Department of Computer Engineering

Bilkent University

CS319 Project

Section 1

Group 1D Risk Takers : Risk Board Game

Analysis Report

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Analysis Report

Project short-name: project title

1 Introduction

The Risk is a strategic game that is derived from the actual board game called "Risk". However, this game will have some different features compared to the real one.

When the game is about to begin, the parts of map, territories, will be distributed among players randomly such that each territory associated with a player. The purpose of a player is to invade all territories to win the game.

2 Overview

For the overview of the game, player can transfer units between his territories or he can add new units to his territories. In order to invade other player's territory, a player needs to attack them. While attacking, dice will be rolled and the result will determine the success of invasion. The player can only attack or transfer his units with the territories which are border connected.

2.1 Actions

2.1.1 Transfer unit

After clicking the "transfer unit" button, the player has to choose first territory from where he will transfer units. Then, he will decide the amount of units that will be transferred and a connected (there is a path composed of player's own territories) territory into where units will be transferred.

2.1.2 Add unit

In order to add new units player needs to choose the territory first, then by clicking "add unit" button player can add new units by specifying unit amount. However, player can add new units only during Draft stage.

2.1.3 Attack territory

Firstly, the player will click “attack” button. Then he will decide the amount of attacking units and the target territory (can be only neighbors). At the end, they will click “roll dice” button for rolling dices.

2.1.4 Next phase

In each turn, player can use all three functions. However after using a function, player has to click “next phase” button to use next function. If player has used all three functions, turn will change to other player after clicking “next phase”

2.2 Components

2.2.1 Map

The game will be played on the map which is composed of territories and oceans between them. The map will be composed of 6 continents and 42 territories (Figure 1).

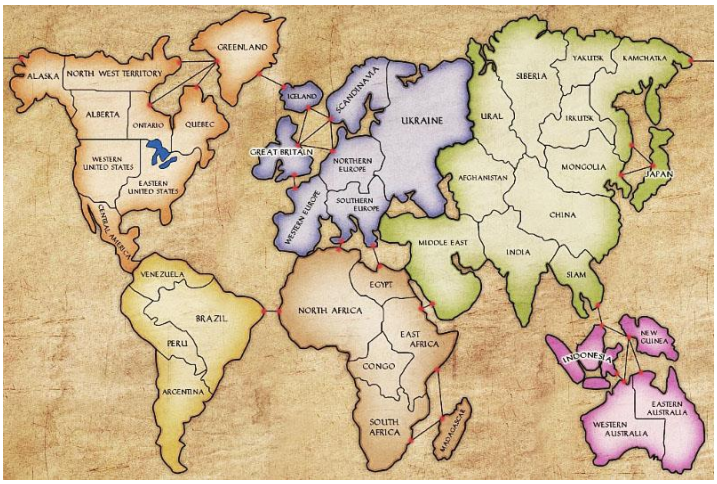


Figure 1

2.2.2 Territory

The Territory represents the region (Figure 2). Each territory has its own card and owner. Territories can be invaded by other players. Each territory possesses some amount of units more than zero. Some actions over territories constrained with the border connections with other territories.

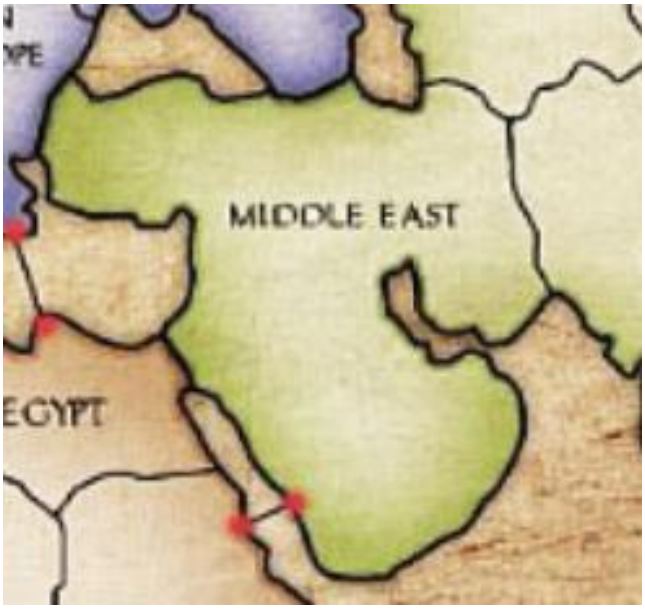


Figure 2

2.2.3 Unit

Each territory have some amount of soldiers more than zero. Number of the units in the territory is represented by the number on the soldier figure (Figure 3). Soldiers are used for attacking or defending

Figure 3

2.2.4 Territory cards

Each territory has its own territory card(Figure 4). They can differ in 3 ways that are shown by stars. Stars decide the amount of units can be spawned in game if 3 of that same star-level card are acquired.

