EGE UNIVERSITY

FACULTY OF ENGINEERING

COMPUTER ENGINEERING DEPARTMENT

SOFTWARE ENGINEERING

2022–2023 FALL SEMESTER

CITY GUIDE APPLICATION

REQUIREMENTS (ANALYSIS) REPORT

DELIVERY DATE

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Table of Contents

1) Introduction

This project involves an analysis of the requirements for the City Guide application that is currently under development. One of the most important aspects in the development process is the analysis of the requirements. A poor requirements analysis could have disastrous effects on the products. Additionally, a thorough requirement analysis is crucial for effective time and cost management. This analysis needs to be thorough and adaptable. As a result, the application can respond to all requests as well as anticipated requests. When maintaining a project, changes to the final product or its components are based on new needs, modifications to the design, and new implementations. If the customers ‘ needs or user change, the requirements may also change in the form of new requirements that emerge from the requirements development process. We shall ascertain the system's points of view within the parameters of the project. In parallel, we will conduct stakeholder interviews. We will categorize the system requirements into the sorts that are required of us and write the requirements from the viewpoints of the viewpoints. We will finish the steps, which include prioritizing the requirements and resolving conflicts. Following an analysis of the requirements that are necessary for the application to function, we will create a use case for each requirement. Finally, we will draw the domain model for the e-book application.

2) Identification of Viewpoints

2.1) Principal Viewpoints of the System

1) Users
2) Service Providers
3) System Managers
4) UI Standards
5) Organizations
6) Tour Guides
7) Human Resources
8) Developer Team
9) Security Team
10) Customer Service
11) Classification System
12) Ministry of Finance
13) Banks
14) Law Regulations
15) Financial Department

2.2) Description of each Viewpoint

Users: People who require and desire a certain kind of assistance from providers.

Premium Users: Private users with certain features that standard users cannot access.

Standard Users: Users with access to normal features.

Service Providers: Individuals or companies that offer a variety of services.

System Managers: People in charge of the system's planning, management, and maintenance.

UI Standards: The User Interface that we will employ in the system.

Organizations: Organizations that have information such as telephone, address, working hours that we will add to the system.

Tour Guides: Employees who will guide premium users.

Human Resources: People who will hire tour guides, customer service.

Developer Team: It is the team that adds the functionality in the system.

Security Team: People who work to protect the system from outside attacks and to ensure secure payment.

Customer Service: They communicate with users and respond to their demands and requests.

Classification System: System for categorizing various services.

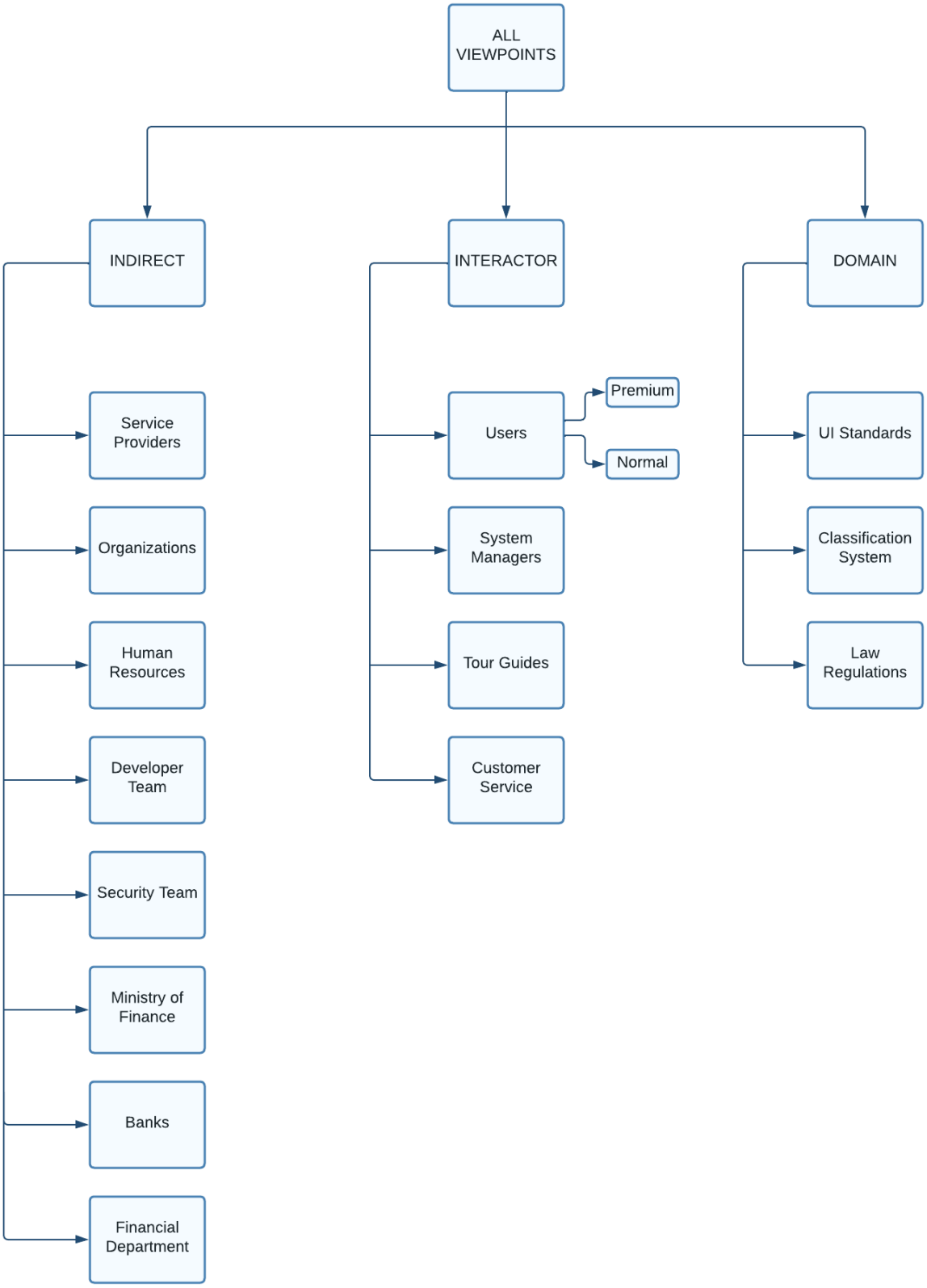
Ministry of Finance: For each purchases the follow-up of taxes is done through this institution.

