Theme: Development of a Web-Based Application for Gas Bottle Purchase, Supply, and Delivery

1. CONTEXT AND JUSTIFICATION

CONTEXT:

Over the years, Cameroon's cooking gas bottle market has seen significant transformation, with an increasing number of retailers involved in the B2C (business-to-consumer) model. This sector is essential for households relying on LPG (Liquefied Petroleum Gas) also known as Cooking gas. but it faces several challenges, including the manual search for suppliers and the risk of encountering fraudulent practices, such as discrepancies in gas prices and weights, which leave clients at a disadvantage. For this reason, we decided to develop a web-based application that will enable clients to order gas bottles remotely from a broad network of verified suppliers, minimizing the risk of fraud and ensuring that clients receive accurate pricing and proper gas bottle weights. Additionally, the web based application will facilitate timely delivery through a network of vetted delivery personnel, ensuring that clients receive their orders promptly and can focus on their daily activities without worrying about gas supply issues, making the process more efficient and reliable.

JUSTIFICATION:

The existing challenges in Cameroon’s cooking gas market highlight the need for a comprehensive solution to address issues such as manual supplier searches, the requirement for clients to be onsite for orders, and fraudulent practices, including discrepancies in gas prices and weights. Our proposed project, "Development of a Web-Based Application for Gas Bottle Purchase, Supply, and Delivery," aims to tackle these issues head-on. By creating a web-based application with the following features, we can:

* **Streamline Supplier Access**: Allow clients to remotely order gas bottles from a broad network of verified suppliers, eliminating the need for manual searches and reducing the risk of dealing with unreliable or fraudulent suppliers.
* **Enable Remote Ordering**: Address the current challenge where clients must be onsite to place an order by allowing them to make orders remotely, enhancing convenience and accessibility.
* **Ensure Accurate Pricing and Weights**: Minimize the risk of fraud by partnering with verified suppliers and implementing a robust verification process to ensure accurate pricing and proper gas bottle weights.
* **Facilitate Timely Delivery**: Utilize a network of vetted delivery personnel to ensure prompt delivery of orders, allowing clients to focus on their daily activities without worrying about gas supply issues.
* **Enhance Efficiency and Reliability**: Make the process more efficient and reliable, ensuring clients receive their orders promptly and improving their overall experience with gas bottle purchasing and delivery.

1. PROJECT OBJECTIVES

General Objective:

Develop a web-based application that verifies suppliers and delivery personnel, enabling clients to remotely place orders from nearby verified suppliers and receive timely delivery, ensuring reliability and convenience.

Specific Objectives

With this platform:

* **Clients should be able to**:
  + Submit their map address for easy search of nearby or close suppliers.
  + Remotely place and cancel orders at their convenience.
  + Remotely pay for an order.
* **Suppliers and Delivery Persons should be able to**:
  + Submit their application documents, such as driver's license, business license, etc., for verification.
  + Know whether they are validated or not.
  + Manage their orders and delivery requests, respectively.
* **Admin should be able to**:
  + Access submitted application documents.
  + Validate or reject submitted application documents.
  + Set gas bottle price constraints and specifications.

The project has the following characteristics:

✓ Name of Project: **Gas Space.**

✓ Project Target: Ensure Buying, Selling and Delivery of Domestic(cooking) Gas Bottles.

✓ Technical Specification: Web Application.

