Software Development Methods

School Year 2019/2020

2nd Phase Report

Magellan's Race – 500 years

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Assumptions

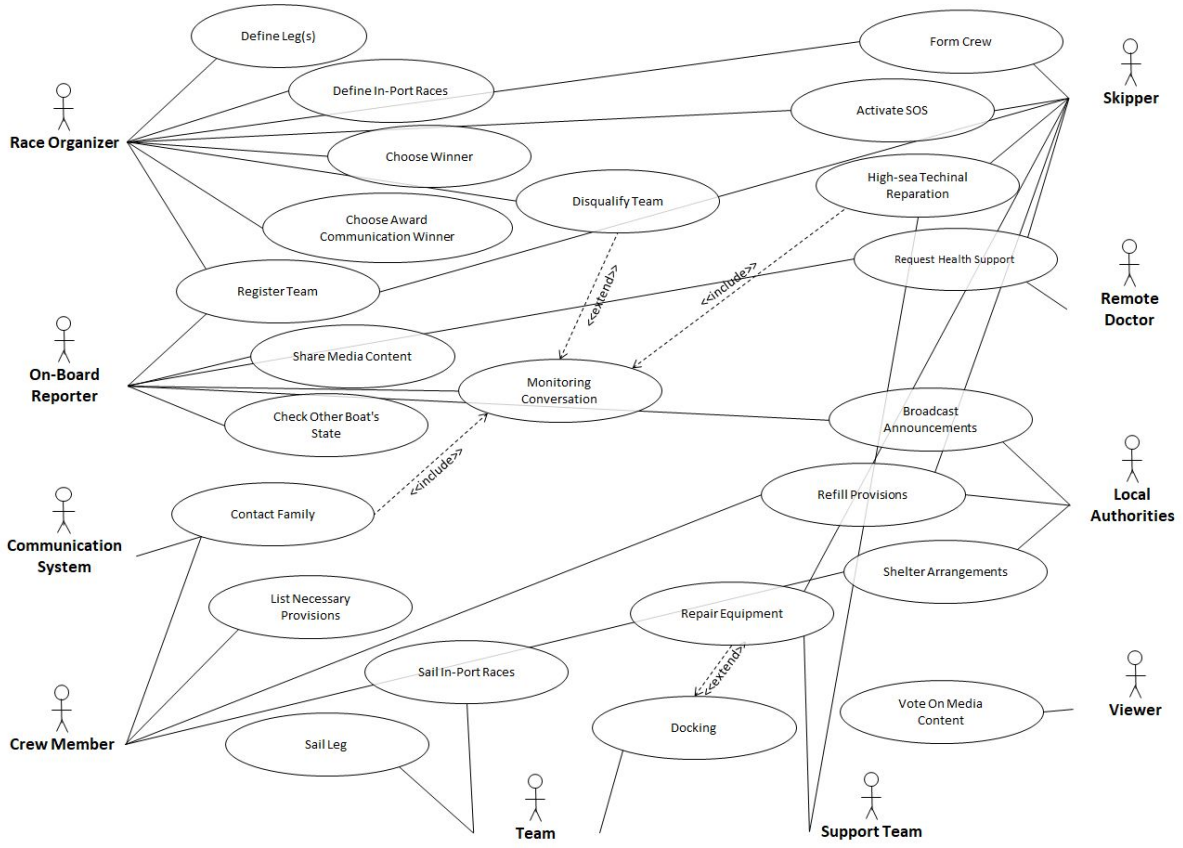
We assume that the Race Organizer “manages” a team, this means, the Race Organizer is responsible for register and disqualify a team. When the Race Organizer wants to register a new team to the race, it asks the Skipper for every information about the boat and the Support Team. About the disqualifying process, we assume that the only thing that the OBR does is to report a violation committed by the team to the Race Organizer, being the Race Organizer the one that disqualifies the team.

It was assumed that all the communications are made through a communication system. When the conversation ends, the system notifies the OBR with the exchange messages. The OBR will check if it was committed a violation, and if so he reports to the Race Organizer.

While sailing the team can order provisions and/or request shelter to the Local Authorities of the port they are arriving.

Analysis Phase

Use Case Diagram



Use Case Specifications

Register Team

Use Case Specification

Name: Register Team

Id: 1

Description: Register a team in the system

Actors:

- Main: Race Organizer
- Secondary: None

Pre-conditions: *None*

Main-Flow:

1. The UC starts when the Race Organizer decides to register a team.
2. The Race Organizer inserts the team's name.
3. The system validates the team's name.
4. The Race Organizer adds an On-Board Reporter to the team.
5. The system validates the On-Board Reporter.
6. The Race Organizer adds the Skipper to the team.
7. The system validates the Skipper.
8. The Race Organizer submits the boat information.
9. The system validates the boat.
10. The Race Organizer submits a list of the Support Team members.
11. The system validates the Support Team.
12. The system sends a notification saying "Team registered".
13. The UC ends.

Alternative Flows:

- Name associated to another team.
- OBR associated to another team.
- Support team associated to another team.
- Ship does not meet the requirements.

Post-Conditions: Team registered in the system.

Alternative Flows Specifications

Name: OBR associated to another team
Id: 1.1
Description: Describes the steps when an OBR is associated to another team
Actors:

- Main: Race Organizer
- Secondary: OBR

Pre-conditions: OBR is associated to another team
Main-Flow:

1. The UC starts when the system does not validate the OBR.
2. The system notifies the Race Organizer that the OBR is associated to another team.
3. The system provides the available OBRs.
4. Returns to step 4 of the “Register team” Main-flow.

Alternative Flows: *None*
Post-Conditions: *None*

Name: Ship does not meet the requirements
Id: 1.2
Description: Describes the steps when a ship does not meet the race requirements
Actors:

- Main: Race Organizer
- Secondary: Skipper

Pre-conditions: Ship does not have the correct requirements
Main-Flow:

1. The UC starts when the system does not validate the ship.
2. The system notifies that the ship does not meet the race requirements.
3. Returns to step 8 of the “Register team” Main-flow.

Alternative Flows: *None*
Post-Conditions: *None*

Form Crew

Use Case Specification

Name: Form Crew

Id: 2

Description: Updates a team's crew for next leg

Actors:

- Main: Skipper
- Secondary: Race Organizer

Pre-conditions:

- Team already registered
- Boat docked

Main-Flow:

1. The UC starts when the Skipper decides to change the crew before a leg or an In-Port Race.
2. The Skipper submits the male/female ratio.
3. The system validates the ratio.
4. The Skipper submits the information about each crew member.
5. The system validates the new crew members.
6. The system notifies the Race Organizer about the team's crew composition.
7. The UC ends.

Alternative Flows:

- Male/Female ratio is not valid.
- Crew composition doesn't match male/female ratio.

Post-Conditions: Crew has been updated in the system.

Alternative Flows Specifications

Name: Male/Female ratio not valid
Id: 2.1
Description: Describes the steps when the ratio is not approved
Actors:

- Main: Skipper
- Secondary: *None*

Pre-conditions: Genre ratio is not valid
Main-Flow:

1. The UC starts when the ratio is not approved
2. The system notifies the Skipper that the ratio is not valid.
3. The system provides the acceptable ratios.
4. Returns to step 2 of the “Form Crew” Main-Flow.

Alternative Flows: *None*
Post-Conditions: *None*

Name: Crew composition doesn’t match male/female ratio
Id: 2.2
Description: Describes the steps when the crew composition does not match the male/female ratio
Actors:

- Main: Skipper
- Secondary: None

Pre-conditions: Crew composition doesn’t match male/female ratio
Main-Flow:

1. The UC starts when the crew composition does not match the male/female ratio
2. The system notifies the Skipper that crew composition does not match the male/female ratio.
3. The system requests a new composition.
4. Returns to step 4 of the “Form Crew” Main-Flow.

Alternative Flows: None
Post-Conditions: None

High-Sea Technical Reparations

Use Case Specification

Name: High-sea technical reparations

Id: 3

Description: Describes the steps of a high-sea technical reparation

Actors:

- Main: Skipper
- Secondary: Support Team, OBR

Pre-conditions: The boat is not docked

Main-Flow:

1. The UC starts when the Skipper requests technical support or when the support team detects a problem.
2. The system establishes a connection between the Skipper and the Support Team.
3. The Skipper identifies the problem.
4. The system notifies the Support Team with a description of the problem.
5. The Support Team gives technical advice.
6. The system sends the Support Team's advice.
7. The Skipper fixes the problem.
8. The Skipper confirms that the problem has been fixed.
9. The system notifies the Support Team that the problem has been fixed.
10. The system closes the connection.
11. The system notifies the OBR with the sent messages.
12. The UC ends.

Alternative Flows:

- Team is disqualified.
- Problem has not been fixed.

Post-Conditions: Problem fixed

Alternative Flows Specifications

Name: Notify violation
Id: 3.1
Description: Describes the steps when the OBR detects a violation
Actors:

- Main: OBR
- Secondary: Team, Race Organizer

Pre-conditions: Violation committed
Main-Flow:

1. The UC starts when the OBR detects a violation in a message exchanged.
2. The OBR submits the information about the violation.
3. The system notifies the Race Organizer about the violation.
4. The UC ends.

