Chapter 1
Introduction

1.1- Overview

In the Robabikia program, it has become easy to get rid of things that you do not use and also get money for them.

All you have to do is log in to the program and upload the product you want to dispose of, and we will evaluate the product and send representatives to inspect, then we will give you the appropriate money in exchange for your product instead of throwing that waste on the street and it becoming one of the causes of environmental pollution.

Also, companies and factories can obtain these wastes and consumed products from Through us and benefiting from them in making other things by requesting to enter an auction for these products and winning them, as we have many natural materials that you can use such as iron, plastic, wood, etc.

Our slogan is yes to a better environment without waste.

1.2- Objectives

Increasing Public Awareness: Educate the community about the importance of recycling and its environmental benefits.

Promoting Recycling Practices: Encourage individuals and households to adopt recycling habits by providing information on how to recycle properly and the impact it has on reducing waste.

Reducing Waste Generation: Set targets for reducing the amount of waste generated within a specific timeframe through recycling initiatives.

Improving Recycling Infrastructure: Work towards improving recycling facilities and accessibility to make recycling easier for everyone in the community.

Implementing Recycling Programs: Develop and implement recycling programs in schools, businesses, or neighborhoods to promote active participation in recycling efforts.

Measuring and Monitoring Progress: Establish metrics to track progress towards recycling goals and regularly evaluate the effectiveness of recycling initiatives.

Engaging Stakeholders: Collaborate with local government, businesses, schools, and community organizations to foster partnerships and support for recycling initiatives.

Reducing Contamination: Educate individuals about the importance of avoiding contamination in recycling bins to ensure materials are properly recycled and not sent to landfills unnecessarily.

Encouraging Innovation: Support research and development of new recycling technologies or methods to improve efficiency and expand the range of recyclable materials.

Advocating for Policy Change: Advocate for policies and regulations that support recycling efforts, such as extended producer responsibility laws or incentives for businesses to use recycled materials.

1.3- Purpose

To promote environmental sustainability and waste reduction by raising awareness about the importance of recycling and implementing effective recycling initiatives within the community.

Through education, advocacy, and collaboration, the project aims to inspire individuals and organizations to adopt responsible recycling practices, thereby minimizing the negative impact of waste on the environment and contributing to a more sustainable future for generations to come.

address the pressing issue of waste management and environmental degradation through comprehensive recycling efforts.

By fostering a culture of recycling and waste reduction, the project seeks to mitigate the adverse effects of excessive waste accumulation on ecosystems, wildlife, and human health. Through education, engagement, and strategic partnerships, the project aims to empower communities to take proactive measures in recycling, ultimately working towards a cleaner, healthier planet for present and future generations.

1.4- Scope

Community Outreach and Engagement: The project aims to engage residents across various communities and regions to participate in recycling initiatives. Through educational campaigns and outreach programs, the project will raise awareness about the importance of recycling and its impact on environmental sustainability.

Holistic Approach to Recycling: The scope of the project extends beyond traditional recycling efforts to encompass a wide range of materials and waste streams. In addition to promoting the recycling of common materials such as paper, plastic, and glass, the project will explore innovative solutions for recycling electronic waste, organic matter, and other non-traditional recyclables.

Infrastructure Development and Enhancement: The project will assess the existing recycling infrastructure within target communities and identify opportunities for improvement. This includes evaluating recycling facilities, collection systems, and processing capabilities to optimize efficiency and effectiveness.

Public-Private Partnerships: Collaboration with local government agencies, businesses, and non-profit organizations will be key to the success of the project. By fostering partnerships and leveraging resources, the project aims to strengthen recycling initiatives and maximize community participation.

Technology and Innovation: The project will explore emerging technologies and innovative practices to enhance recycling processes and increase recycling rates. This may include the implementation of smart recycling bins, blockchain-based tracking systems, or advanced sorting technologies to streamline the recycling supply chain.

Education and Awareness Campaigns: Educational campaigns will be launched to inform residents about proper recycling practices, waste reduction strategies, and the environmental benefits of recycling. Outreach efforts will target schools, community centers, and public events to engage residents of all ages.

1.5- General constraints

Project constraints are the general limitations of a project, including time,

scope, costs, and collecting raw data. Understanding project constraints are

important because they affect project performance.

. Time constraint

The time constraint refers to the project's schedule for completion,

including the deadlines for each phase of the project, as well as the

date for rollout of the final deliverable.

. Scope constraint

The scope of a project defines its specific goals, deliverables, features,

and functions, in addition to the tasks required to complete the project.

. Cost constraint

The cost of the project, often dubbed the project's budget, comprises all the financial resources needed to complete the project on time, in its predetermined scope.

Keep in mind that cost does not just mean money.

there are a lot of factors such as time drain.

. Collecting raw data

Collecting raw data for simulation was not easy to access because of

- Concept of data collection
- Types of data
- Issues to be considered for data collection
- Methods of primary data collection

Chapter 2
Planning & Analysis

2.1- Project Planning

2.1.1- Feasibility Study

1) Financial Feasibility

To assess the financial feasibility of The Sustainable Circle project, let's consider the following factors:

Cost Analysis: Assessing expenses associated with collection, processing, quality assurance, marketing, administration, and partnerships to understand the financial aspects of the recycling project.

Revenue Projection: Predicting income through pricing strategies, negotiation of selling prices, and estimating the volume of recyclables to be processed based on market demand and outreach efforts.

Market Analysis: Researching current market prices, trends, and competition in the recycling industry to ensure competitiveness and identify opportunities for differentiation.

Return on Investment (ROI): Calculating potential ROI and payback period by comparing projected revenue with total costs incurred to evaluate the project's financial viability.

Risk Assessment: Identifying potential risks such as regulatory changes, price fluctuations, logistical challenges, and market volatility, and developing mitigation strategies to address them.

Sustainability of Revenue Streams: Evaluating the project's scalability and ability to adapt to environmental policies and consumer behaviors to ensure long-term revenue sustainability.

2) Technical Feasibility

The Sustainable Circle project is a mobile application. The main technologies and tools that are associated with The Sustainable Circle project are:

- **Dart**
- **Flutter**
- **Html**
- **Node.js**
- **Express.js**
- **Mongo Db**

Each of the technologies are freely available and the technical skills required are manageable, Time limitations of the product development and the ease of implementing using these technologies are synchronized.

Initially the application will be hosted in a free hosting space, but for later implementations it will be hosted in a paid web hosting space with a sufficient bandwidth required in (his application is very low).

3) Resource and Time Feasibility

Resources that are required for the sustainable circle.

project includes:

- Programming device (Laptop)
- Hosting space (freely online)
- Programming tools (freely available)
- Programming individuals

4) Social/Legal Feasibility

The Sustainable Circle project uses freely available development tools and provide the service for all Arab people

only the maintenance Cost Will be Charged from potential customers. Software libraries that are used in this system are free open-source libraries since this website eliminates the effort Raise money for any specific situation.

2.1.2- Estimated Cost

2.1.3- Gantt Chart

Chapters	Start Date	End Date	Duration
Chapter 1	01\06\2023	07\06\2023	7 Days
Chapter 2	08\06\2023	15\06\2023	7 Days
Chapter 3	16\06\2023	30\06\2023	14 Days
Chapter 4	23\08\2023	01\03\2024	162 Days
Chapter 5	15\03\2024	22\03\2024	8 Days
Chapter 6	23\03\2024	30\03\2024	7 Days
Chapter 7	01\04\2024	07\04\2024	7 Days
Chapter 8	08\04\2024	15\04\2024	7 Days

2.2- Analysis and Limitation of existing system

The current system of recycling, despite its positive impact on environmental sustainability, faces several limitations:

1. Lack of Participation: One of the main limitations is the low participation rate among individuals and businesses. Many people still do not prioritize recycling or may not have access to convenient recycling facilities, leading to significant amounts of recyclable materials ending up in landfills.

2. Contamination: Contamination of recyclables remains a significant challenge. Improper sorting or mixing of different materials can reduce the quality and value of recyclables, making them less desirable for recycling companies and potentially leading to rejection of entire batches.

3. Infrastructure Challenges: Inadequate infrastructure for recycling collection, sorting, and processing can limit the effectiveness of recycling efforts. Rural areas, in particular , may have limited access to recycling facilities, leading to disparities in recycling rates between urban and rural communities.

4. Limited Market Demand: Market demand for recycled materials fluctuates and can be influenced by factors such as commodity prices, global market trends, and consumer preferences. If demand for certain recycled materials is low, it can affect the economic viability of recycling programs.

