Requirements specification according to IEEE 830 standard IEEE std. 330 - 1998 September 20, 2024.

Abstract

This document presents, in Spanish, the Software Requirements Specification (ERS) format according to the 'latest version of the IEEE 830 standard. According IEEE, to good Requirements Document, although it is not mandatory to strictly follow the organization and format given in the 830 standard, it should include, in one way or another, all the information presented in that standard. The IEEE 830 standard is not free of defects or prejudices, and for this reason it has been rightly criticized by many authors and from many points of view, even questioning whether it is really a standard in the usual sense of the term in other engineering fields. This document does not intend to pronounce itself either for or against one or the other: it only reproduces, for teaching purposes, how Requirements Document would be organized according to the IEEE 830 standard.

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Introduction

This document is a proposal and specification on the creation of a project and improvement of a software for Repair and Maintenance Management of Private Transportation Units that meets the needs of a company. This project arises due to the need to improve operational efficiency on problems in maintenance and repair areas. Among the aspects analyzed are diagnoses of the current problems, system objectives, solution proposal, functional and non-functional requirements of the system. Likewise, the implementation and improvements of this software are specified because new requirements arise and greater efficiency and management of the software is requested for a more precise control. The material requirements for the development and use of this web application are hardware, software, network infrastructure, security, backups and information storage.

These elements are essential for the proper functioning of the proposed web application.

1.1. Purpose

The purpose of this document is to define the Software Requirements Specification (ERS) for the Private Transport Units Repair and Maintenance Management project that meets the needs of a company. This document is directed to the employees of the Plants to the drivers of the units and to all the personnel that have to do with this management.

1.2 Scope of the System

The Management of Repair and Maintenance of Private Transportation Units that meets the needs of a company. It is designed to manage the administration of these transports and to have more efficiency at the moment that the transports have some failure in order to have a better efficiency in the work environment.

1.3 Definitions, Acronyms and Abbreviations

ERS: Software Requirements Specification. DB:

Database.

1.4. References

Specification document on the project of Repair and Maintenance Management of Private Transport Units that meets the needs of a company.

1.5 Document Overview

This document is organized into the following sections:

- Introduction
- General Description
- Specific Requirements
- Appendices

2. General Description

Repair and Maintenance Management of Private Transport Units is a key process to ensure the optimal operation of a vehicle fleet. It includes the planning of preventive maintenance, corrective repairs when failures occur, control of spare parts inventories, and the recording of the interventions performed. It is crucial to manage the associated costs, whether through internal or external repairs, and to ensure compliance with safety and emissions regulations. The use of specialized software to monitor and analyze fleet status improves efficiency, reduces downtime and optimizes resources. All this allows the company to maximize the useful life of vehicles, reduce operating costs and ensure road safety.

2.1. Product Perspective

Private Transport Unit Repair and Maintenance Management is a key service that offers companies a comprehensive solution to keep their fleet operating efficiently. This product allows you to schedule preventive maintenance, manage corrective repairs, control spare parts inventories and monitor the condition of each vehicle. By optimizing downtime and operating costs, it guarantees continuous and safe operation, maximizing the useful life of the fleet and ensuring regulatory compliance.

2.2. Product Functions

- 1. User Registration and Authentication
- 2. Fault report creation
- 3. Management of reports by the coordinator.
- 4. Assignment of tasks in the workshop
- 5. Repair reports by the mechanic
- 6. Notifications
- 7. Report and repair history
- 8. Repair priority

2.3. User Characteristics

User characteristics in a Private Transport Unit Repair and Maintenance Management system may include:

1. Fleet Managers:

they are responsible for overseeing the maintenance of the entire fleet. They seek real-time visibility of vehicle conditions, maintenance scheduling, and cost analysis.

2. Maintenance Technicians:

Perform repairs and preventive maintenance. They need access to work orders, parts inventory and technical manuals to optimize repair time.

3. **Drivers:**

These are users who report mechanical failures and problems. They may also need access to basic information about the status of their vehicle and upcoming maintenance.

4. Operations Supervisors:

They seek to ensure that vehicles are available when needed. They focus on minimizing downtime and maximizing fleet availability.

5. Financial Managers:

They are in charge of maintenance and repair cost control. They look for cost reports, return on investment in repairs and budget management.