EXPRESSION OF NEEDS

Functional Needs

These are the requirements that the system must meet to fulfil its purpose, typically expressed in terms of the system’s inputs, outputs, and behaviours. They are as follows:

The administrator should be able to:

Manage Client Account

Add Client Account

View Account

Delete Account

Block Account

Manage Supplier Account

Add Client Account

View Account

Delete Account

Block Account

Manage Delivery Account

Add Client Account

View Account

Delete Account

Block Account

The Delivery Person should be able to:

Create Account

Authenticate

Submit National ID Card Application

Submit Vehicle Insurance Application

Submit Driver's License Application

Submit Visite Technique Application

Submit Vehicle registration Card Application

Manage Delivery

Accept Delivery Request

Execute Delivery Request

Decline Delivery Request

Manage Payments

Change Payment Account

View Payment History

Go Online

Go Offline

The Supplier should be able to:

Create Account

Submit Business License Application

Manage Gas Stock

Add Gas Bottle

Update Gas Bottle Info

Delete Gas Bottle

Manage Order

View Order

Accept Order

Decline Order

Manage Payments

Change Payment Account

View Payment History

The Client should be able to:

Place Order

Review Order

Cancel Order

Make Payment

Pay by Cash

Pay by E-Money

Receive Notification

Successful Order Notification

Successful Payment

**Non-Functional Needs**  
These specify the quality attributes of a software system. They evaluate the software system based on its performance, usability, scalability, portability, and other non-functional standards that are critical to its success. Failing to meet these non-functional needs can result in the system not fulfilling the users' needs.

**Performance and Scalability:**  
Performance refers to how quickly the web application responds to user actions under various workloads. It measures how long a user must wait for the system to process an action, such as placing an order, even when multiple users are using the application simultaneously. In addition, performance includes background operations that ensure smooth functioning without user awareness. Our goal is to deliver optimal performance, as it greatly impacts user satisfaction and overall experience.

Scalability, on the other hand, refers to the system’s ability to maintain its performance standards as the number of users increases. The platform should scale efficiently, ensuring clients, suppliers, and delivery personnel can all access it comfortably, even during peak demand.

**Accessibility:** The platform should be accessible across multiple platforms, including mobile phones, tablets, and desktop computers. As long as a user has a browser and an internet connection, the system should work seamlessly, ensuring flexibility in use.

The application should be intuitive, with a simple user interface that allows users to easily navigate and complete tasks;

The application should implement robust security measures to protect user data, ensuring safe transactions and preventing unauthorized access;

The code should be clean and well-organized to allow for easy updates and future improvements.

PROJECT PLANNING

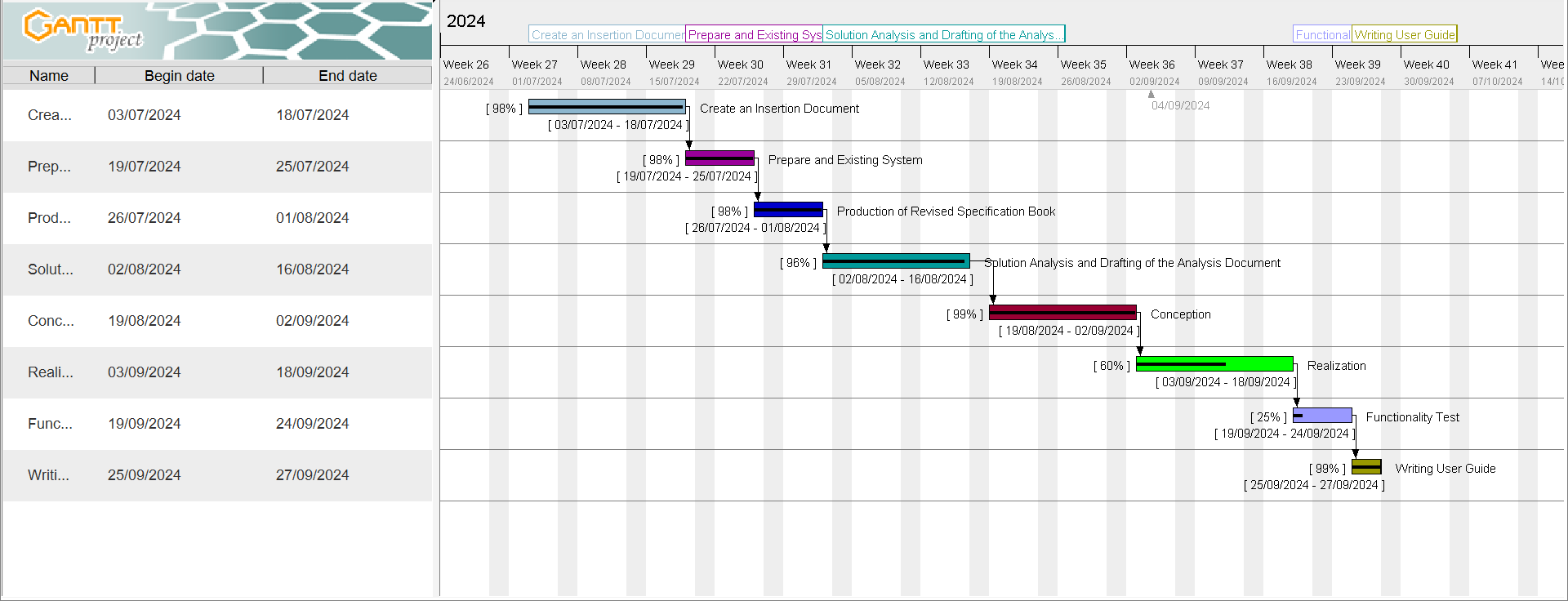
Project planning involves scheduling tasks and milestones within a set time frame, based on the structured phases of the project. Our internship spanned three months, from the 3rd of July to the 30th of September, and the following outlines how the work phases were organized during this period.