5. Costs and Economic Viability: Recycling operations entail significant costs for collection, transportation, sorting, and processing. In some cases, the costs of recycling may outweigh the revenue generated from selling recycled materials, making it economically challenging for recycling programs to sustain themselves without subsidies or financial support.

6. Technological Limitations: Some materials, such as certain types of plastics or composite materials, may be challenging to recycle due to technological limitations or lack of efficient recycling processes. This can result in these materials being either downcycled into lower-value products or disposed of in landfills.

7. Educational and Awareness Gaps: There may be gaps in public education and awareness about the importance of recycling, proper sorting practices, and the environmental benefits of recycling. Addressing these gaps is crucial for increasing participation and improving the quality of recycled materials.

8. Policy and Regulatory Barriers: Policy and regulatory barriers, such as inconsistent recycling policies across different jurisdictions or lack of supportive legislation, can hinder the effectiveness of recycling programs and limit their scalability and impact.

Addressing these limitations requires a multifaceted approach involving education and outreach, investment in infrastructure and technology, policy interventions, and collaboration among stakeholders to create a more efficient and sustainable recycling system.

General rules

The general rules of The Sustainable Circle recycling system can be summarized as follows:

1. Participation: Encourage widespread participation from individuals and businesses in recycling efforts by making the process convenient, accessible, and incentivized.

2. Source Separation: Implement source separation practices where recyclable materials are sorted at the point of generation to minimize contamination and improve the quality of recycled materials.

3. Acceptable Materials: Clearly define and communicate which materials are accepted for recycling, including but not limited to plastics, metals, paper, cardboard, glass, and electronics.

4. Collection Methods: Offer convenient collection methods such as curbside pickup, drop-off centers, or community collection events to facilitate the collection of recyclable materials from diverse sources.

5. Sorting and Processing: Establish efficient sorting and processing facilities equipped with appropriate technology and trained personnel to ensure thorough sorting and processing of recyclable materials.

6. Quality Assurance: Implement quality assurance measures to maintain the quality and integrity of recycled materials, including quality control checks, inspections, and adherence to industry standards.

7. Market Development: Develop partnerships with recycling factories and markets for the sale of recycled materials, ensuring fair prices and sustainable outlets for recycled materials.

8. Education and Awareness: Conduct educational programs, workshops, and awareness campaigns to educate the public about the importance of recycling, proper sorting practices, and the environmental benefits of recycling.

9. Regulatory Compliance: Adhere to relevant regulations and standards governing recycling practices, waste management, environmental protection, and occupational health and safety.

10. Continuous Improvement: Regularly evaluate and improve the efficiency, effectiveness, and sustainability of the recycling system through monitoring, feedback mechanisms, and adaptation to changing circumstances.

By following these general rules, The Sustainable Circle can establish a robust and sustainable recycling system that contributes to environmental conservation, resource efficiency, and community well-being.

Factors that make the current system operate slowly.

Several factors can contribute to the slow operation of the current recycling system:

1. Inadequate Infrastructure: Insufficient infrastructure, including collection, sorting, and processing facilities, can slow down the recycling process.

Limited access to recycling facilities or outdated equipment may lead to bottlenecks and inefficiencies.

2. Limited Participation: Low participation rates among individuals and businesses can slow down the collection of recyclable materials. Lack of awareness, convenience, or incentives may deter people from actively participating in recycling programs.

3. Contamination: Contamination of recyclables, caused by improper sorting or mixing of different materials, can slow down the recycling process. Contaminated materials may require additional sorting or cleaning before they can be processed, increasing time and labor requirements.

4. Market Demand Fluctuations: Fluctuations in market demand for recycled materials can slow down the recycling process. When market demand is low, recycling facilities may stockpile materials or reduce processing capacity, leading to delays in recycling operations.

5. Logistical Challenges: Logistics-related issues, such as transportation delays, supply chain disruptions, or inefficient routing, can slow down the movement of recyclable materials from collection points to processing facilities.

6. Technological Limitations: Technological limitations or inefficiencies in recycling processes can slow down the processing of recyclable materials. Outdated or inefficient equipment may require more time and resources to process materials effectively.

7. Policy and Regulatory Barriers: Policy and regulatory barriers, such as complex permitting processes, compliance requirements, or inconsistent regulations across jurisdictions, can slow down the implementation and expansion of recycling programs.

8. Budget Constraints: Budget constraints or funding shortages may limit investments in recycling infrastructure, technology upgrades, or outreach efforts, slowing down the development and improvement of recycling systems.

9. Public Education and Awareness: Lack of public education and awareness about recycling practices, environmental benefits, or proper sorting techniques can slow down the adoption of recycling behaviors and impede efforts to increase participation rates.

10. Fragmented Systems: Fragmented or disjointed recycling systems, characterized by lack of coordination among stakeholders or inconsistent approaches to recycling, can slow down the overall progress of recycling efforts.

Addressing these factors requires a concerted effort from policymakers, industry stakeholders, community organizations, and the public to overcome barriers and accelerate the transition to a more efficient and effective recycling system.

Problems that hinder operations within any charitable organization and make it work slowly are the following:

1. Inefficient Processes: Complex or outdated processes can slow down operations, leading to delays and inefficiencies. Streamlining processes and eliminating unnecessary steps can help improve workflow speed.

2. Poor Communication: Communication breakdowns, lack of clarity, or ineffective channels for communication can lead to misunderstandings and delays in decision-making, hindering overall productivity.

3. Bureaucracy: Excessive bureaucracy, red tape, or hierarchical structures can slow down decision-making processes and impede the implementation of innovative ideas or solutions.

4. Lack of Collaboration: Siloed departments or teams that operate in isolation can hinder collaboration and coordination, leading to duplicated efforts and slower progress towards organizational goals.

5. Resource Constraints: Limited resources, including budgetary constraints, staffing shortages, or inadequate technology infrastructure, can hinder operations by restricting the organization's ability to invest in necessary tools and resources.

6. Resistance to Change: Resistance to change from employees or leadership can slow down the adoption of new processes, technologies, or strategies aimed at improving efficiency and productivity.

7. Micromanagement: Micromanagement can stifle creativity and autonomy among employees, leading to reduced motivation and slower decision-making processes.

8. Poor Time Management: Ineffective time management practices, such as procrastination, multitasking, or failure to prioritize tasks, can lead to delays and missed deadlines, slowing down overall operations.

9. Inadequate Training: Insufficient training or skill gaps among employees can hinder their ability to perform tasks efficiently, leading to errors, rework, and slower workflow.

10. Lack of Clear Goals and Priorities: Unclear goals or priorities can lead to confusion and indecision, slowing down progress as employees may not know where to focus their efforts.

Addressing these problems requires proactive leadership, open communication, investment in resources and training, a culture of collaboration and innovation, and a commitment to continuous improvement. By identifying and addressing these issues, organizations can overcome obstacles and create a more efficient and productive work environment.

2.3- Need for the new system

Item Identification:

Implement a feature that uses image recognition or barcode scanning to identify different types of recyclable items.

Recycling Center Locator:

Integrate a map-based feature that helps users find nearby recycling centers, including their addresses, contact information, and operating hours.

Recycling Tracker:

Enable users to track their recycling progress, including the amount and types of items they have recycled over time.

Rewards and Incentives:

Implement a reward system to motivate users to recycle more. Offer virtual badges, discounts, or redeemable points that can be exchanged for eco-friendly products or services.

Donation Option:

Allow users to donate their recyclable items to local charities or organizations that accept such items.

Education and Tips:

Provide educational content, articles, and tips on recycling best practices, environmental impact, and sustainable living.

2.4- Analysis of the new system

2.4.1- User requirements:

1. Ease of Use and Convenience:

• Users should be able to easily participate in the recycling program without encountering significant barriers.

• The system should offer convenient collection methods such as curbside pickup, drop-off locations, or scheduled pickups.

2. Clear Guidelines and Instructions:

• Users need clear guidelines and instructions on what materials are accepted for recycling and how to properly prepare and sort recyclables.

• Educational materials, signage, and online resources can help users understand recycling practices and requirements.

3. Transparent and Fair Compensation:

• Users selling recyclable materials should receive transparent and fair compensation based on the type and quantity of materials provided.

• Pricing structures should be clearly communicated, and payment processes should be efficient and reliable.

4. Efficient Collection and Processing:

• Users expect efficient collection and processing of recyclable materials to minimize delays and inconvenience.

• Collection schedules should be reliable, and processing facilities should be equipped to handle incoming materials efficiently.

5. Quality Assurance and Environmental Impact:

• Users want assurance that collected materials are processed responsibly and contribute to environmental sustainability.