6. External Suppliers:

If services are outsourced, workshops and external parts suppliers can access the system.

2.4. Restrictions

This project will be restricted to all those users who are not registered by the coordinator or a worker of the area.

2.5. Assumptions and Dependencies

- It is assumed that all users have access to the Internet.
- The system relies on a database server to store all information.

2.6 Future Requirements

Future versions of the system we want to have the stability to handle more units without so many failures that will help in the efficiency that people need to have these units in better conditions and also the customization to adapt to the specific needs of each user or company, ensuring that the system remains efficient and adaptable.

3 Specific Requirements

1. User registration and authentication:

Operators, fleet coordinators and workshop managers must be able to register and log in with specific roles.

2. Fault report creation:

Operators should be able to generate unit failure reports, specifying the type of failure (minimum, medium, high) and providing a detailed description.

3. Management of reports by the coordinator:

The coordinator should be able to view all fault reports.

The coordinator must assign a priority to each report (minimum, medium, high).

The coordinator must be able to assign the reports to workshops with which he/she has an agreement.

4. Assignment of tasks in the workshop:

The workshop manager must be able to receive the reports sent by the coordinator.

The manager must be able to assign repair tasks to available mechanics.

5. Mechanic's report of repairs:

Mechanics should be able to create a report of the work performed on the unit and send it to the fleet coordinator.

6. Notifications:

The system should notify operators when their units are ready to circulate.

The system should notify the coordinator about the status of repairs.

7. Report and repair history:

The system should store a history of failures and repairs performed for each unit.

8. Repair Priority:

Units with non-circulatable faults should have priority in the workshops.

3.1. External Interfaces

3.2. Functions

1. User registration and authentication:

The system must handle different types of users (such as coordinators, mechanics, or administrators) with different permissions.

2. Fault report creation:

A failure report should include information such as the type of problem, detailed description of the failure, the vehicle involved, and possibly attachments such as photos or videos to help diagnose the problem.

3. Report management by the coordinator:

The shop coordinator is responsible for reviewing and managing failure reports. This requirement implies that the coordinator can view reports, assign priorities, update the status of reports, and assign reports to specific mechanics.

4. Assignment of tasks in the shop:

The shop floor coordinator or supervisor must be able to assign tasks related to fault reports to available mechanics. This functionality allows managing the workload and optimizing the efficiency of the shop floor by assigning tasks according to the mechanic's skills or availability, as well as the priority of the report.

5. Mechanic repair reporting:

Once a mechanic has been assigned to a failure report, he should be able to update the system with details of the repair performed. This includes information on parts replaced, labor time spent, any additional problems encountered, and the final status of the repair.

6. Notifications:

This requirement ensures that the system notifies involved users (coordinators, mechanics, customers) about important events, such as the creation of a new report, task assignment, progress on the repair, or when a repair has been completed.

7. Report and repair history:

The system should allow users, especially coordinators and mechanics, to access a complete history of failure reports and repairs performed on each vehicle.

8. Repair Priority:

This requirement states that the system must allow fault reports to be classified according to their priority (urgent, medium, low).

3.4 Performance Requirements

• Response Time:

Description: The system must respond quickly to user requests.

• Processing Capacity:

Description: The system must be able to handle multiple users simultaneously.

• Storage Capacity:

Description: The system must be able to store a large amount of data, such asfailure reports, repairs, and historical records.

Scalability:

Description: The system must be able to accommodate growth in the number of users and fault reports without significant loss of performance.

• Availability:

Description: The system must be available at all times to users.

3.5. System Attributes

Security: The system must ensure the privacy and security of user data.

Usability: The interface must be intuitive and easy to use. Maintenance: The system must be easy to maintain and update.

Other Requirements

The system must include complete documentation for users and developers.

ANNEX:

Use Case 1: User Registration

Name: User Registration

Author: Daniel Gomez Miramontes

Date: 09/23/2024

Description: This use case describes the process in which operators, fleet coordinators, and workshop managers register in the system, obtaining specific roles according to their function.

Actors: Operator, Fleet Coordinator, Workshop Manager

Preconditions: The user must not be previously registered in the system.

Normal Flow:

The user accesses the registration page.

The user fills out the registration form with personal information and credentials (name, email, password, role).

