UTM
UNIVERSITI TEKNOLOGI MALAYSIA

SECD2523
(DATABASE)

SECTION 10

PHASE 1
PROJECT: UNILAUNDRY

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DATAMATES

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1.0 Introduction

For our first task of this project, we are required to create a system which meets our user requirements. In this proposal, we will introduce our client's existing system on how to increase efficiency for the current laundry system in UTM. This is by creating a computerized system that eases both users and administrators using our proposed laundry system. We decided to develop this system because, in the context of today's fast-paced learning environment, colleges and universities are always looking for ways to improve the lives of their students by offering resources that foster both personal and intellectual development. We made the decision to create this system because colleges and universities are constantly seeking methods to improve the quality of life of their students by providing resources that support both intellectual and personal development in the context of today's fast-paced learning environment.

This proposal describes the main goals, advantages, and specifics of our suggested university laundry system, emphasizing how it will meet the many demands of our student body, promote a feeling of community, and support our university's sustainability efforts. With the help of this cutting-edge system, we hope to offer our students a dependable and practical solution that will improve their lives and, in the end, their university experience.

The problem of our current system is that, Students must wait for extended periods of time under our client's existing manual system. The reason for this is that there aren't enough machines, so students have to wait in line for a long period, especially during peak periods. This causes delays and inconveniences. In addition, some users leave their clothes unattended, which results in longer than usual wait times for other users. As a result, our goal is to lessen these issues by developing a system that addresses them.

Finally, but just as importantly, we want to support administrators in their efforts to develop a self-service laundry system that is more efficient, well-maintained, and satisfies the requirements and expectations of its users, especially UTM students.

2.0 Background Study

For decades, laundry services have been a vital aspect of city living, progressing from manual washing and drying techniques to state-of-the-art, completely automated facilities. However, coin-operated or card-based manual self-service laundry systems continue to be widely used in many areas, particularly in urban and college environments, where individuals manage their laundry. The history and present state of manual self-service laundry systems are examined in this background research. In UTM, we would like to share two laundry systems currently used by students. Firstly, UNILaundry which is situated in Arked Angkasa. Secondly, Scholar's Laundry, situated in Arked Meranti.

Washing Machines

For Arked Angkasa's laundry there are 4 washing machines. With the few amount of washing machines, this causes students to spend a lot of time waiting for the previous user to finish washing their clothes. For Arked Meranti's laundry, there are 5 washing machines.

Dryer

For Arked Angkasa's laundry there are 6 dryers while for Arked Meranti's laundry, there are 5 dryers.

Payment Methods

Arked Angkasa's Laundry accepts only cash to be inserted into the token machine. The token machine will then convert cash received by the user into tokens. One token is equivalent to RM1.

Arked Meranti's Laundry however accepts e-wallets, qr payments, and cash. The money received will also be converted into tokens. One token is equivalent to RM1.

Waiting Time

The waiting time varies depending on time, amount of users and machine setup. On peak hours, which is from 8.00p.m to 1.00a.m, it could take a student to wait and finish doing their laundry from one to three hours. This is because most students finish their classes and have time to do their laundry during these hours. The amount of users also may result in the change of waiting

time. During weekends, nearing the end of semester and nearing holidays, may result in an increase in the number of users. This is because most students would want a clean laundry before they start weekdays where they have a packed timetable so they do not have time to do their laundry. Near semester break and holidays, there's also an increase in the amount of users because users want to minimize their baggage to bring to their homes. Lastly, each machine setup may cause an increase of time such as increasing temperature of washing machine and dryer, also resulting in an increase of time. Besides that, lack of user accountability can also cause more time for other users to wait until their turns.

Machine Setup

Three changes can be made to the dryers and washing machines at both Arkeds. Users of washing machines can choose between warm, hot, and cold water temperatures. Users must pay more than the standard rate as a result of the temperature adjustment. There are three modification buttons for the dryer as well: cold, medium, and high. Users do not have to spend more than usual to adjust the temperature. Detergent and softener are included in the laundry supplies but with minimal amounts.

3.0 Problem Statement

1. **Long Waiting Times**

   Without a booking system, users may need to wait for a longer time for their turn especially during peak hours.This leads towards user frustration and inconvenience.

2. **Inconsistent Service**

   Some users may receive faster services than others based on the time they arrive. Besides that, some inconsiderate users may cut lines so that they can finish earlier. When a machine malfunctions, such as breakdowns or coin-operated machine issues, these cause disruptions and inconvenience for users and the administrators may not notice these issues since they are not there 24/7 to monitor.

3. **Customer Uncertainty**

   Some users are uncertain when their laundry would be ready for pickup. Users have to decide on time to make return trips to collect their laundry and load the machine. Besides that, users have to wait a longer time if they are other users taking their time or did not unload their laundry. Lastly, users aren't able to know their laundry status immediately because certain issues may arise while using the service.

4. **Inconvenient for Users**

   Cash payments are inconvenient, and nowadays students would much rather use e-wallets or internet banking. It is inconvenient that certain ATMs at the Arked's may be undergoing maintenance thus, causing withdrawal challenges. Moreover, inconsistent token top-offs by administrators also hinder users, preventing some users from receiving their tokens. Aside from that, the absence of data for business insights may make it difficult for administrators to monitor sales and payments from the laundry service.

