

System Analysis Project

**Faculty of Computers & Information
Menoufia University**

TEAM MEMBERS

Baraa Mohamed Masoud

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Moaaz Ahmed Abd El-Mordy

PROJECT IDENTIFICATION

Project Name	CarZone System
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PROJECT DESCRIPTION

The system will boost sales by providing an easy-to-use platform for displaying, comparing, and selling cars. It will streamline the registration and management of spare parts inventory and offer remote booking for maintenance services. These features will enhance customer experience, improve operational efficiency, and drive overall business growth.

SYSTEM REQUEST

Project Sponsor	CEO / Mr . Mohamed Eltelwany
Business Needs	<ol style="list-style-type: none"> 1. Inventory Management: Track vehicle sales, spare parts, and stock across dealerships. 2. CRM: Manage customer interactions, service history, and preferences for better after-sales service. 3. Service Scheduling: Enable online booking and automate maintenance history tracking. 4. Financial Integration: Streamline invoicing, payments, and warranty claims. 5. Automated Pricing: Update promotions, discounts, and exchange deals in real-time. 6. After-Sales Service: Handle warranties, part replacements, and collect customer feedback.
Business Requirements	<p>User Requirements: Customers need the ability to make reservations, monitor the car's condition, and utilize electronic payment options.</p> <p>Technical Requirements: To manage the center, the necessary software includes an inventory management system and reservations software, along with hardware such as POS machines and IoT devices.</p>
Business Value	<p>The system is expected to achieve the following results:</p> <ul style="list-style-type: none"> • Increase new customers by 10% within the first 6 months. • Improve order processing speed by 25%. • Boost customer satisfaction to 90%. • Reduce sale completion time by 20%. • Enhance online sales engagement by 15%.
Special Issues	<ul style="list-style-type: none"> • Changing Customer Requirements: • Training and Technical Support:

Feasibility Analysis

Economic Feasibility:

	Year 0	Year 1	Year 2	Year 3	Total
Total Benefits		22,200,230	27,000,500	31,190,300	80,391,030
Total Cost	12,780,000	20,524,500	20,775,200	21,120,000	75,119,700
Net Benefits					
(Total Benefits – Total Cost)	12,780,000	1,675,730	6,225,300	10,150,300	5,271,330
Cumulative Net Cash Flow	12,780,000	-11,104,270	-4,878,970	5,271,330	

- Return On Investment (ROI)

$$\text{ROI} = \frac{\text{Total Benefits} - \text{Total Costs}}{\text{Total Costs}}$$

$$\text{ROI} = \left(\frac{80,390,030 - 75,119,700}{75,119,700} \right) \times 100 = 7\%$$

- Break Even point (BEP)

$$\text{BEP} = \frac{\text{Number of years of negative cash flow}}{\text{That year's Net Cash Flow} - \text{That year's Cumulative Cash Flow}} + \frac{\text{That year's Net Cash Flow} - \text{That year's Cumulative Cash Flow}}{\text{That year's Net Cash Flow}}$$

$$\text{BEP} = 2 + \left(\frac{10,150,300 - 5,271,330}{5,271,330} \right) = 2.9 \text{ Years}$$

	Year 0	Year 1	Year 2	Year 3	Total
Total Benefits		22,200,230	27,000,500	31,190,300	
PV of Total Benefits		21,143,076	24,490,249	26,943,353	72,576,678
Total Cost	12,780,000	20,524,500	20,775,200	21,120,000	
PV of Total Cost		19,547,512	18,843,718	18,244,250	56,635,480

- Present Value

$$PV = \frac{\text{Cash flow amount}}{(1 + \text{rate of return})^n}$$

- Net Present Value

$$NPV = \sum PV \text{ of Total Benefits} - \sum PV \text{ of Total Costs}$$

$$NPV = 72,576,678 - 56,635,480 = 15,941,198$$

Technical Feasibility:

System Architecture

1. Client-Server Model

- **Remote Access:** Cloud-based solution for remote accessibility.

2. Data Storage

- **Centralized Storage:** Data stored on a central server accessible through a web application.

3. Front-end

- **Technologies:** React.js, HTML5, CSS3, JavaScript, and TypeScript.

4. Back-end

- **Preferred Technology:** .NET Core with Entity Framework.
- **API Design:** RESTful API for interaction between front-end and back-end.

5. Database

- **Choice:** SQL Server for integration with the .NET environment.

6. Hardware Requirements

- **Devices:** Desktop or tablet devices with touch screens and modern browsers.
- **Network Speed:** Minimum internet speed of 50 Mbps.

7. Modules

- **Customer Management:** Store customer information and maintenance records with notifications.
- **Billing and Payments:** Handle invoicing and payment processing.
- **Inventory Management:** Track available tools and spare parts.
- **Reports and Analytics:** Provide financial reports and customer data analysis.

8. User Interfaces

- **Customer Interface:** For scheduling maintenance appointments and reviewing invoices.
- **Employee Interface:** To log maintenance details and manage schedules.
- **Admin Interface:** To view performance statistics and manage users.

9. Integration with Other Systems

- **Payment Gateways:** Integration with PayPal and Visa.
- **Accounting Software:** Integration with QuickBooks.
- **CRM Integration:** Potential integration with CRM systems.

10. Security Measures

- **Data Encryption:** Use HTTPS and encrypt the database.
- **Two-Factor Authentication (2FA).**
- **Access Control:** Define user permissions.

11. Scalability and Maintenance

- **Scalability:** Designed to be scalable with cloud infrastructure.
- **Regular Maintenance:** Routine maintenance for performance.

12. Car Maintenance Tools

- **Diagnostic Tools:** OBD-II scanners.
- **Tire Equipment:** Tire changing tools and air compressors.
- **Lifting Equipment:** Hydraulic lifts.
- **Battery Tools:** Testing and charging tools.
- **Oil Change Equipment:** Oil drain tanks and filter wrenches.
- **Basic Tools:** Toolkits.
- **Polishing & Detailing:** Polishers and vacuum cleaners.

13. Showroom Maintenance and Cleaning

- **Floor Cleaning:** Cleaning machines.
- **Glass Cleaning:** Squeegees and spray solutions.
- **Dust Control:** Vacuums and air filters.
- **Waste Management:** Trash bins and compactors.

14. Worker Equipment

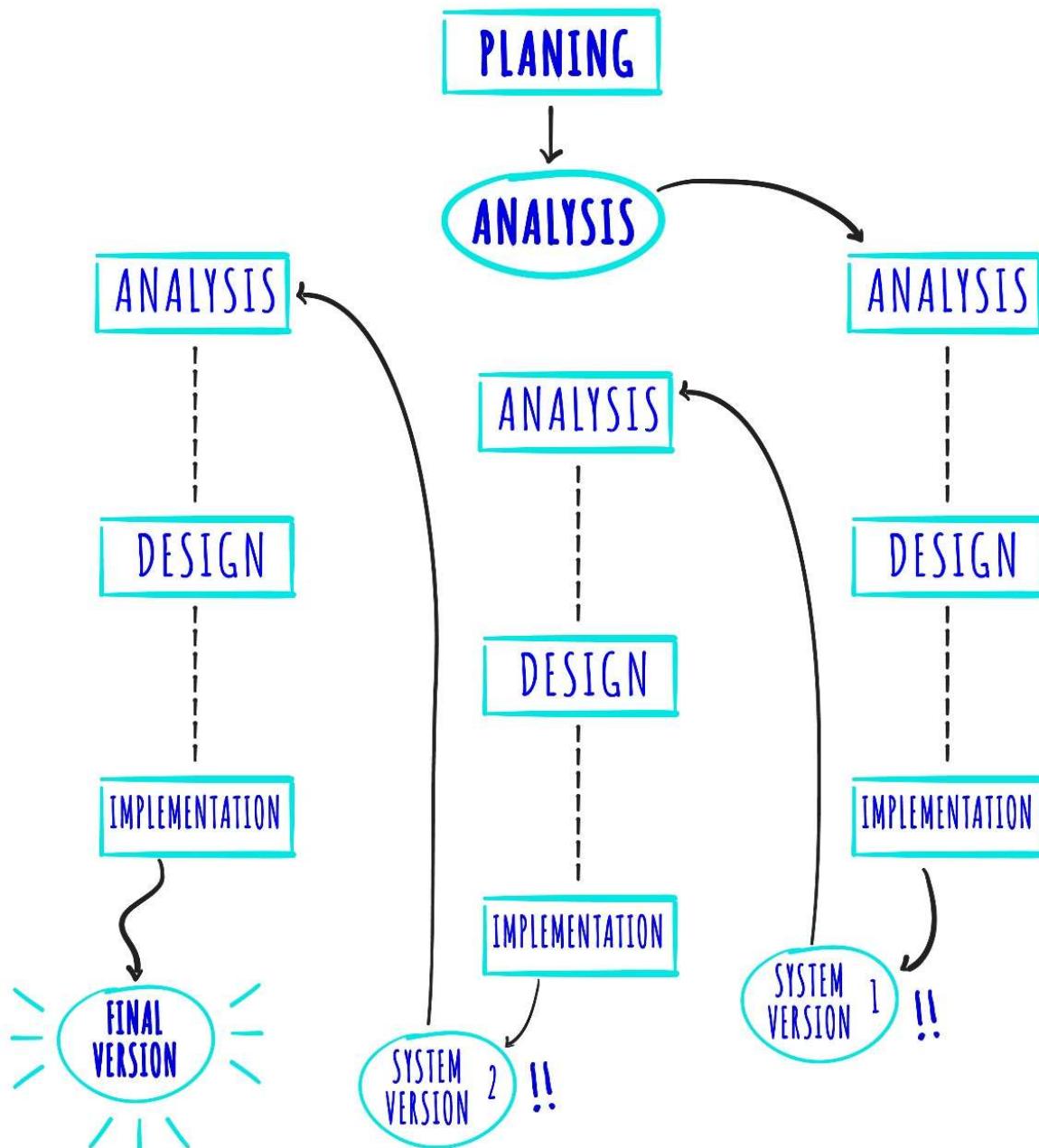
- **Safety Gear:** Gloves, safety glasses, steel-toed shoes.
- **Cleaning Tools:** Cleaning carts and mops.
- **Additional Supplies:** First aid kits and spare parts.

Organizational Feasibility:

- The app is to provide a simple and convenient way for customers to request services, schedule appointments, and ensure that the shop can manage those appointments effectively without congestion. The app will help organize the car repair shop's scheduling system and ensure that resources (e.g., parts, labor) are available before appointments are confirmed.
- Customers will be able to monitor the status of their vehicle, such as when it's under diagnostics, repair, or ready for pickup. After the service is completed, customers will be able to leave feedback, helping improve the quality of the service.

