees to find out the number of days that are left for leaves since there are only a limited number of leaves given to an employee per year. Also, there is no way of specifying the existing leave status of employees.

Handling transportation services is also done manually, and the HR Department has no records of the drivers and the respective employees that are using these services. In case of an emergency, there is no way to contact them. This was a huge problem during the pandemic since there was no way of contacting relevant drivers.

Employees are categorized under two sections, Manpower Employees and Company Employees. There are two buildings under this company and the employees are assigned to those buildings, but the system is unable to differentiate these employees, due to this it has been difficult to make reports on the respective departments. It has also been difficult for them to filter the employees according to certain keywords as well which reduces the efficiency of managing the information of employees.

When it comes to the payroll management, the system is unable to detect the EPF and ETF eligibility of each employee. This leads to complications when calculating employee salaries. The company allocates certain allowances for the employees based on different criterias and the current system is unable to show whether these employees are eligible or not. Another major issue with this system is that in certain instances when an employee has worked overtime the system has not recorded it, the employees are unaware of this situation. Employees usually see this only after they get their pay sheet. The employees will not be paid for the overtime hours, and it will cause an error in salary calculation.

Health-related information regarding employees is recorded manually. When there are lots of employees getting in line to get the treatment it takes a lot of time. Also, there is no way of knowing the prescriptions given to patients in case they had allergies.

The company's inventory management system is currently managed manually. The lack of a computerized system for this purpose had caused the company to face several issues including compilation in the accounts department. It is currently impossible for the department to find the available quantity of stocks of each type of inventory present. This could result in any manual work being put on hold. This time that is wasted, could affect the productivity and output of the workers tremendously.

In order to boost motivation and increase productivity the company has been using different methods to appreciate the employees., but there has not yet been a proper mechanism.

As mentioned above the company has faced various problems. By addressing these problems, the company has benefited as follows.

The Attendance can be gathered without errors which will solve the errors related to odd clocking. Also, the shifts can be now gathered with the proper hours. This will help in calculating the proper overtime pay for each employee.

Employees will be able to apply for leave using the system which then will be accepted or rejected by the management. Employees will be able to view details regarding their previous leaves. The Human Resource manager can have an idea regarding the leaves of employees.

The human resource department can have detailed information regarding the shuttle services available and their routes. They can also have information on relevant drivers assigned to different routes and the employees who are using the services. They can also find the number of seats available in each shuttle.

The HR Department can now search employees based on different criteria; they also can filter out the employees according to different keywords which will be very much effective when generating reports on employees.
Calculating the salary can also be done smoothly without any mistakes.
Managing the benefits given to employees regarding their health can be done systematically. The system will record the prescriptions given to each employee which will be used to inform the doctors whenever a serious illness arises.
Inventories can now be utilized efficiently and now can get detailed reports on the inventories. Stocks can be managed, and errors occurred the accounts department will also be solved.
Employees will be appreciated based on their skills and will be given the chance to fill the vacant positions in the company. This will also boost the motivation of employees and will help increase productivity.

Aim and objectives

Aims

- Our main aim of this project is to fix the vulnerabilities and faults of the current system and simplify the system further.
- We plan on making our system interface very user friendly so that a new user of the system can easily catch on with how things work.
- We plan on automating some of the current processes that are done manually. (Leave request, Inventory management, health and benefit and transportation are performed manually).
- Solve the issue of failed facial recognitions.
- Save the time of employees and staff to check the number of remaining leaves.
- Eliminate delays in salary creation.
- Store and manage the skills of employees so that that information could be used when filling the vacant positions in the future.
- Store employee health records in order to use in an emergency.

Objectives

- Conduct interviews, observations, report analysis to identify user requirement are
- Gather information on the failures of the existing system.
- Provide prototypes to the client and get feedback to make sure we are on the right path.
- Come up with a visual confirmation once facial recognition is successful.
- Computerize leave information
- Give employees access to their payroll information 24/7
- Maintain qualifications of current working employees
- Maintain medical records of employees in case of emergencies

System overview

Leave management system

Functional Requirements

- The system stores the history of the leaves taken by each employee
- The system displays the availability of leaves of an employee.
- The system allows the employee to request for a leave, update a leave request (extend the leave dates), delete a leave request made and view all the leave requests of an employee.
- The system provides a search function for the HR department to filter the employees who have applied for certain type of leaves, Employees absent on a specific date.
- The Human Resources department can view the employees who have applied for leave.