4.0 Proposed Solutions

UniLaundry is a new proposed system improvised from one of the existing laundry systems here in UTM with the aim to overcome common problems faced by the users. The new system concentrates on bringing convenience to both business owners and users as this innovative solution includes the implementation of a user-friendly booking system that enables users to schedule their laundry sessions in advance to reduce waiting times and long queues. The system will generate a distinct and unique code to each user ensuring security as well as efficiency. Apart from that, the new system is integrated with e-wallets and an online banking system for direct payment execution to enhance user convenience by eliminating the need for physical cash transactions to exchange with tokens. On the other hand, real-time machine monitoring and automated alerts will be incorporated to ensure timely responses for service inconsistencies. Additionally, a mobile application will keep users informed about the status of their laundry to minimize uncertainty. This system will implement the usage of SQL for managing and querying databases for every functionalities. This holistic approach not only prioritizes user satisfaction but also provides administrators with data analytics for improved service management.

Technical Feasibility

The new proposed system is technically feasible. The current technical resources in the existing laundry system are sufficient for the new laundry system as the current site is already equipped with the main utilities such as water, sewage and electricity thus requiring minimal renovation. Besides, the existing laundry machinery and equipment are compatible with the new proposed system as it can be developed with the available technology. Moreover, the laundry system does not involve any conversion from raw materials into final products hence negating the need for further processing. Nonetheless, supplies like liquid detergents and liquid fabric conditioners are solely required to ensure inclusive services and the existing laundry system has a supplier for these products. However, technical expertise is needed to deploy the online banking system for payment execution. In terms of maintenance, the new proposed system can be managed by the current technicians with minimal upgrades and the self-service nature of the system minimizes labor requirements. Lastly, the machines are environmentally friendly as no toxic waste is produced and the wastewater is efficiently directed to a proper sewerage system.

Operational Feasibility

The operational feasibility of the new proposed system is promising in several ways. The current laundry system does not really meet the users satisfaction due to few inefficiencies thus, making users receptive to the need for an upgrade. Not only is the new system easy to adopt, but is also user friendly and the expected gains in efficiency as well as user experience are believed to outweigh any challenges or changes. Customers are expected to benefit from improved services, experiencing shorter waiting times and encounter easy payment execution. The new proposed system is seen as a positive step in enhancing the business's reputation for innovation and customer-centric services positively impacting goodwill. In terms of resource management, the system will be in place to monitor and optimize resource allocation to meet demand effectively. Lastly, legal and ethical considerations are being taken into account ensuring that the new laundry system complies with data privacy and security regulations including adheres to ethical standards making it a feasible endeavor.

Economical Feasibility

Assumptions	
Discount Rate	10%
Sensitivity Factor (Costs)	1.1
Sensitivity Factor (Benefits)	0.9
Annual Change in Production Costs	7%
Annual Change in Benefits	5%

Estimated Cost	
Hardware	RM 55 000
Software Development Implementation	RM 33 000
Training (staff and users)	RM 11 000
Infrastructure Upgrades	RM 11 000

Supplies (laundry detergent, fabric softener, etc)	RM 4800
Utilities (water, electricity, etc)	RM 7000
Maintenance & Technical Support	RM 10 000

Estimated Benefits	
Inventory Savings	RM 10 000
Increase Sales	RM 30 000

Costs	**Year 0**	**Year 1**	**Year 2**	**Year 3**
Development Cost				
Hardware	RM 55 000			
Software Development Implementation	RM 33 000			
Training	RM 11 000			
Infrastructure Upgrades	RM 11 000			
Total	**RM 118 800**			
Production Cost				
Supplies		RM 5280	RM 5650	RM 6046
Maintenance		RM 11 000	RM 11 770	RM 12 594
Utilities		RM 7700	RM 8239	RM 8816
Total		**RM 23 980**	**RM25 659**	**RM 27 455**
Annual Production Cost (Present Value)		RM 21 800	RM 21 205	RM 20 627
Accumulated Costs		RM 140 600	RM 161 805	RM 182 433

Benefits	**Year 0**	**Year 1**	**Year 2**	**Year 3**
Inventory Savings		RM 27 000	RM 28 350	RM 29 768
Increase Sales		RM 9000	RM 9450	RM 9923

Total		**RM 36 000**	**RM 37 800**	**RM 39 690**
Reduced Inventory Costs (Present Value)		RM 32 727	RM 31 240	RM 29 820
Accumulated Benefits (Present Value)		RM 32 727	RM 63 967	RM 93 787
Gain or Loss		RM 107 873	RM 97 839	RM 88 646
Profitability Index	0.75			

The profitability index resulted in 0.75 indicating that this system may not be financially viable. Hence, further refinements and detailed analysis are needed. In order to enhance the project's viability, strategic adjustments involving cost reduction and benefit increase are suggested to ensure that the total present value of benefits outweigh the total present value of costs. By leveraging potential funding sources, optimizing resource utilization and refining the cost-benefit, this project has a way to overcome financial challenges and increase prospects for successful implementation despite the current index.

5.0 Objectives

The mission objective is the basis for the mission objective, which is the component task that the system has to finish in order to execute the functions that have already been addressed in the preceding section. That task consisted of a series of parts.