Banks: Organizes the user's purchases.

Law regulations: Personal data protection law article 4-5-6-7-8-9 states that their data (name, surname, e-mail, phone number) cannot be processed without their explicit consent.

Financial Department: Check financial documents of the system.

2.3) Viewpoint Hierarchy Diagram


ALL VIEWPOINTS
INDIRECT
INTERACTOR
DOMAIN
Service Providers
Organizations
Human Resources
Developer Team
Security Team
Ministry of Finance
Banks
Financial Department
Users
Premium
Normal
System Managers
Tour Guides
Customer Service
UI Standards
Classification System
Law Regulations

3) Requirements Definition

3.1) Definition of requirements of each viewpoint

Users

- The user shall register via e-mail account and password.
- The user wants to add information (phone number, name, surname, credit card) on his/her existing account.
- The user shall sign in via a unique e-mail account or phone number and a password.
- If the user forgets his/her password, he/she shall get a new password via his/her e-mail or phone number.
- The user wants to sign out.
- The user wants to subscribe for unlimited access by paying the subscription fee.
- The user wants to join tours if he/she has subscripted.
- The user wants to get a random 10 routes for places and picks one if he/she has subscripted.
- The user wants to add/remove specific locations to the route.
- The user wants to eat/drink while on the route.
  (I want to eat -> direction to closest restaurant)
- The user wants to purchase the public transport card for the city.
- The user wants to see the news, events, and tips from the city.
- The user wants to see the attractions in the city such as museums, monuments, landmarks, historic buildings, parks, beaches etc.
- The user wants to get a direction to where he/she wants to go by public transport or walking or car.
- The user wants to see his/her location on the map.
- The user wants to hear/read information about nearby attractions.
- The user wants to know the weather of the city.
- The user wants to know about where to eat.
- The user wants to know about where to stay.

Service Providers

- Service providers shall provision services according to the system requirements.

System Managers

- The system shall provide monthly renewal of user subscription.
- The system shall provide more access rights to subscribed users.
- The system shall available 24 hours a day. If the system crashes, it shall not remain unreachable for more than 10 seconds.
- The response time of the system for any action performed by the user should not exceed 5 seconds.
- The system shall reboot itself within 10 seconds after the error that caused the system to crash.
- The error probability of the system shall not exceed 0.1%.
- The space occupied by the system in memory shall not exceed 200 MB. This field is valid for the version without additional files downloaded to the system.
- The system wants sell public transport card for the city to the user.
- The system should be in working condition for 80% of mobile devices with Android operating system.

- When the user selects a route or tour guide, The system shall display message searching tour guide or searching route.

UI Standards

- The UI shall provide multilingual options English/Turkish.
- The UI shall contain the necessary designs for the standard interface.

Organizations

- The organizations want to give permission about their information such as opening-closing time, place photos, menus, phone number, content etc.

Tour Guides

- The tour guide shall login via “tour guide login” button that displaying at the start page of the application.
- The tour guide wants to apply to the application with uploading her/his CV for being tour guides.
- The tour guide shall interview with HR if he/she qualified for becoming a tour guide.
- The tour guide shall guide the tour that HR has determined.
- The tour guide shall share his/her bank account details to the application for getting payments.

Human Resources

- HR shall evaluate the tour guides who have applied for the job.
- HR shall interview with suitable applicants.
- HR shall assign tour guides for routes.

Developer Team

- The developer team shall check that the password set by the user consists of 8 characters that contains at least one upper case, one lower case and one number.
- The developer team shall ensure that a confirmation e-mail is sent to the e-mail account of the newly registered user.
- The developer team shall ensure that the user who logs into the system once is automatically recognized in the next logins.
- The developer team shall display became a tour guide button and ask for CV in it.
- The developer team shall send all CVs to the HR.
- The developer team shall display the city map and the centralized user location with GPS.
- The developer team shall display text box for search locations and get directions with public transport or walking or driving to them.
- The developer team shall display a button for showing user’s current location.
- The developer team shall display the attractions in the city such as museums, monuments, landmarks, historic buildings, parks, beaches etc. to the user.
- The system shall suggest 10 routes and leave the decision to the user if the user has subscription.
- The developer team shall give information about nearby attractions either by text or audio.
- The developer team shall display the weather of the city.