Project Methodology

Rapid Application Development (RAD) :-



Time Estimation

	Planning	Analysis	Design	Implementation
Standard Percentages	15%	20%	35%	30%
Estimated time based on planning time	1 Months	1.5 Months	2.5 Months	2 Months

Task Identification

Name of Task	Project Identification
Start Date	10/10/2024
End Date	20/10/2024
Person assigned to task	Abd El-Rahman Amr
Priority	High
Resources Needed	Microsoft Word
Estimated Time	9 days
Actual Time	5 days

Name of Task	System Request
Start Date	13/10/2024
End Date	16/10/2024
Person assigned to task	Yousef Ramadan
Priority	High
Resources Needed	Microsoft Word
Estimated Time	2 days
Actual Time	1 day

Name of Task	Organizational Feasibility
Start Date	17/10/2024
End Date	20/10/2024
Person assigned to task	Mariam Gaber , Basmala Ahmed
Priority	High
Resources Needed	Microsoft Word
Estimated Time	16 Hours
Actual Time	8 Hours

Name of Task	Economic Feasibility
Start Date	15/10/2024
End Date	18/10/2024
Person assigned to task	Baraa Mohamed
Priority	High
Resources Needed	Microsoft Word
Estimated Time	30 Hours
Actual Time	18 Hours

Name of Task	Technical Feasibility
Start Date	17/10/2024
End Date	20/10/2024
Person assigned to task	Nada Ezzat
Priority	High
Resources Needed	Microsoft Word
Estimated Time	12 Hours
Actual Time	6 Hours

Name of Task	Project Methodology
Start Date	20/10/2024
End Date	22/10/2024
Person assigned to task	Baraa Mohamed
Priority	High
Resources Needed	Microsoft Word
Estimated Time	6 Hours
Actual Time	5 Hours

Name of Task	Time Estimation
Start Date	20/10/2024
End Date	23/10/2024
Person assigned to task	Nada Ezzat
Priority	High
Resources Needed	Microsoft Word
Estimated Time	6 Hours
Actual Time	4 Hours

Name of Task	Tasks Identification
Start Date	22/10/2024
End Date	25/10/2024
Person assigned to task	Moaaz Ahmed
Priority	High
Resources Needed	Microsoft Word
Estimated Time	16 Hours
Actual Time	10 Hours

Name of Task	Pert chart
Start Date	25/10/2024
End Date	27/10/2024
Person assigned to task	Basmala Ahmed
Priority	High
Resources Needed	Microsoft Word
Estimated Time	7 Hours
Actual Time	4 Hours

Name of Task	Gantt Chart
Start Date	25/10/2024
End Date	27/10/2024
Person assigned to task	Yousef Ramadan
Priority	Medium
Resources Needed	Microsoft Word
Estimated Time	6 Hours
Actual Time	3 Hours

Name of Task	Scope Management
Start Date	26/10/2024
End Date	29/10/2024
Person assigned to task	Abd El-Rahman Amr
Priority	High
Resources Needed	Microsoft Word
Estimated Time	10 Hours
Actual Time	4 Hours

Name of Task	Interview
Start Date	1/11/2024
End Date	8/11/2024
Person assigned to task	Moaaz Ahmed , Mariam Gaber
Priority	High
Resources Needed	Microsoft Word
Estimated Time	5 days
Actual Time	3days

Name of Task	Questionnaire
Start Date	10/11/2024
End Date	18/11/2024
Person assigned to task	Abd El-Rahman Amr
Priority	Medium
Resources Needed	Microsoft Word
Estimated Time	7 days
Actual Time	5days

Name of Task	Context diagram _DFD
Start Date	1/12/2024
End Date	8/12/2024
Person assigned to task	Team work
Priority	High
Resources Needed	Microsoft Word
Estimated Time	7 days
Actual Time	7 days

Name of Task	DFD_Level 0
Start Date	1/12/2024
End Date	14/12/2024
Person assigned to task	Team work
Priority	High
Resources Needed	Microsoft Word
Estimated Time	10 days
Actual Time	10 days

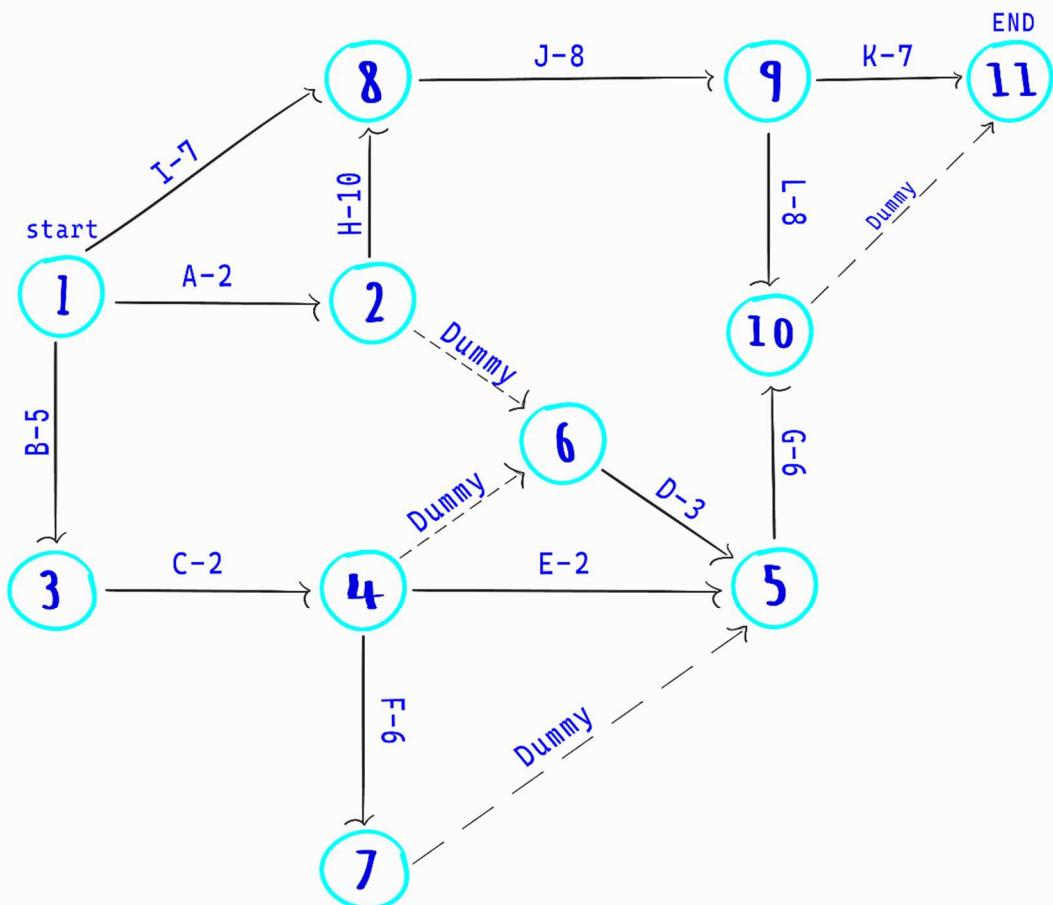
Name of Task	DFD_Level 1
Start Date	3/12/2024
End Date	16/12/2024
Person assigned to task	Team work
Priority	High
Resources Needed	Microsoft Word
Estimated Time	10 days
Actual Time	10 days

Name of Task	Data Dictionary
Start Date	1/12/2024
End Date	16/12/2024
Person assigned to task	Baraa Mohamed , Yousef Ramadan , Moaaz Ahmed
Priority	High
Resources Needed	Microsoft Word
Estimated Time	11 days
Actual Time	9 days

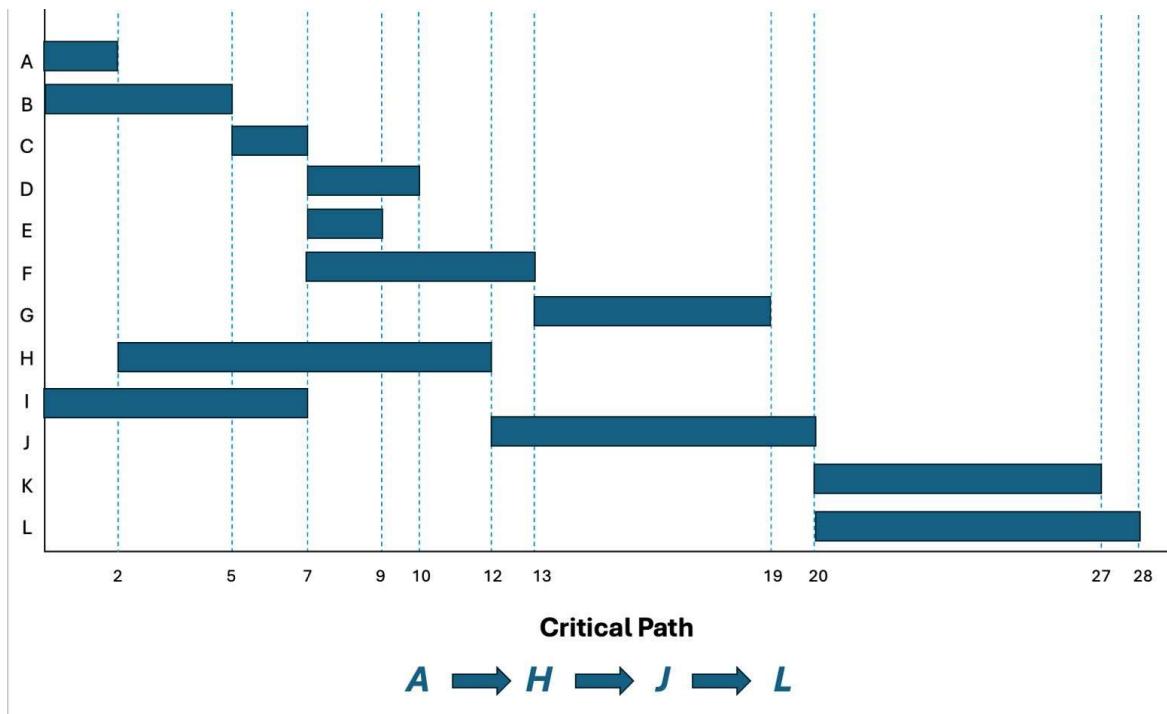
Name of Task	Process Specification
Start Date	4/12/2024
End Date	16/12/2024
Person assigned to task	Abd El-Rahman Amr , Mariam Gaber Basmala Ahmed , Nada Ezzat
Priority	High
Resources Needed	Microsoft Word
Estimated Time	10 days
Actual Time	9 days

Pert Chart

Activity	Description	Predecessors	Duration (Days)
A	System request	-	2
B	Feasibility analysis	-	5
C	Methodology	B	2
D	Time estimation	A , C	3
E	Task identification	C	2
F	Pert chart	C	6
G	Gantt chart	D , E , F	6
H	Interview	A	10
I	Questionnaire	-	7
J	DFD	H , I	8
K	Data Dictionary	J	7
L	Process specification	J	8



