CPSC 2720 [Spring 2023]

# Under Us

A Sea Exploration Adventure
(The Hunt for the Lost Sea Cucumber)

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## [Tali]


**[Team Members:]**

**Logan Feit**

**Keagan Rieder**

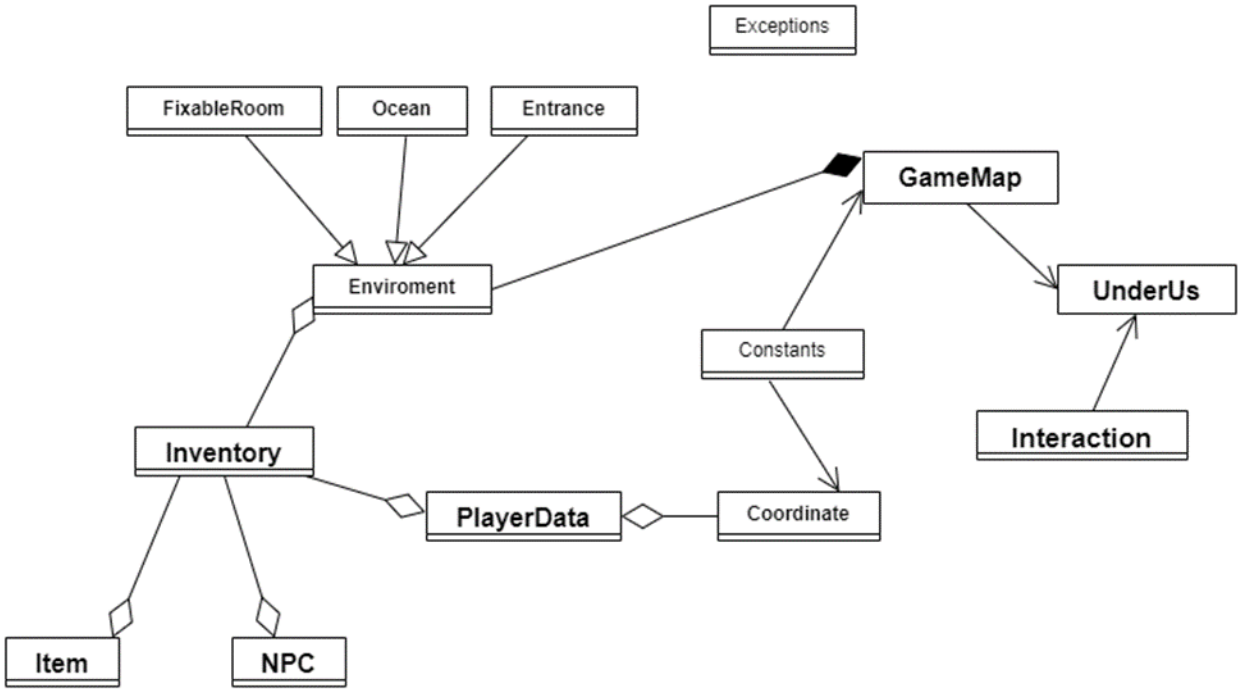
**Maxenne Jubane**

**Jenil Jani**

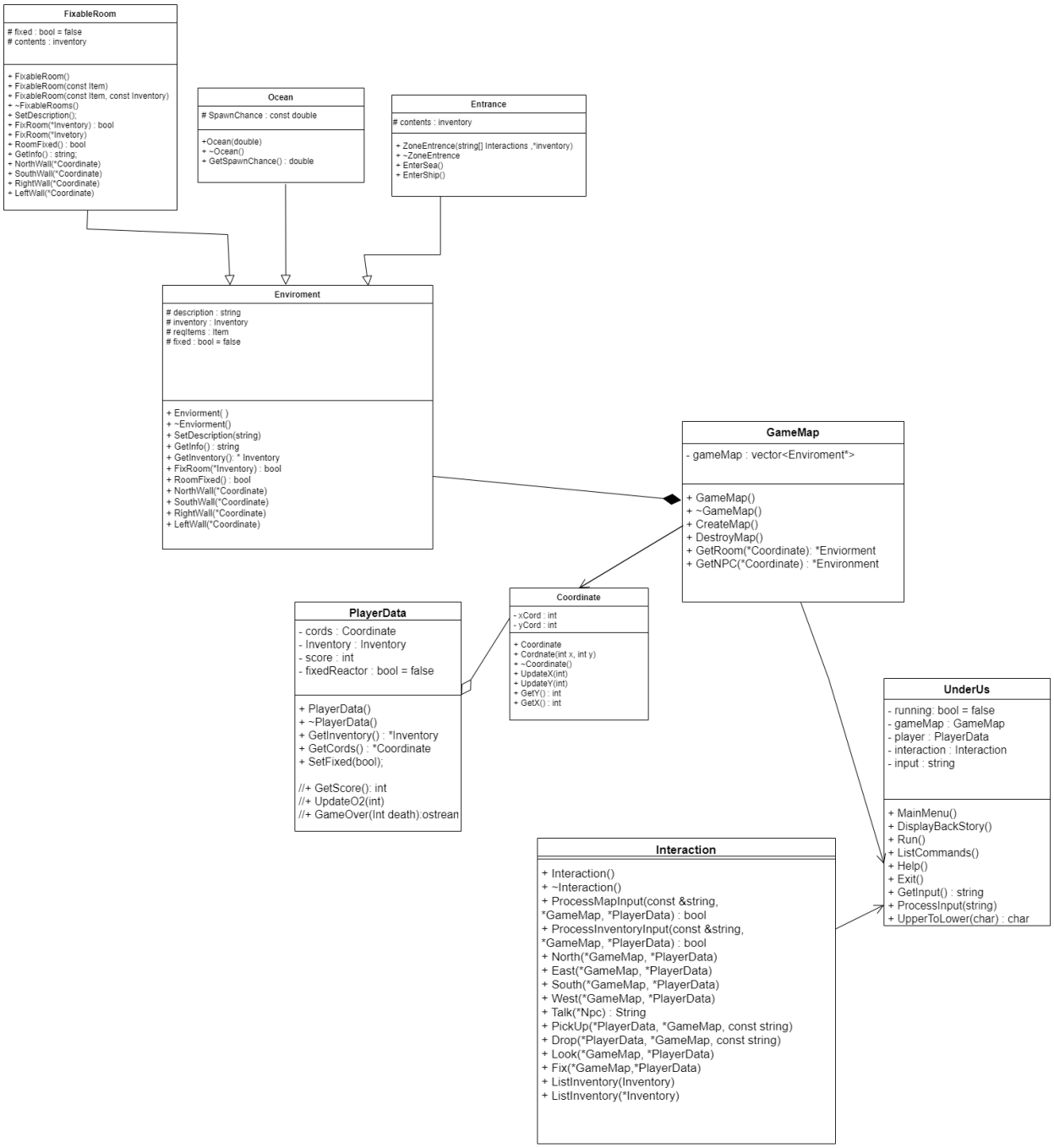