- The developer team informs users about where to eat and where to stay.
- The developer team shall display the news, events, and tips from the city.
- The developer team shall get payment from user's bank account for subscription.

Security Team

- The security team shall perform security checks of user input and output.
- The security team shall perform the security control of the payments.
- The security team shall detect vulnerabilities in the system.
- The security team shall provide solutions to system vulnerabilities.

Customer Service

- Customer service shall contact users.
- Customer service shall learn the requests of users.
- Customer service shall determine system requirements.
- Customer service shall transfer users' requests and needs to the system

Classification System

- The system shall have services under different categories so it shall have a classification system which is based on some rules and constraints.

Ministry of Finance

- Ministry of Finance shall control the prices of services.
- Ministry of Finance shall calculate taxes and costs at regular intervals.
- Ministry of Finance shall calculate profits and losses at regular intervals.
- Ministry of Finance shall calculate employee's salaries and company expenses.
- Ministry of Finance shall communicate with banks.

Banks

- Payments received from users are transferred to the company's main account.
- Banks want to transfer money to the tour guide's bank account.

Law Regulations

- The personal data of all works that in the system shall subject to the KVKK.

Financial Department

- The finance department controls the prices of services.
- Finance department wants to calculate taxes and costs.
- Finance department wants to calculate profits and losses.
- Finance department wants to calculate employee's salaries and company expenses.
- Finance department wants to be in contact with banks

4) Requirements Classification (considering functionality)

4.1) Functional Requirements

- The user shall register via e-mail account and password.

- The user wants to add information (phone number, name, surname, credit card) on his/her existing account.
- The user shall sign in via a unique e-mail account or phone number and a password.
- If the user forgets his/her password, he/she shall get a new password via his/her e-mail or phone number.
- The user wants to sign out.
- The user wants to subscribe for unlimited access by paying the subscription fee.
- The user wants to join tours if he/she has subscripted.
- The user wants to get a random 10 routes for places and picks one if he/she has subscripted.
- The user wants to add/remove specific locations to the route.
- The user wants to eat/drink while on the route.
  (I want to eat -> direction to closest restaurant)
- The user wants to purchase the public transport card for the city.
- The user wants to see the news, events, and tips from the city.
- The user wants to see the attractions in the city such as museums, monuments, landmarks, historic buildings, parks, beaches etc.
- The user wants to get a direction to where he/she wants to go by public transport or walking or car.
- The user wants to see his/her location on the map.
- The user wants to hear/read information about nearby attractions.
- The user wants to know the weather of the city.
- The user wants to know about where to eat.
- The user wants to know about where to stay.

- The tour guide shall login via “tour guide login” button that displays at the start page of the application.
- The tour guide wants to apply to the application with uploading her/his CV for being tour guides.
- The tour guide shall interview with HR if he/she qualified for becoming a tour guide.
- The tour guide shall guide the tour that HR has determined.
- The tour guide shall share his/her bank account details to the application for getting payments.

- HR shall evaluate the tour guides who have applied for the job.
- HR shall interview with suitable applicants.
- HR shall assign tour guides for routes.

4.2) Non-functional Requirements

- Service providers shall provision services according to the system requirements.

- The organizations want to give permission about their information such as opening-closing time, place photos, menus, phone number, content etc.

- The developer team shall check that the password set by the user consists of 8 characters that contains at least one upper case, one lowercase and one number.
- The developer team shall ensure that a confirmation e-mail is sent to the e-mail account of the newly registered user.
- The developer team shall ensure that the user who logs into the system once is automatically recognized in the next logins.
- The developer team shall display became a tour guide button and ask for CV in it.

- The developer team shall send all CVs to the HR.
- The developer team shall display the city map and the centralized user location with GPS.
- The developer team shall display a text box for search locations and get directions with public transport or walking or driving to them.
- The developer team shall display a button for showing user's current location.
- The developer team shall display the attractions in the city such as museums, monuments, landmarks, historic buildings, parks, beaches etc. to the user.
- The system shall suggest 10 routes and leave the decision to the user if the user has subscription.
- The developer team shall give information about nearby attractions either by text or audio.
- The developer team shall display the weather of the city.
- The developer team informs users about where to eat and where to stay.
- The developer team shall display the news, events, and tips from the city.
- The developer team shall get payment from the user's bank account for subscription.

- The security team shall perform security checks of user input and output.
- The security team shall perform the security control of the payments.
- The security team shall detect vulnerabilities in the system.
- The security team shall provide solutions to system vulnerabilities.

- Customer service shall contact users.
- Customer service shall learn the requests of users.
- Customer service shall determine system requirements.
- Customer service shall transfer users' requests and needs to the system

- Ministry of Finance shall control the prices of services.
- Ministry of Finance shall calculate taxes and costs at regular intervals.
- Ministry of Finance shall calculate profits and losses at regular intervals.
- Ministry of Finance shall calculate employee's salaries and company expenses.
- Ministry of Finance shall communicate with banks.

- Payments received from users are transferred to the company's main account.
- Banks want to transfer money to the tour guide's bank account.

- The finance department controls the prices of services.
- Finance department wants to calculate taxes and costs.
- Finance department wants to calculate profits and losses.
- Finance department wants to calculate employee's salaries and company expenses.
- Finance department wants to be in contact with banks.