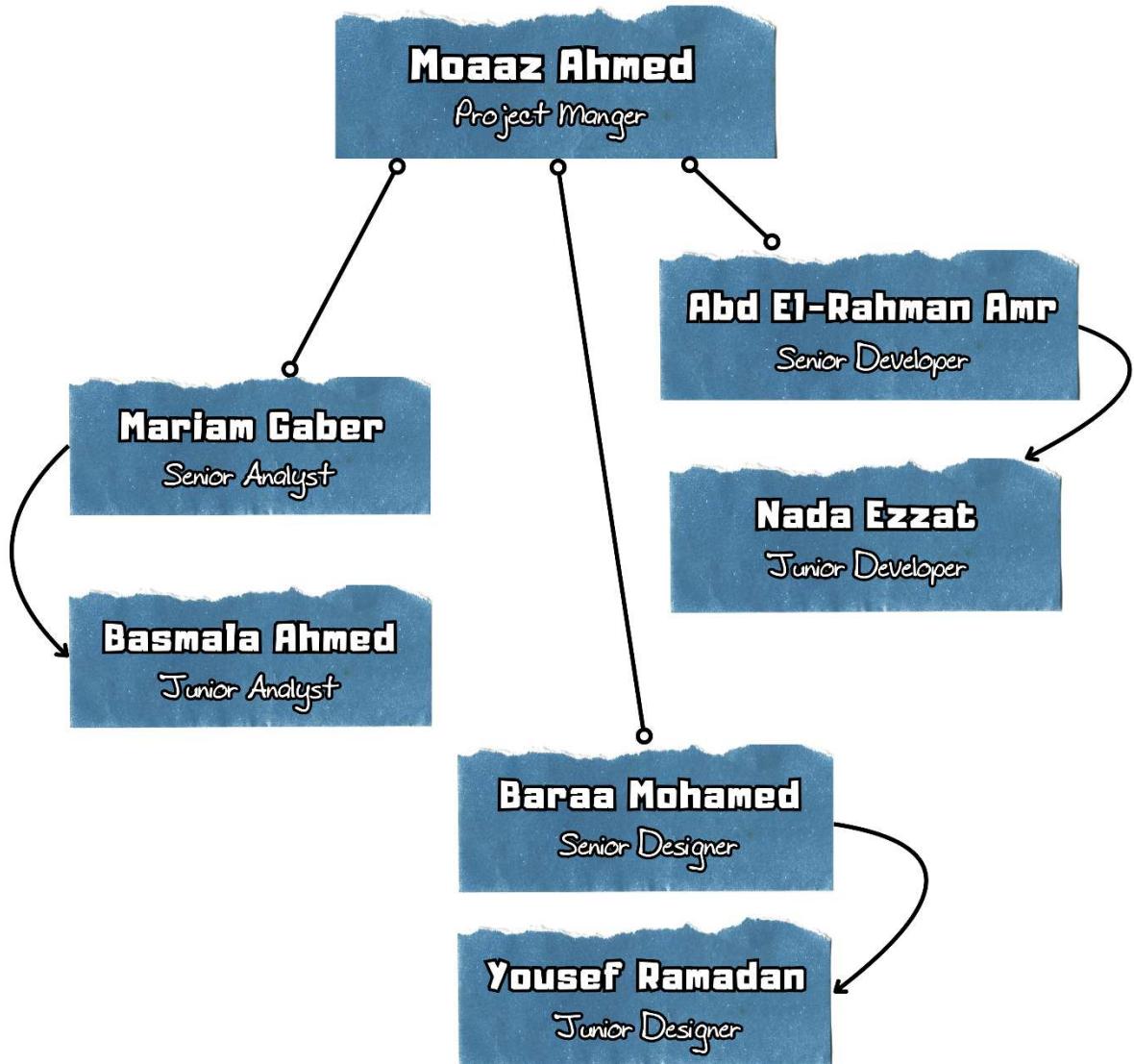
Gant Chart



Critical Path

A → H → J → L

Scope Management



Interview

Interview with Head Manager

1. **Hello! To start, could you tell us a bit about yourself and your role in managing the maintenance center?**
 - "Hello! I am the manager of the maintenance center, and I have over 10 years of experience in this field. I make sure the operations run smoothly and efficiently."
2. **What are the main services provided by the maintenance center?**
 - We offer services such as oil and filter changes, electrical and mechanical repairs, and diagnosing issues using advanced tools.
3. **How is vehicle data recorded upon reception?**
 - We record the customer's and vehicle's details, including make, model, year, and condition, then create an initial report.
4. **What mechanisms are used to prioritize maintenance tasks?**
 - We prioritize based on the severity of the problem, with major issues or emergencies handled first, while routine maintenance is scheduled later.
5. **How is the vehicle's status monitored during maintenance?**
 - We continuously update the vehicle's status in the system and communicate with the customer via phone or text messages to inform them about progress.
6. **How are service costs determined, and is an initial estimate provided to customers?**
 - We provide an initial estimate after examining the vehicle, but the final cost may vary based on the findings during maintenance.
7. **What systems or software do you use to manage operations at the center?**
 - We use an ERP system to manage appointments, billing, and inventory, as well as specialized software for diagnosing issues and managing customer data.
8. **What are the main challenges you face in managing the center?**
 - The main challenges are ensuring quick availability of genuine spare parts and dealing with advanced technological systems in modern vehicles.
9. **What strategies do you use to handle customer complaints?**
 - We have a dedicated customer service department that handles complaints quickly, and we offer compensation or discounts for issues related to service quality or delays.
10. **What advice would you give for improving performance at the maintenance center?**

"My advice would be to focus on integrating modern technologies more extensively and ensuring continuous training for technicians"

Interview with Employee

1. **Hello! Could you tell us a little about your role at the center and your daily responsibilities?**
 - "Hello! I work at the maintenance center and am responsible for receiving vehicles and updating their details in the system."
2. **What are your daily tasks at the center?**
 - My daily tasks include receiving vehicles, updating data in the system, and informing customers about their vehicle status.
3. **How do you interact with customers when receiving vehicles?**
 - We greet customers with a smile, record their vehicle details, and schedule a maintenance appointment based on their needs.
4. **How do you handle work pressure during peak times?**
 - We cooperate as a team to ensure tasks are distributed fairly and completed quickly and accurately.
5. **How do you ensure customer requests are effectively handled?**
 - I track each request and keep the customer updated regularly on the progress of their vehicle.
6. **Are you provided with continuous training on new systems?**
 - Yes, we receive regular training on new systems, both in software and maintenance techniques.
7. **How does the team coordinate to complete tasks?**
 - We coordinate through daily meetings and prioritize tasks to ensure smooth workflow.
8. **How is vehicle data recorded upon reception?**
 - "When receiving a vehicle, we first greet the customer and collect the car key. Then, we record all essential details such as the customer's name, phone number, car model, chassis number, and manufacturing year. These details are directly entered into the center's electronic system."
9. **What mechanisms are used to prioritize maintenance tasks?**
 - "We prioritize maintenance tasks based on the severity of the issue and its impact on the vehicle's operation. Critical problems, such as engine or brake failures, are handled first to ensure customer safety. Routine maintenance, like oil and filter changes, are scheduled later."
10. **How is the vehicle's status monitored during maintenance?**
 - "We use an electronic system to update the vehicle's status at each stage of the maintenance process. Information such as the start of the inspection, ongoing repairs, and any new notes or changes are documented. We also communicate with the customer via text messages or phone calls to keep them informed."
11. **What suggestions do you have for improving the center's work?**
 - "Improving team training and increasing the use of modern technology for vehicle diagnostics and maintenance would significantly enhance the work."

Interview with Customer

1. **Hello! Could you share your first experience with the maintenance center?**
 - "Hello! My first experience was excellent. The staff were welcoming, and my car was taken care of promptly and efficiently."
2. **What services did you benefit from at the center?**
 - I benefited from an oil and filter change, along with a comprehensive diagnostic check.
3. **Did you face any difficulties in booking a maintenance appointment?**
 - No, it was easy to book an appointment through the center's website.
4. **Were you satisfied with the quality of the service provided? Why?**
 - Yes, I was very satisfied because the service was quick, and the quality was excellent. The technicians were very professional.
5. **How are you informed about your car's status during maintenance?**
 - I received text messages with updates on the car's status, and sometimes a staff member would call to provide more details.
6. **Were the costs clear to you before the maintenance began?**
 - Yes, I was given an initial estimate before any work started.
7. **Did you notice any improvements in your car after the maintenance?**
 - Yes, there was a noticeable improvement in the engine's performance and reduced fuel consumption.
8. **What suggestions do you have for improving the customer experience?**
 - I think adding an app to track the car's status during maintenance would be very helpful.
9. **What would you like the center to add to improve your future experience?**
 - "I would love if they could offer a pick-up and drop-off service for the car to save time."

Interview Report

Interview with Head Manager Report

Interview Report

Person Interviewed: Car Maintenance Center manager

Interviewer: Moaaz

Purpose of Interview: Determine System's details and understanding the Car Maintenance Center's work environment

Summary of Interview:

- The center provides regular maintenance services, diagnostics of faults, and replacement and repair of vehicles.
- Upon arrival, customer details are recorded, and priority is determined based on the type of issue.
- Maintenance status is continuously updated in the system as each step of work is completed.
- Regular training is provided for technicians on the latest technologies in vehicle diagnostics and repairs.
- A dedicated customer service department handles complaints and inquiries.
- Quality checks are performed on all vehicles after repair work is completed.

Open items:

- Main services provided by the maintenance center.

Interview with Employee Report

Interview Report

Person Interviewed : Car Maintenance Center Employee

Interviewer: Moaaz

Purpose of Interview : Describe how to work and deal with customer and the car

Summary of Interview:

- The employee's daily tasks include receiving vehicles, updating data in the system, and informing customers about their vehicle status.
- The team coordinates through daily meetings, where they discuss and prioritize tasks to ensure a smooth workflow.
- Regular training is provided on new systems, including both software and maintenance techniques.
- Maintenance tasks are prioritized based on the severity of the issue and its impact on the vehicle's operation, with critical problems addressed first.
- An electronic system is used to update the vehicle's status at each stage of the maintenance process, keeping both the team and customers informed.

Open items:

- Ensuring customer needs are fully addressed during their visit, including regular updates and feedback.

Interview with Customer Report

Interview Report

Person Interviewed : Customer

Interviewer: Moaaz

Purpose of Interview: To understand the details of the services the center offers from the customer's point of view.

Summary of Interview:

- Customers expressed overall satisfaction with the center's services, including routine tasks like oil changes and filter replacements, as well as diagnostics and general maintenance.
- Customers were consistently kept informed about the status of their cars through text messages and phone calls.
- The center's use of electronic systems to track the status of vehicles was widely appreciated.
- Some customers suggested improvements, including the addition of an app for real-time car tracking and the implementation of a pick-up and drop-off service to enhance convenience.

Recommendation:

The addition of features such as a car tracking app or pick-up and drop-off service would contribute to improving the overall service and make the customer experience more convenient and smooth.