Non-functional Requirements

- The system shall load within less than one minute.
- The requests shall be added quickly.
- The primary memory consumption of the system is very less.

Related technical requirements

- Desktop / laptop devices
- Kiosk machine
- Internet connection

Payroll Management

Functional Requirements

- The Payroll Management allows the HR staff to manage all payment related details of all employees.
- Payroll management stores all payment details of all employees in one place.
- Every employee working for the company has to have a payroll record so the system allows the information of new employees to be added whenever necessary. When a new employee is added to the Employee database, a pending request is automatically sent to the Payroll System regarding this new employee, so from here the HR staff can decide whether they want to add the necessary payroll information to this employee or not. If they choose to add this information, a new record will be added to the payroll database with respect to that employee.
- In case there is a change or error in the details of any employee, the system allows the HR staff to easily update this information to ensure to the correct settlements of payments.
- If an employee was to leave the organization at some point in time, that employee's payroll information is no longer necessary, so the system allows the functionality to delete an employee's payroll record from the payroll database.
- If for any reason the HR staff had to look up the payroll information of a specific employee, it would be a hassle to go through thousands of records to find this one

employee, so for that the system has a search function where we are able to find a specific employee's payroll information by entering his/her Employee ID.

- Another crucial functionality of the Payroll Management is the report generation. A report can be generated of any employee we want. This report consists of an employee's allowances, deductions, over time hours, basic salary and leaves. This is used by Accountant to calculate the salaries of employees.
- Lastly the system allows employees to check their overtime hours, leaves and other payroll information to make sure that there are no errors in their overtime hours etc. Allowing to do so will mitigate delays in payment processing.

Related Non-Functional Requirements

- Since our database is cloud based, there is no need for external hard drives, so there is less risk of the data being corrupted or hacked.
- Since the database is cloud based, storage is not an issue, it can be upgraded on demand.
- System data is safer since the security is manager by the cloud service provider such as Google
- System is fast
- User friendly and easy to use

Related technical requirements

- PCs
- Keyboards
- Mouse
- Internet Connection

Inventory Management

Functional Requirements

- The inventory management system manages all the stationery that is used in the HR department.
- All stationeries are maintained by the HR Clerk in the company. Allowing the respective individual to add details of inventories consisting of attributes like, item code, description, quantity, re-order level. These details will be stored in the cloud database of the company.
- Any new quantity of stocks delivered by the GRM section of the company (STG) to the HR department, could be updated by the HR Clerk by making necessary changes to the quantity column of the database that is relevant to the given stationery in place.
- Furthermore, the HR Clerk could also completely delete records of stationery, or details of stationery that will no longer needed by the department, with the prior permission or approval of the HR manager or the immediate supervisor of the HR Clerk.

- The system should display an alert when the stocks reach the re-order level. Thereby informing the HR Manager and the HR Clerk, that no further issues of stationeries could be made to their HR workers based on any of the requests they might make.
- The HR Clerk and the HR Manager should be able to access a monthly report that is generated by the system, which depicts the monthly usage or consumption of inventories and how much of it is remaining in specific to each stationery type. With the use of these reports, the HR Manager might be able to take precautionary measures that could refrain them from overusing or wasting stationery.
- The HR Clerk should be notified with an alert, whenever duplicate records are entered.
- Furthermore, retrieval of records specific to a given inventory type needed, is made much easier, with the use of the search function implemented in the new system.

Non-functional

- The screen refresh time is something that occurs instantly in the new system. Thereby, stimulating the speed of the system.
- Furthermore, it is a system that is developed to be used easily, with user friendly features implemented. Thus, it is easier to use.
- Pressures on storage and the costs related to storage could be eliminated.
- Allows the company to remain competitive in the market, since the company would be using a web-based system for its inventory management purpose.