Maintenance

- To maintain user details.
- To maintain username and password.
- To maintain user and administrator roles.
- To maintain user permissions.
- To maintain laundry item type, service type, water temperature, additional instruction, and time.
- To maintain booking time and date.
- To maintain a unique order ID.
- To maintain order cancellation and rescheduling.
- To maintain order details.

Searching

- To perform searches on personal details of users.
- To perform search on user roles and permissions.
- To perform a search on a detailed list of laundry item type, service type, water temperature, additional instruction, booking date, and date.
- To perform search on order details, order cancellation, rescheduling, outstanding orders, order confirmation emails, order status, and order history.

Tracking

- To track registered users in the system.
- To track administrator and user roles and permissions.
- To track details of laundry item types, service types, water temperatures, additional instructions, booking times, and dates.

- To track order details, cancellations, rescheduling, outstanding orders, order confirmation emails, order status, and order history.

Reporting

- To report personal details of administrators.
- To report administrator settings.
- To report details of laundry item types, service types, water temperatures, additional instructions.
- To report order details, cancellations, rescheduling, outstanding orders, order confirmation emails, order status, and order history.

6.0 Scope

Three different user types will be present in our system: UTM residents, staff, and admin (owner). First and foremost, the admin, who is the laundry business owner, will have visibility to our system's dashboard that shows the availability, usage, and maintenance needs of every washing machine and dryer at Arked Angkasa. In addition, the system's administrator will have the ability to supervise and control the cash, e-wallet, and QR payment systems. They have the ability to view transaction logs, confirm payments, and guarantee safe and precise payment processing. Admins can also keep an eye on peak hours, monitor user activity, and guarantee equitable usage of the laundry facilities.

On top of that, our system gives employees access to it so they can help customers operate washers and dryers by adjusting temperature or showing them where to put the detergent to guarantee a hassle-free laundry experience. Additionally, there is user support, where employees may use the system to quickly address questions and concerns from users and offer any necessary help and direction. In order to guarantee prompt attention to machine concerns, staff members are also permitted to submit any maintenance issues or repair requests immediately through the system. In order to guarantee that users have access to the essential laundry supplies, staff members can also keep an eye on the detergent and softener supplies and replenish them as needed.

Beyond that, our technology gives UTM residents, including lecturers, staff, and students, access to real-time data on peak hours, wait times, and washing and dryer availability. They can schedule their washing chores more effectively and save time by doing this. Residents of UTM will also have the option to select their preferred payment method via the system. Depending on their laundry needs, users are to alter the machine's settings, such as the dryer's heat setting and the washing machine's water temperature. Not to mention, the system allows users to track transparency by allowing them to access their payment records and transaction history.

The UniLaundry laundry system that is being suggested has a scope that depends on reliable internet access for necessary features including payment processing, real-time monitoring, and

booking. Potential obstacles, such as the early implementation expenses of connecting online banking systems and creating a mobile application, could, however, temper the project's success. To guarantee efficient use of the system, user and administrator training will be essential. Although every attempt is made to guarantee compatibility with current laundry machines, in order to ensure a smooth integration of the system, upgrades or replacements might be required. Completely minimizing waiting times is not feasible since waiting times are impacted by outside factors such user behavior, machine setting choices, and peak hours. There are restrictions on the system's ability to source detergent and fabric conditioners due to its dependence on particular suppliers. Furthermore, even with best attempts to abide by data privacy laws, data security issues could still surface, requiring constant observation to fix any weaknesses.

The UniLaundry project's distinctiveness is in its all-encompassing and creative strategy to transform the conventional UTM laundry experience. In contrast to the manual procedures now in place, UniLaundry offers an easy-to-use booking system that enables people—including UTM residents, employees, and administrators—to plan laundry sessions ahead of time, reducing the length of wait times that are encountered during peak hours. UniLaundry stands out as a comprehensive and cutting-edge solution for the laundry needs of the UTM community since it not only prioritises user pleasure by resolving frequent concerns but also gives administrators useful data insights for enhanced service administration.

7.0 Project Planning

7.1 Human Resource

- **Team Manager**

  The team manager provides leadership to their team members, by guiding and motivating them to achieve the goals of the laundry system project. The team manager is responsible for overseeing and managing the task within the project, ensuring the work is well-organized and on track.

- **Data Manager**

  The data manager is responsible for developing and implementing the processes of the project to guarantee a high quality and reliability of data, ensuring it aligns with the project's objectives. They also need to minimize the potential errors in data, to enhance the trustworthiness of the data that will be used by the organization. It is important for the decision-making process as they rely on the data that have been collected.

- **Data Security Analyst**

  The role of data security is to maintain and protect the data from the potential threats , ensuring that the data and all the information remains confidential and trustworthy.

- **Project Manager**

  The project manager is responsible for overall project planning, from defining the objectives to creating detailed project plans that meet the requirements from stakeholders. They also need to oversee the execution of the task, ensuring the project is delivered on time, while making sure that the cost remains within the budget constraint.

- **Team Developer**

  The team developer plays an important role in creating and maintaining the software applications of the laundry system. They need to identify and fix bugs, errors and issues throughout the testing and debugging process to ensure the software reliability and quality.

- **Project Analytics**

  The project analytics will be focusing on collecting data that is related to the laundry system project that their team have been working on from various sources. They will analyze the collected data by using the analytical tools to identify the pattern and trend of the data in order to provide insight of the project's performance. The project analytics will generate the report of the project to convey their findings to the team, ensuring to archive the best possible results.