Questionnaire



CarZone System

Questionnaire for the system



بدائل الحساب

غير مشترك

* يشير إلى أنَّ السؤال مطلوب

* Your Name

إجابتك

* ?What features are most important to you in a car service center's website

Easy online booking for services

Detailed pricing information

Real-time service updates

* ?What type of car services do you usually need

Maintenance

Brake repair

Tire replacement

Oil change

* How convenient would it be to have a feature that lets you choose a preferred time slot for the service

5 4 3 2 1

Very convenient Not convenient

* ?How often do you service your car

Monthly

Every 3 Month

Every 6 Month

Once a year

* ?What are the most common issues you face with your car

Difficulty booking appointments

Lack of transparency

High costs

Maintenance delays

أخرى:

* ?What type of website design do you prefer

Simple and clean

Visually rich with images and animations

Functional with a focus on fast navigation

* ?How important is an online payment option on the website

Essential

Nice to have

Not needed

* ?What would make you trust a car service center's website

Positive customer reviews

Clear and transparent pricing

Professional design and branding

* ?What additional services or features would you want to improve your experience

A loyalty rewards program

Video tutorials or guides on car maintenance

Ability to track service status in real time

* ?Would you prefer a mobile app over a website for the same services

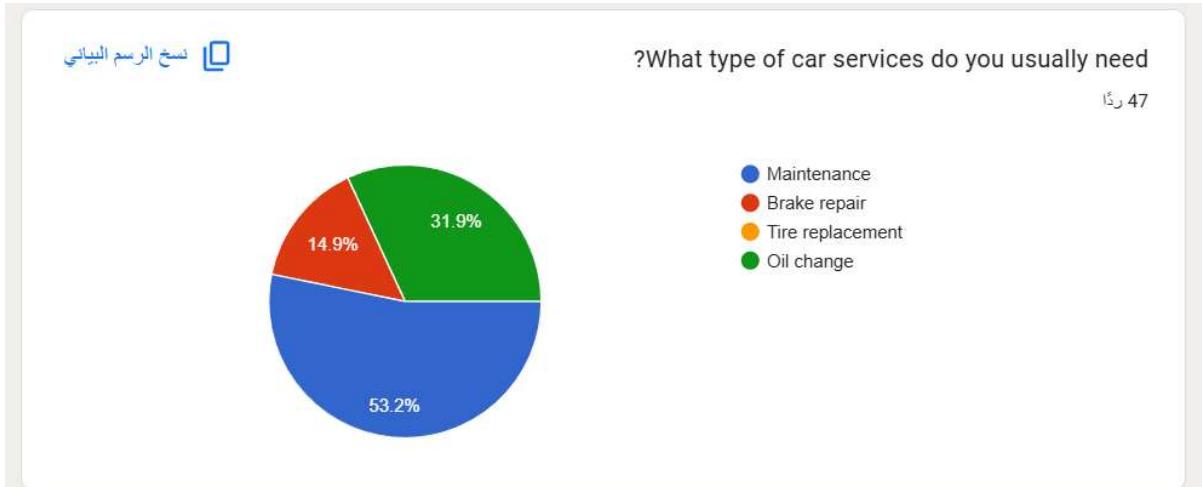
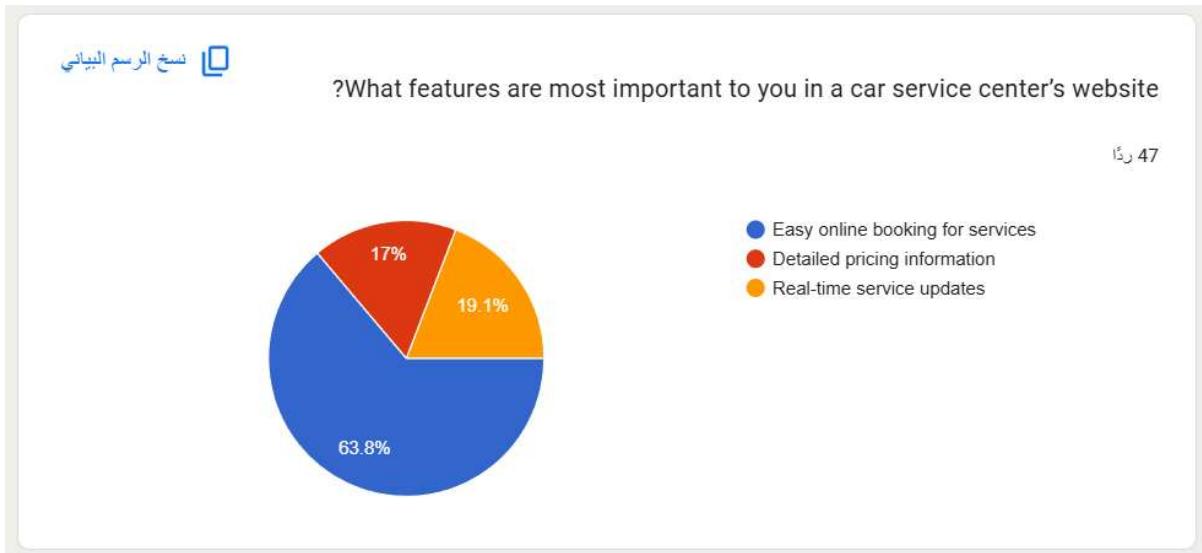
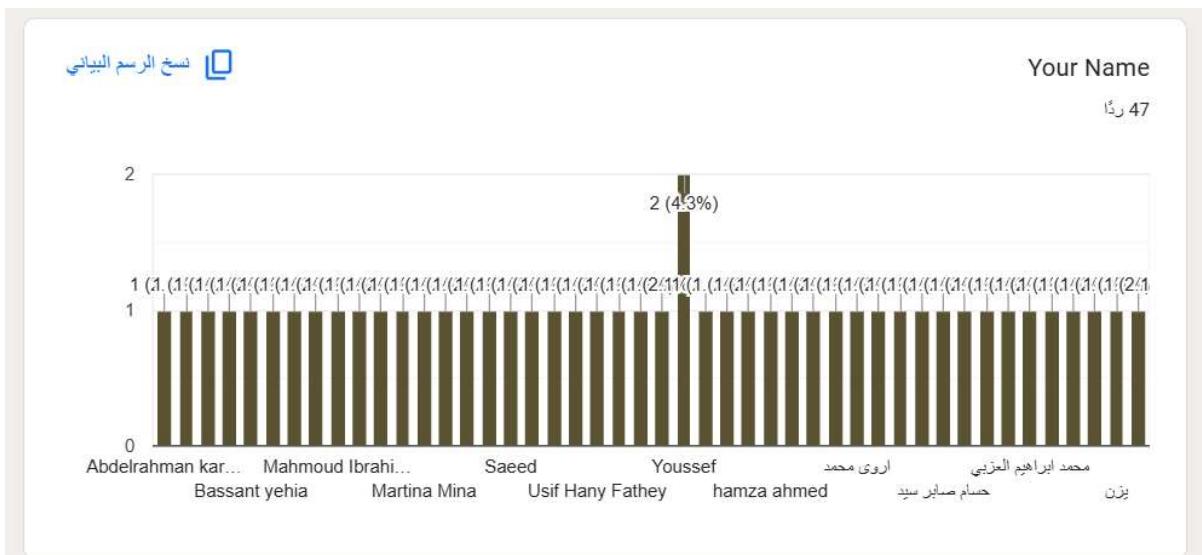
Yes, I prefer an app

No, I prefer a website

Both are equally fine

* ?What features would you like in an online car service booking system

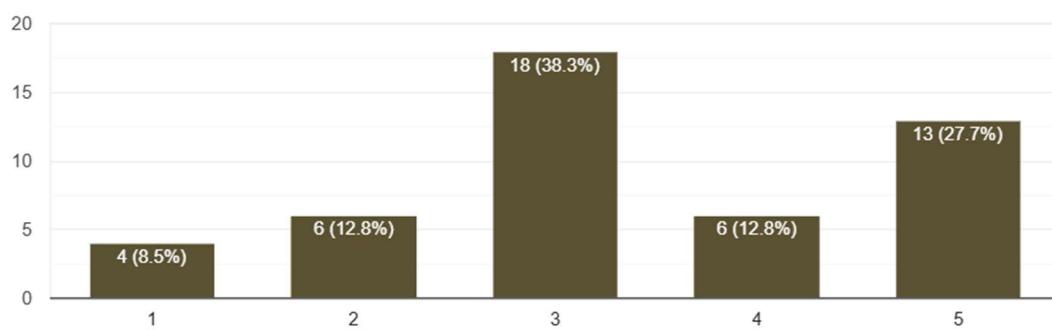
Responds



[نسخ الرسم البياني](#)

How convenient would it be to have a feature that lets you choose a preferred time slot for the service

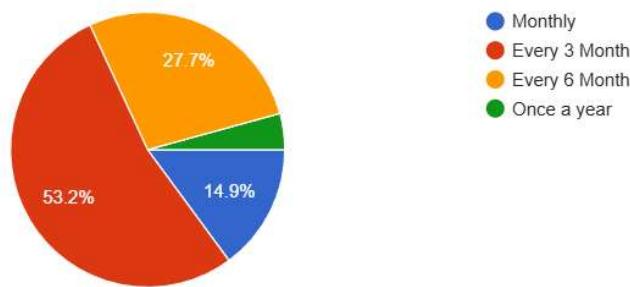
رداً 47



[نسخ الرسم البياني](#)

?How often do you service your car

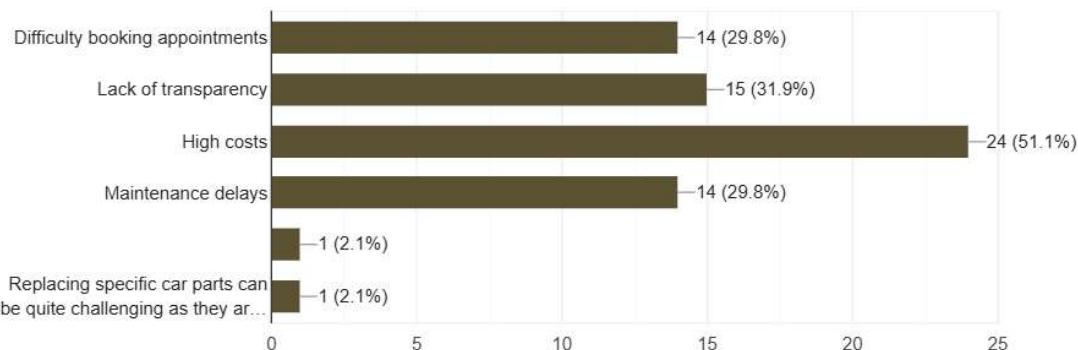
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?What are the most common issues you face with your car

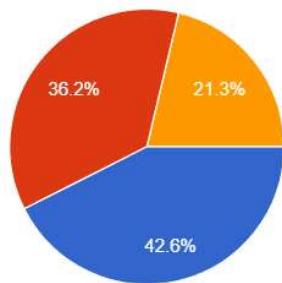
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?What type of website design do you prefer

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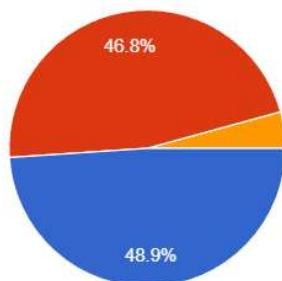


- Simple and clean
- Visually rich with images and animations
- Functional with a focus on fast navigation

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?How important is an online payment option on the website

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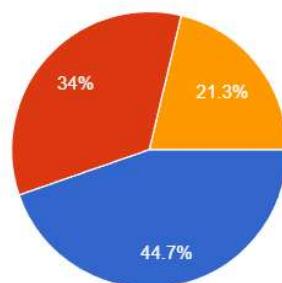


- Essential
- Nice to have
- Not needed

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?What would make you trust a car service center's website

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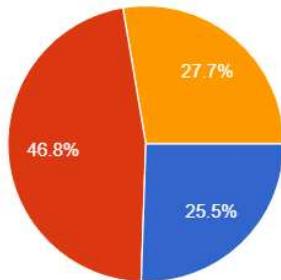


- Positive customer reviews
- Clear and transparent pricing
- Professional design and branding

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What additional services or features would you want to improve your ?experience

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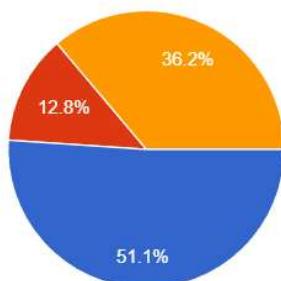


- A loyalty rewards program
- Video tutorials or guides on car maintenance
- Ability to track service status in real time

[نسخ الرسم البياني](#)

?Would you prefer a mobile app over a website for the same services

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- Yes, I prefer an app
- No, I prefer a website
- Both are equally fine

?What features would you like in an online car service booking system

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Real-time service updates

a booking scadual time to check

Easy to book and I can book anytime I want

Parking service

The period during which car repairs will be available, along with the names of the individuals working on .the repairs and their respective skills

.Nothing in mind right now

.....