Technical Requirements

- Computers
- Stable internet connection

Transport Management

Functional Requirements

- HR Clerk can add details of a new vehicle to the system using the system user interface.
- System allows to view all the vehicle details in a single page for HR staff.
- HR Clerk will be able to make changes to a particular vehicle's details.
- HR Clerk can remove unusable vehicle's details from the system.
- System allows to find any vehicle details searching by vehicle number or vehicle type for HR staff.
- System generates a summary report regarding the transport service details.

Related Non-Functional Requirements

- HR Clerk / HR Manager can see details of transport services at any time.
- There is a proper navigation method to navigate between components.

- Security has been improved. Only the HR staff can access the transport management.
- Environment is user friendly.

Related technical requirements

- LAN connection
- Personal computers

Attendance Management

Functional requirements

- The attendance management system allows the Data and process coordinator to view attendance details of all the employees on a certain day or a certain month.
- The system allows the data and process coordinator to update the information on a certain attendance record when necessary. For example, if an employee doesn't come to work, the type will be displayed as a no-pay. But if the employee has met with an accident, the type should be changed to an emergency.
- The system allows records to be deleted when there are duplicate or inconsistent records.
- The search bar can be used to get the attendance details of an employee by the employee number or the date.
- The system will display the number of people who attended and the number of people who didn't attend on that day. This will allow the data and process lead to monitor and take decisions on the average attendance of employees.
- The system is optimized so that odd clocking is addressed to a deep extent. A newly developed algorithm is used so that errors will not occur when scanning the faces of employees.
- An abstract view of daily and monthly attendance will be displayed in a pie chart which will also help the data and process lead to taking decisions.

Non-functional requirements

- Cloud storage is used instead of local storage which ensures data reliability and data security.
- Access to data is controlled using specific constraints which will also secure the data.
- Reports can be generated at any given time within a short period of time. This ensures the speed and efficiency of data.

Technical Requirements

- A high-quality camera system
- Servers and computers

Skill Metric System

Functional requirements

- The skill metric system allows the HR staff to manage all skills and potentials related details of all employees.
- The skill metric system helps the HR staff to take decisions when promoting employees.
- A checklist can be created to asses scores for the employees based on the performance.
- when the data and process coordinator enter details of a new employee into the system, a notification will be received from the system which then allows the people relations officer to add educational qualifications, working experience, skills and other courses of the newly recruited employee.
- the system allows people relations officers to update the qualification details when an employee acquires a new skill.
- when the detail of the new employee is added, a score will be calculated by the system based on a performance checklist. According to that score, the employee will be added to the corresponding grid of the nine-box system.
- when an employee obtains a new qualification or a skill the database should be updated and the score of the relevant employee will be updated as well. Then the employee will be assigned to a new grid based on the newly calculated score, and the data which was in the previous grid will be deleted.
- When a certain grid is selected, the ID and the name of the employees assigned to that grid will be displayed. When you click on the view qualification button, the qualifications corresponding to that employee will be displayed.
- Using the search bar, employees can be searched using the employee number or a specific qualification/skill.
- the number of employees in each grid will be displayed as a pie chart to get a better view of the performance of the employees.

Non-functional requirements

- Data is stored in a cloud database which ensures data security.
- Storage is not limited since it can be upgraded as per user demand.
- The system is reliable, and the data can be accessed at any given time with ease of access.
- We can control access to the data by setting up restrictions which also ensure data security.

Technical Requirements

- Computer
- Keyboard
- Mouse

Health and Benefit

Functional requirements

- Allow all members of the HR department, supervisors, and nurses to access the system
- Only nurses and HR department members can add/update and delete data
- HR staff, nurses and supervisors can read the data.
- Report generation can only be done by nurses and HR staff.
- Only the above people can have access. For others, access will be restricted
- Alerts will be given from the system when the delivery dates of pregnant employees are close
- Relevant supervisors get an email when an emergency case happens

Non-functional requirements

- The system should load in less than 30 seconds
- Since we use cloud storage no need to worry about the storage capacity
- No damage will happen to memory since we use cloud storage

Related technical requirements

- PC
- Keyboard
- Mouse
- Internet connection

Employee Management

Functional Requirements

- The system should allow the Data & Process Leader and Co-Ordinator to manage all employee information-related details
- The system stores all personal and work-related information
- The system provides a search function which can be used to filter employees according to different criteria
- The system allows HR to view all employee details
- The system should not remove information on inactive employees