4.3) Domain Requirements

- The system shall provide monthly renewal of user subscription.
- The system shall provide more access rights to subscribed users.
- The system shall available 24 hours a day. If the system crashes, it shall not remain unreachable for more than 10 seconds.
- The response time of the system for any action performed by the user should not exceed 5 seconds.
- The system shall reboot itself within 10 seconds after the error that caused the system to crash.
- The error probability of the system shall not exceed 0.1%.

- The space occupied by the system in memory shall not exceed 200 MB. This field is valid for the version without additional files downloaded to the system.
- The system wants sell public transport card for the city to the user.
- The system should be in working condition for 80% of mobile devices with Android operating system.
- When the user selects a route or tour guide, The system shall display message searching tour guide or searching route.
- The UI shall provide multilingual options English/Turkish.
- The UI shall contain the necessary designs for the standard interface.

- The developer team shall display a button for showing user's current location.
- The system shall have services under different categories so it shall have a classification system which is based on some rules and constraints.

- The personal data of all works that in the system shall subject to the KVKK.

5) Requirements Classification (considering lifetime)

5.1) Volatile Requirements

- The user wants to subscribe for unlimited access by paying the subscription fee.

- The user wants to join tours if he/she has subscripted.

- The user wants to know about where to eat.
- The response time of the system for any action performed by the user should not exceed 5 seconds.
- The UI shall provide multilingual option English/Turkish.
- The tour guide wants to apply to the application with uploading her/his CV for being tour guides.
- Customer service shall contact users.
- Ministry of Finance shall control the prices of services.
- The tour guide shall share his/her bank account details to the application for getting payments.

- The developer team shall check that the password set by the user consists of 8 characters that contains at least one upper case, one lower case and one number.
- The developer team shall display the attractions in the city such as museums, monuments, landmarks, historic buildings, parks, beaches etc. to the user.

5.2) Enduring Requirements

- If the user forget his/her password, his/her gets a new password via his/her e-mail.
- The UI shall contain the necessary designs for the standard interface.
- The user shall register via e-mail account and password.

- The user wants to purchase the public transport card for the city.
- The user wants to see the attractions in the city such as museums, monuments, landmarks, historic buildings, parks, beaches etc.
- The user wants to see his/her location on the map.
- The system wants sell public transport card for the city to the user.
- The organizations want to give permission about their information such as opening-closing time, place photos, menus, phone number, content etc.
- The personal data of all works that in the system shall subject to the KVKK.
- Finance department wants to calculate employee's salaries and company expenses.
- Finance department wants to be in contact with banks

6) Requirements Interview

7) Requirements Prioritization and Negotiation

Requirements	Priority Level
The user shall register via e-mail account and password.	High
The user wants to add information (phone number, name, surname, credit card) on his/her existing account.	Medium
The user shall sign in via a unique e-mail account or phone number and a password.	High
If the user forgets his/her password, he/she shall get a new password via his/her e-mail or phone number.	High
The user wants to sign out.	High
The user wants to subscribe for unlimited access by paying the subscription fee.	Low
The user wants to join tours if he/she has subscripted.	Medium
The user wants to get a random 10 routes for places and picks one if he/she has subscripted.	Low
The user wants to add/remove specific locations to the route.	Medium
The user wants to eat/drink while on the route. (I want to eat -> direction to closest restaurant)	Low
The user wants to purchase the public transport card for the city.	Low
The user wants to see the news, events, and tips from the city.	Low
The user wants to see the attractions in the city such as museums, monuments, landmarks, historic buildings, parks, beaches etc.	Medium
The user wants to get a direction to where he/she wants to go by public transport or walking or car.	Medium
The user wants to see his/her location on the map.	High
The user wants to hear/read information about nearby attractions.	High
The user wants to know the weather of the city.	High
The user wants to know about where to eat.	High
The user wants to know about where to stay.	High

Service providers shall provision services according to the system requirements.	High
The system shall provide monthly renewal of user subscription.	Low
The system shall provide more access rights to subscribed users.	Low
The system shall available 24 hours a day. If the system crashes, it shall not remain unreachable for more than 10 seconds.	High
The response time of the system for any action performed by the user should not exceed 5 seconds.	High
The system shall reboot itself within 10 seconds after the error that caused the system to crash.	High
The error probability of the system shall not exceed 0.1%.	High
The system wants sell public transport card for the city to the user.	Low
The system should be in working condition for 80% of mobile devices with Android operating system.	Medium
When the user selects a route or tour guide, The system shall display message searching tour guide or searching route.	Low
The UI shall provide multilingual options English/Turkish.	Medium
The UI shall contain the necessary designs for the standard interface.	High
The space occupied by the system in memory shall not exceed 200 MB. This field is valid for the version without additional files downloaded to the system.	High
The organizations want to give permission about their information such as opening-closing time, place photos, menus, phone number, content etc.	High
The tour guide shall login via “tour guide login” button that displaying at the start page of the application.	Medium
The tour guide wants to apply to the application with uploading her/his CV for being tour guides.	Medium
The tour guide shall interview with HR if he/she qualified for becoming a tour guide.	Medium
The tour guide shall guide the tour that HR has determined.	Medium
The tour guide shall share his/her bank account details to the application for getting payments.	High
HR shall evaluate the tour guides who have applied for the job.	Medium
HR shall interview with suitable applicants.	Medium
HR shall assign tour guides for routes.	Medium
The developer team shall check that the password set by the user consists of 8 characters that contains at least one upper case, one lower case and one number.	High
The developer team shall ensure that a confirmation e-mail is sent to the e-mail account of the newly registered user.	High
The developer team shall ensure that the user who logs into the system once is automatically recognized in the next logins.	High
The developer team shall display became a tour guide button and ask for CV in it.	High
The developer team shall send all CVs to the HR.	Low
The developer team shall display the city map and the centralized user location with GPS.	High