• Quality assurance measures should be in place to ensure that recyclable materials meet industry standards and are processed in an environmentally friendly manner.

6. Transparency and Accountability:

• Users value transparency and accountability in the recycling process, including clear communication about how their recyclables are processed and the environmental impact of their participation.

• Reporting mechanisms and feedback channels can help maintain transparency and address user concerns or feedback.

7. Educational Resources and Support:

• Users may require access to educational resources, workshops, or support services to learn about recycling practices, sustainability, and waste reduction.

• The system should provide ongoing support and guidance to help users adopt and maintain environmentally responsible behaviors.

8. Accessibility and Inclusivity:

• The recycling system should be accessible and inclusive to all members of the community, regardless of demographic factors or socioeconomic status.

• Efforts should be made to address barriers to participation and ensure equitable access to recycling services.

Our system consists of two users.

1- User:

• Through the main menu (he can see all types of categories that he can recycle and all the information of it)

• He can search for a specific category to perform auction on it

• He can create an account for the platform by registering his basic data (Name - Address - Nationality - Mobile Number)

• He can then log in (using username or email – password)

• He can modify his data from (name - address - email - password - mobile number)

• He can take pictures of the product that he wants it to be recycle

• He submits these pictures to the system to see the quality of the product and response with the appropriate price

• Submit a request to make an order to make the courier take his product for recycling

• He can take part in the auction of the raw materials by paying action deposit amount

•If he wins the auction, he can pay with different methods of payment

2- Admin:

• Log in to the platform.

• Modify his data (name - email - password)

• Delete users or modify their data.

• Can add or delete products.

• See all the requests submitted, he can add a case

-He can approve the request "with the addition of some notes."

- Delete the request

- Requesting modification from the user of some data to complete the process and approve it.

• Approve the request of the user’s product according to its quality.

• Approve the price of the Product before it purchased.

• Set the limit of auction and its duration.

•Decide who wins the auctions.

• See all users on the platform.

• He can also add another admin to the platform.

• View the complaint submitted by users or visitors.

2.4.2- System Requirements:

1. Collection System:

• Implement a system for collecting recyclable materials from individuals, households, businesses, and other sources.

• Designate collection points, such as curbside pickup locations, drop-off centers, or scheduled collection routes.

2. Sorting and Processing Facilities:

• Establish sorting and processing facilities equipped with the necessary infrastructure, machinery, and technology to efficiently process recyclable materials.

• Ensure facilities are capable of sorting materials into different categories (e.g., plastics, metals, paper) to maximize recycling rates.

3. Quality Assurance Measures:

• Implement quality control processes to ensure the integrity and quality of recycled materials.

• Conduct inspections and testing to verify that materials meet industry standards and are suitable for recycling.

4. Information Management System:

• Develop an information management system to track the collection, processing, and sale of recyclable materials.

• Utilize software solutions for inventory management, transaction tracking, and reporting purposes.

5. Market Development and Partnerships:

• Establish partnerships with recycling facilities, manufacturers, and other stakeholders to facilitate the sale and distribution of recycled materials.

• Develop market channels and negotiate pricing agreements to ensure a sustainable revenue stream.

6. Educational Resources and Outreach:

• Create educational resources, such as brochures, videos, and online materials, to educate the public about recycling practices and environmental benefits.

• Conduct outreach activities, workshops, and awareness campaigns to promote recycling and encourage participation.

7. Regulatory Compliance:

• Ensure compliance with relevant regulations and standards governing waste management, recycling practices, and environmental protection.

• Stay informed about regulatory changes and adapt processes and procedures accordingly.

8. Customer Support and Feedback Mechanisms:

• Provide customer support services to address inquiries, resolve issues, and assist users with participating in the recycling program.

• Implement feedback mechanisms to gather input from stakeholders and identify areas for improvement.

9. Sustainability and Environmental Impact:

• Incorporate sustainability principles into system design and operations to minimize environmental impact.

• Measure and monitor key performance indicators related to resource conservation, energy efficiency, and waste reduction.

10. Scalability and Flexibility:

• Design the system to be scalable and adaptable to accommodate changes in demand, technology advancements, and evolving recycling practices.

• Allow for flexibility in processes and procedures to accommodate different types of recyclable materials and geographic locations.

2.4.3- Domain Requirements / Business Requirements

1. Collection Efficiency:

• The system should ensure efficient collection of recyclable materials from various sources, including households, businesses, and community collection points.

• Collection routes and schedules should be optimized to minimize resource usage and maximize collection coverage.

2. Material Sorting Accuracy:

- The system should facilitate accurate sorting of recyclable materials into different categories (e.g., plastics, metals, paper) to ensure high-quality output.
- Sorting processes should be designed to minimize contamination and maximize the value of recycled materials.

3. Transparent Pricing and Compensation:

- The system should provide transparent pricing and compensation mechanisms for individuals and businesses selling recyclable materials.
- Pricing structures should be fair and reflective of market conditions, ensuring that sellers receive adequate compensation for their materials.

4. Quality Assurance and Standards Compliance:

- The system should implement quality assurance measures to ensure that recycled materials meet industry standards and regulatory requirements.
- Materials should undergo inspection and testing to verify quality and suitability for recycling.

5. Market Development and Partnerships:

- The system should establish partnerships with recycling facilities, manufacturers, and other stakeholders to facilitate the sale and distribution of recycled materials.
- Market channels should be developed to ensure a steady demand for recycled materials and maintain sustainable revenue streams.

6. Community Engagement and Education:

- The system should support community engagement and education initiatives to promote recycling awareness and participation.
- Educational resources and outreach programs should be developed to inform the public about recycling practices and environmental benefits.

7. Regulatory Compliance and Reporting:

- The system should ensure compliance with relevant regulations and reporting requirements governing waste management and recycling operations.

• Reporting capabilities should be built into the system to track and document key performance indicators and regulatory compliance metrics.

8. Customer Support and Feedback Mechanisms:

• The system should provide customer support services to address inquiries, resolve issues, and assist users with participating in the recycling program.

• Feedback mechanisms should be implemented to gather input from stakeholders and identify areas for improvement in system operations.

9. Sustainability and Environmental Impact:

• The system should prioritize sustainability principles and environmental stewardship in its operations and decision-making processes.

• Measures should be taken to minimize environmental impact, conserve resources, and promote circular economy practices.

2.4.4- Functional Requirements

1- Registration:

- The User must log in first:

A- The user logs in by Username–Gmail – Password – Confirm Password.

B- The Data will be saved in the database.

C- The user becomes registered in the system.

D- Who uses this: - Users who are visiting the site for the first time.

2-login As User:

- The user tries to get into the system:

A-The user tries to enter after the site by Gmail and Password if the data is correct if the data is incorrect there appears to him error message.

B- Now the user can use the application if he wants to sell his product.

C-Every User can edit his profile {Username – Gmail – Password-Address }

D- Who uses this:

- Any user who wants to benefit from the services of the application.

3-login As Admin:

- The admin tries to get into the system

A- Log in to the system by username and password.

B- Can add or delete or update any raw material.

C- Can Update his profile.

D- Can See all the details that are specific to a particular product.

E- Can See all requests and can add it to the system or delete it.

F- Can add another admin to the system.

G- Start the auction.

2.4.5- Non-Functional Requirements

1. Performance:

- The system should respond to user interactions within acceptable response times, even during peak usage periods.
- It should be able to handle simultaneous requests and maintain performance under heavy load conditions.

2. Reliability:

• The system should be highly available, with minimal downtime for maintenance or upgrades.

• It should be resilient to failures and able to recover quickly in the event of a system crash or data loss.

3.Scalability:

• The system should be scalable to accommodate growth in user base, data volume, and transaction throughput.

• It should support horizontal and vertical scaling to handle increased demand without sacrificing performance.

4. Security:

• The system should ensure the confidentiality, integrity, and availability of user data and system resources.

• It should implement strong authentication mechanisms, access controls, and encryption protocols to protect against unauthorized access and data breaches.

5. Usability:

• The system should be intuitive and easy to use, with clear navigation and user-friendly interfaces.

• It should provide adequate guidance and feedback to users, reducing the likelihood of errors and confusion.

6. Compatibility:

• The system should be compatible with a wide range of devices, operating systems, and web browsers.

• It should adhere to industry standards and best practices to ensure consistent performance across different platforms.

7. Maintainability:

• The system should be easy to maintain and update, with well-documented code and modular architecture.

• It should support version control, automated testing, and deployment processes to facilitate ongoing maintenance and enhancements.