Alternative Flows: *None*
Post-Conditions: Team disqualified

Name: Problem has not been fixed
Id: 3.2
Description: Describes the steps when boat problem has not been fixed
Actors:

- Main: Skipper
- Secondary: Support Team

Pre-conditions: Malfunction detected
Main-Flow:

1. The UC starts when the boat problem has not been fixed.
2. The Skipper informs that the problem has not been fixed.
3. The system notifies the Support Team that the problem has not been fixed.
4. Returns to step 4 of the “High-sea technical reparations” Main-flow.

Alternative Flows: None
Post-Conditions: None

Refill Provisions

Use Case Specification

Name: Refill provisions

Id: 4

Description: Describes the steps for the team to buy provisions from the local authorities.

Actors:

- Main: Skipper
- Secondary: Crew Member, Local Authorities

Pre-conditions: The boat is docked

Main-Flow:

1. The UC starts when the Skipper wants to order products.
2. The Skipper assigns a Crew Member to order the products through the system.
3. The system notifies the assigned Crew Member.
4. The assigned Crew Member submits the list of products to the system.
5. The system sends the list to the Local Authorities.
6. The Local Authorities check the stock of the requested products.
7. The Local Authorities submits that they have those products in stock.
8. The system notifies the assigned Crew Member that he/she can order the products.
9. The assigned Crew Member confirms the order.
10. The system saves the order.
11. The UC ends.

Alternative Flows:

- Products are not available
- Fresh food is not allowed

Post-Conditions: Provisions have been sold

Alternative Flows Specifications

Name: Products are not available
Id: 4.1
Description: Describes the steps when the local authorities do not have the requested products
Actors:

- Main: Local Authorities
- Secondary: Crew Member

Pre-conditions: Products have been requested
Main-Flow:

1. The UC start when Local Authorities do not have the products in stock.
2. The Local Authorities inform the system that the products are not available.
3. Returns to step 11 of the “Refill provisions” Main-flow.

Alternative Flows: *None*
Post-Conditions: *None*

Name: Fresh food is not allowed
Id: 4.2
Description: Describes the steps when fresh food is not allowed
Actors:

- Main: Local Authorities
- Secondary: Crew Member

Pre-conditions: Fresh food have been requested
Main-Flow:

1. The UC starts when the Crew Member includes fresh food in the list of products.
2. The system notifies the Crew Member that fresh food is not allowed on board.
3. Returns to step 4 of the “Refill provisions” Main-flow.

Alternative Flows: None
Post-Conditions: None

Send Message to Family

Use Case Specification

Name: Contact family

Id: 5

Description: Describes the steps when a crew member wants to send messages to his/her family.

Actors:

- Main: Crew Member
- Secondary: OBR, Communication System

Pre-conditions: Crew Member is sailing

Main-Flow:

1. The UC starts when the crew member wants to send messages to his/her family.
2. The Crew Member requests to the system to contact family.
3. The system informs the OBR that the crew member wants to contact family.
4. The OBR approves the request.
5. The system establishes a connection between the Crew Member and the Communication System.
6. While the Crew Member wants to send another message.
    6.1. The Crew Member submits the message.
    6.2. The system sends the message to the Communication System.
    6.3. The Communication System notifies about a response.
    6.4. The system shows the response to Crew Member.
7. The Crew Member tells the system to end the connection.
8. The system notifies the OBR about the messages exchanged.
9. The UC ends.

Alternative Flows:

- Notify violation.
- OBR doesn't allow the Crew Member to contact family.

Post-Conditions: Crew Member contacted family

Alternative Flows Specifications

Note: The alternative flow “Notify violation” in the use case “Contact family” is described by the “Notify violation” use case, which id is 3.1.

Name: OBR doesn't allow the Crew Member to contact family
Id: 5.1
Description: Describes the steps when the OBR does not approve the crew member to contact family
Actors:

- Main: OBR
- Secondary: Crew Member

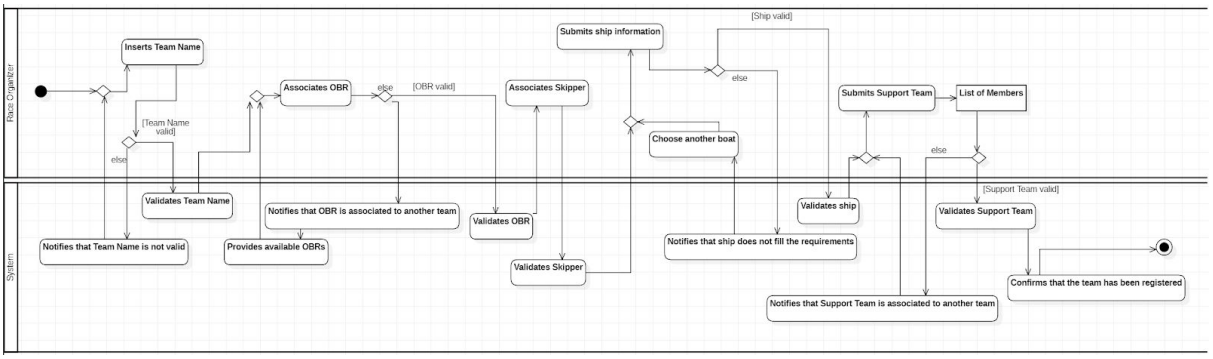
Pre-conditions: OBR didn’t allow the Crew Member to contact family
Main-Flow:

1. The UC starts when the OBR doesn’t allow the Crew Member to contact family.
2. The system informs the Crew Member that is not possible to contact family.
3. Returns to step 10 of the “Contact family” Main-flow.

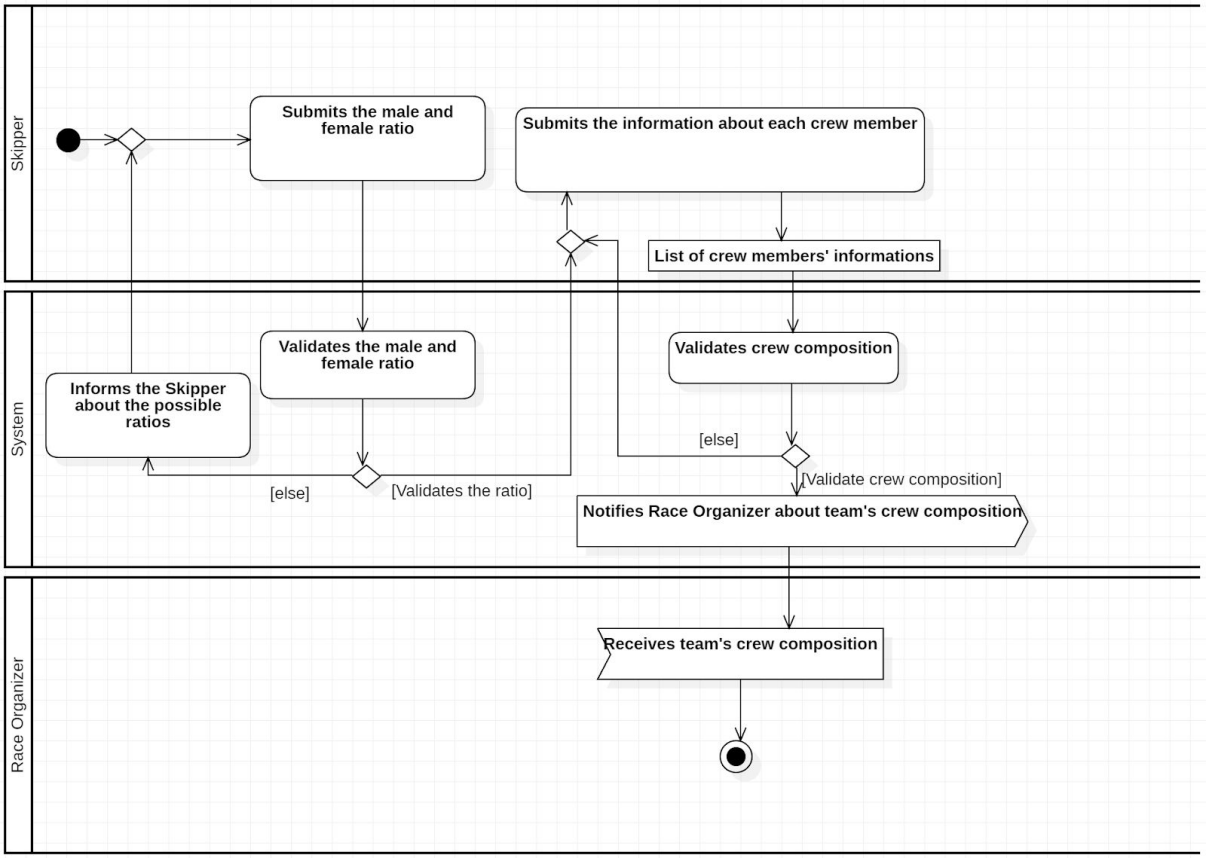
Alternative Flows: *None*
Post-Conditions: *None*