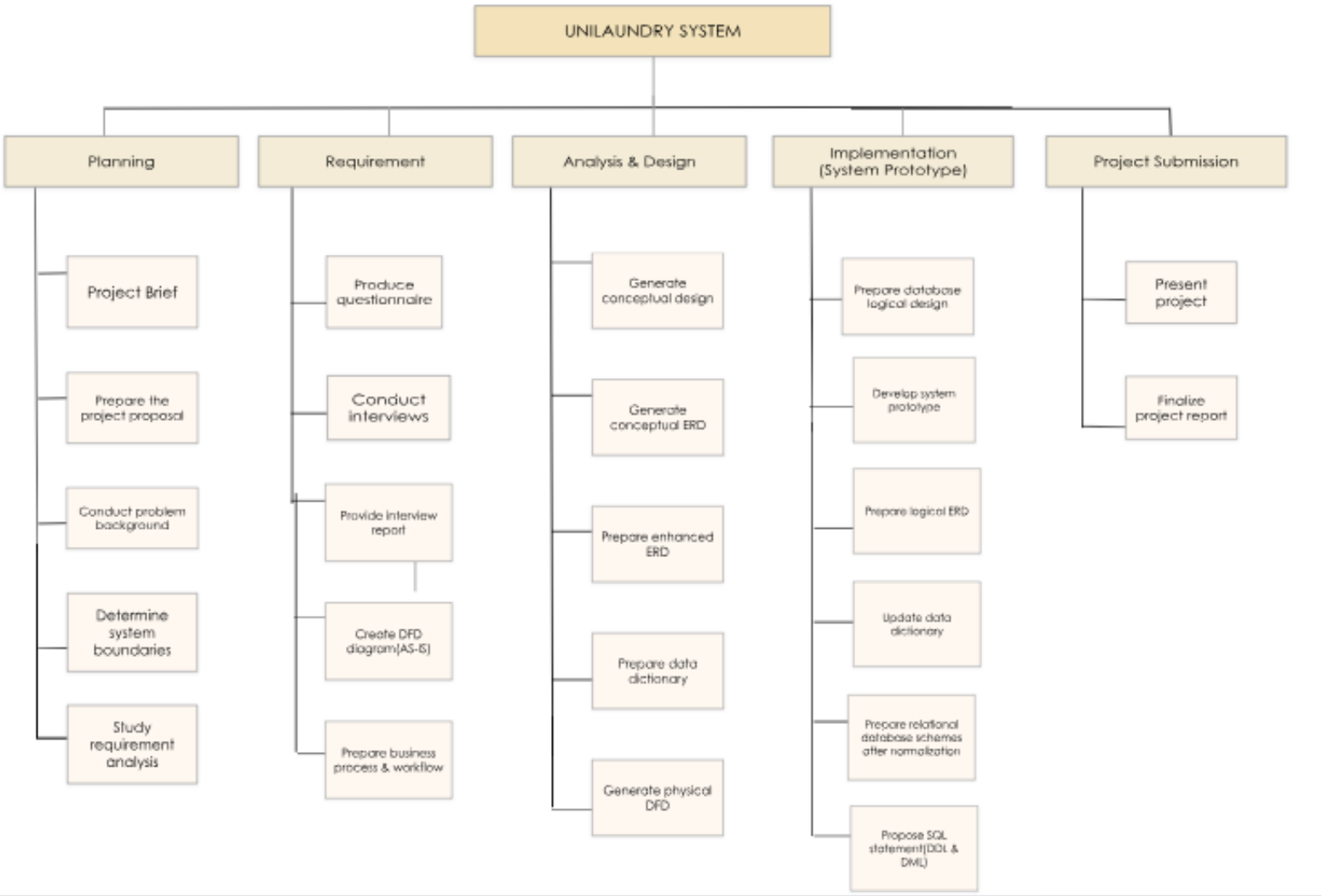
- **User Interface (UI) and User Experience (UX) Designer**

  The role of UI and UX is to create and design an intuitive and user-friendly interface, in order to enhance the overall user experience by focusing on how users will interact with the interface.

- **Stakeholder Relation Manager**

  The stakeholder relation manager needs to work closely with the stakeholders as they play a crucial role in building and maintaining a positive relationship between two parties. They need to communicate with the stakeholders in order to understand their needs, concerns and expectations of the laundry system project. They also need to collect the feedback to make improvements of the project, ensuring it aligns with the stakeholders requirements.