Easy and quick booking with high quality

سهولة الاستخدام و معلومات تفصيلية عن الخدمات

Questionnaire For CEO



CarZone System "Interview 1"

Interview with the COE



[تبديل الحساب](#)

[غير مشترك](#)

* تشير إلى أنَّ السؤال مطلوب

* ?What is the main priority for the new system

Improving customer experience

Automating maintenance schedules

Simplifying sales processes

*** ?How should customer data be stored**Cloud-based storage On-premises storage A combination of both *** ?Which of the following features is most critical for the system**Real-time inventory management Integration with accounting software Automated customer notifications Detailed reporting and analytics *** ?How frequently do you want sales and maintenance reports generated**Daily Weekly Monthly

*** ?What type of user interface do you prefer**

- Simple and minimalistic
- Detailed with advanced options
- Customizable for different roles

*** How do you see this system improving the company's operations in the next 2–3
?years**

أجابك

*** ?How important is mobile accessibility for the system**

- Very important
- Somewhat important
- Not important

*** ?What should the system prioritize for technicians**

Easy scheduling and task assignment

Tracking performance and efficiency

Access to maintenance history

Integration with diagnostic tools

**If there were no technical or financial limitations, what would your ideal car sales
?and maintenance system look like**

Response

لنسخ الرسم البياني 

?What is the main priority for the new system

رد واحد

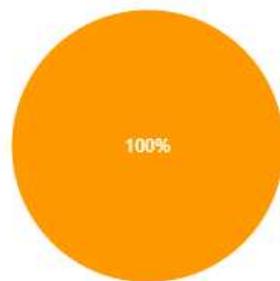


- Improving customer experience
- Automating maintenance schedules
- Simplifying sales processes

لنسخ الرسم البياني 

?How should customer data be stored

رد واحد



- Cloud-based storage
- On-premises storage
- A combination of both

If there were no technical or financial limitations, what would your ideal car sales and maintenance system look like

رد واحد

ideal car sales and maintenance system would be an all-in-one intelligent platform combining advanced technologies to create a seamless, personalized, and efficient experience for both buyers and car owners

نسخ الرسم البياني 

?Which of the following features is most critical for the system

رد واحد



- Real-time inventory management
- Integration with accounting software
- Automated customer notifications
- Detailed reporting and analytics

نسخ الرسم البياني 

?How frequently do you want sales and maintenance reports generated

رد واحد



- Daily
- Weekly
- Monthly

نسخ الرسم البياني 

?What type of user interface do you prefer

رد واحد



- Simple and minimalistic
- Detailed with advanced options
- Customizable for different roles

?How do you see this system improving the company's operations in the next 2–3 years

رد واحد

i think it will be very nice and will improve the sales and it will Increase income

نسخ الرسم البياني 

?How important is mobile accessibility for the system

رد واحد

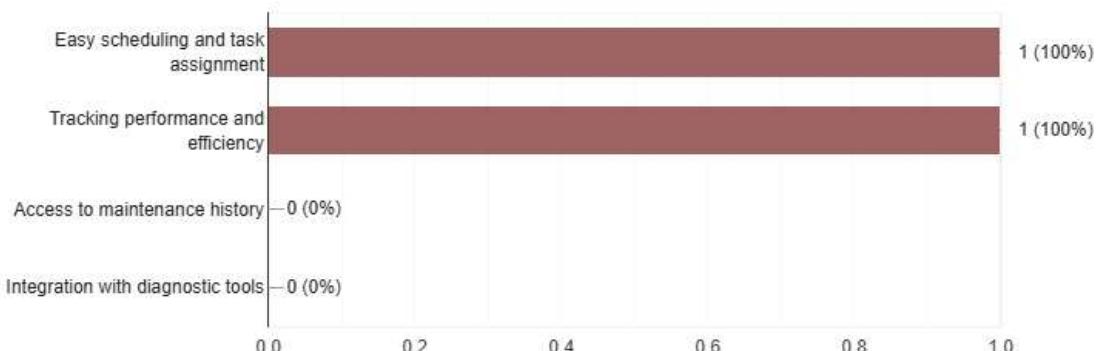


- Very important
- Somewhat important
- Not important

نسخ الرسم البياني 

?What should the system prioritize for technicians

رد واحد



Interview with Employees



CarZone System "Employees Interview"

Interview with employees



تعديل الحساب

غير مشترك

* يشير إلى أنَّ السؤال مطلوب

* ?Your Name

إجابةك

* ?How many years of experience do you have in the automotive service field

Less than 1 year

3 to 5 years

1 to 3 years

More than 5 years

* ?How do you record the customer's car information when they arrive

Write in a paper

Enter in the computer system

Use a mobile app

* ?Do you follow a specific checklist for each service

Yes , always

Yes, sometimes

Maybe

Never

* ?How do you check for car problems

Check the car manually

Use tools from the car manufacturer

Ask the customer for details

* ?How do you tell customers about their car's status

Send a text message

Call them

Talk to them in person

Send an email

*** ?How do you decide which task to do first during busy times**

Based on how serious the problem is

Based on customer urgency

Supervisor decides

First-come , first-served

*** ?How do you make sure the tools and equipment are ready for repairs**

Check the tools before each repair

Tell the supervisor if tools are missing

Keep a personal list of tools

Use the inventory system

*** ?How do you make sure repairs are done well**

Test drive after the repair

Have a senior technician inspect it

Get feedback from the customer

Follow manufacturer guidelines

* ?What safety steps do you follow during repairs

- Wear safety gear
- Follow standard procedures
- Check tools regularly
- Report any safety issues

* What ideas do you have to make the work easier and faster in the service
?center

* ?How often do you check the car before starting the repairs

- Always
- Sometimes
- Never
- Often

* How do you deal with customer complaints or issues

- Write it down and check later
- Offer other solutions
- Tell a supervisor
- Fix the problem right away

Responses

?Your Name

ر.د 14

Ebrahim

Ahmed Ezzat Fawzy Mansour

محمد احمد عصام

Saif Mohamed

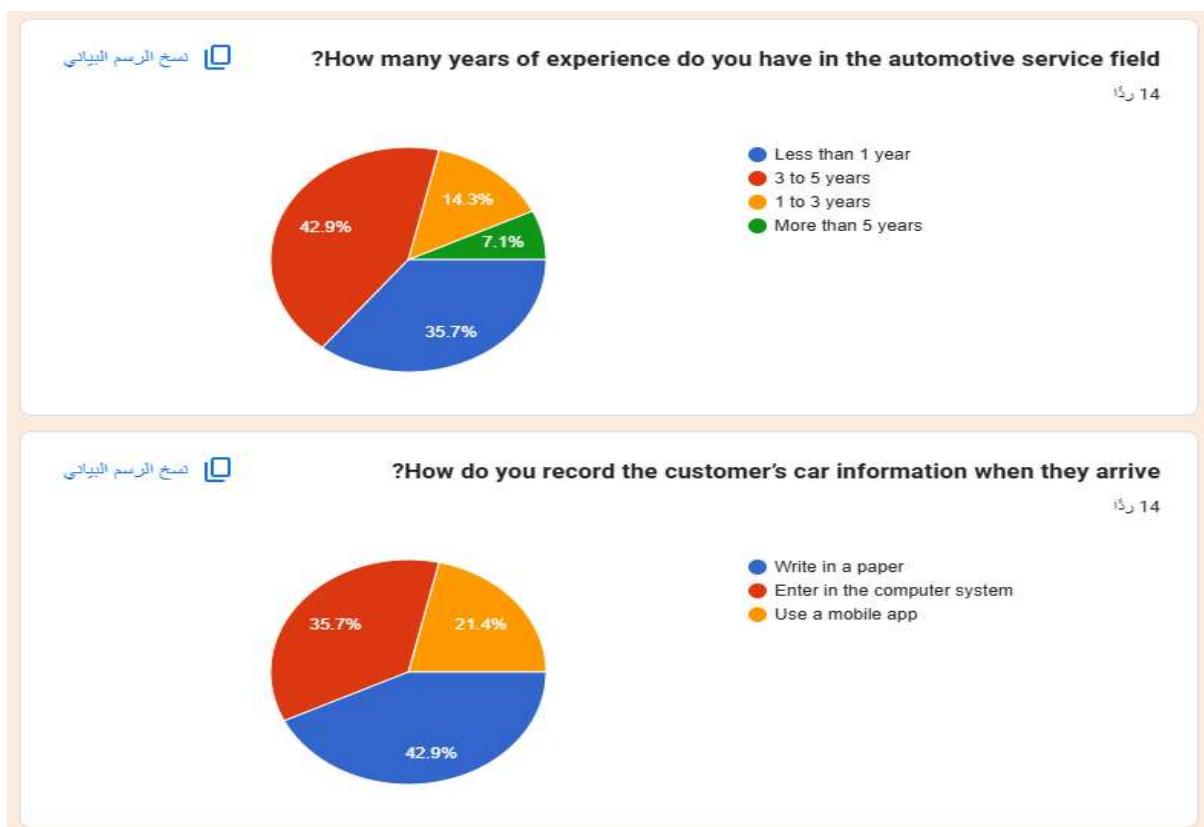
محمد احمد محمد عصام

Amgad

Ahmed Hatem

Farouk Ayman

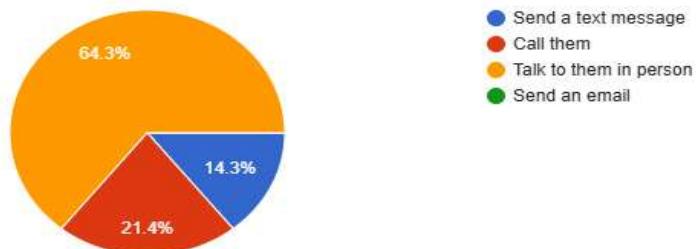
محمد عصام حمام



نسخ الرسم البياني

?How do you tell customers about their car's status

رداً 14



نسخ الرسم البياني

?How do you decide which task to do first during busy times

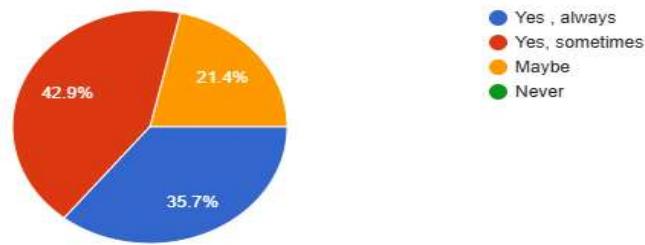
رداً 14



نسخ الرسم البياني

?Do you follow a specific checklist for each service

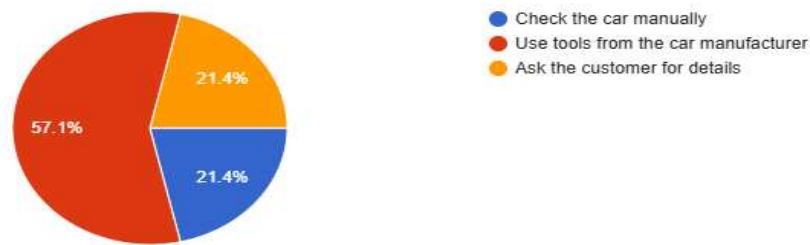
رداً 14



نسخ الرسم البياني

?How do you check for car problems

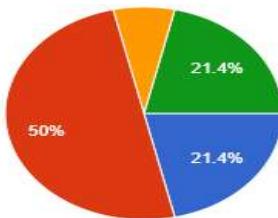
رداً 14



نسخ الرسم البياني

?What safety steps do you follow during repairs

ر. ١٤



- Wear safety gear
- Follow standard procedures
- Check tools regularly
- Report any safety issues