Non-Functional Requirements

- The system should have expandable storage(cloud)
- The system should be always reliable and available
- The system should be easy to use
- Each section should load within two seconds

Related Technical Requirements

- Printer
- Keyboard
- Mouse
- PC

Literature Review

1)Leave Management

Similar solutions – The manual system of leave cards could be one alternative solution when dealing with leaves. Where if at all an employee wants to request a leave, they must write it on their leave cards. The denial or approval of these leaves would also be maintained by the responsible supervisor with the use of cards. One of the main advantages of this solution is that corruption of data could be avoided. However, misplacing records could be a huge problem. In addition to that, the supervisor may have to go through all these cards to assess, who is on leave as of a given date. This is an exhausting procedure.

Why a new system is needed – With the use of the existing system, supervisors are unable to track which employees are on leave currently. Applying for leave is done by filling out a physical leave card which takes time. Without a system like this, the HR department cannot get a clear idea about how many leaves an employee has taken immediately as and when required. Furthermore, the new system to be developed, allows each employee to view the remaining count of leaves he could request, and how much of it had been consumed as of now. This is of immense benefit not just to the employee, but to the employer as well, as errors or issues could be corrected without delay, without accumulating till the end. In addition to that, the existing system accounts for only two types of leaves the system as "Annual" and "Special." With the development of the new system, more precise results could be obtained regarding the specific type of leave each employee had taken and how many of those leaves are remaining specifically.

2)Transport

Similar solutions – Managing a separate book to store all the vehicle details could be one solution. Through this approach, even non-technical workers, like the factory workers of STG, would be able to refer to these transportation details and evaluate which routes could be used to attend to work without any disruptions. This approach does not require technical skills when managing the employees' transport system. However, this alternative solution may not be always dependable. There could be instances where these written records could go missing, in such a case, the entire functioning of the transport system could collapse.

Why a new system is needed – Currently, STG does not have a separate transport management system for its employees. Thus, the new system to be developed is an HRM system with a cloud-based database to manage all the vehicle details. When employees request shuttle details, it is difficult to provide them since this system is not yet computerized at present. When recruiting employees shuttle information is needed, thereby making it easier for the company to make necessary arrangements, for the transportation of the employees, considering the seating capacity available. The existing problems of under or over-capacity utilization of seats could be eliminated with the use of the new system. Thus, a new system is needed to be developed.

3)Employee Management.

Similar solutions – Manual Electronic Employee Records could be one similar solution that could be used by the company. A benefit of this alternative approach is that, since only one user has access to the relevant details, there's better security over employee records. However, this mechanism is only limited to one PC mostly. Each user managing records of employees should log in to the PC to do the necessary operations. This is a hectic process as not everyone who is allowed to access, would be able to obtain access to it simultaneously. All related files of employees will be stored in the computer itself. Thus, storage is a huge concern. Any updates made to the details of the employees must be done manually by the responsible worker assigned.

Why a new system is needed – The existing system, does not facilitate the management in terms of where they can filter out the records of employees based on certain categories. Furthermore, if at all the HR manager or any other authoritative body requires a list of employees falling under a specific category, then this entire process might have to be done manually. Thus, the system to be developed helps the company overcome pressures such, as the new system includes features, where quick filtering and searching of employees is enabled.

4)Payroll Management

Similar solutions – Manual Electronic Files could be one solution used when dealing with payroll management of the company (STG). One of the main advantages is that it is easier to search records faster than if paper records were used in managing the payroll of workers. Furthermore, thousands of records could be stored in comparatively a smaller space. Thus, any storage-related costs that the company might have to incur could be deliberately avoided. Thereby, helping to improve the financial stability of the company as well. However, the information stored in manual electronic files has a higher chance of being corrupted or hacked. Since payroll-related information is confidential, it should be of prime importance for the management to protect it from being transferred to the hands of illegal authorities. The burden of protecting these payroll details could be exhausting.