8. Interoperability:

• The system should be interoperable with external systems and APIs, enabling seamless integration with third-party applications and services.

• It should support standard data formats and communication protocols to facilitate data exchange and interoperability.

9. Environmental Impact:

- The system should minimize its environmental footprint by optimizing resource usage, energy consumption, and waste generation.
- It should promote eco-friendly practices such as paperless transactions, energy-efficient infrastructure, and sustainable sourcing.

10. Regulatory Compliance:

- The system should comply with relevant laws, regulations, and industry standards governing data privacy, environmental protection, and waste management.
- It should undergo regular audits and assessments to ensure compliance with legal and regulatory requirements.

2.5- Advantages of the new system

1.Environmental Preservation: The system promotes environmental sustainability by diverting recyclable materials from landfills, reducing pollution, conserving natural resources, and mitigating the impacts of climate change.

2.Resource Conservation: Recycling helps conserve valuable natural resources such as water, minerals, and energy by reducing the need for raw material extraction and production of new goods.

3.Energy Savings: Recycling consumes less energy compared to manufacturing products from raw materials, leading to significant energy savings and reduced greenhouse gas emissions.

4.Waste Reduction: By encouraging recycling and proper waste management practices, the system helps reduce the amount of waste generated, minimizing the burden on landfill capacity, and reducing pollution.

5.Economic Benefits: The recycling industry creates economic opportunities by generating revenue from the sale of recyclable materials, supporting job creation, and stimulating economic growth in communities.

6.Community Engagement: The system fosters community engagement and participation in environmental conservation efforts, promoting a sense of environmental responsibility and civic pride.

7.Educational Opportunities: Educational programs and outreach initiatives associated with the system provide opportunities to raise awareness about recycling, environmental issues, and sustainable living practices.

8.Circular Economy Promotion: By closing the loop on material flows and promoting the reuse and recycling of materials, the system contributes to the development of a circular economy, where resources are used more efficiently, and waste is minimized.

9.Improved Public Health: Reduced pollution and cleaner environments resulting from recycling efforts can lead to improved public health outcomes, including lower rates of respiratory illnesses and other health conditions associated with environmental pollution.

10. Long-Term Sustainability: The Sustainable Circle recycling system lays the foundation for long-term sustainability by promoting responsible consumption and production patterns, enhancing environmental stewardship, and leaving a positive legacy for future generations.

2.6- Risk and Risk Managements

Risks:

1.Low User Adoption: There is a risk that individuals and businesses may not fully adopt the recycling system, leading to low participation rates and limited collection of recyclable materials.

2.Contamination of Materials: Contamination of recyclable materials with non-recyclable items or hazardous substances can degrade the quality of recycled materials and disrupt the recycling process.

3.Operational Delays: Delays in collection, sorting, or processing of recyclable materials can impact the efficiency of the recycling system and lead to backlog accumulation.

4.Market Fluctuations: Fluctuations in market demand for recycled materials and changes in commodity prices can affect the profitability of the recycling operation and revenue generation.

5.Security Breaches: Security breaches, data leaks, or cyber-attacks on the system can compromise the confidentiality, integrity, and availability of user data and sensitive information.

6.Regulatory Compliance: Failure to comply with applicable regulations and standards governing waste management, recycling practices, and environmental protection can result in legal and regulatory penalties.

7.Resource Constraints: Resource constraints such as limited funding, staffing shortages, or inadequate infrastructure can hinder the effective operation and expansion of the recycling system.

8.Technological Failures: Technical failures, system outages, or software glitches can disrupt system operations and impact user experience, leading to dissatisfaction and loss of trust.

9.Negative Public Perception: Negative publicity, public backlash, or misinformation about the recycling system can damage the reputation and credibility of the initiative, affecting user participation and support.

Risk Management:

1.Risk Identification:

- Identify potential risks that could affect the objectives, outcomes, or success of the project or initiative.
- Engage stakeholders, subject matter experts, and team members to gather insights and perspectives on potential risks.

2.Risk Assessment:

- Assess the likelihood and impact of each identified risk to determine its significance and priority.

• Use qualitative or quantitative methods to evaluate risks, considering factors such as probability, severity, and potential consequences.

3.Risk Prioritization:

• Prioritize risks based on their level of significance, focusing on those with the highest likelihood and impact.

• Use risk matrices, scoring models, or other prioritization techniques to rank risks and allocate resources accordingly.

4.Risk Mitigation:

• Develop strategies and action plans to mitigate or reduce the likelihood and impact of identified risks.

• Implement risk mitigation measures such as preventive actions, contingency plans, or risk transfer mechanisms.

5.Risk Monitoring:

• Monitor identified risks throughout the project lifecycle to track changes in their likelihood, impact, or severity.

• Regularly review risk registers, status reports, and key performance indicators to assess the effectiveness of risk mitigation efforts.

6.Risk Response Planning:

• Develop response plans for managing risks, including predefined actions and triggers for activating risk mitigation measures.

• Ensure that response plans are documented, communicated to relevant stakeholders, and integrated into project management processes.

7.Contingency Planning:

• Develop contingency plans to address potential risk scenarios that may occur despite risk mitigation efforts.

• Identify alternative courses of action, resources, or strategies to respond to unforeseen risks and minimize their impact on project objectives.

8.Risk Communication:

• Communicate risk information, updates, and mitigation strategies to stakeholders, project teams, and other relevant parties.

• Foster a culture of risk awareness and transparency to encourage proactive risk management and collaboration.

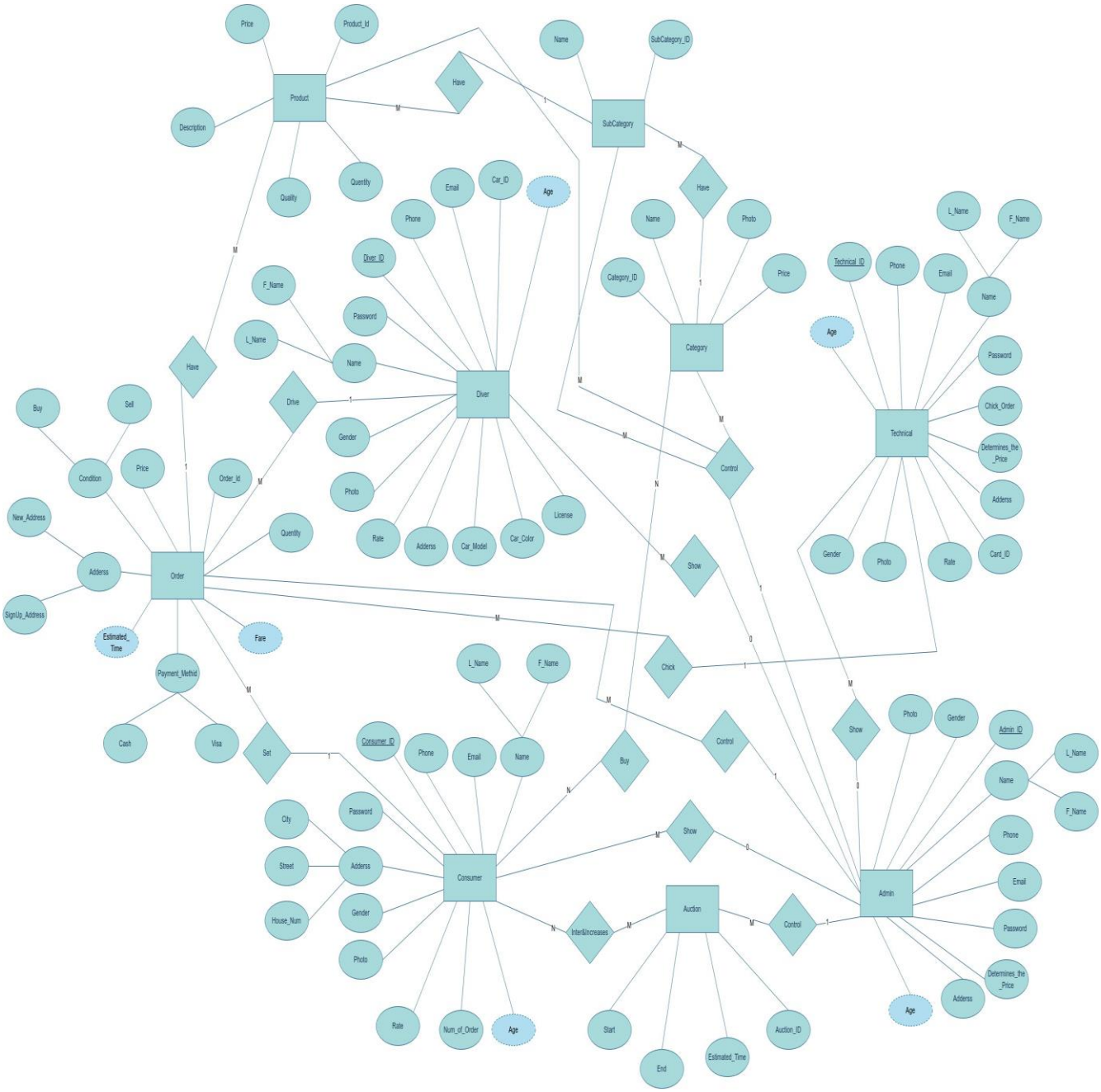
9.Continuous Improvement:

• Continuously review and reassess risk management processes to identify areas for improvement and optimization.