?What ideas do you have to make the work easier and faster in the service center

ر. ١٤

Many people work together

by technology

ج

I don't have anything right now in my mind

I will tell you if I accepted

Customer Feedback

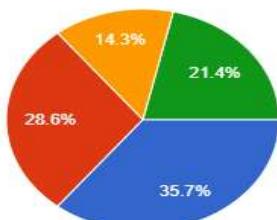
A queue system that effectively manages both regular and urgent cases would be beneficial, ensuring that urgent vehicles are prioritized for repair

Use advanced repair tools

نسخ الرسم البياني

?How do you make sure the tools and equipment are ready for repairs

ر. ١٤

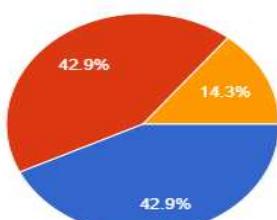


- Check the tools before each repair
- Tell the supervisor if tools are missing
- Keep a personal list of tools
- Use the inventory system

نسخ الرسم البياني

?How do you make sure repairs are done well

ر. ١٤

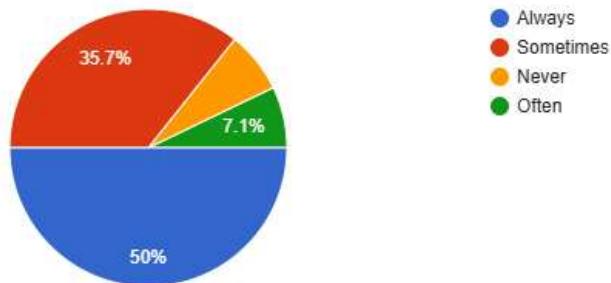


- Test drive after the repair
- Have a senior technician inspect it
- Get feedback from the customer
- Follow manufacturer guidelines

نسخ الرسم البياني 

?How often do you check the car before starting the repairs

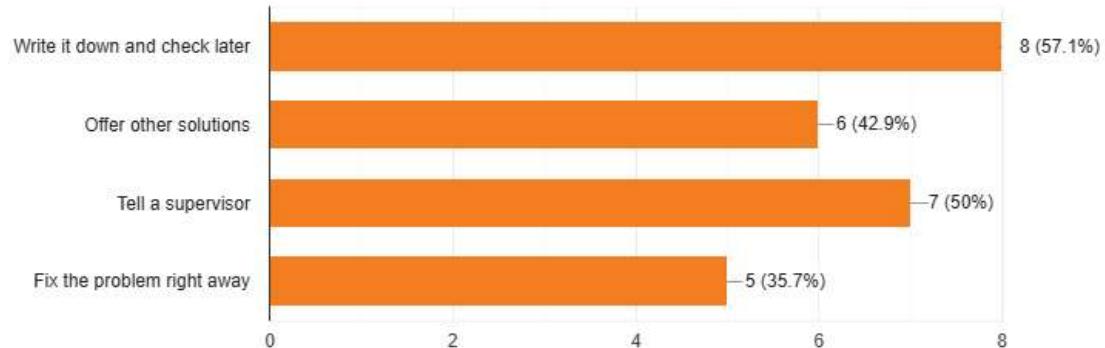
رداً 14



نسخ الرسم البياني 

How do you deal with customer complaints or issues

رداً 14



DFD "Context Diagram"

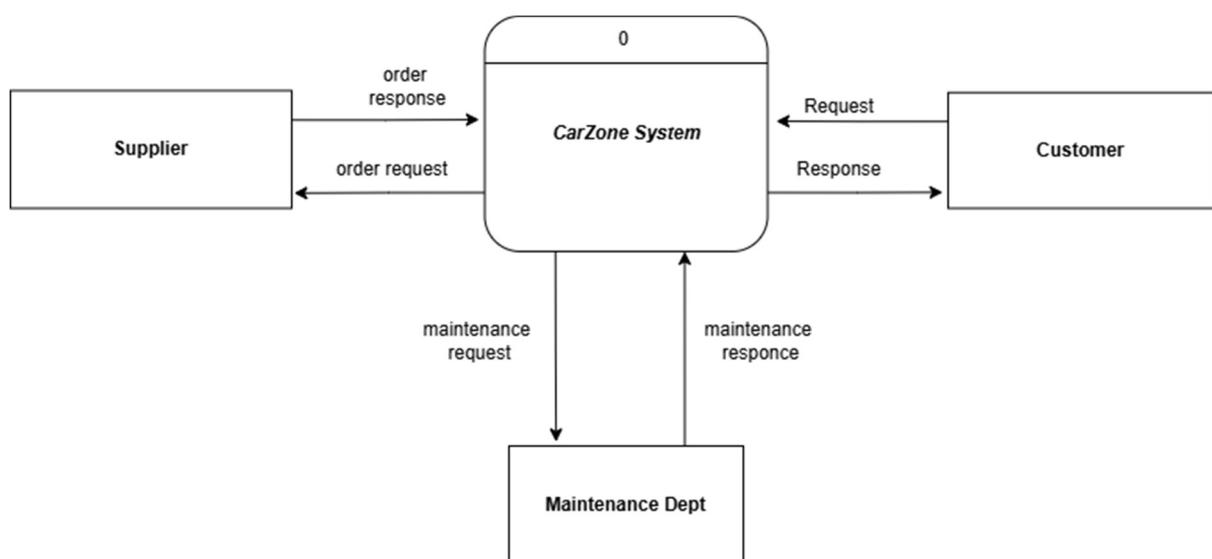


Diagram 0

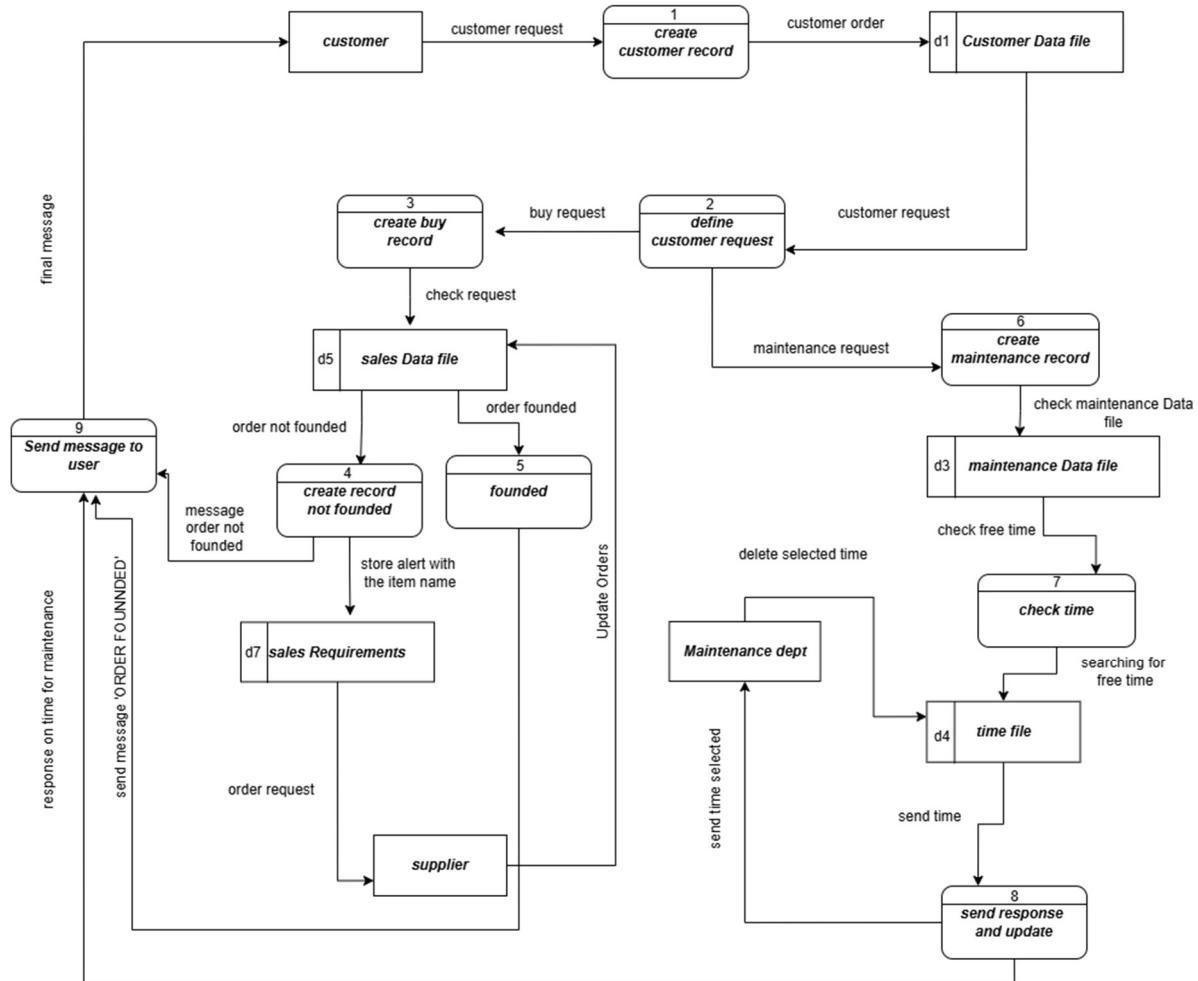
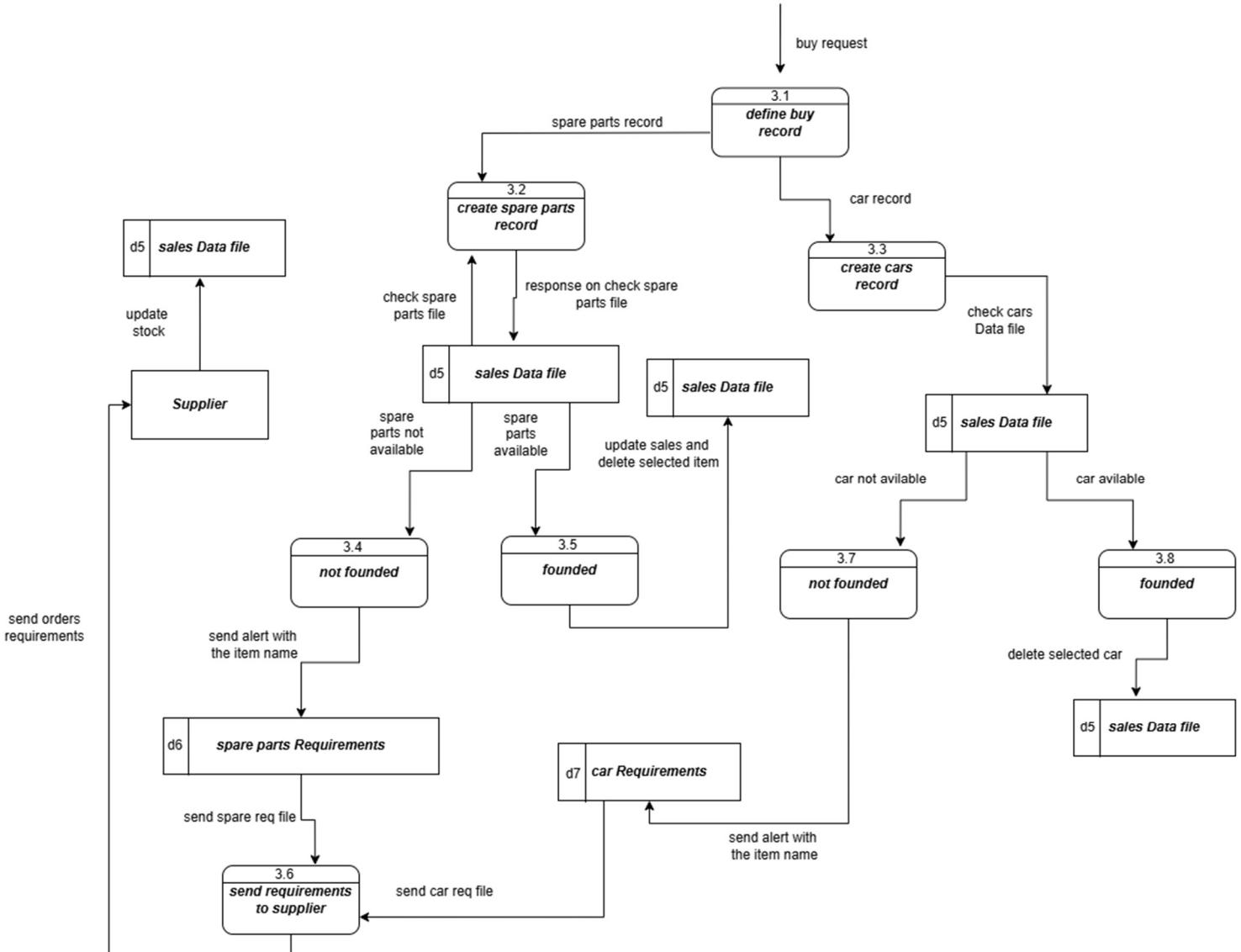