**[March 22]**

# Software Design

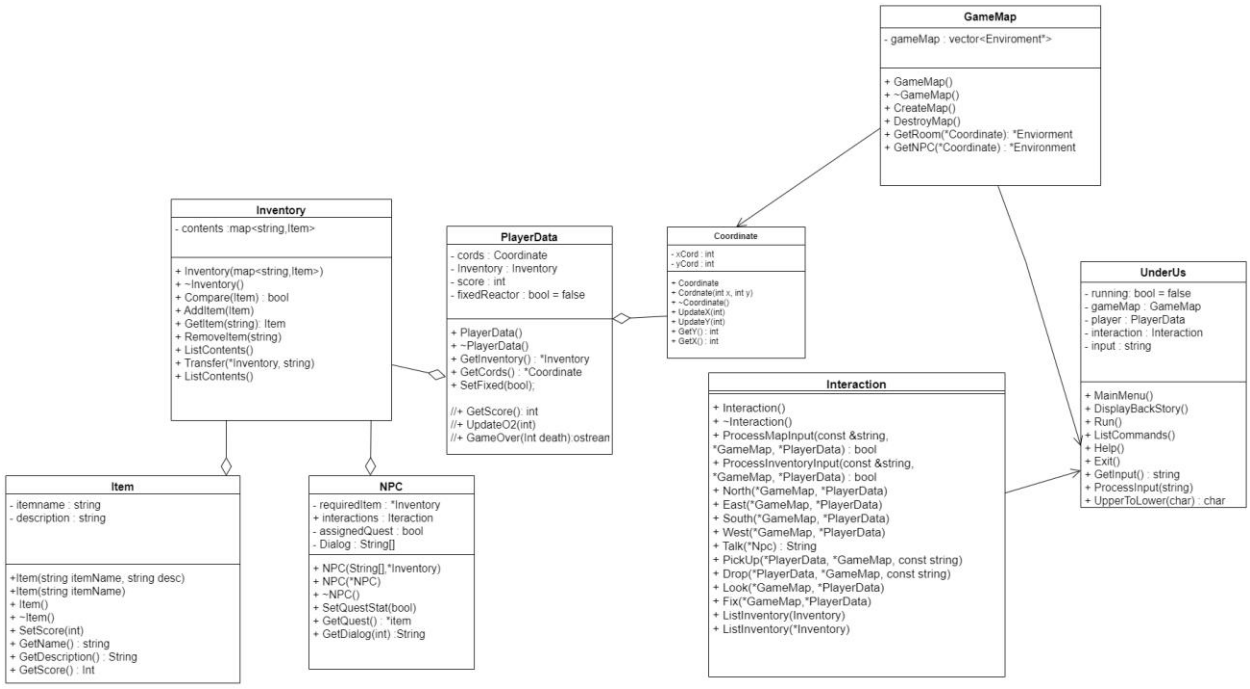
## Design – Class diagrams



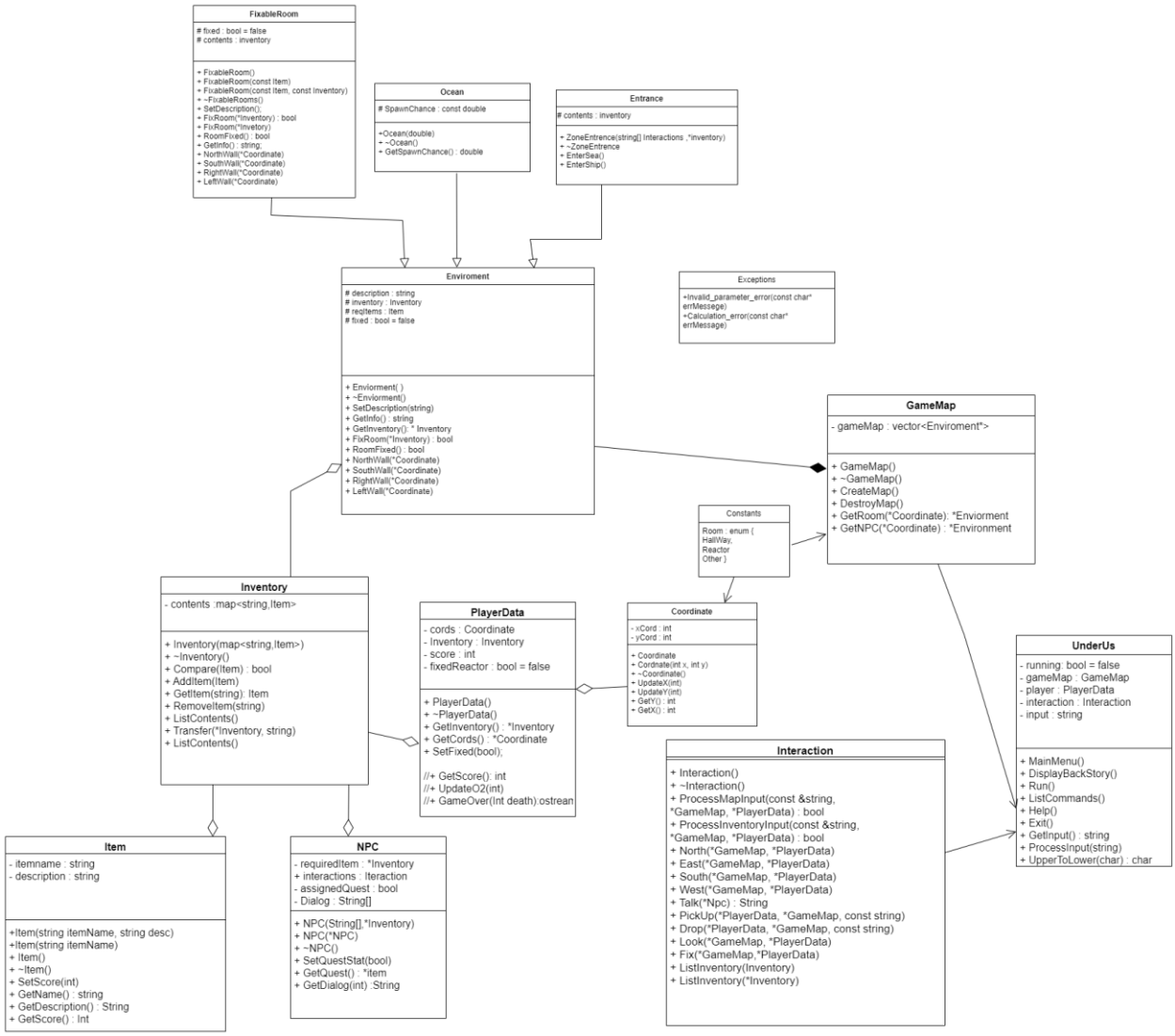
# MapInteraction:



## Item & NPC Interaction:

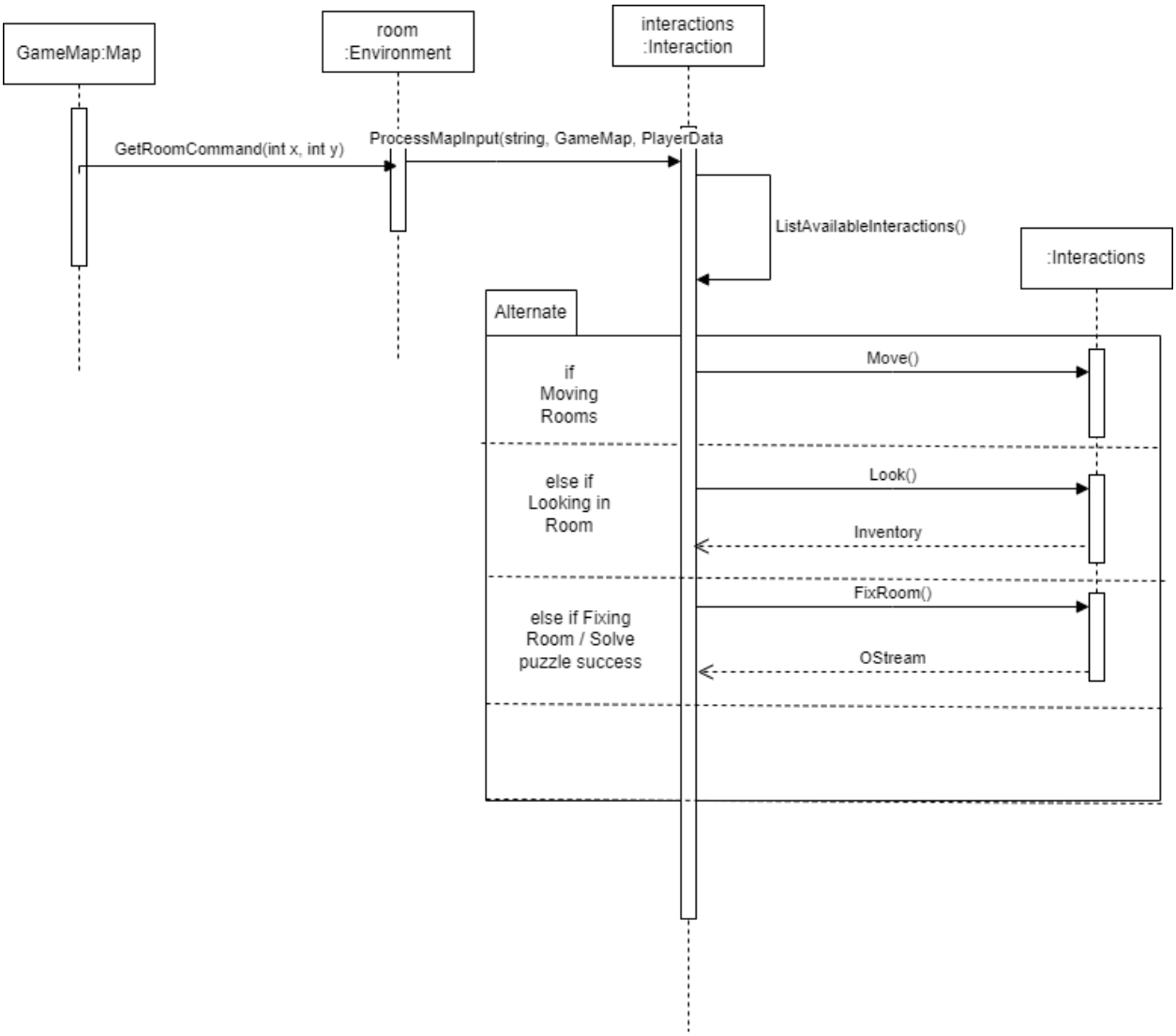


## Full UML:

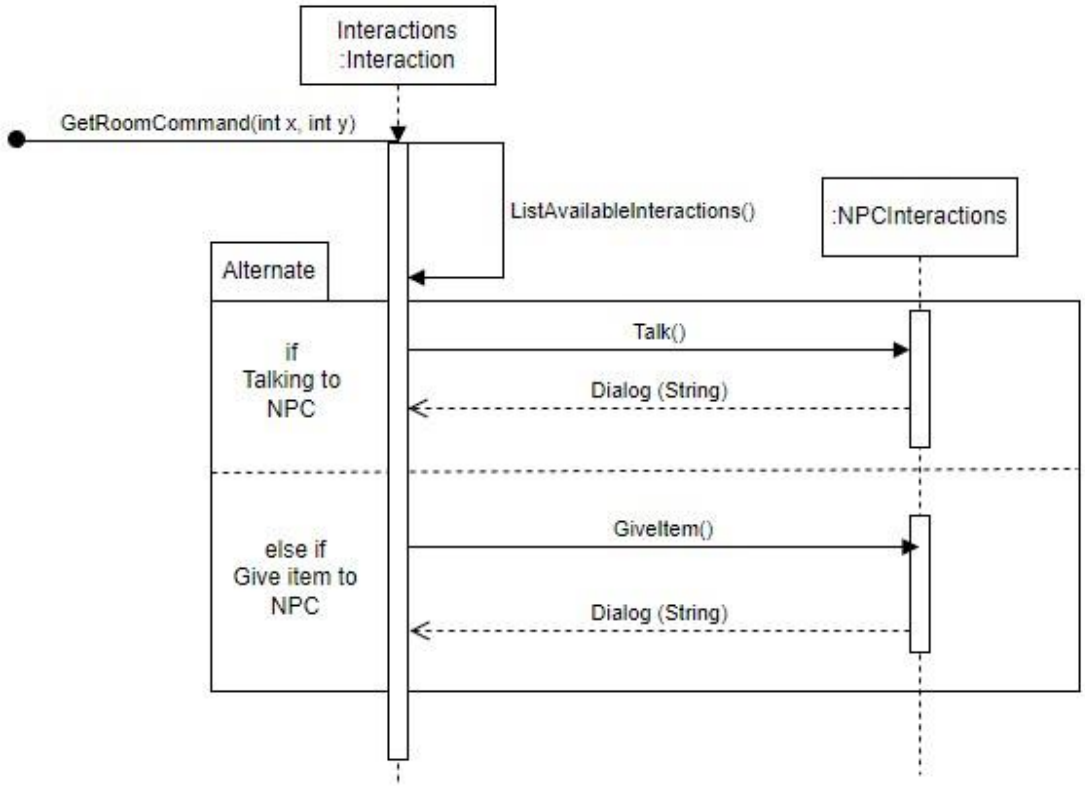

FixableRoom
# fixed : bool = false
# contents : inventory
+ FixableRoom()
+ FixableRoom(const Item)
+ FixableRoom(const Item, const Inventory)
+ ~FixableRooms()
+ SetDescription();
+ FixRoom(*Inventory) : bool
+ FixRoom(*Invetory)
+ RoomFixed() : bool
+ GetInfo() : string;
+ NorthWall(*Coordinate)
+ SouthWall(*Coordinate)
+ RightWall(*Coordinate)
+ LeftWall(*Coordinate)
Ocean
# SpawnChance : const double
+Ocean(double)
+ ~Ocean()
+ GetSpawnChance() : double
Entrance
# contents : inventory
+ ZoneEntrence(string[] Interactions ,*inventory)
+ ~ZoneEntrence
+ EnterSea()
+ EnterShip()
Enviroment
# description : string
# inventory : Inventory
# reqItems : Item
# fixed : bool = false
+ Enviorment( )
+ ~Enviorment()
+ SetDescription(string)
+ GetInfo() : string
+ GetInventory(): * Inventory
+ FixRoom(*Inventory) : bool
+ RoomFixed() : bool
+ NorthWall(*Coordinate)
+ SouthWall(*Coordinate)
+ RightWall(*Coordinate)
+ LeftWall(*Coordinate)
Exceptions