7.2 Work Breakdown Structure (WBS)



7.3 Gantt Chart

TASK	Plan Start	Plan Duration	START	END	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	WEEK 11	WEEK 12	WEEK 13	WEEK 14	WEEK 15
PROJECT PLANNING																	
Project Part 1 Brief	3	4 Weeks	20/10/2023	26/10/2023													
Prepare Project Proposal	3	4 Weeks	20/10/2023	26/10/2023													
Conduct Problem Background	4	1 Week	29/10/2023	2/11/2023													
Determine System Boundaries	5	1 Week	5/10/2023	9/11/2023													
Study Requirement Analysis	6	1 Week	12/11/2023	16/11/2023													
Requirement : Gathering Information																	
Produce Questionaire	6	1 Week	12/11/2023	16/11/2023													
Conduct Interview	7	1 Week	19/11/2023	23/11/2023													
Provide Interview Report	7	1 Week	19/11/2023	23/11/2023													
Create DFD Diagrams(AS-IS)	7	2 Weeks	19/11/2023	30/11/2023													
Prepare Business Process and Workflow	7	2 Weeks	19/11/2023	30/11/2023													
ANALYSIS & DESIGN																	
Generate Conceptual Design	8	3 Weeks	26/11/2023	14/12/2023													
Generate Conceptual ERD	8	3 Weeks	26/11/2023	14/12/2023													
Prepare Enhanced ERD	8	3 Weeks	26/11/2023	14/12/2023													
Prepare Data Dictionary	8	3 Weeks	26/11/2023	14/12/2023													
Generate Physical DFD	8	3 Weeks	26/11/2023	14/12/2023													
IMPLEMENTATION																	
Prepare Database Logical Design	10	4 Weeks	10/12/2023	4/01/2024													
Develop System Prototyoe	10	4 Weeks	10/12/2023	4/01/2024													
Prepare Logical ERD	11	4 Weeks	17/12/1012	11/01/2024													
Updata Data Dictionary	11	4 Weeks	17/12/1012	11/01/2024													
Prepare relational Database Schemes after Normalization	11	4 Weeks	17/12/1012	11/01/2024													
Propose SQL Statement (DDL & DML)	11	4 Weeks	17/12/1012	11/01/2024													
FINAL SUBMISSION																	
Present Project	15	1 Week	14/01/2024	18/01/2024													
Finalize Project Report	15	1 Week	14/01/2024	18/01/2024													

8.0 Requirement Analysis

8.1 Current Business Process

- **Users (UTM Residences)**

  The laundry system process begins by the user arriving at the laundry facility and joining a physical queue to wait for an available washing machine. During peak hours, long waiting times may occur. Once there is an available washing machine, users approach the token machine to collect tokens for payment and the token machine only opts for physical cash which can be inconvenient. The token represents the amount paid for the laundry type and in this case, 6 tokens (RM6) is allocated to wash and 4 tokens (RM4) is allocated to dry. After that, users load their laundry into the selected washing machine, add their detergents into the provided compartment and then insert the corresponding tokens into the token-operated machine to start the cycle. Users typically wait for the laundry cycle to complete and during this time they may engage in other activities or return later to collect their laundry but the exact time for their laundry pick up is uncertain as there are no alerts. After the cycle is complete, users return to unload their laundry and then proceed to the drying machine. The same process occurs, users load their washed laundry into the selected washing machine, select their choice of temperature and then insert the corresponding tokens into the token-operated machine to start the cycle. Once the drying machine is complete, users unload their laundry and return home. This current process undoubtedly leads to inefficiencies, inconsistency in service as well as user frustration particularly during peak hours.

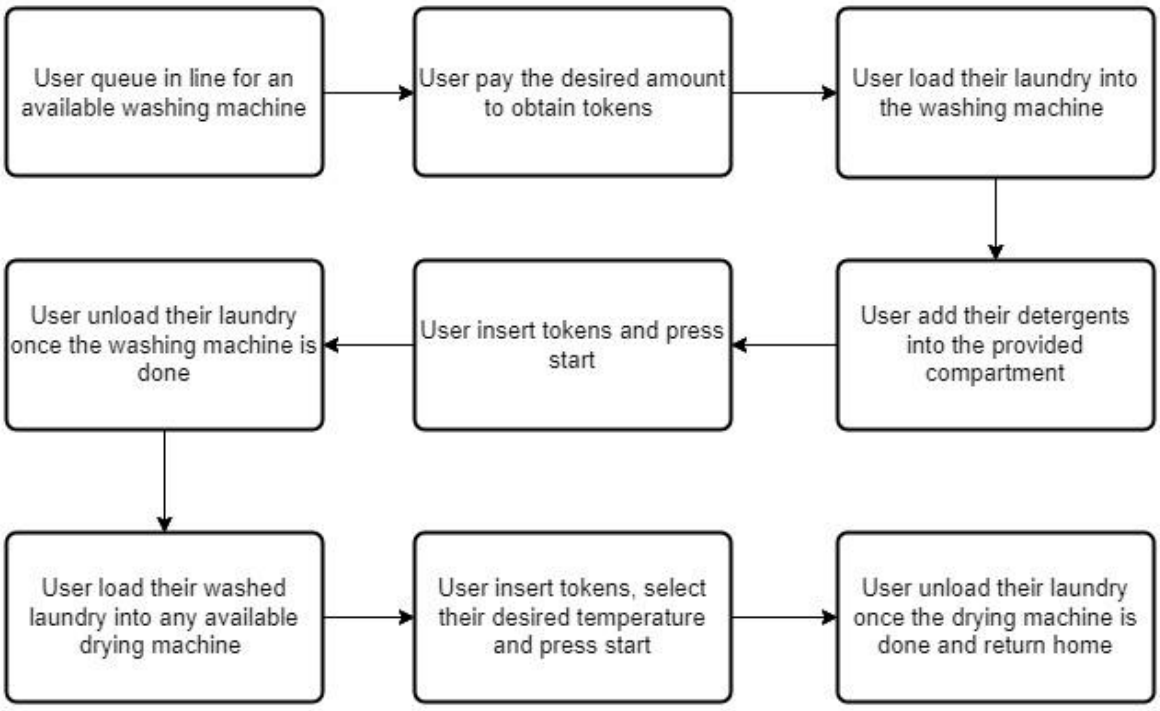
- **Administrator (Owner of UNILAUNDRY)**