Diagram 3



Data Dictionary

"Data Flow"

- **DF1**

ID	1
Label	Final Message
Description	The final message sent to the user after completing the order or maintenance.
Source	Send Message to User
Destination	Customer
Type	Screen
Data Structure	Final Structured
Volume/Time	30 / day
Comments	Could be a success or error message.

- **DF2**

ID	2
Label	Customer Request
Description	The request submitted by the customer (purchase or maintenance)
Source	Customer
Destination	Define Customer Request
Type	Form
Data Structure	Customer Request Structured
Volume/Time	30 / day
Comments	Determines the type of request (purchase or maintenance).

- **DF3**

ID	3
Label	Customer Order
Description	<i>Order details provided by the customer (product/service requested).</i>
Source	Customer
Destination	Customer Data File
Type	File
Data Structure	Customer Order Structured
Volume/Time	30 / day
Comments	<i>Stored in the customer data file.</i>

- **DF4**

ID	4
Label	Customer Request
Description	<i>The request processed based on customer details.</i>
Source	Customer Data File
Destination	Define Customer Request
Type	Internal
Data Structure	Customer Request Structured
Volume/Time	30 / day
Comments	<i>Routed based on request type: purchase or maintenance.</i>

- **DF5**

ID	5
Label	Buy Request
Description	Purchase request created for processing the order.
Source	Define Customer Request
Destination	Create Buy Record
Type	File
Data Structure	Buy Request Structured
Volume/Time	30 / day
Comments	Checks if the order exists.

- **DF6**

ID	6
Label	Check Request
Description	Verifies the order details against existing records.
Source	Create Buy Record
Destination	Sales Data File
Type	Internal
Data Structure	Check Request Structured
Volume/Time	30 / day
Comments	Determines if the order is found or not.

- **DF7**

ID	7
Label	Order Found
Description	The status of the order if it is found in the system.
Source	Sales Data File
Destination	Founded
Type	Internal
Data Structure	Order Found Structure
Volume/Time	30 / day
Comments	-

- **DF8**

ID	8
Label	order not founded
Description	This flow indicates that an order was not found in the sales data file.
Source	sales Data file (d5)
Destination	create record not founded
Type	Report
Data Structure	Order ID Structure
Volume/Time	30 / day
Comments	This flow triggers an action to handle missing order records

- **DF9**

ID	9
Label	send message 'ORDER FOUNNDED'
Description	Send a confirmation message to the user when the order is found
Source	founded
Destination	Send message to user
Type	Internal
Data Structure	ORDER FOUNDED Structure
Volume/Time	30 / day
Comments	Enhances user experience by providing quick confirmation.

- **DF10**

ID	10
Label	store alert with the item name
Description	Stores an alert about the missing item for further follow-up
Source	create record not founded
Destination	sales Requirements (d7)
Type	File
Data Structure	Alert Description Structure
Volume/Time	30 / day
Comments	Alerts are logged for administrative tracking

- **DF11**

ID	11
Label	order request
Description	Send a request to the supplier to fulfill an order
Source	sales Requirements (d7)
Destination	supplier
Type	Report
Data Structure	Item Name, Quantity Structure
Volume/Time	30 / day
Comments	Critical flow for initiating communication with suppliers

- **DF12**

ID	12
Label	message order not founded
Description	Send a message to inform the user that the order was not found.
Source	create record not founded
Destination	Send message to user
Type	Internal
Data Structure	Order Not Found Structure
Volume/Time	30 / day
Comments	Ensures user awareness when an order does not exist in the system

- **DF13**

ID	13
Label	<i>response on time for maintenance</i>
Description	<i>Timely response to maintenance requests</i>
Source	<i>send response and update</i>
Destination	<i>Send message to user</i>
Type	<i>Internal</i>
Data Structure	<i>Response for maintenance Structure</i>
Volume/Time	<i>30 / day</i>
Comments	_____

- **DF14**

ID	14
Label	<i>Update Orders</i>
Description	<i>Updates the order information in the sales data file</i>
Source	<i>founded</i>
Destination	<i>sales Data file (d5)</i>
Type	<i>File</i>
Data Structure	<i>Update Details Structure</i>
Volume/Time	<i>30 / day</i>
Comments	<i>Keeps the sales data file accurate and up to date</i>

- **DF15**

ID	15
Label	Send time selected.
Description	Send time after update.
Source	Send response and update.
Destination	Maintenance dept.
Type	Screen.
Data Structure	Send time data structure.
Volume/Time	30 / day.
Comments	----- .

- **DF16**

ID	16
Label	Send time.
Description	Take the available to update in data base.
Source	Time file.
Destination	Send response and update.
Type	Report.
Data Structure	Available time data structure.
Volume/Time	30 / day.
Comments	----- .

- **DF17**

ID	17
Label	Delete selected time.
Description	Delete selected time from data base.
Source	Maintenance dept.
Destination	Time file
Type	File.
Data Structure	Delete time data structure.
Volume/Time	30 / day.
Comments	----- .

- **DF18**

ID	18
Label	Searching for free time.
Description	Searching for free time.
Source	Check time.
Destination	Time file.
Type	File.
Data Structure	Check time data Structure.
Volume/Time	30 / day.
Comments	----- .

- **DF19**

ID	19
Label	Check free time.
Description	Check free time.
Source	Maintenance Data file.
Destination	Check time.
Type	Report.
Data Structure	Check time data Structure.
Volume/Time	30 / day.
Comments	----- .

- **DF20**

ID	20
Label	Check maintenance Data file.
Description	Check maintenance Data file.
Source	Create maintenance record.
Destination	Maintenance Data file.
Type	File.
Data Structure	Check maintenance Data structure.
Volume/Time	30 / day.
Comments	----- .

- **DF21**

ID	21
Label	Maintenance request.
Description	Take maintenance request to record.
Source	Define customer request.
Destination	Create maintenance record.
Type	Internal.
Data Structure	Maintenance request data structure.
Volume/Time	30 / day.
Comments	----- .

Data Set

● **DS1**

<i>ID</i>	<i>D1</i>
<i>Name</i>	<i>Customer Data File</i>
<i>Alias</i>	<i>Customer File</i>
<i>Description</i>	<i>Stores customer information</i>
<i>File Type</i>	<i>File</i>
<i>File Format</i>	<i>Text/CSV</i>
<i>Record Size</i>	<i>Variable</i>
<i>Maximum Records</i>	<i>10,000</i>
<i>Average Records</i>	<i>5,000</i>
<i>Growth per Year</i>	<i>500</i>
<i>Data Set</i>	<i>Customer Data</i>
<i>Data Structure</i>	<i>Table</i>
<i>Primary Key</i>	<i>Customer ID</i>
<i>Secondary Key</i>	<i>None</i>
<i>Comments</i>	<i>Sensitive data</i>

- **DS3**

<i>ID</i>	D3
<i>Name</i>	Maintenance Data File
<i>Alias</i>	Maintenance DB
<i>Description</i>	Records maintenance requests
<i>File Type</i>	Database
<i>File Format</i>	SQL
<i>Record Size</i>	Variable
<i>Maximum Records</i>	5,000
<i>Average Records</i>	2,000
<i>Growth per Year</i>	200
<i>Data Set</i>	Maintenance Records
<i>Data Structure</i>	Relational Table
<i>Primary Key</i>	Maintenance ID
<i>Secondary Key</i>	Customer ID
<i>Comments</i>	Requires backups

- **DS4**

ID	D4
Name	Time File
Alias	Time Log
Description	Stores available maintenance time
File Type	File
File Format	Text/CSV
Record Size	Variable
Maximum Records	2,000
Average Records	1,500
Growth per Year	100
Data Set	Time Slots
Data Structure	Table
Primary Key	Time Slot ID
Secondary Key	Maintenance ID
Comments	Synced with calendar

- **DS5**

<i>ID</i>	D5
<i>Name</i>	Sales Data File
<i>Alias</i>	Sales File
<i>Description</i>	<i>Stores sales transactions</i>
<i>File Type</i>	File
<i>File Format</i>	XML/JSON
<i>Record Size</i>	Variable
<i>Maximum Records</i>	50,000
<i>Average Records</i>	30,000
<i>Growth per Year</i>	5,000
<i>Data Set</i>	Sales Data
<i>Data Structure</i>	Table
<i>Primary Key</i>	Sales ID
<i>Secondary Key</i>	Product ID
<i>Comments</i>	Regularly updated

- **DS7**

ID	D7
Name	Sales Requirements
Alias	Requirements
Description	Stores unsatisfied sales needs
File Type	File
File Format	Excel
Record Size	Variable
Maximum Records	2,000
Average Records	1,000
Growth per Year	150
Data Set	Sales Requirements
Data Structure	Spreadsheet
Primary Key	Requirement ID
Secondary Key	None
Comments	Monitored daily

Data Struktur Praktische

Customer data:

Customer ID + Customer Name + Customer Number + Customer Email +
[Pay Method].