+Invalid_parameter_error(const char* errMessege)
+Calculation_error(const char* errMessage)
GameMap
- gameMap : vector<Enviroment*>
+ GameMap()
+ ~GameMap()
+ CreateMap()
+ DestroyMap()
+ GetRoom(*Coordinate): *Enviorment
+ GetNPC(*Coordinate) : *Environment
Constants
Room : enum {
HallWay,
Reactor
Other }
Inventory
- contents :map<string,Item>
+ Inventory(map<string,Item>)
+ ~Inventory()
+ Compare(Item) : bool
+ AddItem(Item)
+ GetItem(string): Item
+ RemoveItem(string)
+ ListContents()
+ Transfer(*Inventory, string)
+ ListContents()
PlayerData
- cords : Coordinate
- Inventory : Inventory
- score : int
- fixedReactor : bool = false
+ PlayerData()
+ ~PlayerData()
+ GetInventory() : *Inventory
+ GetCords() : *Coordinate
+ SetFixed(bool);
//+ GetScore(): int
//+ UpdateO2(int)
//+ GameOver(Int death):ostrean
Coordinate
- xCord : int
- yCord : int
+ Coordinate
+ Cordnate(int x, int y)
+ ~Coordinate()
+ UpdateX(int)
+ UpdateY(int)
+ GetY() : int
+ GetX() : int
UnderUs
- running: bool = false
- gameMap : GameMap
- player : PlayerData
- interaction : Interaction
- input : string
+ MainMenu()