The developer team shall display text box for search locations and get directions with public transport or walking or driving to them.	High
The developer team shall display a button for showing user's current location.	High
The developer team shall display the attractions in the city such as museums, monuments, landmarks, historic buildings, parks, beaches etc. to the user.	Medium
The system shall suggest 10 routes and leave the decision to the user if the user has subscription.	Low
The developer team shall give information about nearby attractions either by text or audio.	High
The developer team shall display the weather of the city.	Medium
The developer team informs users about where to eat and where to stay.	Medium
The developer team shall display the news, events, and tips from the city.	Medium
The developer team shall get payment from user's bank account for subscription.	Medium
The security team shall perform security checks of user input and output.	High
The security team shall perform the security control of the payments.	High
The security team shall detect vulnerabilities in the system.	High
The security team shall provide solutions to system vulnerabilities.	High
Customer service shall contact users.	Medium
Customer service shall learn the requests of users.	Medium
Customer service shall determine system requirements.	Medium
Customer service shall transfer users' requests and needs to the system	Medium
The system shall have services under different categories so it shall have a classification system which is based on some rules and constraints.	High
Ministry of Finance shall control the prices of services.	High
Ministry of Finance shall calculate taxes and costs at regular intervals.	High
Ministry of Finance shall calculate profits and losses at regular intervals.	High
Ministry of Finance shall calculate employee's salaries and company expenses.	High
Ministry of Finance shall communicate with banks.	High
Payments received from users are transferred to the company's main account.	High
Banks want to transfer money to the tour guide's bank account.	High
The personal data of all works that in the system shall subject to the KVKK.	High
The finance department controls the prices of services.	High
Finance department wants to calculate taxes and costs.	High
Finance department wants to calculate profits and losses.	High
Finance department wants to calculate employee's salaries and company expenses.	High
Finance department wants to be in contact with banks.	High

8) Requirements Traceability Matrix

1. The user registers.
2. The user sign in and out.
3. The user updates his/her information.
4. The user subscribes and terminate his/her subscription.
5. The user joins a tour.
6. The user adds/removes specific locations to the route.
7. The user wants to eat/drink while on the route.
8. The user purchases the public transport card.
9. The user sees the news, events, and tips from the city.
10. The user sees the attractions and hear/read about these.
11. The user gets a direction to a location.
12. The user sees his/her location.
13. The user knows the weather.
14. The user knows where to eat and stay.
15. The system shall provide more access rights to subscribed users.

Id	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1															
2	D														
3	D	D													D
4	D	D			R										
5	D	D		D		R	R	R			D				
6	D	D		D	D		R								
7	D	D		D	D	R								R	
8	D	D													
9	D	D								R					
10	D	D			R						R				
11	D	D			R					R					
12	D	D													
13	D	D					R		R						
14	D	D									R				
15	D	D		D											

9) Use Cases of the Main Scenarios

Use case 1: The Process of User Sign In

Inputs:

- User email
- User password

Outputs:

- User successfully signed the application.

Actors:

- **User**: Wants to sign in and use his or her account to access the system.
- **Security Team**: Wishes to provide each user who enters the system with a user-assigned authentication id.
- **UI Standards**: Wants to deliver a problem-free interface.

Action:

1. User requests to sign in the system.
2. The system asks the email and password information from the user.
3. User inputs email and password.
4. The system matches the information of the user with records that are in the user record book.
5. System makes signing in of user and system authorize the user with authentication id.
6. User is automatically redirected to the application.

Exceptions:

a* At any time system fails

The information entered up until the last step is preserved and can be used again later to support restart.

1. The user is shown an error.
2. Corrupted data is registered with an error time, and the system requests that the user report this data to the system managers.
3. The application is relaunched with the saved data after the sending process.

3. Incorrectly formatted email

1. The system alerts the user that the email format they submitted is incorrect.

2. The user is shown the proper email format, and the registration request is turned down.

4. Matching Error

1. The user's login request is declined and the warning that there is no account registered to the system that matches the email or password information given by the user is displayed.

Use Case 2: The Process of Registration

Inputs:

- User’s email account
- Password

Outputs:

- Registered user

Actors:

- **User:** Wants to register the system to utilize functionalities of application.
- **Security Team:** Wants to assign private authorization id every user that registered the system to provide system security and to prevent unauthorized enters.
- **UI Standards:** Wants to present interface that user will register.
- **System Managers:** Wants to update number of user that registers the system.

Action:

1. The user requests registering with the system.
2. To register, the system asks the user to provide their email address and password.
3. The user enters the e-mail and password information to be registered.
4. The system prompts the user to re-enter the password to be registered.
5. The user re-enters the password to be registered.
6. The system adds the user to the user registry with their email and password. It creates an ID number assigned to the user and the ID number is added to the database. At this time, a notification message is displayed to the user.