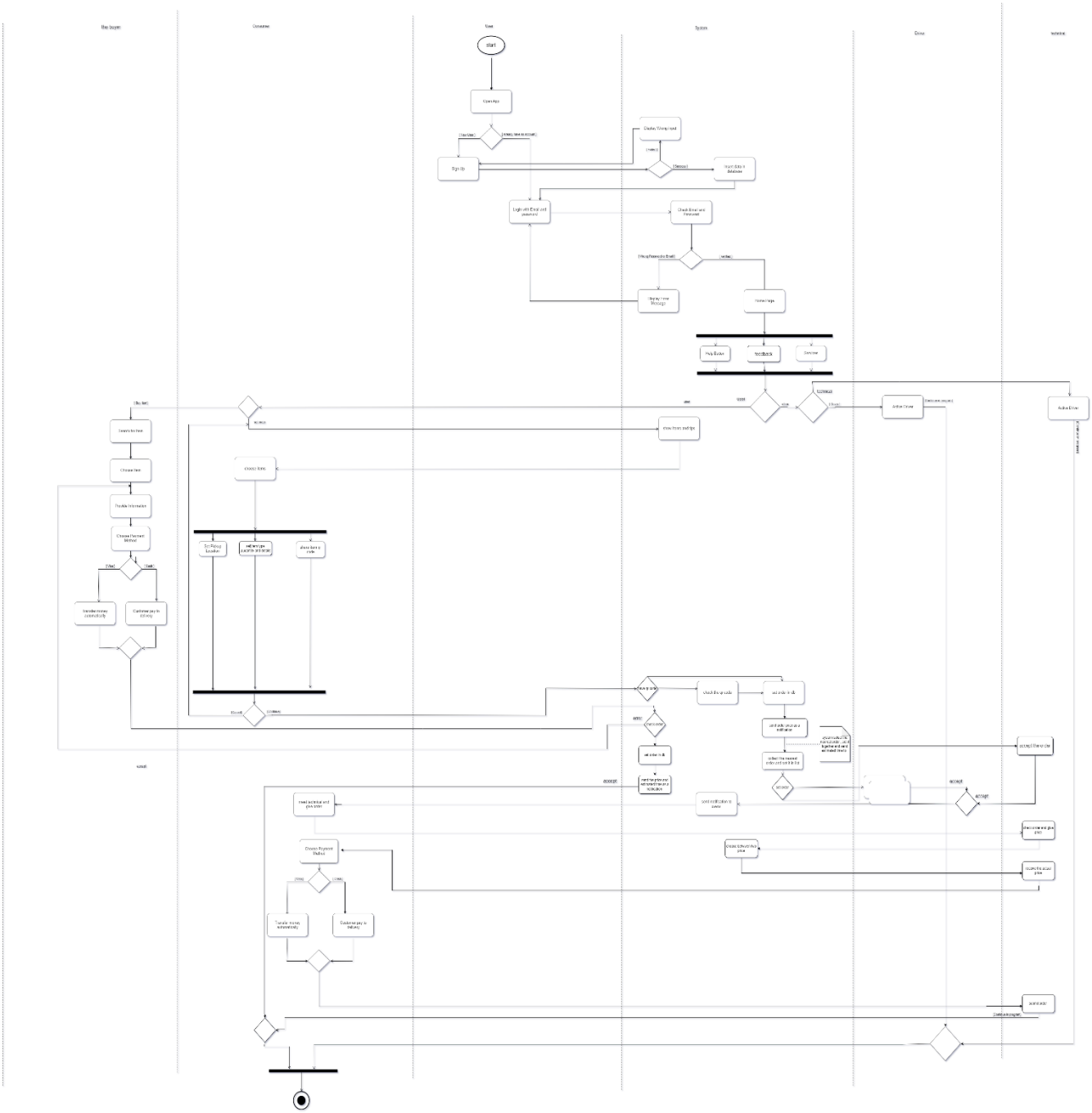
• Incorporate lessons learned from past experiences, feedback from stakeholders, and changes in the external environment to enhance risk management practices.