PROJECT PLAN

|  |  |  |
| --- | --- | --- |
| TASK | Duration(days) | Period |
| Create an Insertion Document | 14 days | 03rd July - 18th July |
| Prepare an Existing System | 5 days | 19th July – 25th July |
| Production of Revised Specification Book | 5 days | 26th July - 1st August |
| Solution Analysis and Drafting of the Analysis Document | 14 days | 2nd August – 17th August |
| Conception | 14 days | 18th August – 2nd September |
| Realization | 14 days | 3rd September – 18th September |
| Functionality Test | 4 days | 19th September – 24th September |
| Writing User Guide | 3 days | 25th September – 29th September |

GANTT DIAGRAM

The Gantt chart is a project management tool that provides a visual representation of a project's schedule. It displays the various tasks and their timelines, allowing project managers to track progress and ensure timely completion. The Gantt chart for this project is as follows:



ESTIMATED COST OF PROJECT

Project cost estimation involves calculating the total expenses, including human resources, hardware, and software of the project. It is critical for any project and essential for effective project management. The tables below provide a detailed breakdown of the project cost estimation.

Software Resources

The following software applications or resourecs were necessary for the successful realization of this project:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Software Resource | Description | Quantity | Price(FCFA)/ day | Total Price  (FCFA) |
| Microsoft 365 | Suite for document creation, spreadsheets, presentations, and collaboration. | 1 | 47, 998 | 47, 998 |
| Visual Studio | |  | | --- | |  |  |  | | --- | | Integrated Development Environment (IDE) for coding and debugging. | | 1 | Freeware | Freeware |
| Node.js | |  | | --- | |  |  |  | | --- | | JavaScript runtime environment for building server-side applications. | | 1 | Freeware | Freeware |
| MySQL Workbench Community Edition | Database design and management tool for MySQL. | 1 | Open Source | Open Source |
| |  | | --- | |  |  |  | | --- | | XAMPP | | |  | | --- | |  |  |  | | --- | | Local server for testing and running PHP and MySQL applications. | | 1 | Open Source | Open Source |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Git | |  | | --- | |  |  |  | | --- | | Version control system used to track changes in the project code. | | 1 | Open Source | Open Source |
| GitHub | Online platform for hosting and managing code repositories. | 1 | Freemium | Freemium |
| Thunder Client | |  | | --- | |  |  |  | | --- | | API testing tool integrated with Visual Studio Code. | | 1 | |  | | --- | |  |  |  | | --- | | Freeware | | |  | | --- | |  |  |  | | --- | | Freeware | |
| Mozilla Firefox | Web browser used for testing and development. | 1 | Freeware | Freeware |
| |  | | --- | |  |  |  | | --- | | VisualParadigm | | creating UML diagrams and system modeling. | 1 | Freemium | Freemium |
| Icogram | Software for designing illustrative diagrams and graphics. | 1 | Freemium | Freemium |
| GanttProject | |  | | --- | |  |  |  | | --- | | Project management tool for creating Gantt charts | | 1 | Freeware | Freeware |
| Total Cost of Software Resources (FCFA) | | | | 47, 998 |