Why the new system is needed – The existing system currently does not offer any facilities where each employee could view their overtime hours worked daily. Thus, there had been frequent issues when determining the overtime hours each worker had worked, since a given worker is only able to check how much overtime hours the worker had worked at the end of the month. With the new system being developed, the given worker could confirm the overtime hours he had worked daily. As this is confirmed daily, there is less occurrence of errors, when determining the overtime hours of each worker and their associated pay. Thereby minimizing the possible conflicts that could be provoked with regards to overtime hours and pay of each worker.

5)Inventory Management

Similar solutions – Manual records could be maintained in books, where any inventories ordered and received by the HR department, could be written in the books. Similarly, any of those stationeries consumed could also be recorded in the books. One major benefit is that the employees may not need extensive technical knowledge when dealing with these manual records of stationery. Thus, finding suitable candidates for this job role might not be a burdensome task. However, these manual records are prone to a lot of errors. The lack of validation in manual records might cause

discrepancies when generating reports with regards to the stationery used and managed. Thereby, making tracking of inventories unreliable. Furthermore, precise reports of inventories would be difficult to generate, since these reports must be generated using the manual records maintained. Failing to produce reports on time to the responsible bodies, could delay the possible measures that the management could take, in managing inventories.

Why a new system is needed – Currently, the HR department does a manual check of inventories. Thus, it does not have a proper computerized system to manage inventories as of now. This had led to too many errors and difficulties at present. Providing stationeries on time is of extreme importance since the company still follows the manual approach with regard to the entry and management of data. Failing to provide workers with the equipment as needed, is likely to disrupt the normal functioning of the company. The new system that is developed acknowledges relevant parties when the stocks reach the re-order level so that they could stop issuing inventories further, to their workers. This feature is currently not available in the existing system used. Furthermore, inventory records could be added in, with proper validation. Thereby avoiding any data redundancies as well. Loosing of these manual records had been a significant issue at the present, making it difficult to get records promptly as and when needed. Moreover, searching for details of needed inventories is made convenient, with the use of the new system, where elated details could be retrieved via the Item Code of the stationery. This limitation could also be overcome using this new system that is to be developed.

6)Attendance management

Similar solutions – The fingerprint system is one of the possible solutions that the company could use for its attendance management purpose. The major benefits of the fingerprint system are that it is more reliable and accurate when it comes to the marking of attendance. Its speed in collecting attendance data is something that must be admired, in comparison to other mechanisms of attendance collection. However, since the health authorities have advised organizations not to use the fingerprint system at the peak of the pandemic, this alternative solution might be of little use to the company. Furthermore, card swiping could be another alternative solution that could be used by the company. The card swiping mechanism is extremely faster than any other attendance marking system that is used at present in the industry. However, it faces a major downside, where any third party could swipe the card and get the attendance marked for the known ones. This could cause a higher chance of a security breach.

Why a new system is needed – The new system to be developed, ensures that face duplication does not occur when marking the daily attendance of the workers. The existing system used by the company faces issues concerning redundancies of attendance records of the employees. This issue could be eliminated with the use of the new attendance system developed since odd clocking is also managed effectively. In addition to that, these attendance records of employees are stored in the cloud storage, thereby ensuring the security of data, since only a limited number of people with the respective rights could access it. Furthermore, redundancies in the existing system will be removed, since we are planning to use a set of high-quality cameras along with algorithms that use the latest technologies. Thus, as the existing redundancies could be eliminated using the new attendance system, it is likely to be preferred over the existing system.

7)Skill metric system

Similar solutions – Manual document filing could be one solution that the company could use to deal with the skill metric system. In this alternative approach, the skills of the freshly recruited employees and any updates made to the existing qualifications or skills of the existing employees could be updated in these files. Any resignations might remove related skill records of employees in the company. One of the major benefits that the company could face via this solution, is that they will not have to ideally make huge investments in computers and expensive systems of advanced technologies. In addition to that, there are many those who have a good sense of how to track data on paper, rather than using computer systems for that purpose. However, this solution suffers from drawbacks where making any changes to the records may require another copy since we cannot edit or destroy details in the original file easily. Furthermore, document filing mechanisms take up a huge deal of workspace area, which results in possible wastage.