Chapter 3
Software Design

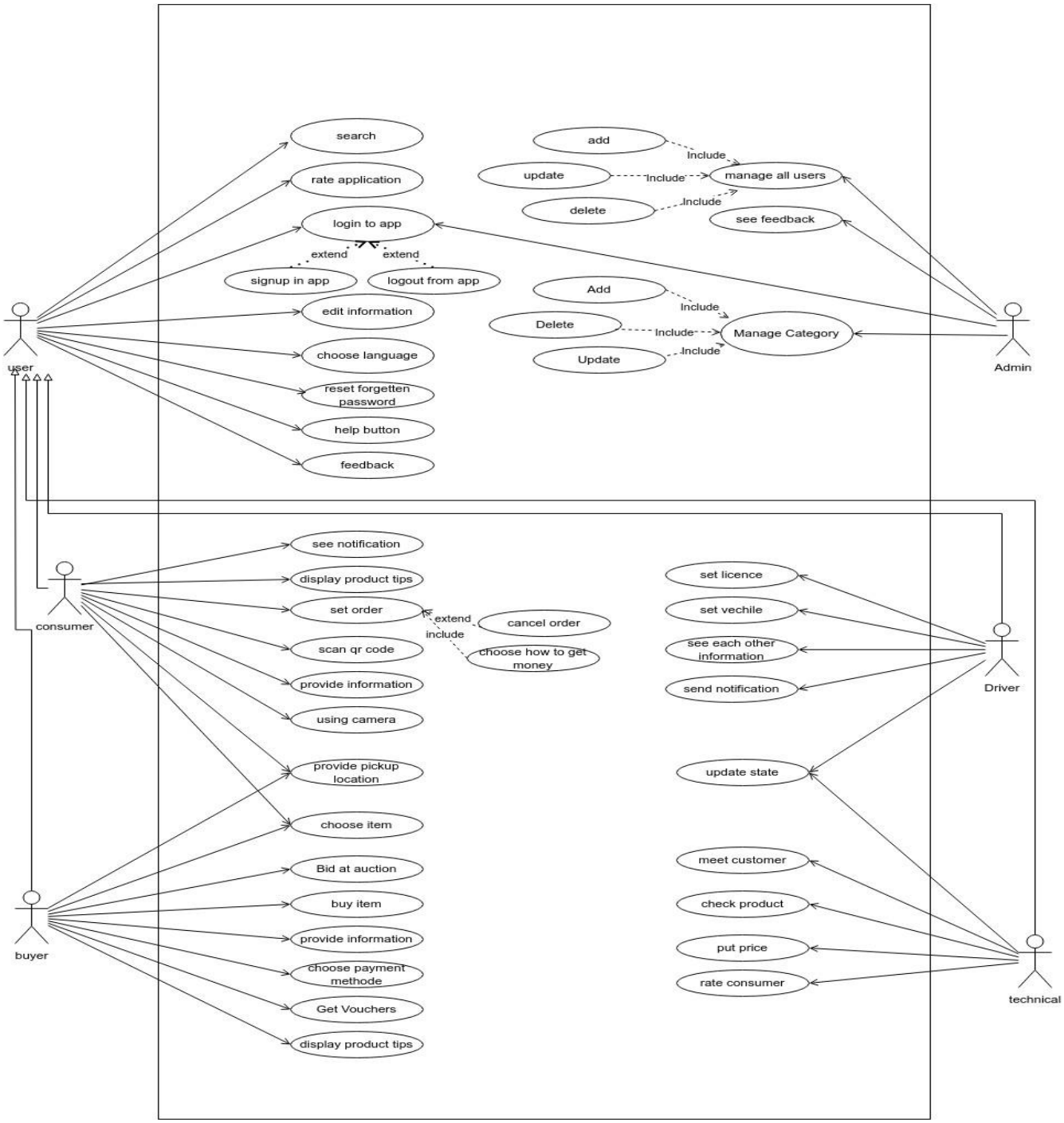
3.1- ERD Diagram



3.2- Activity Diagram

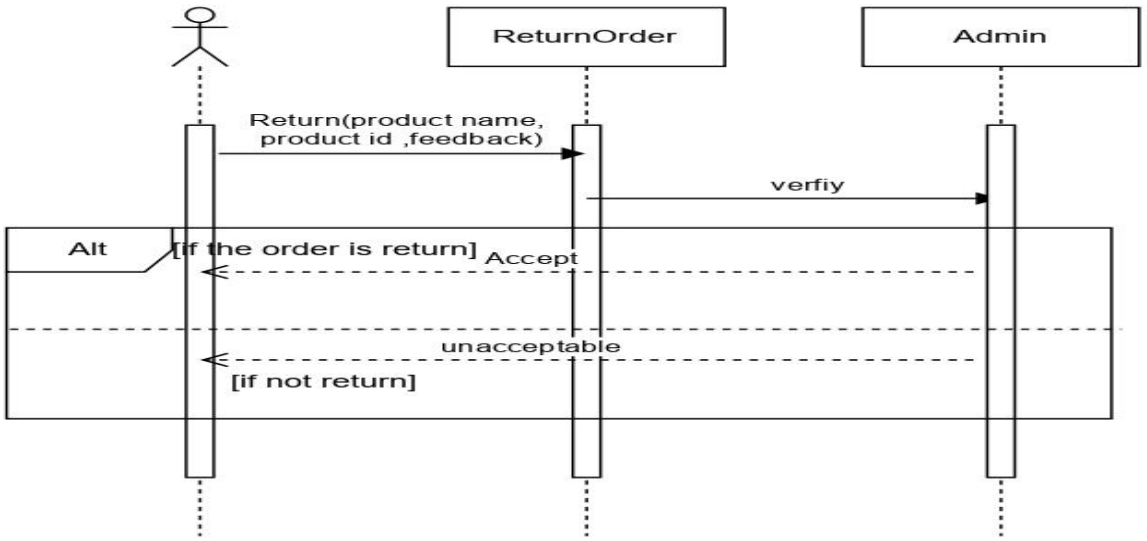


3.3- Use Case Diagram

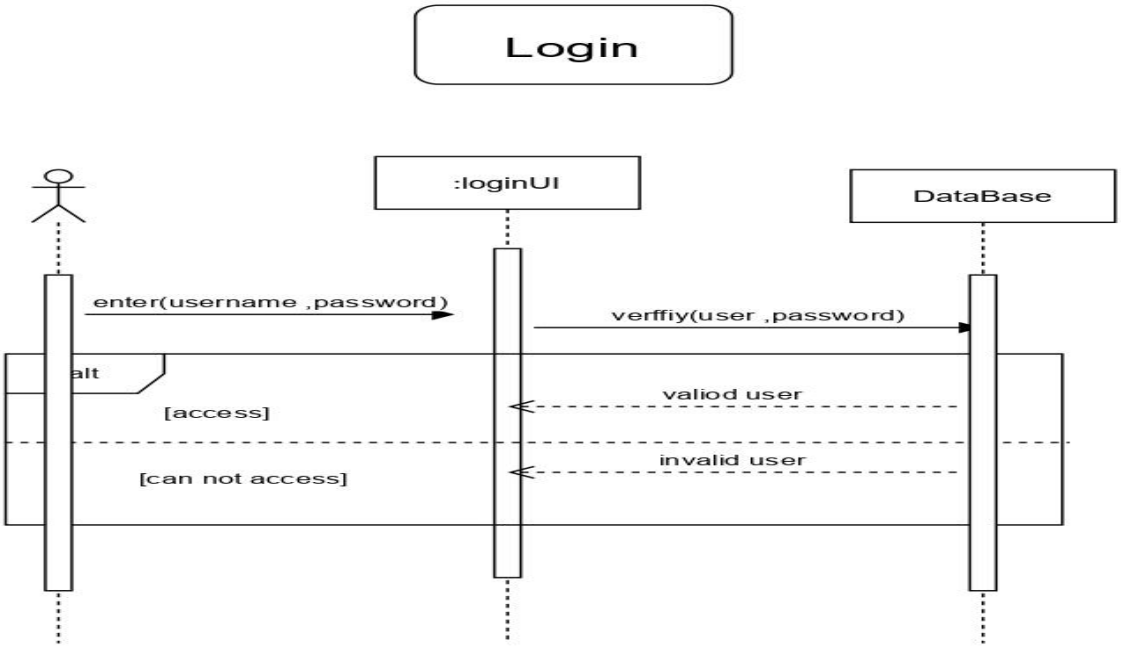