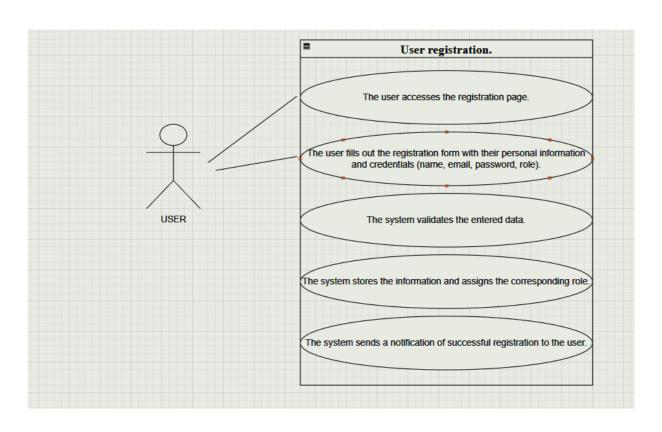
The system validates the entered data.

The system stores the information and assigns the corresponding role.

The system sends a notification of successful registration to the user.

Alternative Flow: If the data is incorrect or incomplete, the system displays an error message requesting correction.

Postconditions: The user is successfully registered in the system and can proceed.



Use Case 2: Creation of Failure Reports

Name: Creation of Failure Reports

Author: William Javier García Bustamante

Date: 09/23/2024

Description: Operators generate failure reports by indicating the type of failure (minor, medium,

major) and providing a detailed description.

Actors: Operator

Preconditions: The operator must be registered and authenticated in the system.

Normal Flow:

The operator logs into the system.

The operator accesses the failure reports section.

The operator selects the affected unit.

The operator indicates the type of failure (minor, medium, major).

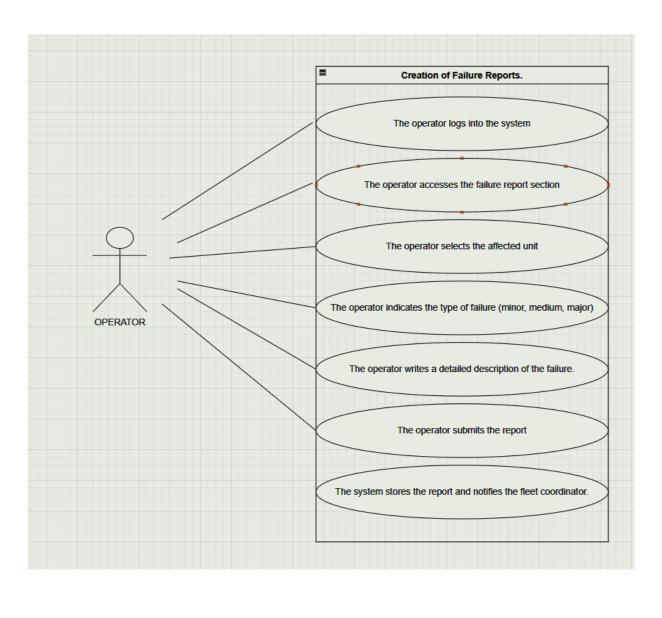
The operator writes a detailed description of the failure.

The operator submits the report.

The system stores the report and notifies the fleet coordinator.

Alternative Flow: If the operator does not complete all required fields, the system displays an error message requesting the missing information.

Postconditions: The failure report is stored in the system, and the fleet coordinator is notified.



Use Case 3: Management of Failure Reports

Name: Management of Failure Reports

Author: Daniel Gomez Miramontes

Date: 09/23/2024

Description: The fleet coordinator reviews failure reports, assigns priorities, and designates

workshops for the repair of the units.

Actors: Fleet Coordinator

Preconditions: The coordinator must be registered and authenticated. There must be at least one

failure report.

Normal Flow:

The coordinator logs into the system.

The coordinator accesses the list of failure reports.

The coordinator reviews each report.

The coordinator assigns a priority to each report (minor, medium, major).