  After a user uses their system, administrators are faced with multiple tasks. To enable customers to convert their cash into tokens and utilise the token-operated machine, administrators must first replenish the token supply. The laundry system needs to be fully operational, so this duty needs to be completed every time. Counting the money collected at the conclusion of each day is the second task. Administrators will have to take their time counting money because there is a lack of online transactions, which means they'll

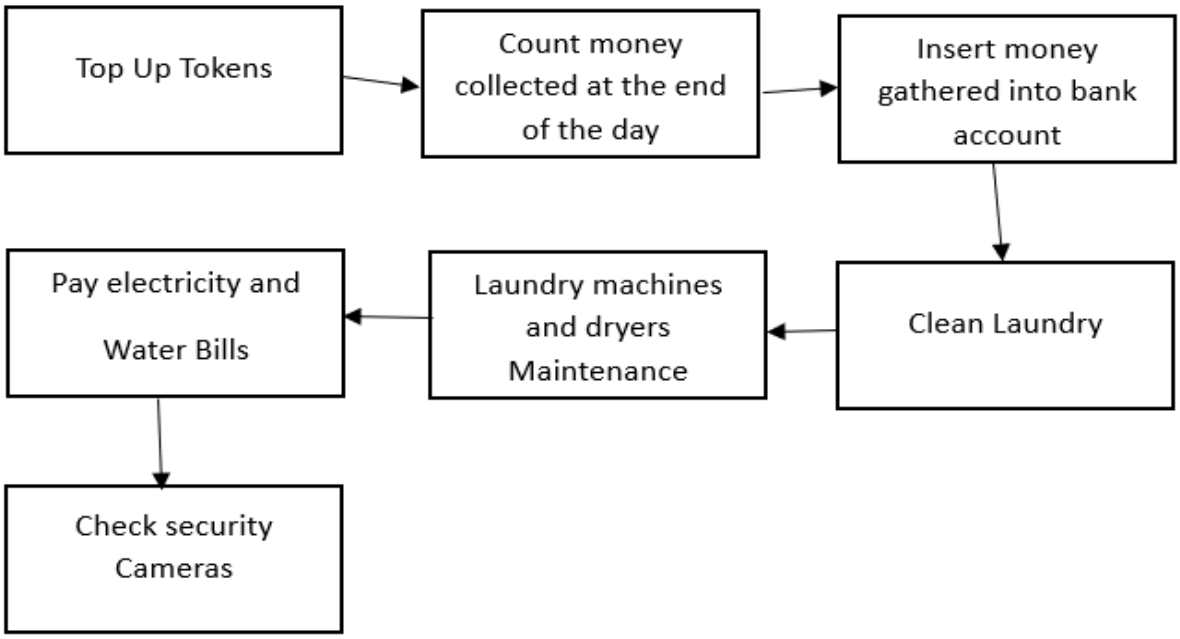
have to deposit the money they've collected into their bank accounts. The third responsibility of an administrator is to keep the laundry area clean and to maintain the dryers and washing machines on a regular basis. Long-term neglect of maintenance might result in malfunctions and render a laundry machine or dryer unusable for consumers. As a result, it costs a lot of money to maintain the business because new machines must be bought. An additional responsibility of an administrator is to settle water and electricity bills. This results in significant financial losses because having a laundry facility increases the quantity of water and electricity used. Finally, managers need to constantly examine security cameras. This is to guarantee that the laundry does not suffer damage and that the laundry system's users are comfortable.

FLOWCHART

- **Users (UTM Residences)**



- **Administrator (Owner of UNILAUNDRY)**



9.0 Data Requirement

9.1 Transaction Requirement

Module 1 : User Management

In a laundry system, the user management module is in charge of overseeing and setting up the features that pertain to users. Typically, this module has capabilities that let users or administrators manage and regulate permissions, access, and user-specific data. This module includes features that allow users or administrators to control access, permissions, and user-specific information. User roles and permissions, profile management, user authentication, and user registration are some of the capabilities included in the user management module. This module's user registration feature enables new users to sign up for the system by entering necessary information such as their name, contact details, staff number, and matric number. In terms of user authentication, users must input their username and password to authenticate themselves each time they use the system. In addition, roles of an administrator or user can be specified under user roles and permission. Each role can have specific permissions allocated to it. Finally, profile management allows users to edit their personal information, profile, and any other pertinent data.

Data Entry

1. Enter user name, matrics no/staff no, and contact no.
2. Enter user username and password
3. Enter user and administrator roles.
4. Enter user permissions.

Data Update/Deletion

1. Update/delete name, matrics no/staff no and contact no.
2. Update/delete username and password.
3. Update/delete user and administrator roles.
4. Update/delete user permissions.