3.4- Sequence Diagram

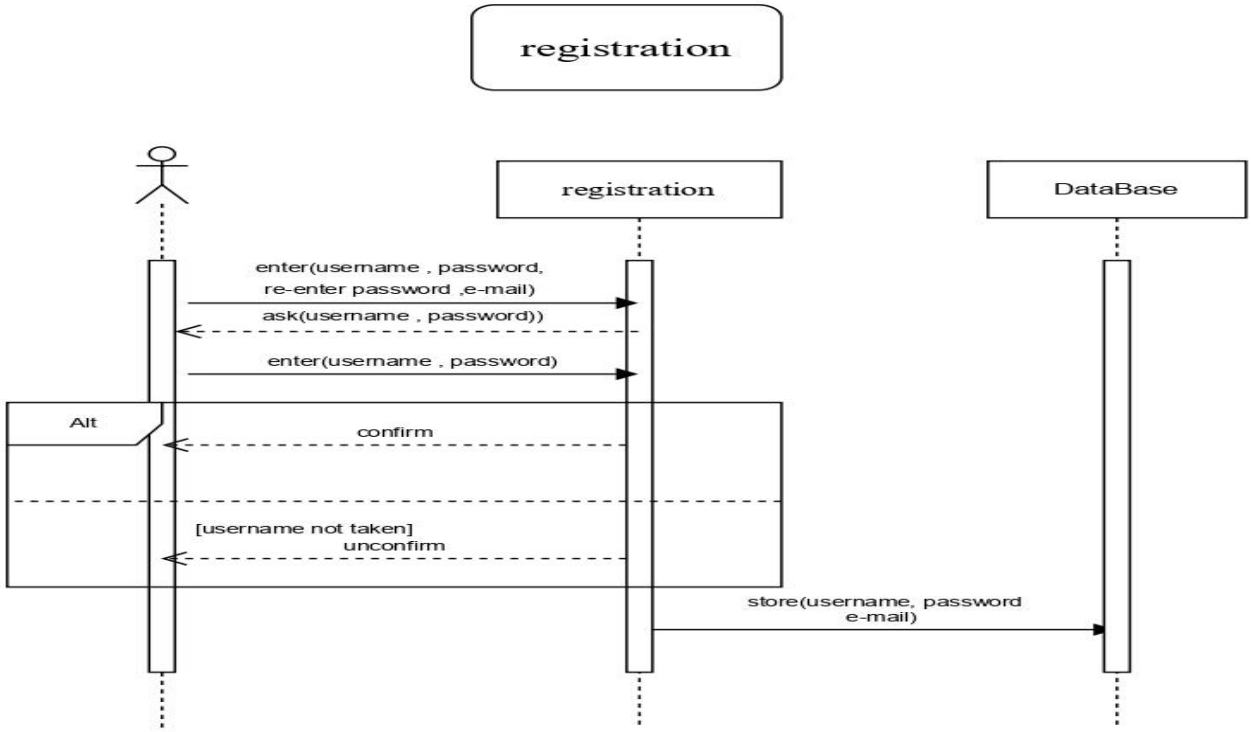
3.4.1-



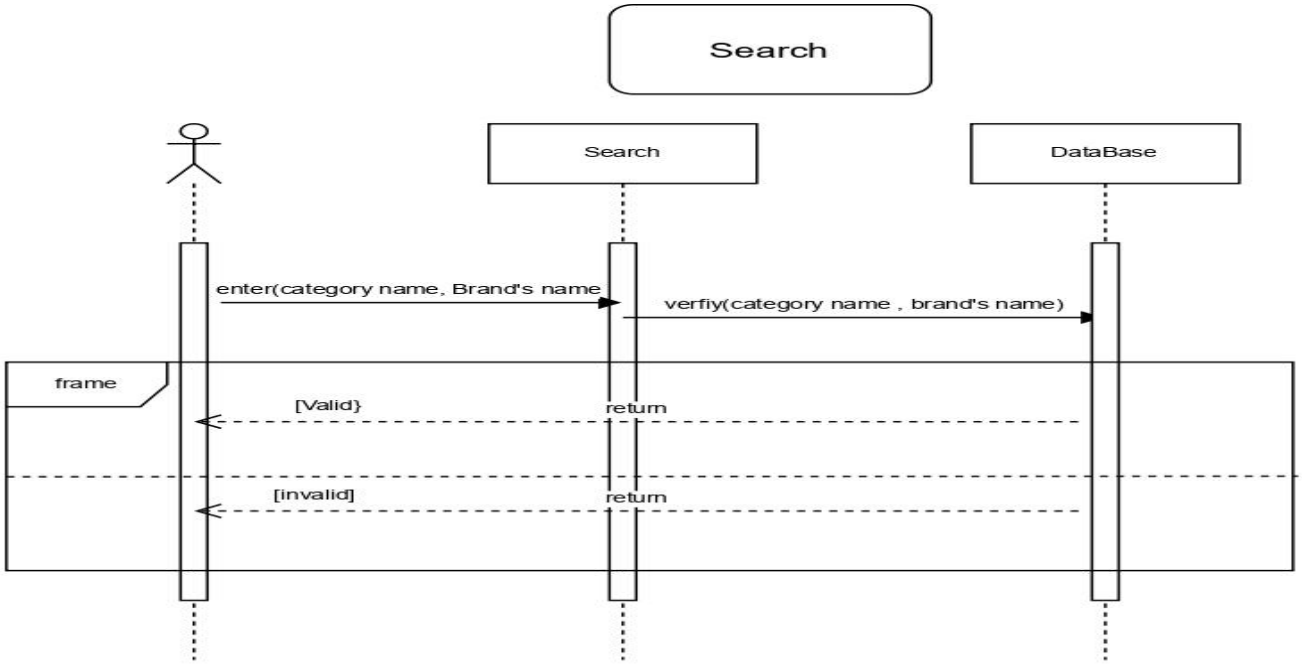
3.4.2- Login



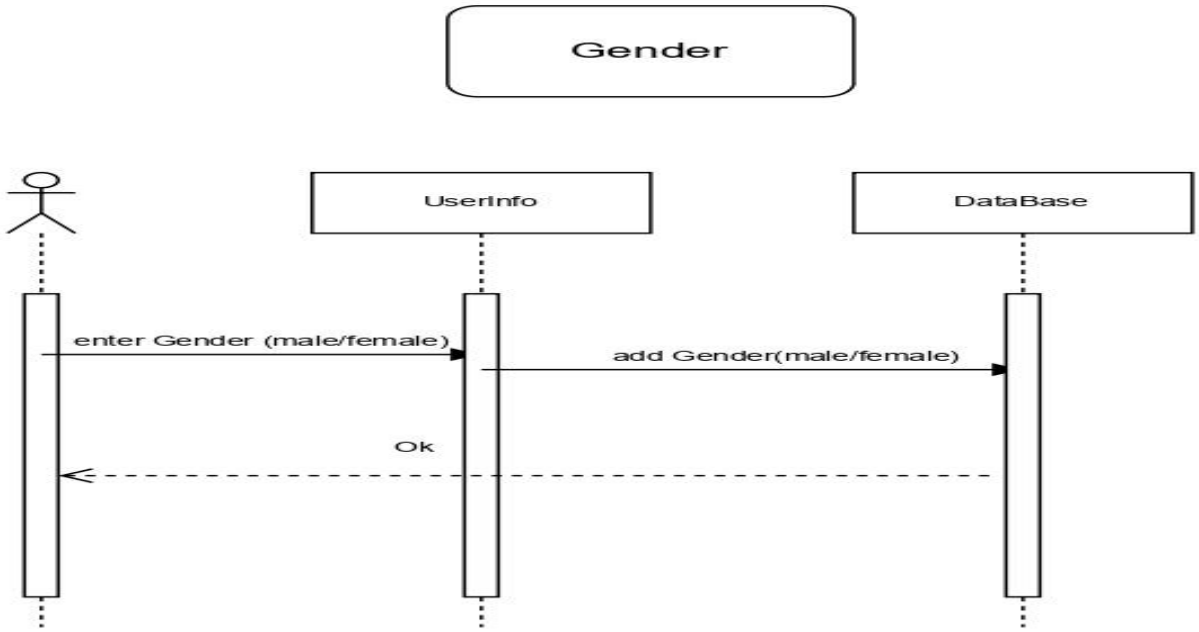
3.4.3- Register



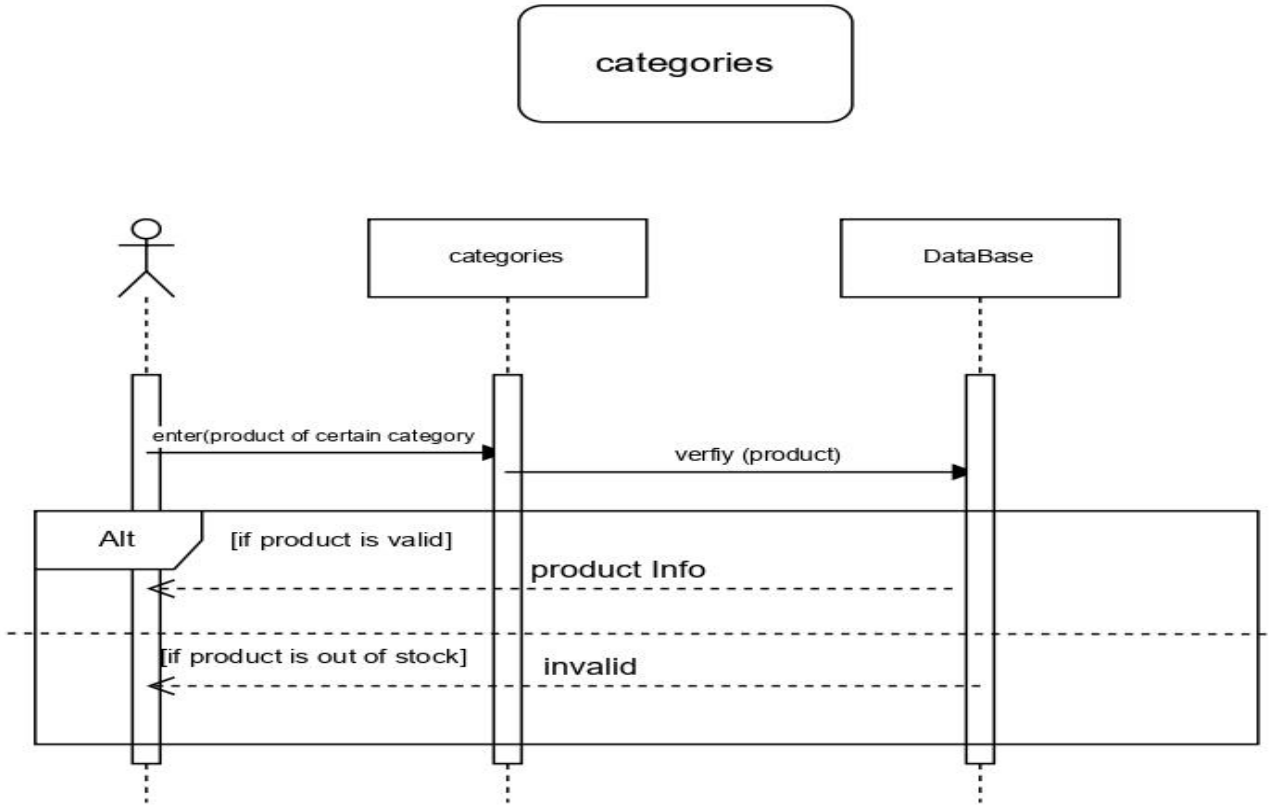
3.4.4- Search