Activity Diagrams

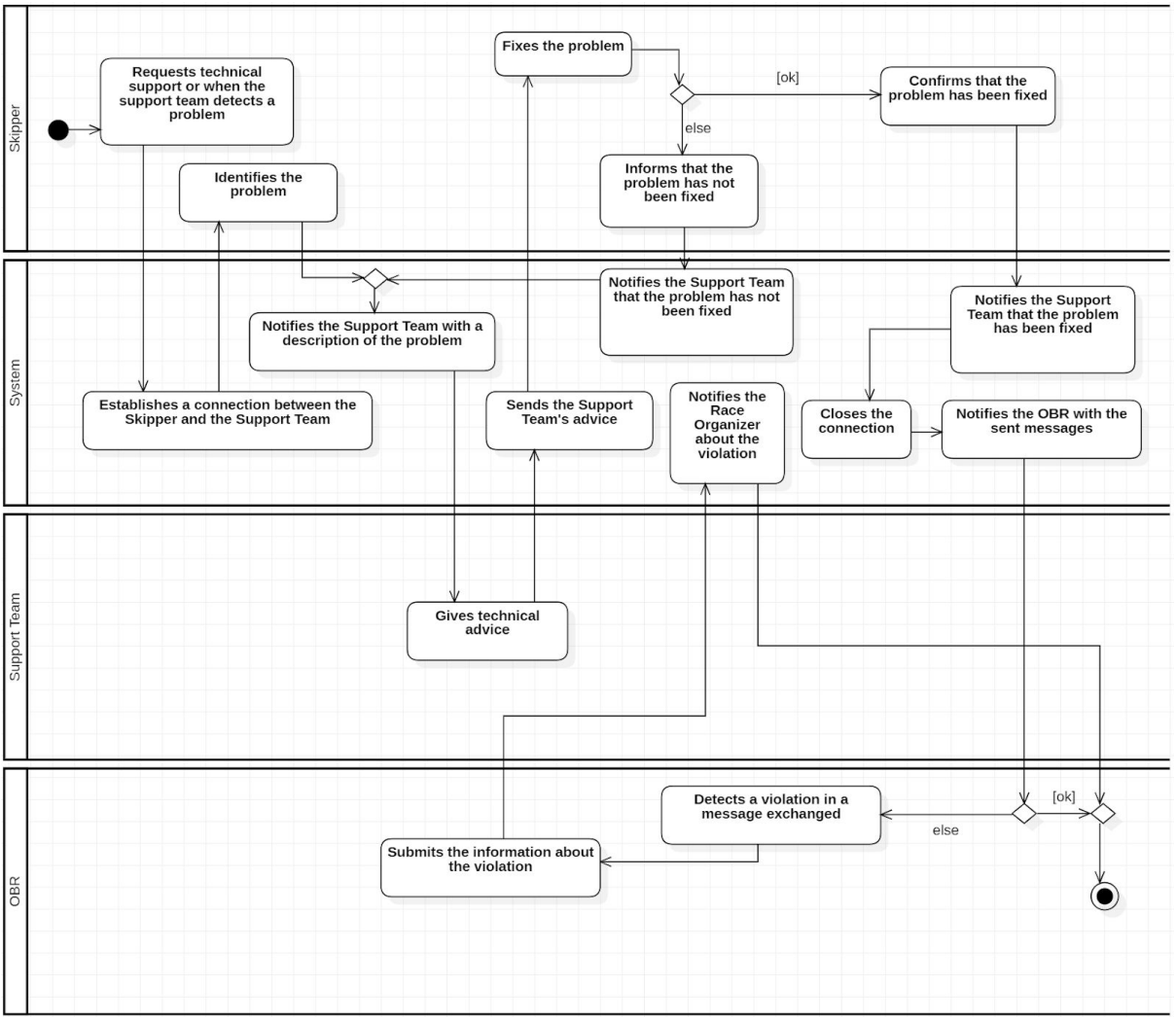
Register Team



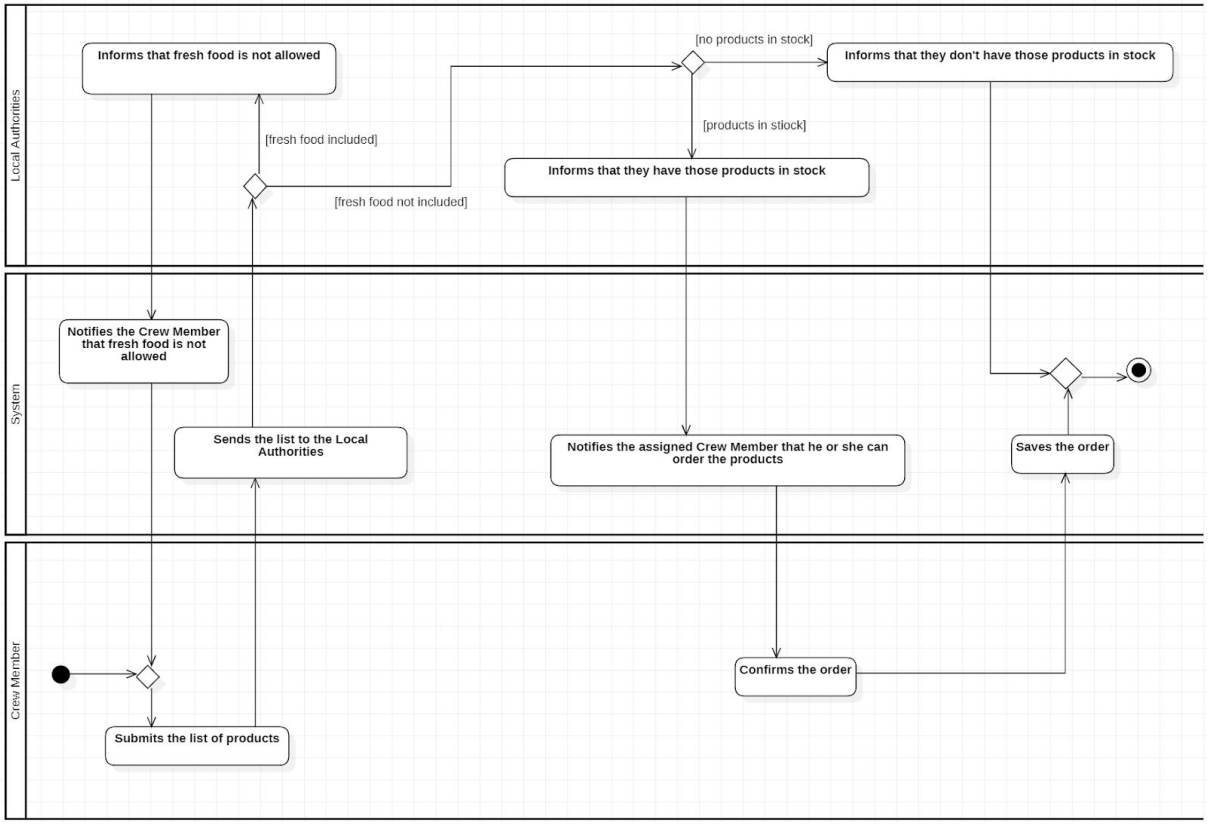
Form Crew



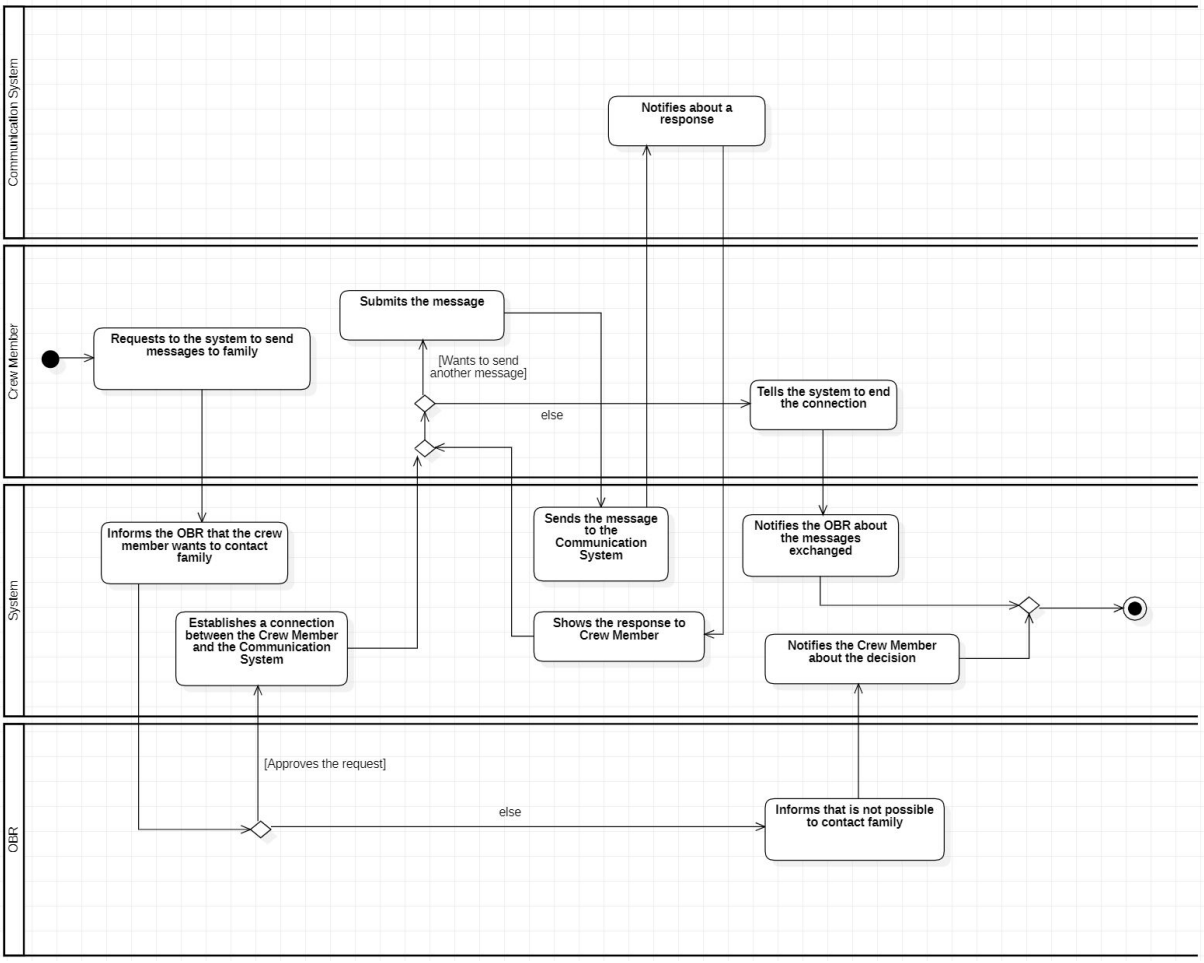
High-Sea Technical Reparations



Refill Provisions

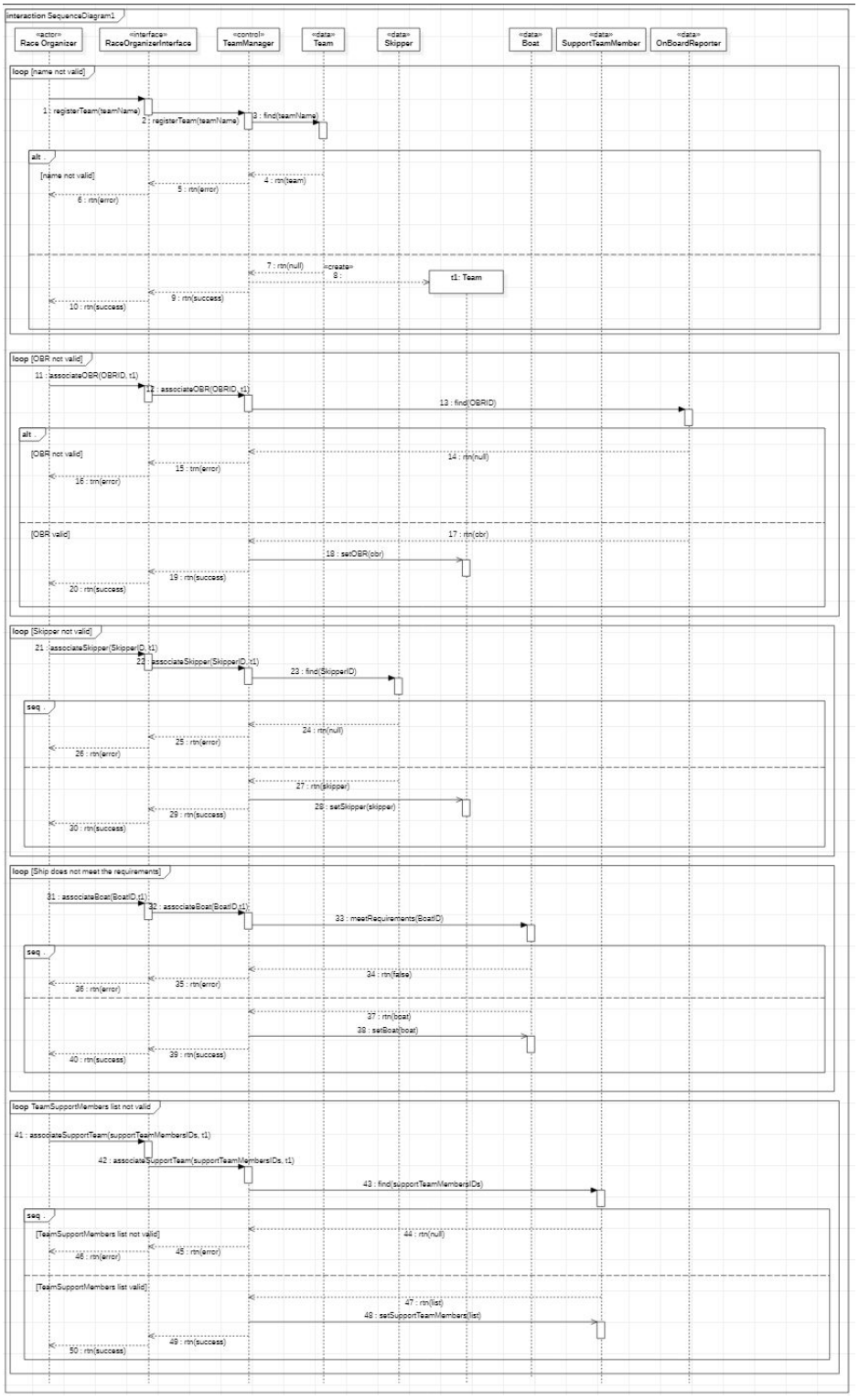


Contact Family

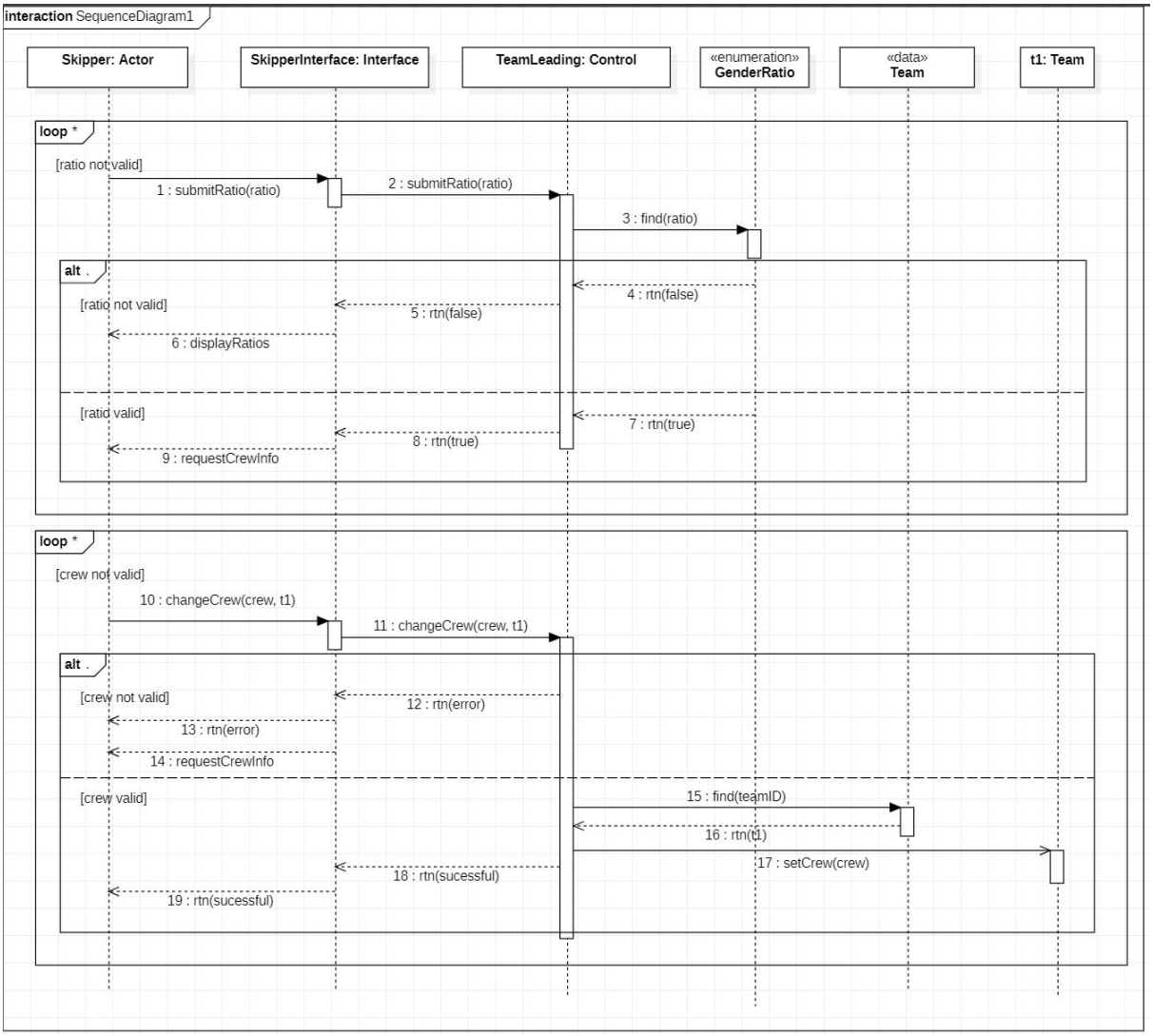


Sequence Diagrams