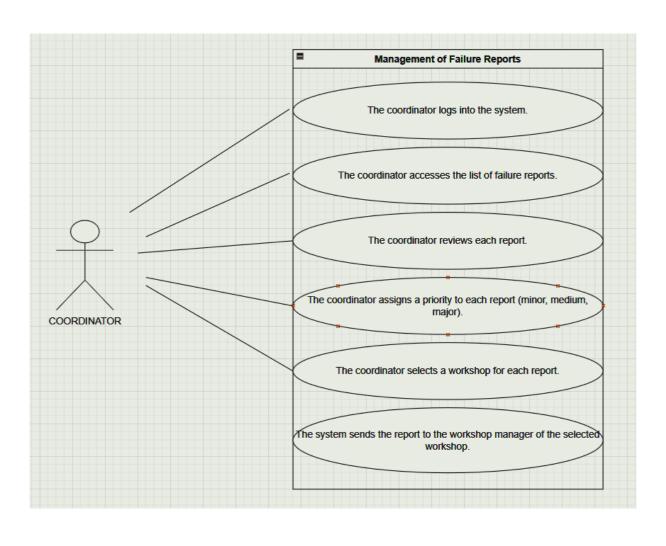
The coordinator selects a workshop for each report.

The system sends the report to the manager of the selected workshop.

Alternative Flow: If no workshops are available, the coordinator can mark the report as pending

until a workshop is assigned.

Postconditions: The reports are sent to the corresponding workshops for repair.



Use Case 4: Assignment of Tasks in the Workshop

Name: Assignment of Tasks in the Workshop

Author: William Javier García Bustamante

Date: 09/23/2024

Description: The workshop manager receives the reports assigned by the coordinator and distributes the tasks among the available mechanics.

Actors: Workshop Manager, Mechanic

Preconditions: The manager must be registered and authenticated. There must be reports assigned by the coordinator.

Normal Flow:

The workshop manager logs into the system.

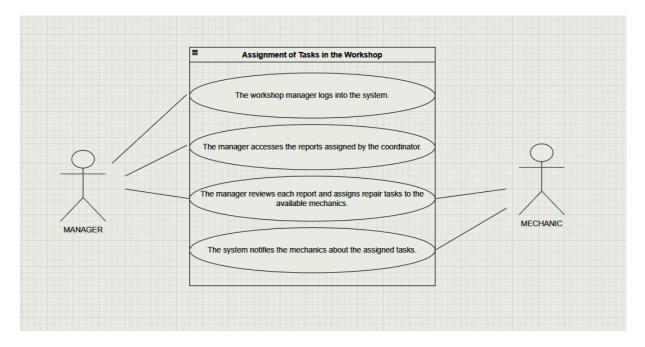
The manager accesses the reports assigned by the coordinator.

The manager reviews each report and assigns repair tasks to the available mechanics.

The system notifies the mechanics about the assigned tasks.

Alternative Flow: If no mechanics are available, the system marks the task as pending.

Postconditions: The mechanics receive the assigned tasks, and the system updates the report's status.



Use Case 5: Repair Report by the Mechanic

Name: Repair Report by the Mechanic

Author: Daniel Gomez Miramontes

Date: 09/23/2024

Description: Mechanics report the repairs performed and submit the final report to the fleet

coordinator.

Actors: Mechanic, Fleet Coordinator

Preconditions: The mechanic must be registered and authenticated. They must have an assigned

repair task.

Normal Flow:

The mechanic accesses the assigned task in the system.

The mechanic completes the repair work.

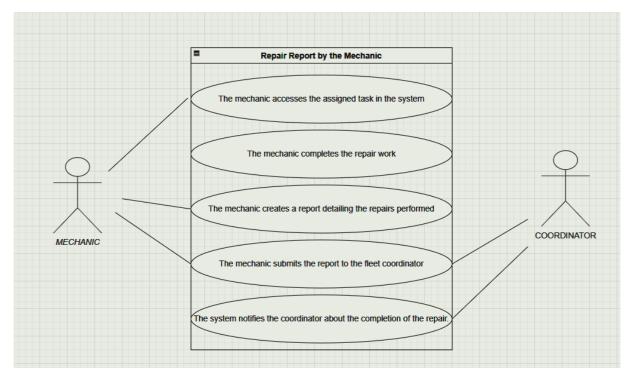
The mechanic creates a report detailing the repairs performed.

The mechanic submits the report to the fleet coordinator.

The system notifies the coordinator about the completion of the repair.

Alternative Flow: If the work cannot be completed, the mechanic reports the issue and requests assistance.

Postconditions: The repair report is stored, and the coordinator is notified.



Use Case 6: Notification to the Operator

Name: Notification to the Operator

Author: William Javier García Bustamante

Date: 09/23/2024

Description: The system notifies the operator when their unit is ready to operate again after the

repair.