Data Query

View of an Administrator:

1. List registered users in the system.
2. List administrator and user roles.
3. List User and Administrators permissions.
4. List personal details of users.
5. List personal details of Administrators.
6. List Administrator Settings

View of a User:

1. List Personal details of the user
2. List User Settings

Module 2 : Reporting and Analytic

In a laundry system, the reporting and analytic module is in charge of introducing data-driven insights and features that significantly improve administration, productivity, and user experience. Administrators are able to easily monitor machine utilisation, payment transactions, and service interruptions and take immediate action when such features are available. With real-time data provided by the live control panel, quick remedial action is ensured by alerts being sent out for important occurrences. Using analytical tools, the module processes data and produces informative reports on user patterns, machine utilisation, income, and service output. To make choices and improve laundry services over time, administrators interact with graphs, charts, and visualisations that allow a thorough examination of certain data points. Laundry service confidentiality and accuracy of data are guaranteed by the system's advanced safety features, which include user authentication, access limits, and encryption. This complies with confidentiality of information laws. Essentially, the Reports and Analytics module gives administrators the ability to transform unprocessed data into meaningful insights that can be put to use. This leads to better decision-making, resource optimisation, and general efficiency in the laundry service, all of which are factors that eventually contribute to the success of the university laundry system.

Data Entry

1. Enter machine usage data, including start time, end time, and user ID.
2. Enter payment transactions data
3. Enter user accountability
4. Enter waiting time data
5. Enter machine setup changes
6. Enter detergent and softener usage

Data Update/Deletion

1. Update/Delete machine configuration details

2. Update/Delete payment methods
3. Update/Delete machine status
4. Update/Delete waiting time data
5. Update/Delete user accountability settings

Data Queries

View of a user:

1. List user transactions
2. List user waiting times
3. List user laundry preferences (temperature settings, etc.)
4. List user payment methods

View of an administrator:

1. List machine usage patterns
2. List peak hours for each machine
3. List machine modification history (temperature changes, etc.)
4. List transaction logs
5. List payment types (cash, e-wallet, qr payments)
6. List payment confirmation records
7. List waiting time data
8. List triggered alerts and notifications
9. List responses to critical events
10. List administrator actions in response to disruptions
11. List current inventory levels
12. List usage patterns
13. List reorder history

Module 3 : Checkout Payment

Once users have finished their laundry, they may pay at the checkout by using cash for Arked Angkasa or e-wallets, QR payments, or cash for Arked Meranti. The system confirms the payment method that the user has selected. Users enter cash into the Arked Angkasa token machine to exchange money for tokens, which cost RM1 each. Arked Meranti ensures uniformity by processing and converting many payment methods into tokens. In order to provide a consistent currency for all transactions, tokens—a sort of virtual money—are created in accordance with the payment amount. Upon transaction confirmation, the system creates a record for the user's reference that includes information about the payment method, amount paid, and unique transaction ID. For administrative reasons, this data is safely retained, and the Reporting and Analytics module uses it to provide financial tracking and insights. After a payment is successfully processed, users receive alerts, guaranteeing an open and interactive process.

Data Entry

1. Enter user information
2. Enter number of washing and drying cycles
3. Enter the chosen payment method
4. Enter the conversion of received e-wallet, QR payments, and cash into tokens
5. Enter machine setup preferences
6. Enter confirmation notification
7. Enter security protocols

Data Update/Delete

1. Update/Delete payment details for cash transactions
2. Update/Delete payment details for e-wallet and QR payments.
3. Update/Delete incorrect payment entries.

4. Update/Delete token conversion records for cash transactions at Arked Angkasa's Laundry.
5. Update/Delete token conversion records for e-wallet, QR payments, and cash at Arked Meranti's Laundry.
6. Update/Delete token balances if errors are identified.
7. Update/Delete inaccurate or out-of-date payment records.

Data Queries

1. List payment transactions details
2. List token conversions history
3. List query payment status
4. List of computing total revenue
5. List of date on payment methods

Module 4 : Product Management

In the product management module of the laundry system, it involves all the users of the system which are sellers, administrators and customers. The customer only has the ability to view and select the laundry option categorized by sellers or admin such as item and service type of laundry, type of water temperature, the detail of additional time and instructions, and time of booking slot. During the booking process, customers can easily choose through a list of available options presented by the category. The sellers and admin are responsible for managing this information as they are empowered to add, edit, update and delete the details related to laundry options. They also can manage the booking slot option by specifying the dates, times and available capacities.

Data Entry

1. Enter the item type of laundry
2. Enter the service type of laundry
3. Enter the type of water temperature
4. Enter the detail of additional instruction and time
5. Enter the time and date of booking slot

Data Update/Deletion

1. Update/Delete the item type of laundry
2. Update/Delete the service type of laundry
3. Update/Delete the type of water temperature
4. Update/Delete the detail of additional instruction and time
5. Update/Delete the time and date of booking slot

Data Queries

1. List detail of item type of laundry
2. List detail of service type of laundry
3. List detail of type of temperature

4. List detail of additional instruction
5. List detail of water temperature
6. List detail of booking time
7. List detail of booking date

Module 5 : Order Management

The order management module facilitates a seamless process for both users and administrators. Users can easily monitor their laundry service orders by cancelling and rescheduling their order. The system will then generate a unique order ID for each user once a laundry session is booked and trigger an order confirmation email upon placement to send timely updates as the order progresses. Moreover, the module allows users to access a comprehensive list of past order history for reference. Meanwhile, administrators are empowered with functionalities to efficiently manage the entire orders process including updating order statuses and sending notifications to customers. This comprehensive module enhances the overall user experience by providing clear visibility into order status and history while enabling administrators to streamline order management tasks.