HARDWARE RESOURCES

This includes the material resources used to realise the project. The table below provides a summary of these materials.

|  |  |  |  |
| --- | --- | --- | --- |
| Hardware Resource | Quantity | Price (FCFA) / day | Total Price (FCFA) |
| Laptop Acer Spin 3  10th Gen Intel Core i5-1035G1 14,  8 GB RAM, 256 GB SSD | 01 | 287,359.25 | 287,359 |
| Modem (Camtel) | 01 | 40,000 | 40,000 |
| Internet Connection | / | 20,990 | 20,990 |
| Total Cost Of Hardware Resources (FCFA) | | | 348,349 |

HUMAN RESOURCES

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Human  resource | Quantity | Price(FCFA)/ day | Duration (days) | Total Price (FCFA) |
| Project Manager | 01 | 40,500 | 90 | 2,745,000 |
| Analyst | 01 | 35,000 | 21 | 735,000 |
| UI/UX Designer | 01 | 30,000 | 10 | 300,000 |
| Developer | 02 | 80,000 | 30 | 2,400,000 |
| Tester | 01 | 20,000 | 14 | 280,000 |
| Total Cost Of Human Resources (FCFA) | | | | 6,460,000 |

TOTAL ESTIMATED COST FOR THE PROJECT

|  |  |
| --- | --- |
|  | |
| SOFTWARE RESOURCE | 47, 998 FCFA |
| HARDWARE RESOURCE | 348,349 FCFA |
| HUMAN RESOURCE | 6,460,000 FCFA |
| Unexpected charges (10%)  (Total cost) \* 10% | 680,939.4 FCFA |
| TOTAL COST | 7,490,333.4 FCFA |
| Total | 7,490,333.4 FCFA |

SUM TOTAL: 7,490,333.4 FCFA

SEVEN MILLION FOUR HUNDRED AND NINETY THOUSAND THREE HUNDRED AND THIRTY-THREE POINT FOUR FCFA

PROJECT PARTICIPANTS

The table below presents the different individuals who took part in the accomplishment of

this project. They include:

|  |  |  |
| --- | --- | --- |
| Names | Functions | Role and Tasks |
| Mr. | Full Stack Developer at Realize | Professional Supervisor |
| Mr. NGUH PRINCE | Lecturer at AICS-Cameroon  Software Engineer | Academic Supervisor |
| Mr. BALEMBA JESSE NJEA MASSOMA | Second year Student at AICS - Cameroon | Project Head, Analyst, Project Design and Coding, Testing. |

PROJECT CONSTRAINTS

Because every project and its resources are finite, we must respect three main constraints which includes;

**Budget Constraint**: The total budget for the project is strictly limited to 7,490,333.4 FCFA and must be adhered to without exceeding this amount;

**Deadline Constraint**: The project must be completed within a duration of 3 months, starting from July 3rd, 2024, while meeting all specified objectives and milestones;

**Quality Constraint**: The application must be flexible, web-based, and reusable, ensuring it meets high standards of user-friendliness, reliability, and security.

DELIVERABLES

In this section, we will outline the elements to be delivered upon project completion. These include:

* A CD-ROM containing the web application;
* The installation guide and user manual;
* A PowerPoint presentation of the application;
* A video demonstration of the application's functionality.