Actors: System, Operator

Preconditions: The unit must have been repaired, and the coordinator must have marked the

repair as completed.

Normal Flow:

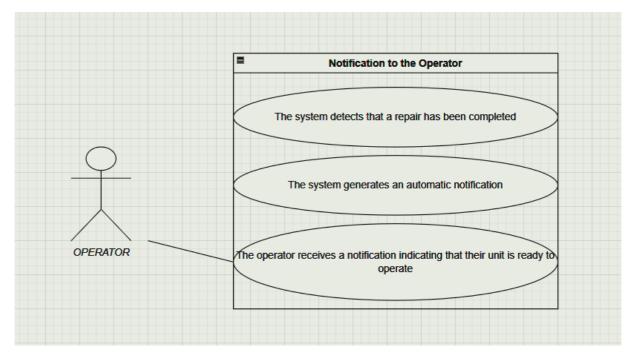
The system detects that a repair has been completed.

The system generates an automatic notification.

The operator receives a notification indicating that their unit is ready to operate.

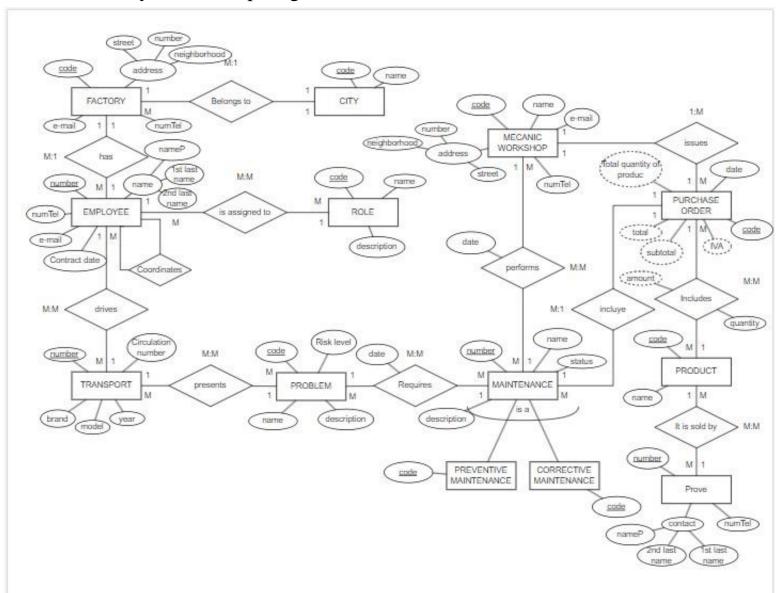
Alternative Flow: Not applicable.

Postconditions: The operator is notified about the status of their unit.