Exceptions:

a* At any time system fails

The information entered up until the last step is preserved and can be used again later to support restart.

1. The user is shown an error.
2. Corrupted data is registered with an error time, and the system requests that the user report this data to the system managers.
3. The application is relaunched with the saved data after the sending process.

3a. Incorrectly formatted email

1. The system alerts the user that the email format they submitted is incorrect.

2. The user is shown the proper email format, and the registration request is turned down.

3b. Incorrect format of the password

1. The user receives alert from the system that the password format they submitted is wrong.

2. The user is shown the proper password format and their request to register is rejected.

5. Password match error

1. The registration request is denied, and the user is alerted that the newly supplied password does not match the original password.

6. Entered email is already registered

1. The system informs the user that he has registered before with the e-mail he entered and the request to register is rejected.

Use case 3: Process of Subscription

Inputs:

- User’s bank account

Outputs:

- User’s changed their account state to subscribed user

Actors:

- **User**: Subscribe and want to have the full version of the app.
- **Security Team**: It wants the user's purchasing experience to be safe and hassle-free.
- **Ministry of Finance**: Wants to collect the necessary taxes for each subscription fee received.
- **Financial Department**: Wants to correctly calculate the company's share of the subscription fee and transfer it to the company's account.
- **Bank**: Handles the withdrawal of money from the user's account and wants to receive a commission at a certain rate from each purchase.
- **UI Standard**: Wants to provide the interface that the user will use for purchasing.

Action:

1. The user requests to subscribe to the system.

2. The system prompts the user to enter payment information.

3. User enters payment information.

4. The system contacts the bank to confirm the accuracy of the information. The

bank transfers the fee received from the user account to the system account. The

system deducts taxes from the fee it receives and transfers the taxes to the account of the

Ministry of Finance. The system transfers the remaining fee to the company account.

5. The system displays a message to the user that their subscription has started, and the user's

subscription is added to the subscriber registry.

Exceptions:

a* At any time system fails

The information entered up until the last step is preserved and can be used again later to support restart.

1. The user is shown an error.
2. Corrupted data is registered with an error time, and the system requests that the user report this data to the system managers.
3. The application is relaunched with the saved data after the sending process.

4a. If Payment Information Is Incorrect

1. The system displays a message to the user stating that the payment information is incorrect, and the subscription request is rejected.

4b. If there is not enough balance

1. The system displays a message stating that enough cannot be collected with the payment method entered and the subscription request is rejected.

4c. Money Transfer Error

1. If the money transfer cannot be performed for some reason, the user will be shown a message stating that the transaction was unsuccessful, and the subscription request will be rejected.

Use case 4: Terminate Subscription

Inputs:

- User’s bank account details

Outputs:

- User’s changed their account state to normal user

Actors:

- **User**: Wants to terminate his/her subscribed account.
- **Security Team**: It wants the user's terminating experience to be safe and hassle-free.

- **Bank**: Handles the terminating subscription cycle from the user's account and wants to receive a commission at a certain rate from each termination.
- **UI Standard**: Wants to provide the interface that the user will use for terminating.

Action:

1. The user requests to unsubscribe from his/her subscription.
2. The system asks for confirmation.
3. The user confirms that he/she wants.
4. The system removes the link between the user's bank account and app account and terminates his/her subscription. And the system displays a message “unsubscripted successfully.”

Exceptions:

a* At any time system fails

The information entered up until the last step is preserved and can be used again later to support restart.

1. The user is shown an error.
2. Corrupted data is registered with an error time, and the system requests that the user report this data to the system managers.
3. The application is relaunched with the saved data after the sending process.

2. The user disapproves process

The system returns to the main menu.

4. An error with the terminating

The user is shown an error and will try again later.

Use case 5: Update Information

Inputs:

- User’s bank account details
- User’s e-mail adress
- User’s password

Outputs:

- User succesfully updated informations

Actors:

User: Update user informations and contuniue using application
Security Team: It wants the user's updating experience to be safe and hassle-free.
Ministry of Finance: Wants to collect the necessary taxes for each subscription fee received.

Financial Department: Wants to correctly calculate the company's share of the subscription fee and transfer it to the company's account.
Bank: Handles the withdrawal of money from the user's updated account and wants to receive a commission at a certain rate from each purchase.
UI Standard: Wants to provide the interface that the user will use for updating informations.

Action:

1. The user requests to update his/her informations to the system.

2. The system prompts the user to enter email, password and bank account informations to update.

3. The user enters data into the fields that need to be updated.

4.

    4.1. If user updated his/her bank account informations system contacts the bank to confirm the accuracy of the information. The bank transfers the fee received from the user account to the system account. The system deducts taxes from the fee it receives and transfers the taxes to the account of the Ministry of Finance. The system transfers the remaining fee to the company account.

    4.2. If user updated his/her email address the system validates email address by sending confirmation link.

    4.3. If user updated his/her password the system validates password.

5. The system displays a message to the user that his/her informations updated, and the user's

updated informations are added to the subscriber registry.

Exceptions:

a* At any time system fails

The information entered up until the last step is preserved and can be used again later to support restart.

1. The user is shown an error.
2. Corrupted data is registered with an error time, and the system requests that the user report this data to the system managers.
3. The application is relaunched with the saved data after the sending process.

4.1a If Payment Information Is Incorrect

The system displays a message to the user stating that the payment information is incorrect, and the update request is rejected.