Why a new system is needed – Currently, there is no skill metric system that the organization uses currently. A skill metric system is of extreme importance to the company, especially when organizing teams based on project requirements that allow identifying the best roles for the positions in those teams. In addition to that, gaps in the skills of the employees could be identified with the use of a skill metric system, thereby provoking better decision-making regarding the training of employees. Furthermore, the HR Manager would also benefit from a skill metric system, where any replacements for job positions could be identified quickly when the skills of the existing employees are managed. Procedures related to internal recruitment and promotions would fasten, boosting employees' motivation as well. In addition to that, effective scheduling of work could be done especially during the seasonal or vacation times of the year, as with the use of the skill metric the company will ensure that there are sufficient co-workers with the needed skills to cover up any loss of work during these vacation times of the year.

8)Health and Benefits management

Similar solutions – Records with regards to prescriptions and drugs could be stored in excel files. One of the major benefits that the company could enjoy from this, is that it removes the need to write prescriptions and drugs in books. In addition to that, it comparatively takes a less amount of time to search the required details of inventories, when compared to the manual search of records that could be done otherwise. However, this approach currently has no auto-fill option, thereby making filtering of records quite an intense task to be performed. Thus, any associated updates to be made concerning the health records would be a hectic task to be performed. Generation of reports, with the details derived from records in the excel sheet, might be time-consuming.

Why a new system is needed – The Health and Benefits system is something that does not currently exist in the company. This is a fresh idea of thought that is requested by the client. Any updates to the records could now be made via one modification of an entry. Modifications need not be made in every associated record, instead changing one specific record will modify all related records regarding the health of the workers and the maintenance of drugs. Thereby being a vital benefit that is experienced, with the development of the new Health and Benefits system. Furthermore, one of the most crucial features that are intended to develop in the new system is that the nurses of the company get an alert promptly when the delivery dates of pregnant mothers get closer. Thereby allowing them to give additional attention to them. Furthermore, retrieving data

via the search function is also made easier, as, with the use of the EPF number, the related employee's health records could be fetched, respectively.

Methodology

- **Tools we used**
  - Visual Studio Code and PyCharm as the IDE's
  - Postman to test the backend
  - Trello for project management

- **Technologies**
  - MERN stack is used to develop the entire application
  - Firebase is used to store files and images
  - Mocha and chai frameworks for unit testing
  - GitHub for version control

Requirement Engineering methods

- For **requirement elicitation**, we had meetings with the stakeholders on site to discover and gather requirements. We also observed how the existing system works to gather more knowledge. We talked with staff and workers to obtain the exact information we needed.
- Then we classified the requirements into functional, non-functional requirements and constraints. The biggest constraint we had was the time limit.
- For **requirement specification**, we created use case diagrams, and we used user stories to concisely describe the functionality. After that we created an SRS document mentioning all the requirements needed to develop the project.
- Then we created a backlog prioritizing the requirements and each member was assigned a functionality to be developed. We did this using an online project management software.
- Then we drew a grant chart to get an idea on how we are going to finish the project on time.

Design methods

- In the design phase we had to draw a class diagram to get an idea about what classes and objects we are going to use. We created wireframes for each UI. Then we had to decide what tools and technologies we are going to use to develop this software.

Development tools and technologies

- As mentioned, we used MERN stack technology to develop our software. Node and express for backend, react for frontend and MongoDB as the database. We could have used Java with servlets. But as we completed a project in the previous semester using java, we decided to try out a new technology. There are many other alternatives like MEAN, LAMP stack. But after doing our research, we found out that MERN is more reliable, and the development is faster.

Testing methods

- To test the backend created using node JS we used postman software.
- To do unit testing we will use Mocha and Chai frameworks