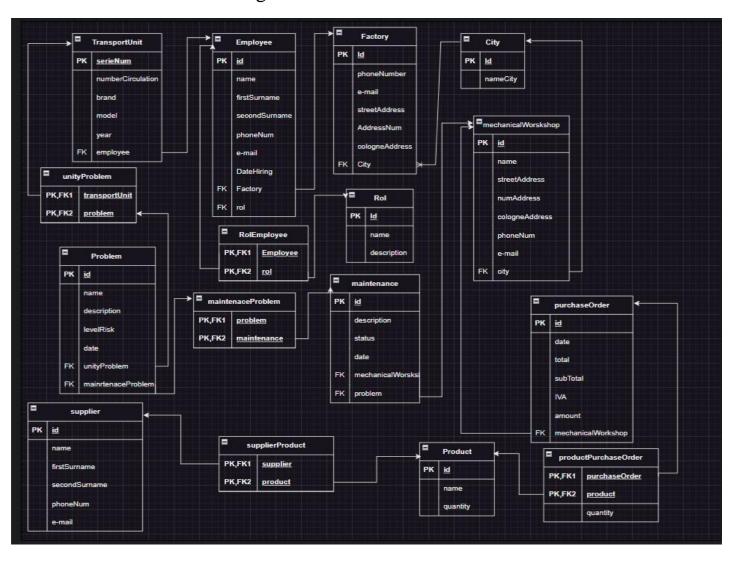


UML Diagrams

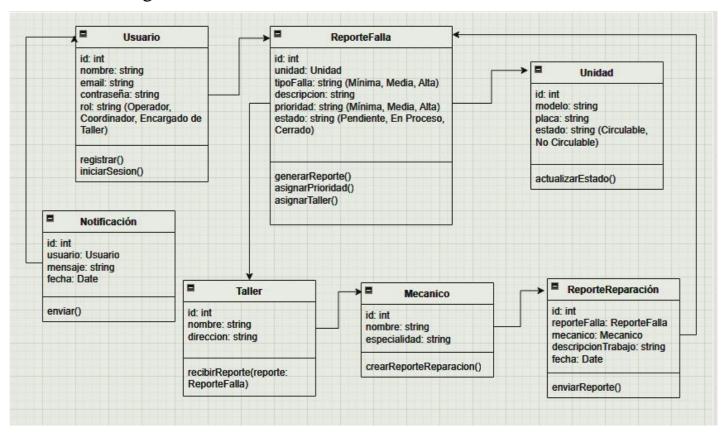
Entity-relationship diagram:



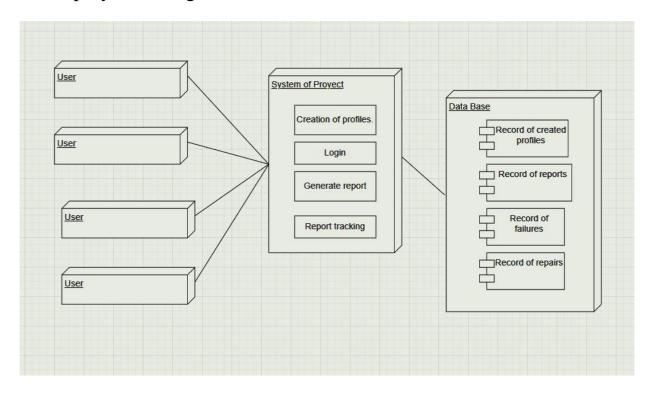
Relational model diagram



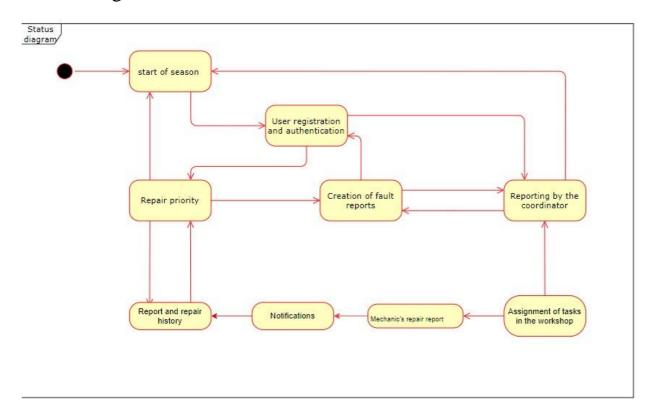
Class diagram:



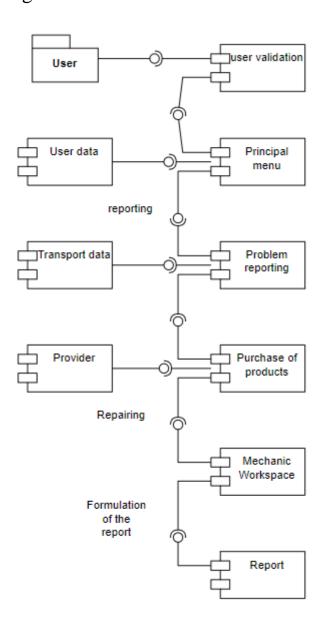
Deployment diagram:



State diagram:



Component diagram:



Anexos.

LOGIN

This page is where users will be able to log in, we use CSS to give it a better format and layout. Logging in will allow users to enter the respective menu to which they have access.

```
<html lang="en">
      <head>
          <meta charset="UTF-8">
          <meta name="viewport" content="width=device-width, initial-scale=1.0">
k rel="stylesheet" href="CSS/style.css">
          <title>Inicio sesión</title>
      </head>
          <header class="header-container">
              <h1>AutoGestión</h1>
          <nav>
16
17
18
19
                  <a href="Nosotros.html">About Us</a>
<a href="#">Contact</a></a>
          </nav>
              <h2>LOGIN</h2>
                  <input type="text" id="usuario" name="usuario" placeholder="Usuario" required>
                       <label for="contraseña">Password</label>
<input type="password" id="contraseña" name="contraseña" placeholder="Contraseña" required>
      <br>
                      ⟨button type="submit"⟩Sign In⟨/button⟩
                  </form>
                 <a href="Registro.html">Register</a>
                   <a href="recuperarContraseña.html">I forgot my password</a>
     </body>
     </html>
```