Order Details:

Order ID + Order Name + Order Price.

Product Details:

ID Product + Product Name + Product Price.

Maintenance Details:

Maintenance ID + Maintenance Name + Maintenance price + Maintenance description.

Data Element

Data Element

Name	<i>Customer ID</i>
Alias	<i>Customer ID</i>
Description	<i>Unique Number for each customer</i>
Length	4
Input Format	9(4)
Output Format	9(4)
Default Value	
Continuous / Discrete	Continuous
Type	Numeric
Base / Derived	Derived
Upper Limit	9999
Lower Limit	0000
Discrete	
Comments	<i>It should be unique</i>

Name	<i>Customer Name</i>
Alias	<i>Customer Name</i>
Description	<i>Contains Customer Name</i>
Length	20
Input Format	X(20)
Output Format	X(20)
Default Value	
Continuous / Discrete	Discrete
Type	Alphabetic
Base / Derived	Base
Upper Limit	
Lower Limit	
Discrete	
Comments	

Name	Customer Number
Alias	Customer Number
Description	The Customer Phone Number
Length	11
Input Format	9 (11)
Output Format	9 (11)
Default Value	Your Name
Continuous / Discrete	Continuous
Type	Numeric
Base / Derived	Base
Upper Limit	99999999999
Lower Limit	00000000000
Discrete	
Comments	

Name	<i>Customer Email</i>
Alias	<i>Customer Email</i>
Description	<i>Personal Customer Email</i>
Length	40
Input Format	X (40)
Output Format	X (40)
Default Value@gmail.com
Continuous / Discrete	Discrete
Type	Alphabetic
Base / Derived	Base
Upper Limit	
Lower Limit	
Discrete	
Comments	<i>It should be an active Email</i>

Name	Order ID
Alias	Order Number
Description	Number of Order
Length	4
Input Format	9(4)
Output Format	9(4)
Default Value	
Continuous / Discrete	Continuous
Type	Numeric
Base / Derived	Base
Upper Limit	9999
Lower Limit	0000
Discrete	
Comments	<i>It should be unique number</i>

Name	Order Name
Alias	Order
Description	Order Name
Length	20
Input Format	X(20)
Output Format	X(20)
Default Value	
Continuous / Discrete	Discrete
Type	Alphabetic
Base / Derived	Base
Upper Limit	
Lower Limit	
Discrete	
Comments	

Name	Order Price
Alias	Order Price
Description	Order Price
Length	10
Input Format	9 (10)
Output Format	9 (10)
Default Value	
Continuous / Discrete	Discrete
Type	Numeric
Base / Derived	Base
Upper Limit	9999999999
Lower Limit	0000000000
Discrete	
Comments	

Name	<i>Product ID</i>
Alias	<i>Product ID</i>
Description	<i>Unique Number for each Product</i>
Length	4
Input Format	9(4)
Output Format	9(4)
Default Value	
Continuous / Discrete	<i>Continuous</i>
Type	<i>Numeric</i>
Base / Derived	<i>Derived</i>
Upper Limit	9999
Lower Limit	0000
Discrete	
Comments	<i>It should be unique number</i>

Name	Product Name
Alias	Product Name
Description	Contains Product Name
Length	20
Input Format	X (20)
Output Format	X (20)
Default Value	
Continuous / Discrete	Discrete
Type	Characters
Base / Derived	Based
Upper Limit	
Lower Limit	
Discrete	
Comments	

Name	Product Price
Alias	Price
Description	Product Price
Length	10
Input Format	9 (10)
Output Format	9 (10)
Default Value	
Continuous / Discrete	Discrete
Type	Numeric
Base / Derived	Base
Upper Limit	9999999999
Lower Limit	0000000000
Discrete	
Comments	

Name	Maintenance ID
Alias	Maintenance ID
Description	Unique Number for each Maintenance
Length	4
Input Format	9(4)
Output Format	9(4)
Default Value	
Continuous / Discrete	Continuous
Type	Numeric
Base / Derived	Derived
Upper Limit	9999
Lower Limit	0000
Discrete	
Comments	<i>It should be unique</i>

Name	Maintenance Name
Alias	Maintenance Name
Description	Contains Maintenance Name
Length	20
Input Format	X (20)
Output Format	X (20)
Default Value	
Continuous / Discrete	Discrete
Type	Alphabetic
Base / Derived	Base
Upper Limit	
Lower Limit	
Discrete	
Comments	

Name	Maintenance Price
Alias	Maintenance Price
Description	Maintenance Price
Length	10
Input Format	9 (10)
Output Format	9 (10)
Default Value	
Continuous / Discrete	Discrete
Type	Numeric
Base / Derived	Base
Upper Limit	9999999999
Lower Limit	0000000000
Discrete	
Comments	

Name	Maintenance Description
Alias	Maintenance Description
Description	Maintenance Description
Length	40
Input Format	X (40)
Output Format	X (40)
Default Value	
Continuous / Discrete	Discrete
Type	Alphabetic
Base / Derived	Base
Upper Limit	
Lower Limit	
Discrete	
Comments	

Process Specifications

Number: 1

Name: create customer record

Description: create record about information customer request

Input Data Flow:

1. customer request from customer external entity

Output Data Flow:

1. customer order to data store d1

Type of process:

Online

Batch

Manual

Process logic:

Structured English

Decision Table

Decision Tree

Unresolved issues : what is type of customer request?

Structure English

Process 1

IF

Customer send request

THEN

Send and Store customer order in data store d1

END IF

Number: 2**Name:** define customer request**Description:** define request buy or maintenance**Input Data Flow:**

1. customer record to data store d1

Output Data Flow:

1. buy request to process 3
2. maintenance request to process 3

Type of process:
 Online

 Batch

 Manual
Process logic:
 Structured English

 Decision Table

 Decision Tree
Unresolved issues : order is found or not?**Structure English****Process 2****IF**

customer send request

IFrequest is buy **THEN**

send buy request to process 3

ELSE IFrequest is maintenance **THEN**

send maintenance request to process 6

END IF**END IF**

Number: 3

Name: Create buy record

Description:

Input Data Flow:

1. buy request to process 3

Output Data Flow:

1. check request to sales data file d5

Type of process:

Online

Batch

Manual

Process logic:

Structured English

Decision Table

Decision Tree

Unresolved issues : -----

Process Logic – Decision Table

Conditions	1	2	3	4
Is buy request present ?	Y	Y	N	N
Is check request complete?	Y	N	Y	N
Actions				
Create buy record	X			
Check sales data file	X			
Send notification (order founded)	X			
Send notification (order founded)		X		X

Number: 4

Name: create record not founded

Description: Create record with unfounded requests

Input Data Flow:

1. order not founded

Output Data Flow:

1. store alert with the item name
2. message order not founded

Type of process:

Online

Batch

Manual

Process logic:

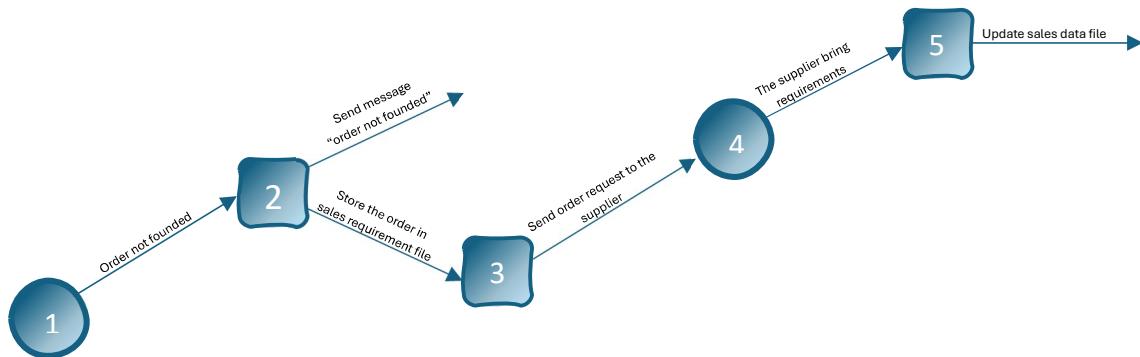
Structured English

Decision Table

Decision Tree

Unresolved issues : -----

Process Logic -- Decision Tree



Number: 5

Name: founded

Description: order is founded

Input Data Flow:

1. order founded to process 5

Output Data Flow:

1. send message “ORDER FOUNDED” to process 9

Type of process:

Online

Batch

Manual

Process logic:

Structured English

Decision Table

Decision Tree

Unresolved issues : -----

Process Logic – Structured English

IF ORDER FOUNDED THEN

send message “ORDER FOUNDED”

END IF

Number: 6

Name: Create maintenance record

Description: a process for maintenance request

Input Data Flow:

1. maintenance request from Define customer request process 2

Output Data Flow:

1. check maintenance data store d3

Type of process:

Online

Batch

Manual

Process logic:

Structured English

Decision Table

Decision Tree

Unresolved issues : -----

Process Logic – Structured English

IF Request is maintenance, THEN

Check maintenance data store d3

END IF

Number: 7

Name: Check time

Description: a process for checking free time

Input Data Flow:

1. check free time from maintenance data store d3

Output Data Flow:

1. searching for free time in time file data store d4

Type of process:

Online

Batch

Manual

Process logic:

Structured English

Decision Table

Decision Tree

Unresolved issues : -----

Process Logic – Structured English

IF received order from maintenance record, **THEN**

Check free time in data store d3

END IF

Number: 8

Name: send response and update

Description: Send the response of request to the customer and update time file.

Input Data Flow:

1. send time

Output Data Flow:

1. send time selected
2. response on time for maintenance

Type of process:

Online

Batch

Manual

Process logic:

Structured English

Decision Table

Decision Tree

Unresolved issues : -----

Process Logic – Structured English

IF Found free time **THEN**

Send the response to the customer

Update time file

END IF

Number: 9

Name: Send message to user

Description: Send the response message to customer

Input Data Flow:

1. Message order not founded
2. send message 'ORDER FOUNDED'
3. response on time for maintenance

Output Data Flow:

1. final message

Type of process:

Online

Batch

Manual

Process logic:

Structured English

Decision Table

Decision Tree

Unresolved issues : -----

Process Logic – Structured English

IF get response of order or maintenance time **THEN**

Send the final message to the customer

END IF