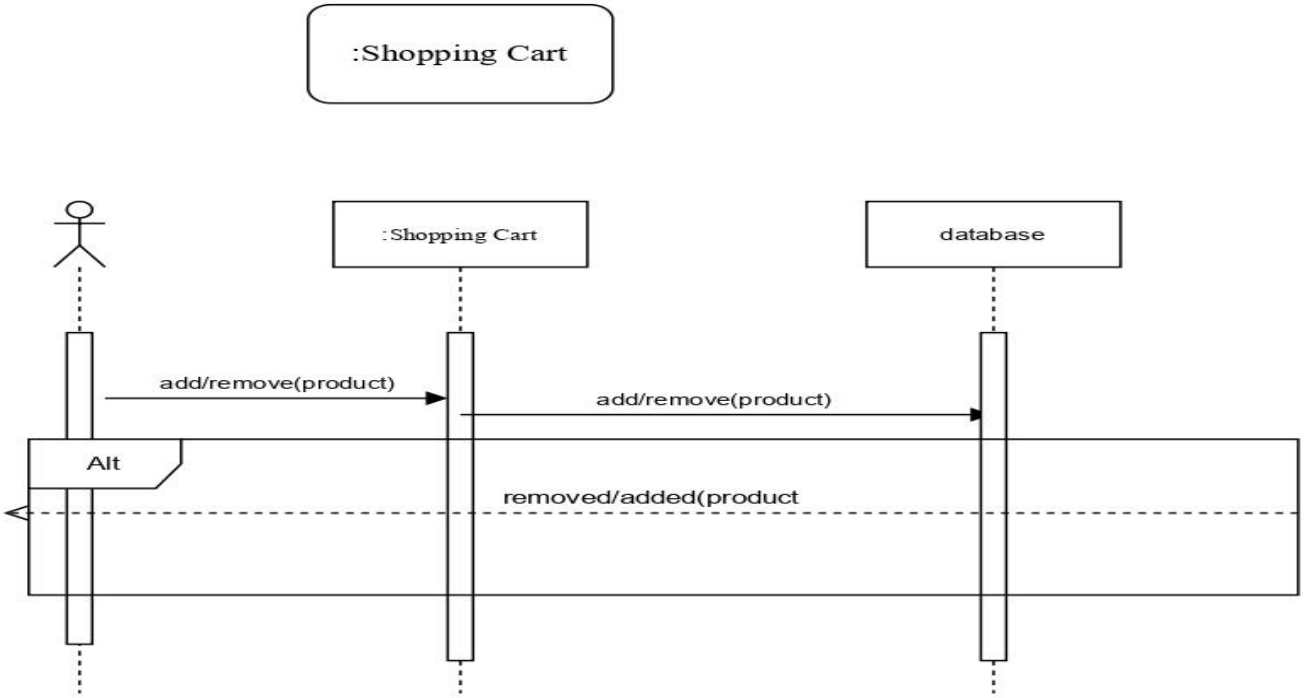
3.4.5- Gender



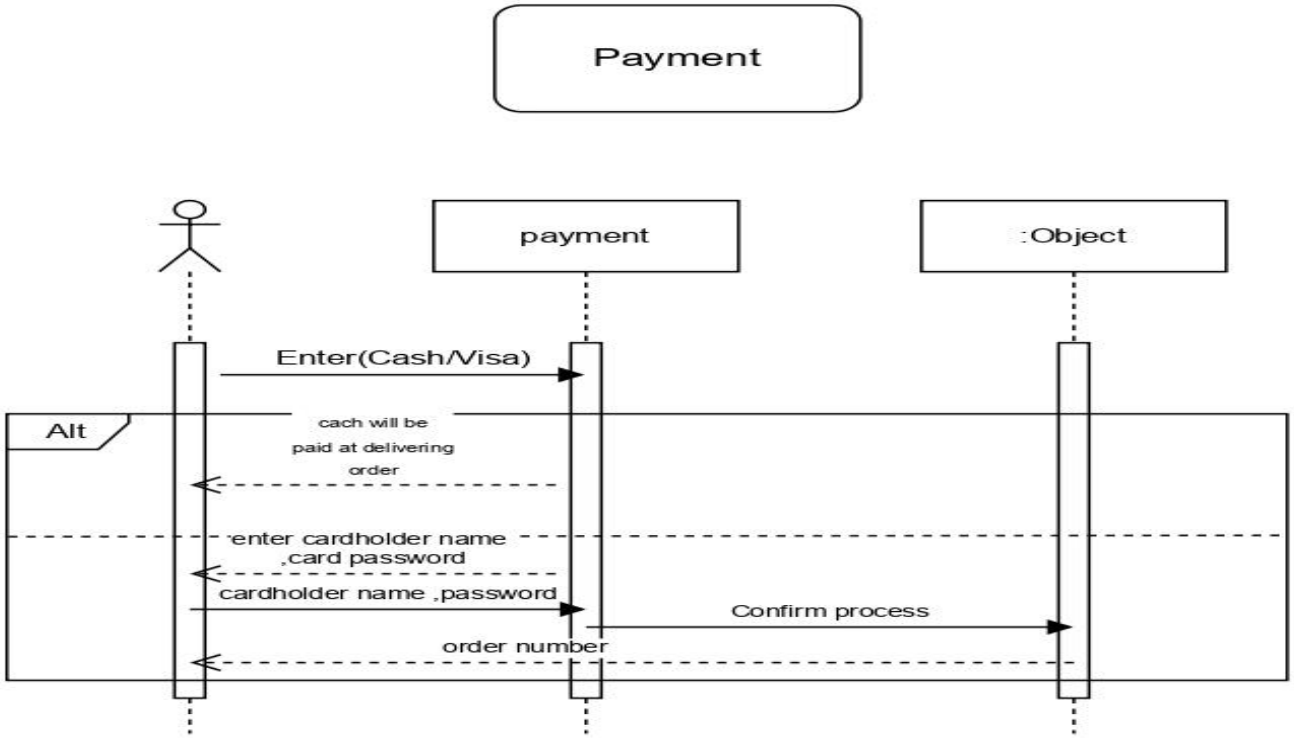
3.4.6- Category



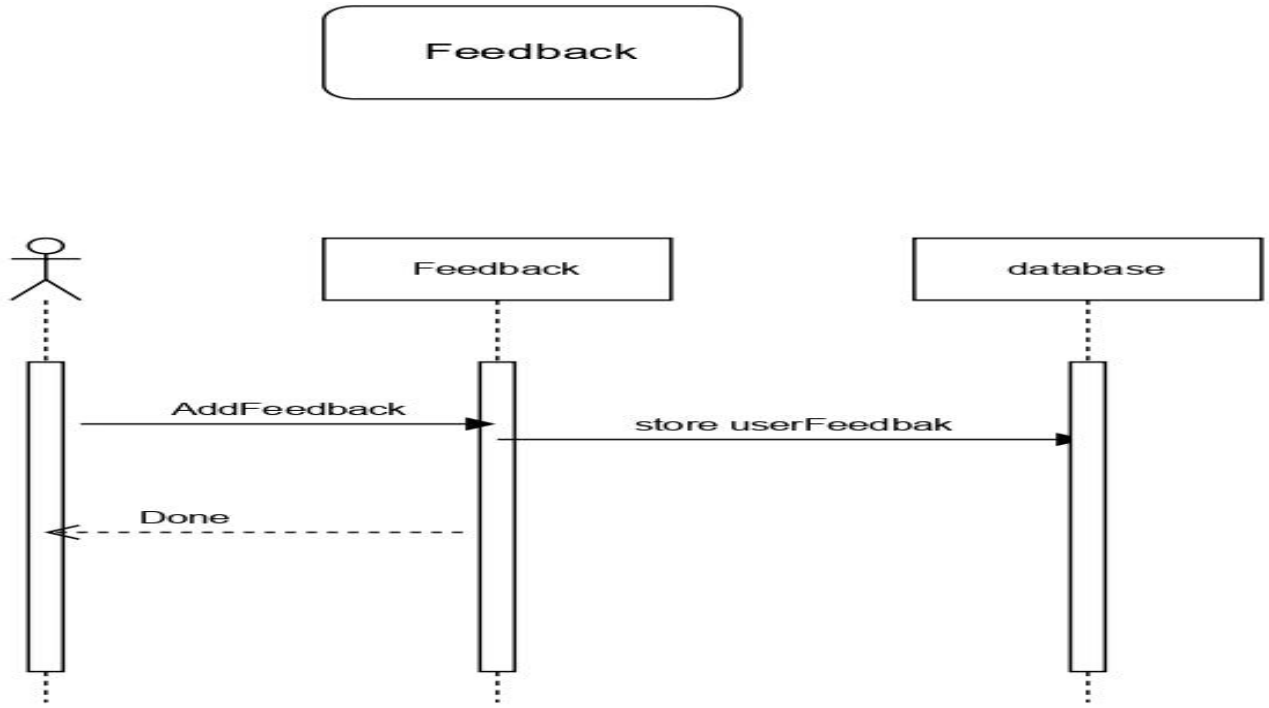
3.4.7- Shop



3.4.8- Payment



3.4.9- Feedback



3.4.10- Order