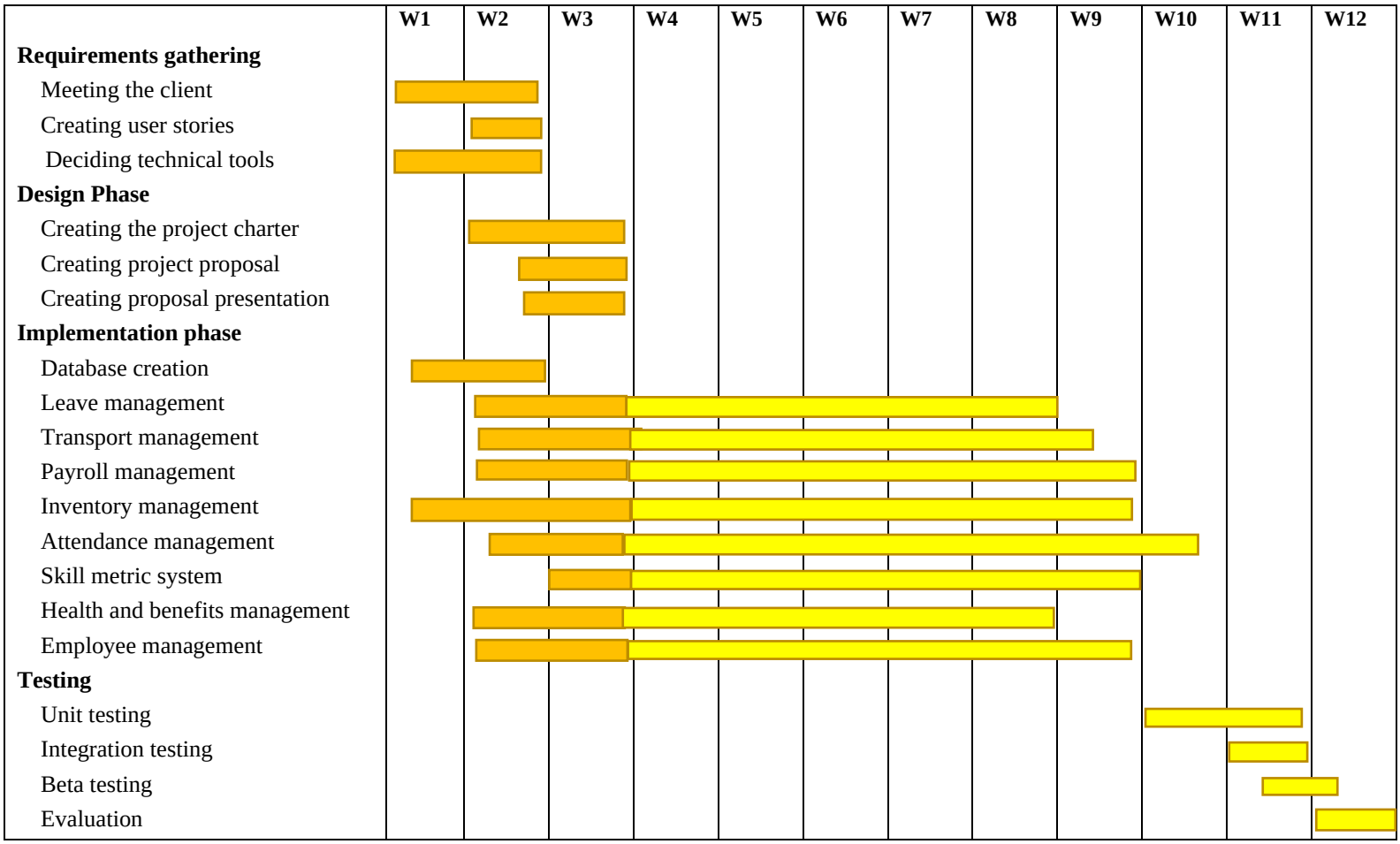
Integration methods

GitHub is used for source control we integrated each member's part by combining all the branches to the main branch.

- **Work breakdown structure**

Student ID	Name	Work allocated
IT21134180	S.A.Sanuthi Vihansa	Leave management
IT21138386	Wijeratne D.M.S.D	Payroll management
IT21127946	Christy H.M	Inventory management
IT21126888	Senadheera P.V.P.P	Transport management
IT21119644	Perera O.R.V	Attendance management
IT21126956	Wijethunge W.D.S.H	Skill metric system
IT21111488	Dilara V.G.N	Health and benefits management
IT21131424	Perera P.Y.C	Employee management