+ DisplayBackStory()
+ Run()
+ ListCommands()
+ Help()
+ Exit()
+ GetInput() : string
+ ProcessInput(string)
+ UpperToLower(char) : char
Item
- itemname : string
- description : string
+Item(string itemName, string desc)
+Item(string itemName)
+ Item()
+ ~Item()
+ SetScore(int)
+ GetName() : string
+ GetDescription() : String
+ GetScore() : Int
NPC
- requiredItem : *Inventory
+ interactions : Iteraction
- assignedQuest : bool
- Dialog : String[]
+ NPC(String[],*Inventory)
+ NPC(*NPC)
+ ~NPC()
+ SetQuestStat(bool)
+ GetQuest() : *Item
+ GetDialog(int) :String
Interaction
+ Interaction()
+ ~Interaction()
+ ProcessMapInput(const &string, *GameMap, *PlayerData) : bool
+ ProcessInventoryInput(const &string, *GameMap, *PlayerData) : bool
+ North(*GameMap, *PlayerData)
+ East(*GameMap, *PlayerData)
+ South(*GameMap, *PlayerData)
+ West(*GameMap, *PlayerData)
+ Talk(*Npc) : String
+ PickUp(*PlayerData, *GameMap, const string)
+ Drop(*PlayerData, *GameMap, const string)
+ Look(*GameMap, *PlayerData)
+ Fix(*GameMap,*PlayerData)
+ ListInventory(Inventory)
+ ListInventory(*Inventory)