Data Entry

1. Enter unique order ID
2. Enter order cancellation
3. Enter order rescheduling

Data Update/Deletion

1. Update/Delete order details
2. Update/Delete unique order ID
3. Update/Delete order cancellation
4. Update/Delete order rescheduling
5. Update/Delete outstanding order
6. Update/Delete order confirmation email
7. Update/Delete order status (processing, in progress & completed)
8. Update/Delete order history

Data Queries

1. List order details

2. List order cancellation
3. List order rescheduling
4. List outstanding order
5. List order confirmation email
6. List order status (processing, in progress & completed)
7. List order history

Module 6 : Notifications

The notifications module is designed to facilitate timely communication between the system and its users. The module will send a confirmation email notification upon order placement to state the estimation start time. It also delivers reminders beforehand for booked slots including any changes as well as the actual start time to ensure users are prepared for their scheduled laundry services. Moreover, the module notifies order progress updates allowing real-time progress tracking as well as estimation time of completion and laundry completion. Administrators also benefit from this module for informing system alerts and update announcements for effective communication. Overall, the notifications module is tailored to provide relevant alerts contributing to an informed and positive user experience for both users and administrators.

Data Entry

1. Enter order confirmation
2. Enter notification response

Data Update/Deletion

1. Update/Delete order confirmation notification
2. Update/Delete booking slot reminder
3. Update/Delete booking slot changes notification
4. Update/Delete actual start time notification
5. Update/Delete system maintenance update notification
6. Update/Delete laundry progress notification
7. Update/Delete laundry estimation time of completion notification
8. Update/Delete laundry completion notification

Data Queries

1. List order confirmation notification
2. List booking slot reminder
3. List booking slot changes notification
4. List order actual start time notification

5. List system maintenance update notification
6. List laundry progress notification
7. List laundry estimation time of completion notification
8. List laundry completion notification

Module 7 : User Reviews and Ratings

The module for user reviews and ratings has the potential to improve user engagement and offer insightful feedback. Administrators can update and enhance the laundry system's user experience with the help of the feedback. This module's submission form is one of these functionalities that is incorporated. The customer can use the form to score their overall experience with this washing service on a scale of 1 to 5. As a result, administrators can enhance the laundry system even further and add new functions. Using this tool, users can report any system malfunctions by adding photographs to substantiate their input. As a result, this supports the general upkeep and enhancement of the laundry service.

Data Entry

1. Enter ratings of the system
2. Enter review regarding on the experience of using this system
3. Enter Images that support relevant feedback
4. Enter comments on the user's review.

Data Update/Deletion

1. Update/Delete user reviews and ratings.
2. Update/Delete administrators comments.
3. Update/Delete irrelevant images.

Data Queries

1. List User Reviews and Ratings
2. List Administrators Comments
3. List Images

10.0 Benefit & Summary of Proposed System

The proposed laundry system promises to deliver the benefits to both customers and laundry services owners. Customers can enjoy the convenience and efficiency of the system due to its user-friendly interface and features. One of the advantages for customers is the time-saving aspect as they can track the laundry time due to the availability of the washing machines. The laundry services tend to be busier during peak hours, by using the laundry system, customers have the capability to schedule and monitor the real time progress of their laundry, avoiding having to physically present at the laundry location to wait for their turn.

Furthermore, with the availability of online banking, it becomes more convenient for customers, especially students to make payment for their laundry. This proves highly advantageous, considering that a significant number of students often lack of cash. Additionally, this approach will also benefit the laundry service owners since it ensures the secure payment processing, lessens the potential of losses and theft. They also can ensure the accurate payment to track their business insight and performance since they can analyze the data of the laundry system.

In the context of university life, laundry is one of the important services for students to maintain their personal hygiene. The UniLaundry system is an innovative solution designed to enhance the user experience by allowing them to book laundry slots through the application, according to their free time. The proposed laundry system is to ensure consistent and high quality services, aligning with the needs and expectations of the student community.

11.0 Summary

In summary, the journey through the exploration of the laundry system has been an informative experience for us as we gained a lot of expertise and insight in this project phase 1. The entire team gives their full commitment to obtain accurate and precise data. This will not only sharpen our analytical skills but also help us to have a better understanding of our system, guiding us to select the most relevant and reliable data. To complement our research, we took a hands-on approach by visiting the physical laundries at University of Technology Malaysia (UTM), including those at Arked Meranti and Arked Angkasa. By involving ourselves in the actual environment, it allowed us to experience the challenges faced by users at these laundry facilities. As the saying goes, "you will never understand the struggle until you are the one who is going through". This experience has enhanced our research findings and provided valuable data that might have been overlooked through data alone.

Other than that, we also believed our communication skills significantly improved due to the role that required us to interact with numerous people. As team members, we need to ensure everyone is on the same page by having the same understanding of our project's objectives. It is not about to convey information, but it is also about understanding and being understood. Communication skills also play a crucial role in this project as it acts as the bridge between team members and stakeholders as we need to understand their needs, concerns and expectations for the laundry system project. Our vision is to create reliability, functionality and a user-friendly laundry system. As we move forward to the next phase, we hope this UniLaundry System not only meets the requirements but also will exceed the expectations.