4.1b If there is not enough balance

The system displays a message stating that enough cannot be collected with the payment method entered and the update request is rejected.

4.1c Money Transfer Error

If the money transfer cannot be performed for some reason, the user will be shown a message stating that the transaction was unsuccessful, and the update request will be rejected.

4.2 **Incorrectly formatted email**

The system alerts the user that the email format they submitted is incorrect. The user is shown the proper email format, and the update request is turned down.

4.3 **Incorrectly formatted password**

The system alerts the user that the password format they submitted is incorrect. The user is shown the proper password format, and the update request is turned down.

Use case 6: Generate a Route

Inputs:

- Informations about where user's wants to go
- User's account information
- Tourist guide information

Outputs:

- A route

Actors:

- User: Wants to create a route for himself/herself.
- UI Standard: Wants to provide the interface that the user will use for creating a route.
- Developer Team: Wants to provide a good algorithm for routing to the user.

Action:

1. The User requests to generate a route randomly to the system.
   1a. If the user account state is a subscribed user. The user can assign a tour guide to their route.
2. The System generates a route to the user and while doing this displays a message "Generating a route...".
3. The system shows the route and asks the user to accept or reject the route.
4. The user accepts the route and starts.

Exceptions:

a* At any time system fails

The information entered up until the last step is preserved and can be used again later to support restart.

1. The user is shown an error.
2. Corrupted data is registered with an error time, and the system requests that the user report this data to the system managers.
3. The application is relaunched with the saved data after the sending process.

2. System errors using the generating algorithm or takes too long

The system displays a message for error and restarts the generator.

4. User rejects the route

The system returns to the main menu.

Use case 7: Add Location to Route

Inputs:

- A specific location name or its coordinates

Outputs:

- A new route

Actors:

- User: Wants to add a location on his/her generated route.
- UI Standard: Wants to provide a button “Add a location” on a route menu.

Action:

1. User sees the route and decides to add a location to his/her route. To the system, he asks for add a location.
2. The system asks for location by its name.
3. The user enters the location and finds that on the map.
4. The system places it in the most suitable place according to the route and shows a message that it has been added to the route.

Exceptions:

a* At any time system fails

The information entered up until the last step is preserved and can be used again later to support restart.

1. 3The user is shown an error.
2. Corrupted data is registered with an error time, and the system requests that the user report this data to the system managers.
3. The application is relaunched with the saved data after the sending process.

3. Location not found

The system asks for search again, and if he/she agrees to try, the system goes to step 2 again. Otherwise, the use case will be terminated without any change on the route.

4. Algorithm error or takes too long time

The system shows a message about the situation to the user and terminates without any change on the route

Use case 8: Purchase Public Transport Card

Inputs:

- Money amount

Outputs:

- Valid transport card for transportation

Actors:

- **User**: Wants to buy transport card for transportation
- **Security Team**: It wants the user's buying experience to be safe and hassle-free.
- **Bank**: Handles the withdrawal of money from the user's account and wants to receive a commission at a certain rate from each purchase.
- **Transportation Card Selling System:** Takes money from user's bank account and wants to provide valid transportation card for public transportations.
- **UI Standard**: Wants to provide the interface that the user will use for purchasing transportation card.

Action:

1. User requests to buy public transportation card.

2. System asks for money amount to load money on the card.

3. The system contacts the bank to analyze the user's bank account to see if the amount entered can be supplied.

4. System goes to public transportation card selling system and buys transportation card and the user's requested amount is loaded onto the card.

5. The system displays a message to the user that his/her the process of buying transportation card is succesfull and show the card informations to the user.

Exceptions:

a* At any time system fails

The information entered up until the last step is preserved and can be used again later to support restart.

- The user is shown an error.
- Corrupted data is registered with an error time, and the system requests that the user report this data to the system managers.
- The application is relaunched with the saved data after the sending process.

3a If there is not enough balance

The system displays a message stating that enough money cannot be collected with the payment method on the system and the process of buying public transportation card is rejected.

3b Money Transfer Error

If the money transfer cannot be performed for some reason, the user will be shown a message stating that the transaction was unsuccessful, and the update request will be rejected.

4. If public transportation card selling system doesn't work online

The system displays a message stating that public transportation card selling system doesn't work online and shows locations to buy physical transportation card.

Use case 9: Locating the User and Giving Information about Nearby Attractions

Inputs:

- GPS information

Outputs:

- Located user by full circle
- Information about nearby Attractions

Actors:

- User: Wants to know where he/she is on the map and about nearby attractions.
- UI Standard: Wants to provide a location and the information.
- Security Team: Wants to keep user's location private from third parties.
- System Managers: Wants to get information from GPS and project into the UI and calculate the distances between user's location and attractions.

Action:

1. The system gets exact coordinates information from GPS.
2. The system locates a full circle on the map to represent user's location.
3. The system calculates the distances between attractions and keeps a list of those less than five kilometers away.
4. The system locates all list elements on the map.

Exceptions:

a* At any time system fails

The information entered up until the last step is preserved and can be used again later to support restart.

1. The user is shown an error.
2. Corrupted data is registered with an error time, and the system requests that the user report this data to the system managers.
3. The application is relaunched with the saved data after the sending process.

1. **Missing coordinates**

1. The system cannot get information from GPS for some reason.
2. The system shows a message “active your GPS and try again”.
3. if the system continues not to receive data from the GPS, shows message “an error occured”. The system continues without locating the user.