# Design – sequence diagrams

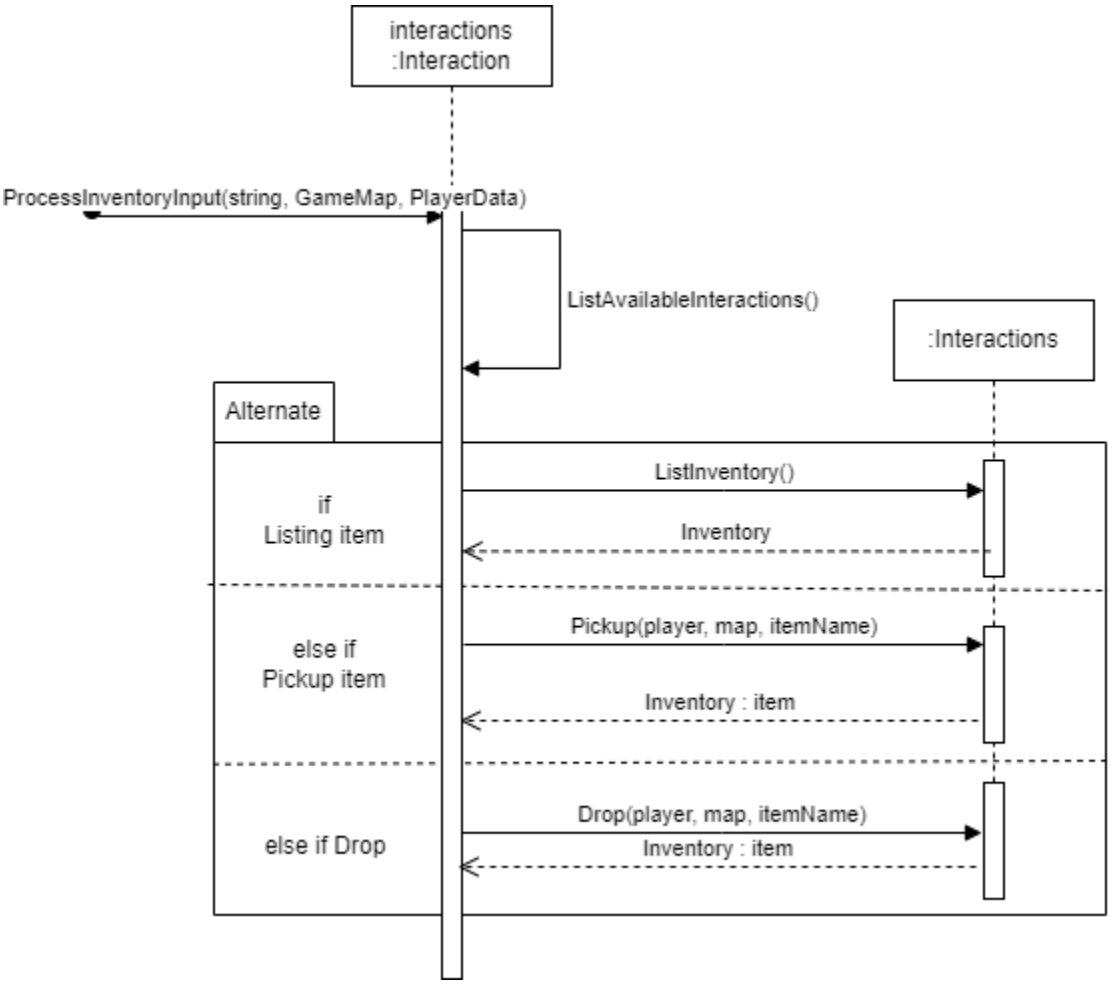
## Environment



**NPC**


Interactions
:Interaction
GetRoomCommand(int x, int y)
ListAvailableInteractions()
:NPCInteractions
Alternate
if
Talking to
NPC
Talk()
Dialog (String)
else if
Give item to
NPC
GiveItem()
Dialog (String)

**Items + Inventory**




# Class Descriptions

# Game Overview

### Plot

- Captain's dead, communications gone, engine is not working. You're a crew member who has to collect items to fix the problems and maybe make some sea cucumber friends along the way.
- First the Soldier man sends you to look for engine parts, you get it, fix it, talk to the Soldier again.
- Second the chef tells you about missing food and equipment, he sends you to look for the source. Gives you keys and a flashlight.
- Looking at the newly unlocked rooms you find the Stowaway who has been causing a ruckus in the submarine.

- During the interrogation on the Stowaway the comms for the submarine is cut. You must find spare parts underwater to fix this grave emergencies.
- The underwater section is unlocked and now explorable. You try to find comms pieces in the dangerous waters. What you do and find there from the randomly generated maps will lead to what ending you get.

## Environment

- Allows for the deceleration/creation of rooms and locations inside of the game. There are two classes which inherit from this class and allow the formation of more specialized rooms able to do things the environment can't. These are ocean and fixable rooms and map entrances

**Variables**

+ interactions : Interaction - a list of interactions for the location, t
# presentCharacters : vector<NPC*> - a vector whitch contains the roms/locations current Npcs which are interactable
#reqItems : Items
# contents : Inventory – the contents of a locations ie the items it has
# locationInfo: string a brief summary of a location, will be outputted upon entering it
# fixed : bool = false

**Member functions:**

+ Enviorment( )
+ ~Enviorment()
+ SetDescription(string)
+ GetInfo() : string
+ GetInventory(): * Inventory
+ FixRoom(*Inventory) : bool
+ RoomFixed() : bool
+ NorthWall(*Coordinate)
+ SouthWall(*Coordinate)
+ RightWall(*Coordinate)
+ LeftWall(*Coordinate)

**FixableRoom**

- Allows for a declaration of a room which is broken on game start and requires items to fix. This inherits and defines it's variables and functions form the environment class

**Variables**

#fixed: bool = false - initially set to false, allows for the room to be checked if fixed, thai will allow for certain interaction inside the game, such as if the engine room is fixed then the sub can move, and new ocean terrain can be generated