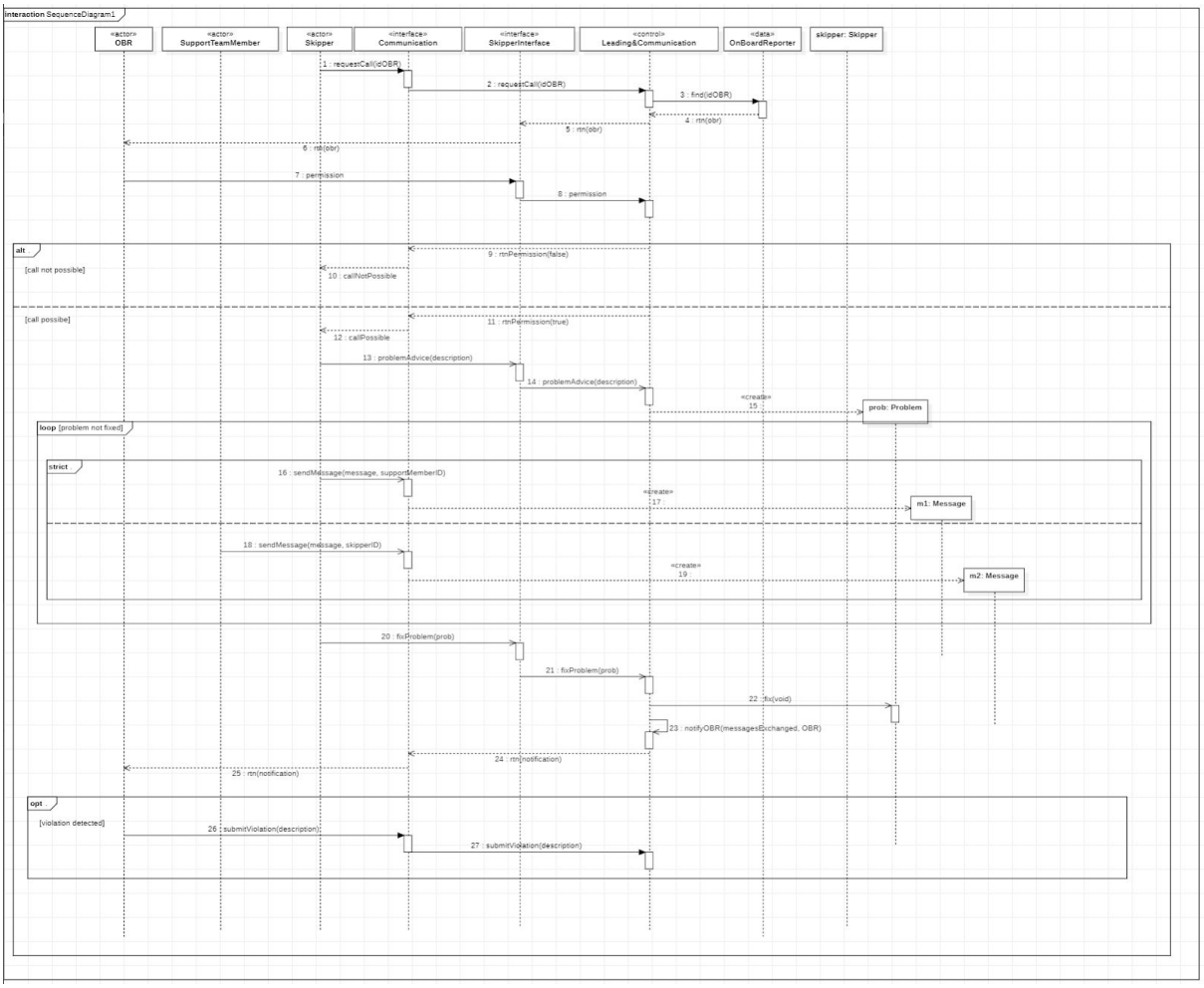
Register Team



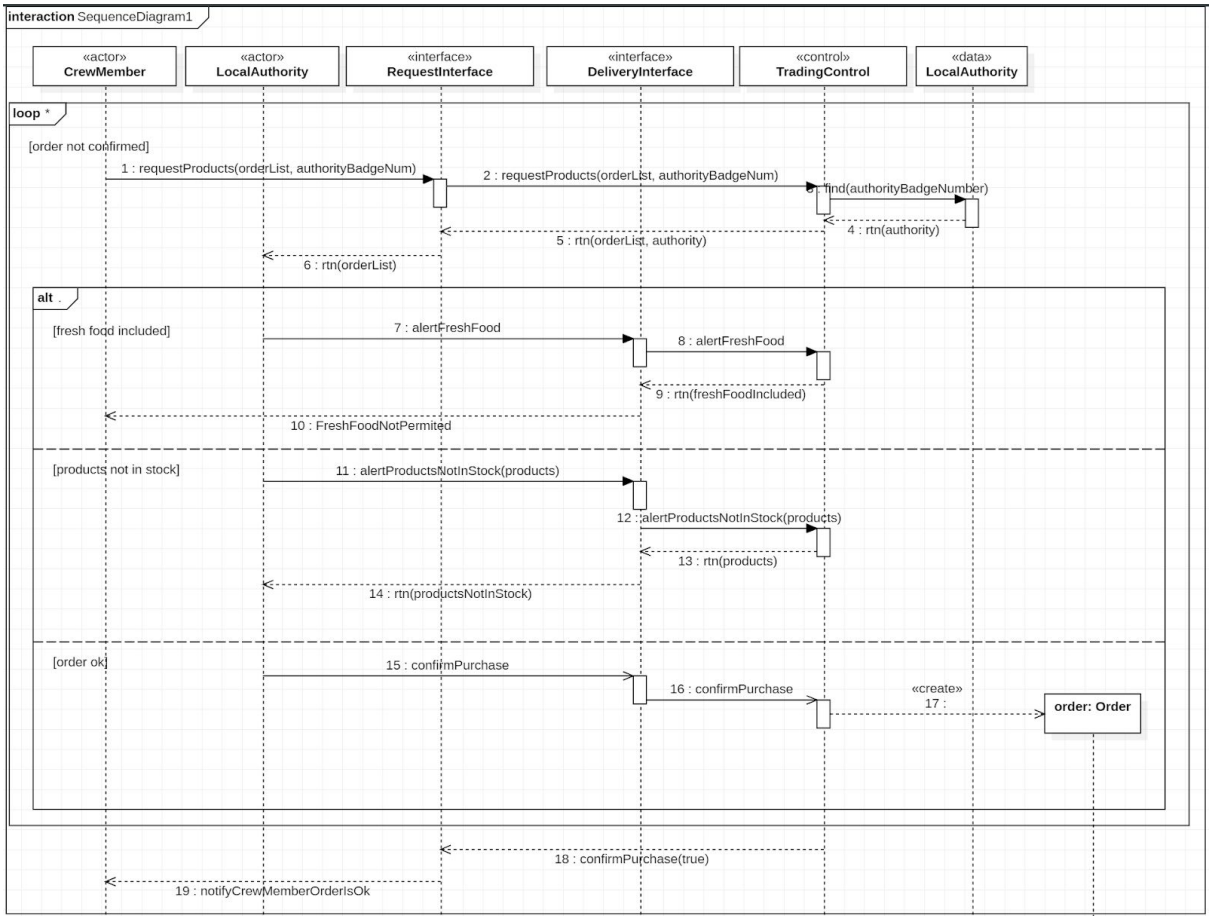
Form Crew


interaction SequenceDiagram1
Skipper: Actor
SkipperInterface: Interface
TeamLeading: Control
«enumeration» GenderRatio
«data» Team
t1: Team
loop *
[ratio not valid]
1 : submitRatio(ratio)
2 : submitRatio(ratio)
3 : find(ratio)
alt .
[ratio not valid]
4 : rtn(false)
5 : rtn(false)
6 : displayRatios
[ratio valid]
7 : rtn(true)
8 : rtn(true)
9 : requestCrewInfo
loop *
[crew not valid]
10 : changeCrew(crew, t1)
11 : changeCrew(crew, t1)
alt .
[crew not valid]
12 : rtn(error)
13 : rtn(error)
14 : requestCrewInfo
[crew valid]
15 : find(teamID)
16 : rtn(t1)
17 : setCrew(crew)
18 : rtn(sucessful)
19 : rtn(sucessful)