Use case 10: Get a Direction to a Location

Inputs:

- User’s current location
- User’s destination

Outputs:

- Shortest path from user’s current location to destination.

Actors:

- **User:** Wants to get correct directions to his/her destination
- **GPS System:** Shows city’s all roads and places.
- **Developer Team:** Finds shortest path from users current location to his/her destination.
- **UI Standard:** Wants to provide the interface that the user will use for direction to a location.

Action:

1. User requests to get directions to a location.
2. System asks for user’s current location to create shortest path.
3. User marks his current location on the city map or allows GPS system to find his location.
4. System displays shortest path on the map and alternative paths.
5. User selects a path and system routes user on his/her destination with audially and/or visually.

Exceptions:

a* At any time system fails

The data may not be received on the API may not be synchronized.

1. The user is shown an error.
2. Corrupted data is registered with an error time, and the system requests that the user report this data to the system managers.
3. When the user presses the OK button, the application is restarted and the relevant data is attempted to be accessed.

3. GPS system can't locate user's location

The system displays a message stating that GPS system can't locate user's location and ask user to manually locate his/her current location.

4. There's no way to a destination

The system displays a message stating that there's no way to a destination and asks for alternative destination.

Use case 11: Get the Weather

Inputs:

- Weather information

Outputs:

- Information about current city weather

Actors:

1. User: Wants to see the weather on the route created.
2. UI Standard: Wants to provide weather information.
3. System Managers: Wants to get weather information from API's

Action:

1. The system gets the exact weather data from the API.
2. The system displays the weather on the route that the user has created.
3. The user observes the weekly weather data on the relevant route

Exceptions:

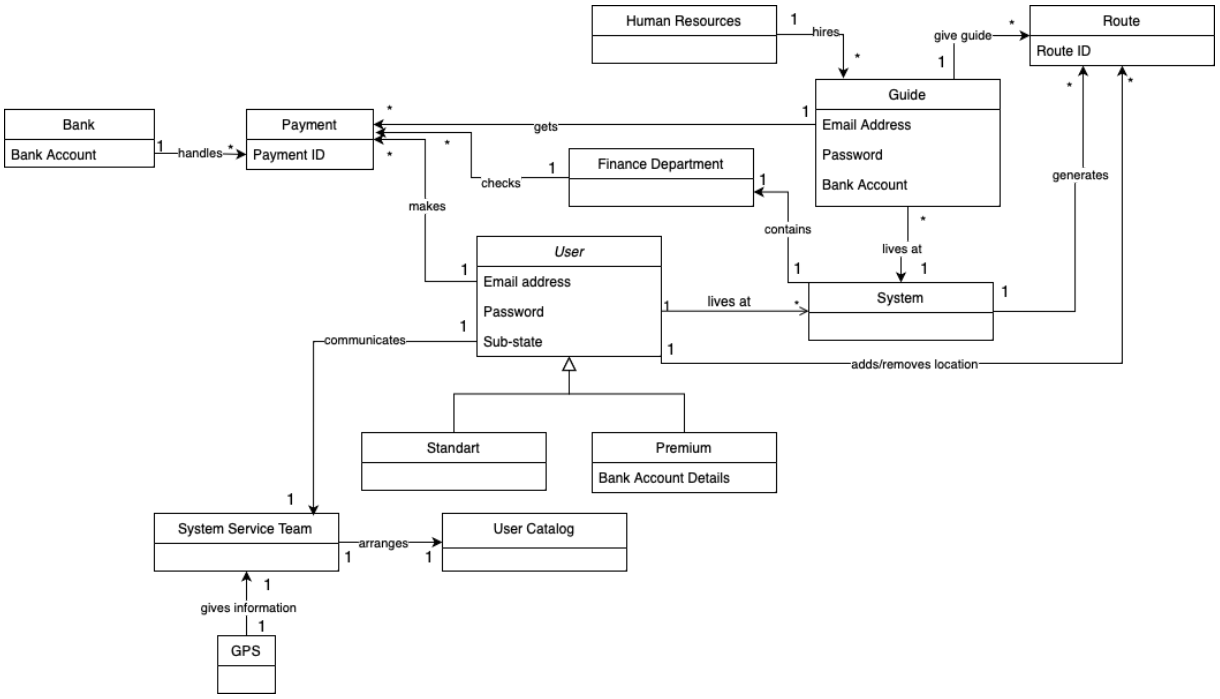
a* At any time system fails

The data may not be received on the API may not be synchronized.

4. The user is shown an error.

5. Corrupted data is registered with an error time, and the system requests that the user report this data to the system managers.
6. When the user presses the OK button, the application is restarted and the relevant data is attempted to be accessed.

10) Domain Model as a UML diagram



11) Conclusion

We first carried out the stakeholder analysis within the parameters of this study. We defined the opinions based on the stakeholders. The viewpoints have been divided into three groups: interactor, indirect, and domain. We described each point of view. Through viewpoint analysis, we produced a requirement analysis. The identified needs have been divided into three groups: functional, non-functional, and domain. We made an effort to determine which criteria would be volatile or lasting. From the identified requirements, we wrote the use cases for the critical ones required for the program to function. We ranked the requirements that were extracted. By designing the domain model, we were able to wrap up this phase of the project.