#reqItems: Items - the required items to fix

# description : string

# inventory : Inventory

**Member functions:**

+ Enviorment( )
+ ~Enviorment()
+ SetDescription(string)
+ GetInfo() : string
+ GetInventory(): * Inventory
+ FixRoom(*Inventory) : bool
+ RoomFixed() : bool
+ NorthWall(*Coordinate)
+ SouthWall(*Coordinate)
+ RightWall(*Coordinate)
+ LeftWall(*Coordinate)

**Ocean**

- A specialized version of environment witch allows for the spawning of sea creatures like sharks

**Variables**

- SpawnChance : const double the spawn chance which a sea creature will spawn

**Member functions:**

+Ocean(double)

+ ~Ocean()

+ GetSpawnChance() : double

### Entrance

- Allow for the creation of an airlock room, witch will ensure the player has the proper gear to enter the ocean.

**Variables**

**# contents : inventory**

**Member functions:**

+ ZoneEntrence(string[] Interactson ,*inventory)
+ ~ZoneEntrence()
+ EnterSea() – checks to make sure the player wants to enter the see from the ship well wearing the proper gear/equipment
+ EnterShip()

### GameMap

- Holds information that relates to map and interaction with it. this also checks the players cords to see what room they are in/what they can do There are two maps ocean and submarine.

**Variables**

- gameMap : vector<Enviroment*>

**Member functions:**

+ GameMap()
+ ~GameMap()
+ CreateMap()
+ DestroyMap()
+ GetRoom(*Coordinate): *Enviorment
+ GetNPC(*Coordinate) : *Environment

### Coordinate

- Cordnates of the player, allows them to be tracked throughout the game

**Variables**

- xCord : int
- yCord : int

**Member functions:**

+ coordinate(int x, int y)
+ SetX(int)
+ SetY(int)
+ GetY() : int
+ GetX() : int

## PlayerData

- The games player data, allows tracking of information involving the player

**Variables**

- cords : Coordinate
- Inventory : Inventory
- score : int
- fixedReactor : bool = false

**Member functions:**

+ PlayerData()
+ ~PlayerData()
+ GetInventory() : *Inventory
+ GetCords() : *Coordinate
+ SetFixed(bool);

//+ GetScore(): int
//+ UpdateO2(int)
//+ GameOver(Int death):ostream

## Inventory

- Manages inventory management for locations, characters and player

**Variables**

- contents :map<string,Item>

**Member functions:**

+ Inventory(map<string,Item>)
+ ~Inventory()
+ Compare(Item) : bool
+ AddItem(Item)
+ GetItem(string): Item
+ RemoveItem(string)
+ ListContents()
+ Transfer(*Inventory, string)
+ ListContents()

## Item

- A base item definition for the game, there is a child call tool which expanded upon it

**Variables**

- itemname : string
- description : string

**Member functions:**

+Item(string itemName, string desc)
+Item(string itemName)
+ Item()
+ ~Item()
+ SetScore(int)
+ GetName() : string
+ GetDescription() : String
+ GetScore() : Int

## Interaction

- Handles the definitions for the games various interactions, this is the base class which has through children who inherit from it.

+ Interaction()
+ ~Interaction()
+ ProcessMapInput(const &string,
*GameMap, *PlayerData) : bool
+ ProcessInventoryInput(const &string,
*GameMap, *PlayerData) : bool
+ North(*GameMap, *PlayerData)
+ East(*GameMap, *PlayerData)
+ South(*GameMap, *PlayerData)
+ West(*GameMap, *PlayerData)
+ Talk(*Npc) : String
+ PickUp(*PlayerData, *GameMap, const string)
+ Drop(*PlayerData, *GameMap, const string)
+ Look(*GameMap, *PlayerData)
+ Fix(*GameMap,*PlayerData)
+ ListInventory(Inventory)
+ ListInventory(*Inventory)

## UnderUs

- The game's ui/interface. Takes in input and outputs various things to the user. It's really the manger for the game

**Variables**

- running: bool = false
- gameMap : GameMap
- player : PlayerData
- interaction : Interaction
- input : string

**Member functions:**

+ MainMenu()
+ DisplayBackStory()
+ Run()
+ ListCommands()
+ Help()
+ Exit()
+ GetInput() : string
+ ProcessInput(string)
+ UpperToLower(char) : char

## Exceptions

- The game's error handling class.

**Member Functions:**

+Invalid_parameter_error(const char* errMessege)
+Calculation_error(const char* errMessage)

## Constants

- Class for room enumeration.

+ Room : enum {
HallWay,
Reactor
Other
}