MAINTENANCE HISTORY

In this section, the user can see the history of maintenance and repairs that the units have had. The user will be able to filter them automatically.

```
<!DOCTYPE html>
<html lang="en">
   <meta name="viewport" content="width=device-width, initial-scale=1.0">
< red = "stylesheet" href="CSS/style.css">
   <title>Maintenance History</title>
   link rel="icon" type="image/svg+xml" href="data:image/svg+xml,<svg xmlns='http://www.w3.org/2000/svg' viewBox='0 0 24 24' fill='none' stroke='currentColor</pre>
</head>
<body>
    <header class="header-container">
       <h1>AutoGestion</h1>
   </header>
    <nav>
       <l
          <a href="menuMecanico.html">My profile</a>
          <a href="Nosotros.html">Log out</a>
       </nav>
   <section>
       <h2>Maintenance History</h2>
           <button class="dropbtn" onclick="toggleDropdown()">Filter maintenance</button>
```

```
<thead>
           Maintenance
              Status
              Problem
             Date
         </thead>
         <!-- Ejemplo de filas de mantenimiento --> 
             Fuel Injector Cleaning
              Completed
              Transmission Fluid Leak
              20-10-2024
           Engine Overhaul
              In Progress
              Engine Overheating
             22-10-2024
62
           Brake System Check
              Pending
              Brakes Squeaking
              25-10-2024
         </section>
   </body>
   </html>
```

Dirver's menú

The user with the role of driver will be able to view their data, will be able to see the reports they have made and create a new report.

```
<html lang="en">
    <head>
       <meta name="viewport" content="width=device-width, initial-scale=1.0">
       <link rel="stylesheet" href="CSS/style.css">
       <title>Menú</title>
    </head>
    <body>
       <header class="header-container">
         <h1>AutoGestion</h1>
       </header>
       <l
17
          <a href="menuChoferCrearReporte.html">Create Report</a>
          <a href="menuChoferMisReportes.html">My Reports</a>
          <a href="Nosotros.html">Log Out </a>
19
       </nav>
    <section class="main-content">
       <h2>My Data</h2>
       28
             Unit Number
             32 🖁
             Number of Plates
             <
          36
             Model
             <
          40
             Year
             </section>
    </body>
    </html>
```

Creating Report Menu

Here the drivers will create reports, we include that the location where the report was created can be given

```
<html lang="en">
  <head>
      <meta name="viewport" content="width=device-width, initial-scale=1.0">
k rel="stylesheet" href="CSS/style.css">
      <title>Create Report</title>
  <body>
      cheader class="header-container">
         <h1>AutoGestion</h1>
      </header>
      <nav>
          <l
             <a href="menuChoferCrearReporte.html">Create Report</a>
             <a href="menuChoferMisReportes.html">My Reports </a>
             <a href="Nosotros.html">Log Out </a>
      <section class="main-content">
  <h2 >Create Report</h2>
  <form action="">
  <label for="">Date</label>
  <label for="">Description</label>
  <input type="text" name="" id="">
  <label for="">Fault Type</label>
  <input type="text">
  <label for="">Place where the fault occurred</label>
  <input type="text" id="ubicacion" name="ubicacion" readonly required><br>
  </form>
    if (navigator.geolocation) {
        navigator.geolocation.getCurrentPosition(
             (position) => {
                 const lat = position.coords.latitude;
                 const lon = position.coords.longitude;
                 document.getElementById('ubicacion').value = `Latitud: ${lat}, Longitud: ${lon}`;
             (error) => {
                 console.error("Error obteniendo la ubicación:", error);
                 document.getElementById('ubicacion').value = "No se pudo obtener la ubicación";
        document.getElementById('ubicacion').value = "Geolocalización no compatible con el navegador";
</script>
    </section>
</body>
</html>
```

Reports by the driver

In this section we will show the reports created by the drivers

```
| Control | Part | Control | Control
```