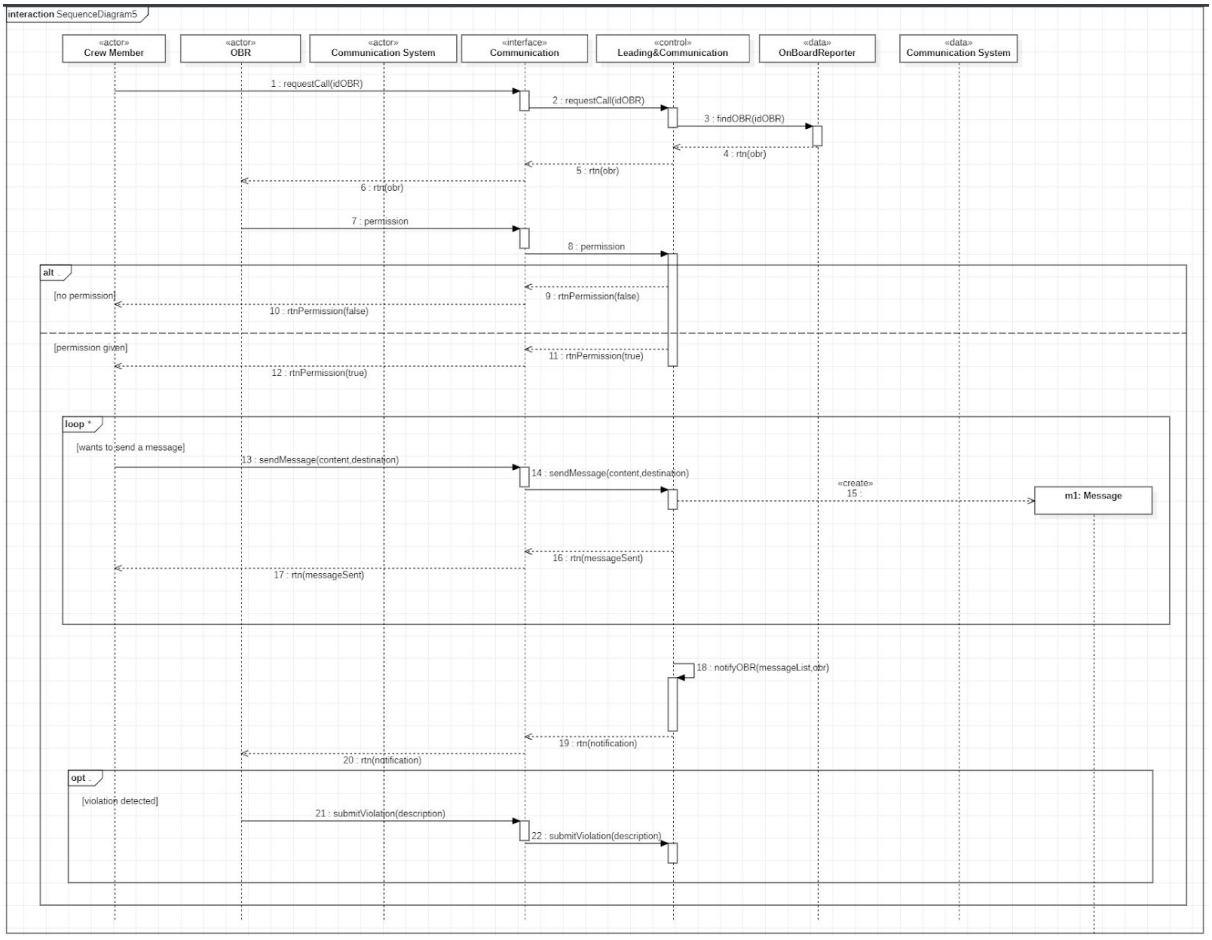
High-Sea Technical Reparations



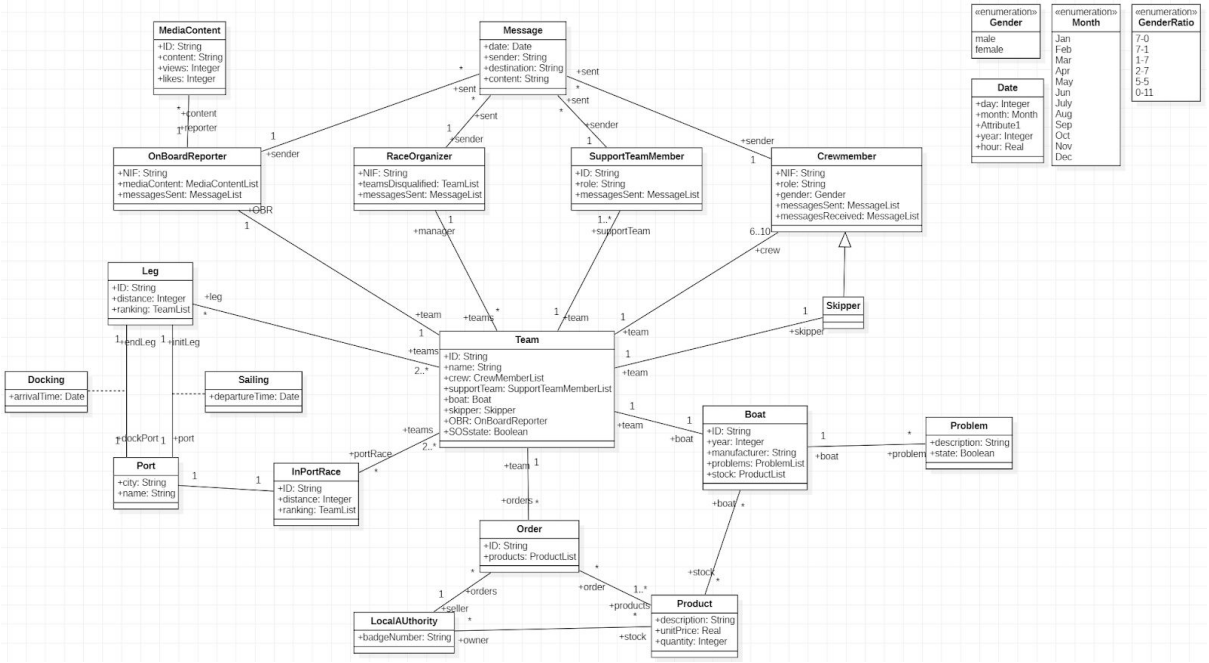
Refill Provisions



Contact Family



Class Diagram



OCL

Invariants

```
context MediaContent
        inv:
                MediaContent.allInstances->isUnique(i | i.ID)
context MediaContent
        inv:
                MediaContent.allInstances->forAll(i | i.views >= 0)
context Team
        inv:
                Team.allInstances->forAll(i | not i.supportTeam->isEmpty())
```

Pre-Conditions

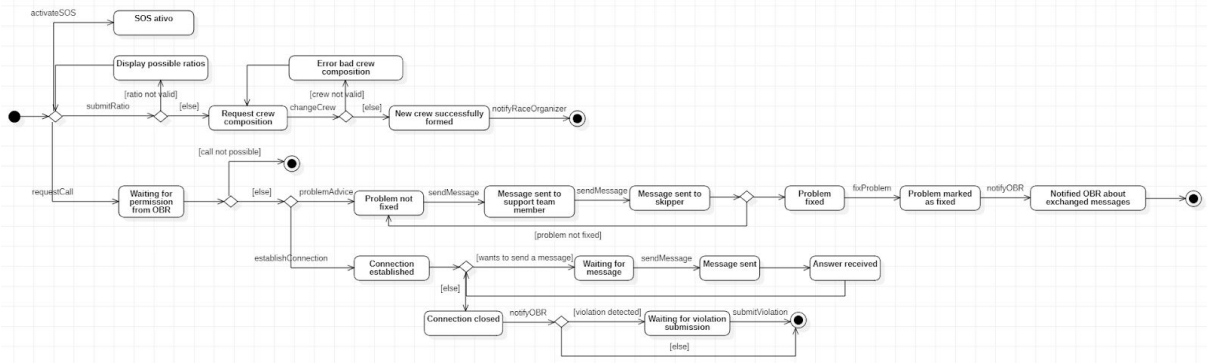
```
context RaceOrganizer::disqualifyTeam(team: Team): void
        pre:
                self.teamsDisqualified->excludes(team)
context CrewMember::sendMessage(message: Message): void
        pre:
                self.messagesSent->count(message) = 0
context Team::setSkipper(skipper: Skipper): void
        pre:
                self.skipper.oclIsUndefined()
```

Post-Conditions

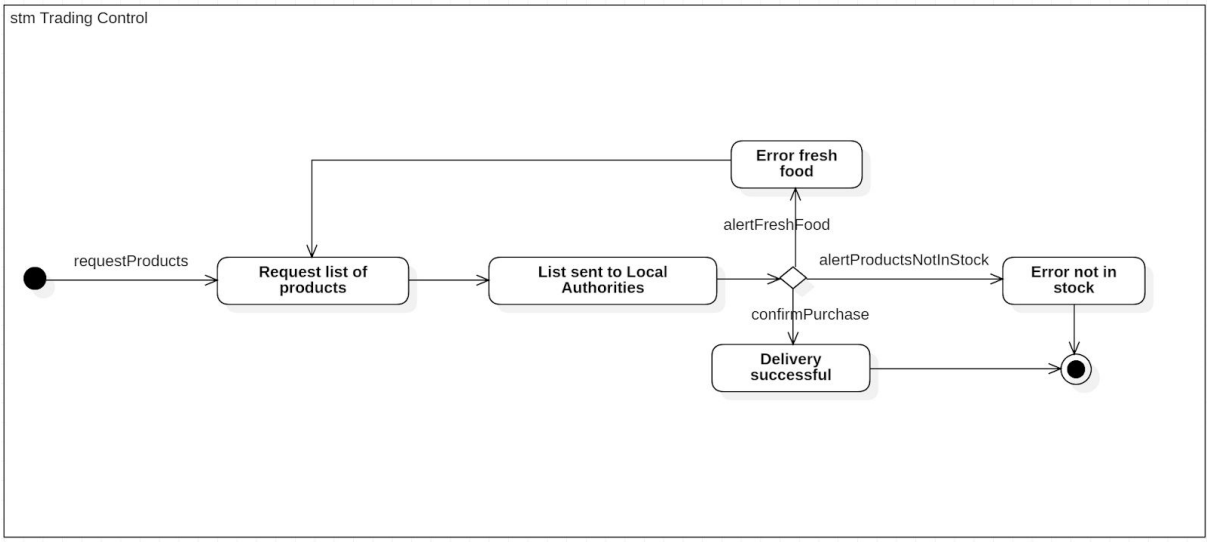
```
context RaceOrganizer::disqualifyTeam(team: Team): void
        post:
                self.teamsDisqualified->includes(team)
context CrewMember::sendMessage(message: Message): void
        post:
                self.messagesSent->size() = self.messagesSent@pre->size + 1
context SupportTeamMember::sendMessage(message: Message): void
        post:
                self.messagesSent->includes(message)
```