Gantt chart



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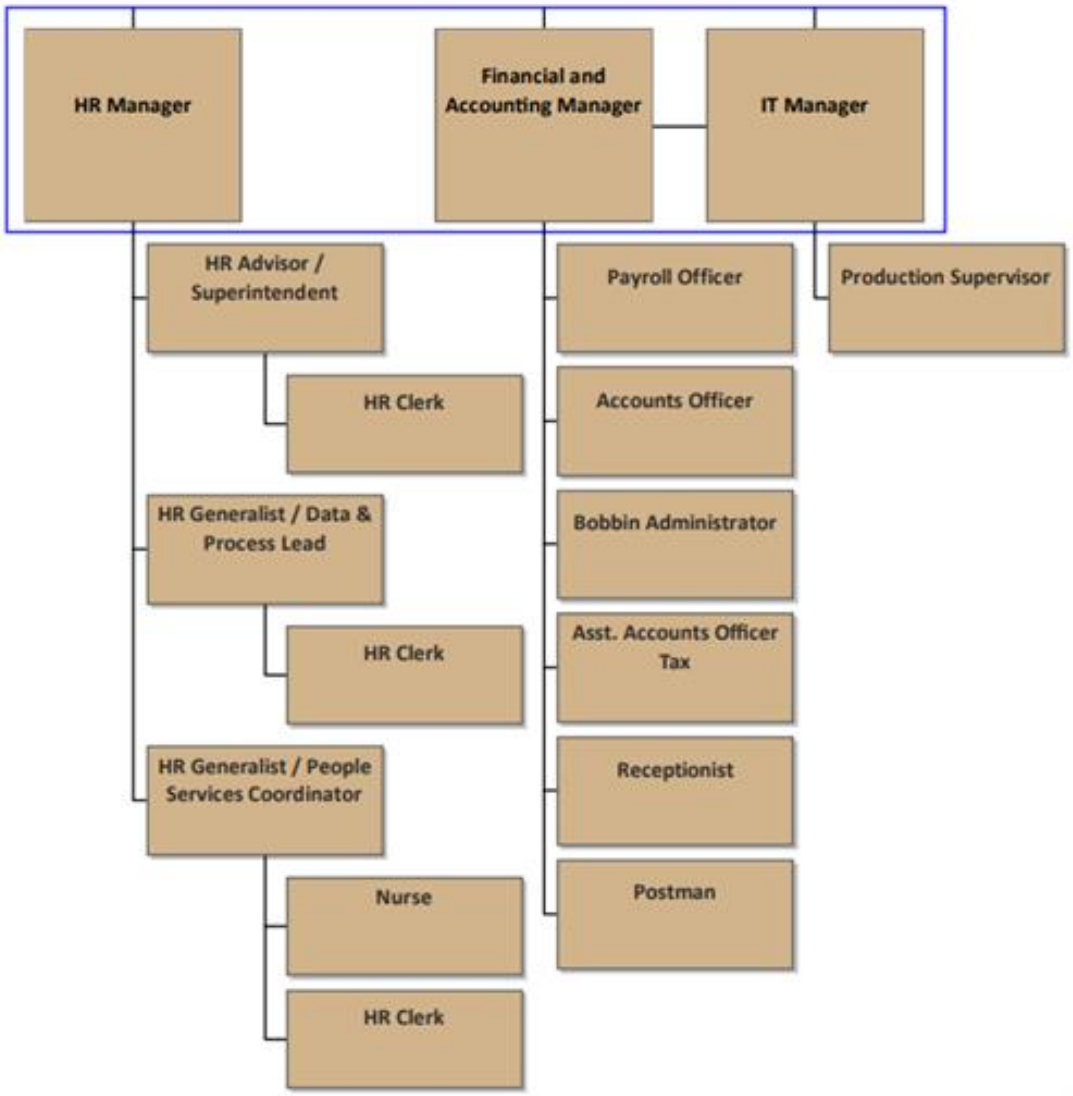
[1] Scandinavian Tobacco Group A/S, Scandinavian Tobacco Group, 2019. [Online]. Available: https://www.st-group.com/

Appendix A

Appendix B


HR Manager
Financial and Accounting Manager
IT Manager
HR Advisor / Superintendent
HR Clerk
HR Generalist / Data & Process Lead
HR Clerk
HR Generalist / People Services Coordinator
Nurse
HR Clerk
Payroll Officer
Accounts Officer
Bobbin Administrator
Asst. Accounts Officer Tax
Receptionist
Postman
Production Supervisor