Mechanic Menu

reader.readAsDataURL(file);

</script>

document.getElementById('uploadForm').addEventListener('submit', (event) => {

The mechanic will be able to see the repair history you have, as well as your status.

```
<html lang="en">
   <title>Mechanic</title>
   k rel="icon" type="image/svg+xml" href="data:image/svg+xml,<svg xmlns='http://www.w3.org/2000/svg' viewBox='0 0 24 24' fill='none' stroke='currentColor' stroke</pre>
</head>
   <header class="header-container">
      <h1>AutoGestión</h1>
   </header>
   <nav>
          <a href="HistorialMante.html">Maintenance History</a>
          <a href="Nosotros.html">Log Out</a>
   <div class="container">
       <h2>Profile Photo</h2>
       <form id="uploadForm">
          <div class="preview-container">
              <img id="imagePreview" src="#" alt="Vista previa" style="display: none;">
          </div>
          <label class="custom-file-upload">
              <input type="file" id="fileInput" accept="image/*" required>
              Examinar
          </label>
          <button type="submit">Save Photo</button>
       </form>
   </div>
            <label class="custom-file-upload">
                <input type="file" id="fileInput" accept="image/*" required>
                Examinar
            </label>
            ⟨button type="submit"⟩Save Photo⟨/button⟩
        </form>
   </div>
   <script>
        const fileInput = document.getElementById('fileInput');
        const imagePreview = document.getElementById('imagePreview');
        fileInput.addEventListener('change', (event) => {
            const file = event.target.files[0];
                const reader = new FileReader();
                reader.onload = function(e) {
                     imagePreview.src = e.target.result;
                     imagePreview.style.display = 'block';
```

```
<body>
 </script>
   <h2>My Data</h2>
      Name
    ID
      <
    Workshop
    Role
    E-mail
    Factory
   </body>
```

About Us

Information about who we are as a company and what our values are will be added here

```
<head>
       <meta name="viewport" content="width-device-width, initial-scale=1.0">
clink rel="stylesheet" href="CSS/style.css">
       <title>About us</title>
    </head>
    <body>
       <header class="header-container">
     <h1>AutoGestion</h1>
       </header>
21
22
23
           </nav>
            <h2>Welcome to AutoGestion</h2>
<h3>Professional Transport Bus Maintenance</h3>
32
            At AutoGestión, we are specialists in the comprehensive maintenance of transport buses, providing high-quality services to guarantee the safety, efficiency and durability of your ve
         </div>
         </div>
41
42
            43
44
```

```
Section

(div)

(div)
```

Recover Password

On this page, users will be able to recover their password in case they have forgotten it.

```
<html lang="en">
<head>
   <meta name="viewport" content="width=device-width, initial-scale=1.0">
k rel="stylesheet" href="CSS/style.css">
   <title>Recover Password</title>
<body>
    <header class="header-container">
       <h1>AutoGestion</h1>
   </header>
   <nav>
           <a href="InicioSesion.html">Login</a>
<a href="Nosotros.html">About us</a>
    </nav>
   <section class="main-content">
        <h2>Recover Password</h2>
        <form>
             <label for="usuario">Username</label>
             <input type="text" name="usuario" id="usuario" placeholder="Enter your Username">
<label for="email">E-mail</label>
             <input type="email" name="email" id="email" placeholder="Enter your E-mail">
             <button type="submit">send</button>
        </form>
    </section>
</body>
</html>
```

Register

Los usuarios podrán registrarse, si el usuario ingresado se encuentra en la base de datos, este podrá ingresar al menú al cual esta asignado, de lo contrario no dejara registrar sus datos.

```
<html lang="en">
<head>
   <meta charset="UTF-8">
   <meta name="viewport" content="width=device-width, initial-scale=1.0">
   <link rel="stylesheet" href="CSS/style.css">
   <title>Login</title>
</head>
<body>
   <header class="header-container">
       <h1>AutoGestion</h1>
   </header>
   <nav>
           <a href="InicioSesion.html">Login</a>
           <a href="Nosotros.html">About us</a>
       </nav>
   <section class="main-content">
       <h2>Registration menu</h2>
```

Team names: Acosta Santoyo Ariana Michelle Tadeo Alvarez Brahian Ivan Garcia Bustamante William Javier Gomez Miramontes Daniel