Statechart Diagrams

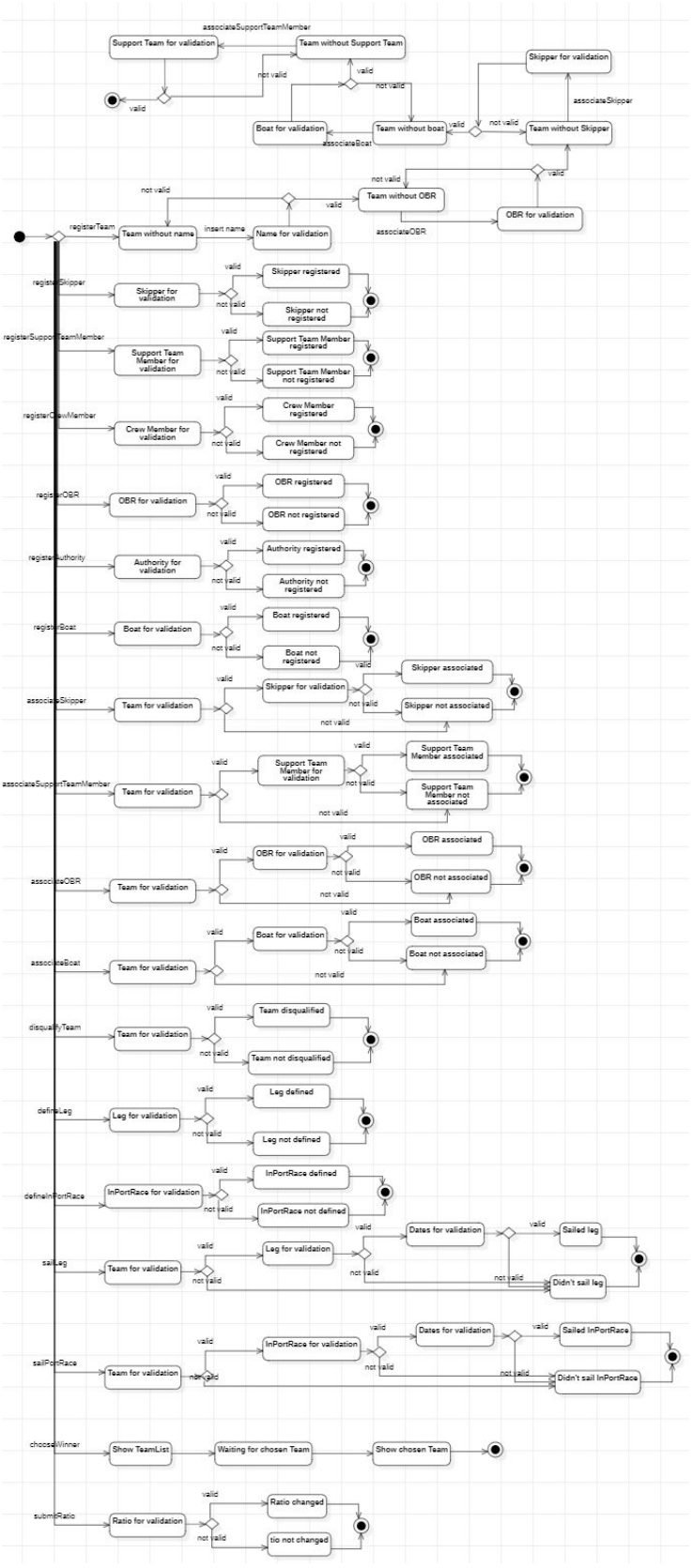
Leading And Communication



Trading Control

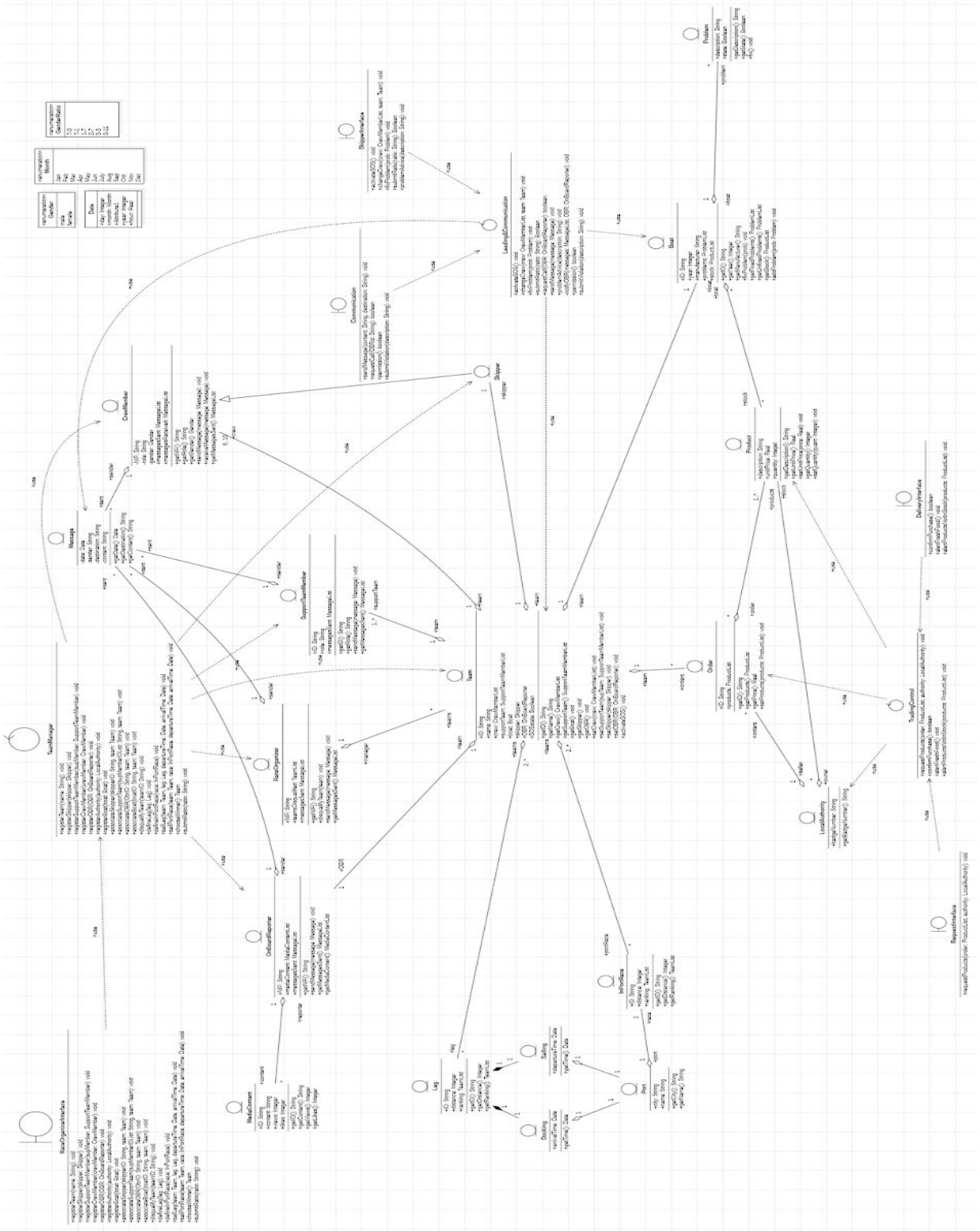


Team Manager

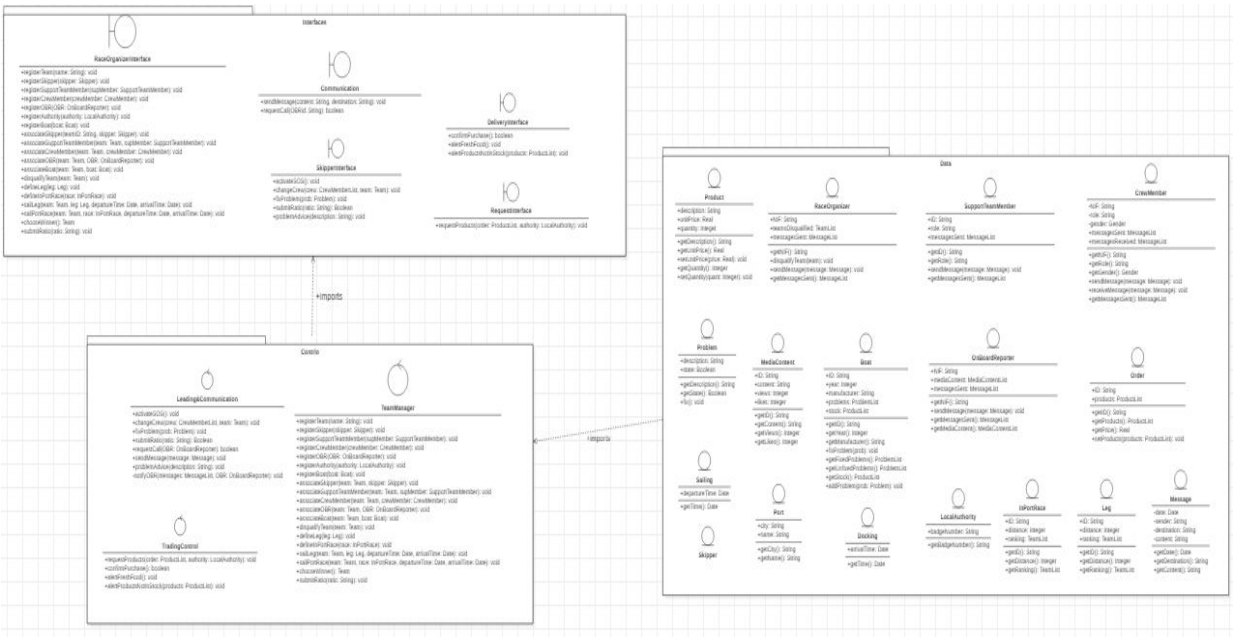


Design Phase

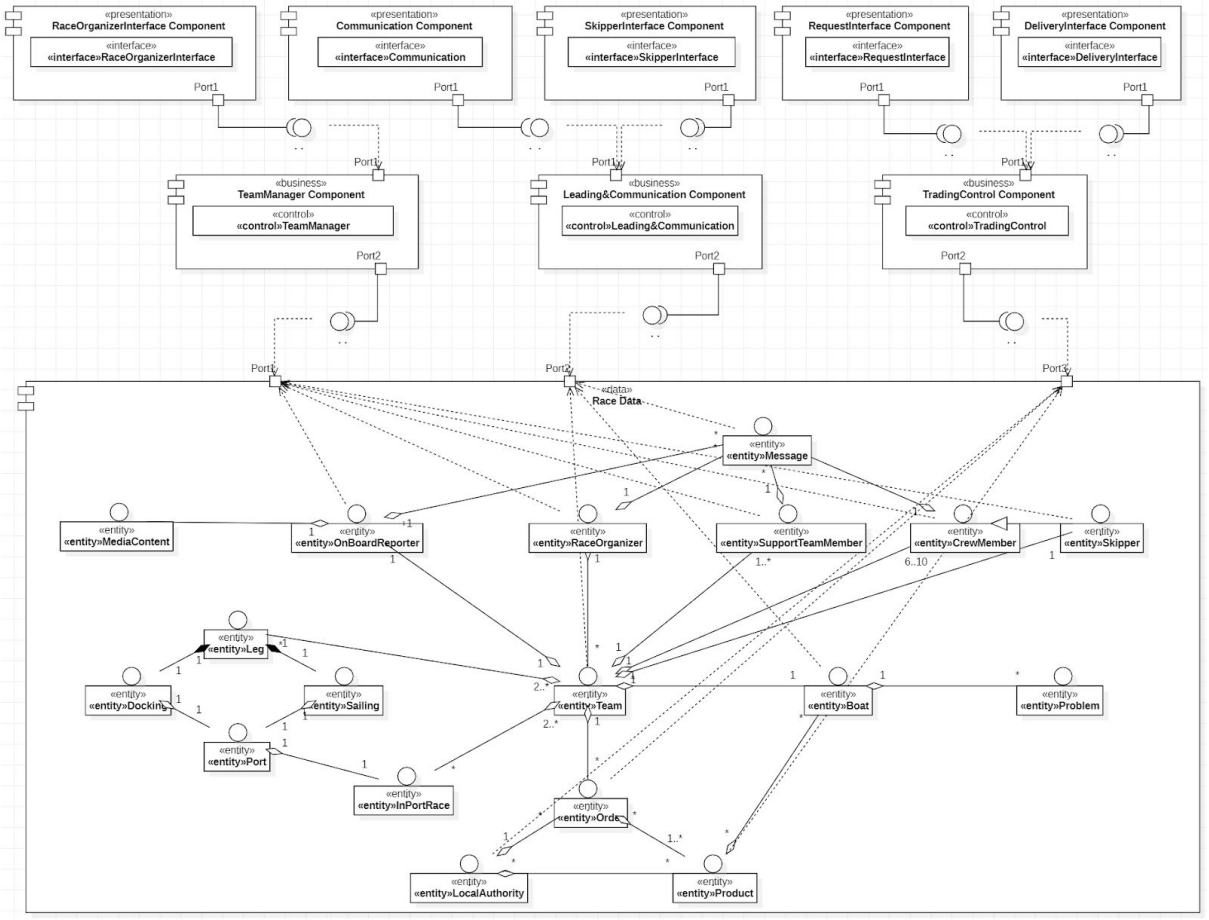
Design Diagram



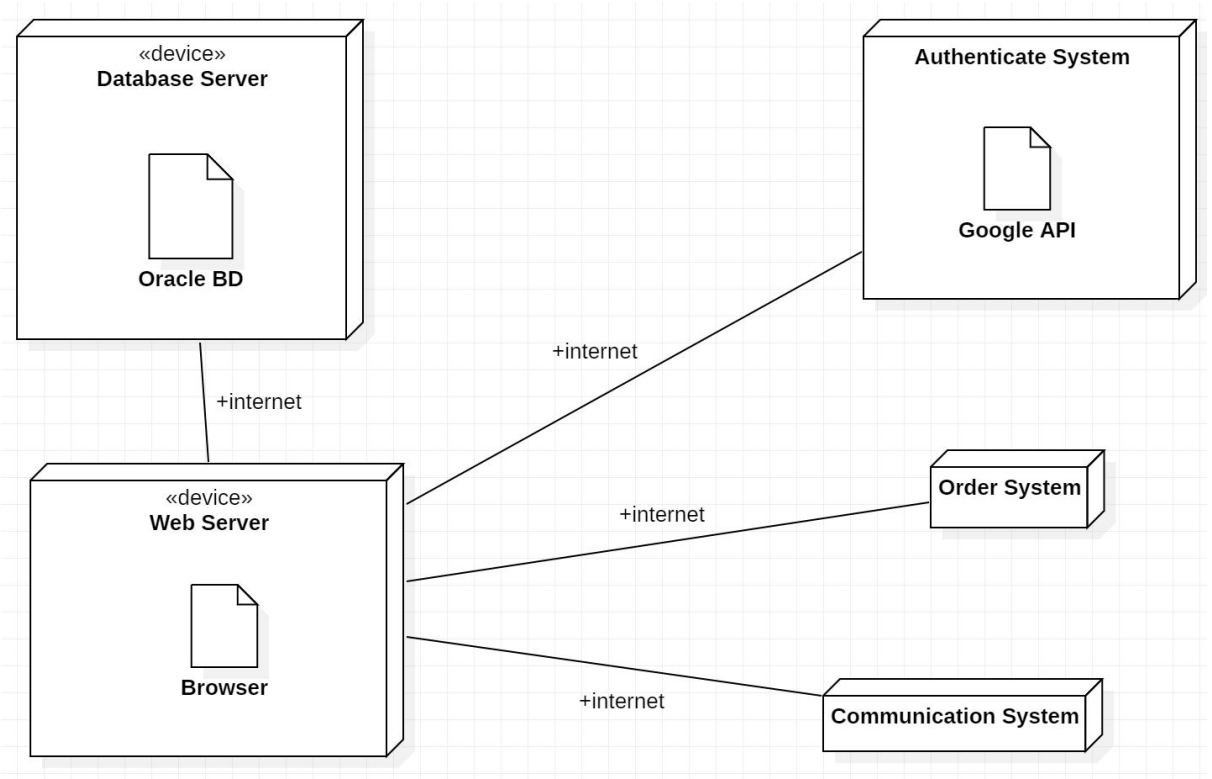
Package Diagram



Component Diagram



Deployment Diagram



Conclusions

With this project, it was possible for us to apply the theoretical knowledge taught in the classes in a very practical situation. We learnt a lot about the development of a complex project from scratch and about the difficulties of satisfying the client needs.

The project had a very large content and was very abstract, hard to determine the necessary situations to develop. To avoid this fact, it was written at the beginning of this report our assumptions about the statement ambiguities.

We also felt difficulties doing the StateCharts Diagrams, on the fact that it was not practiced on the practical classes.

Bibliography

- Classes digital support.
- http://www.db.informatik.uni-bremen.de/projects/USE/use-documentation.pdf