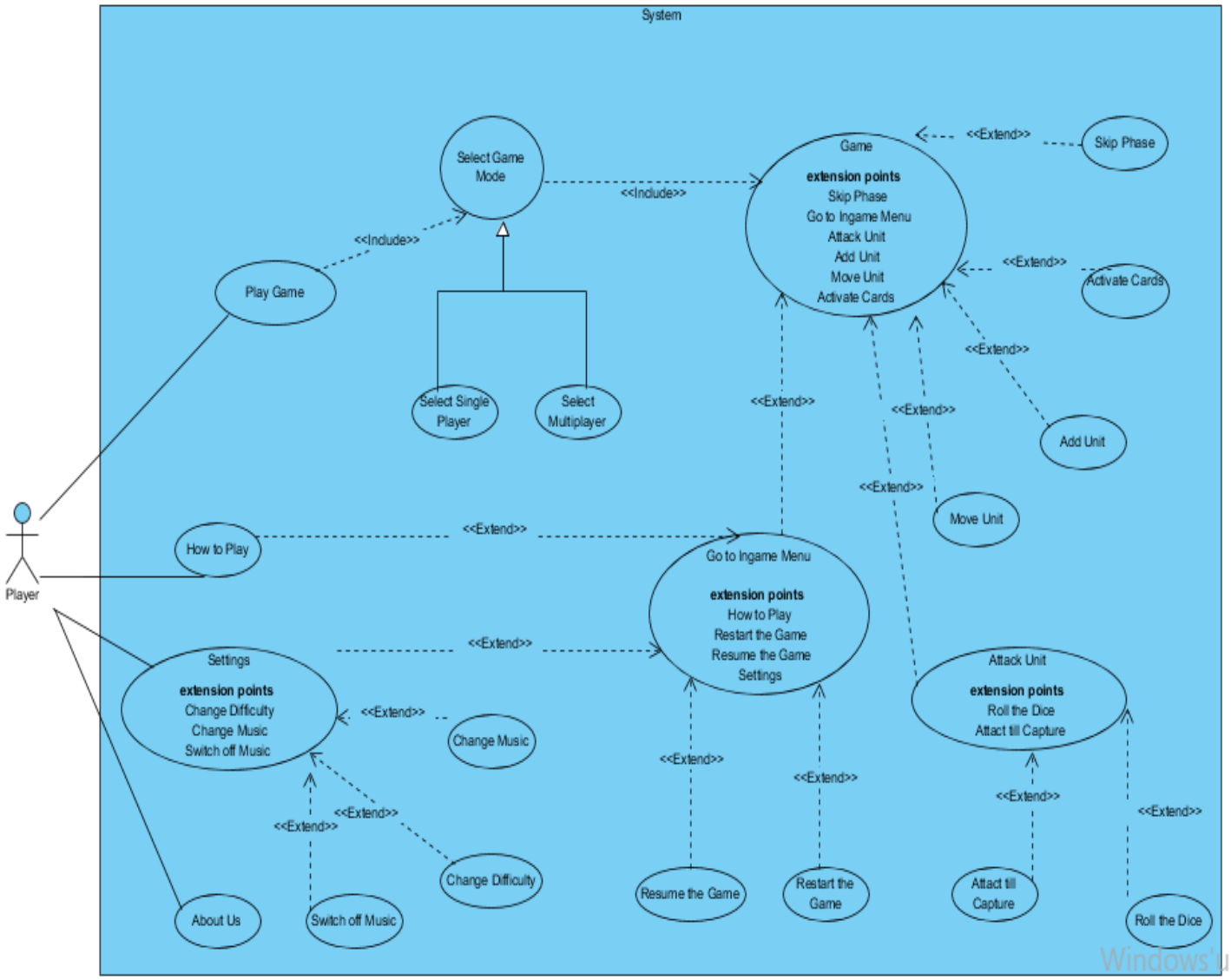
Figure 4

2.2.5 Player

Player is the most fundamental component of the game since game is not a game without a player. Each player has a unique color to symbolize their own territories.

3 System models

3.1 Use case diagram



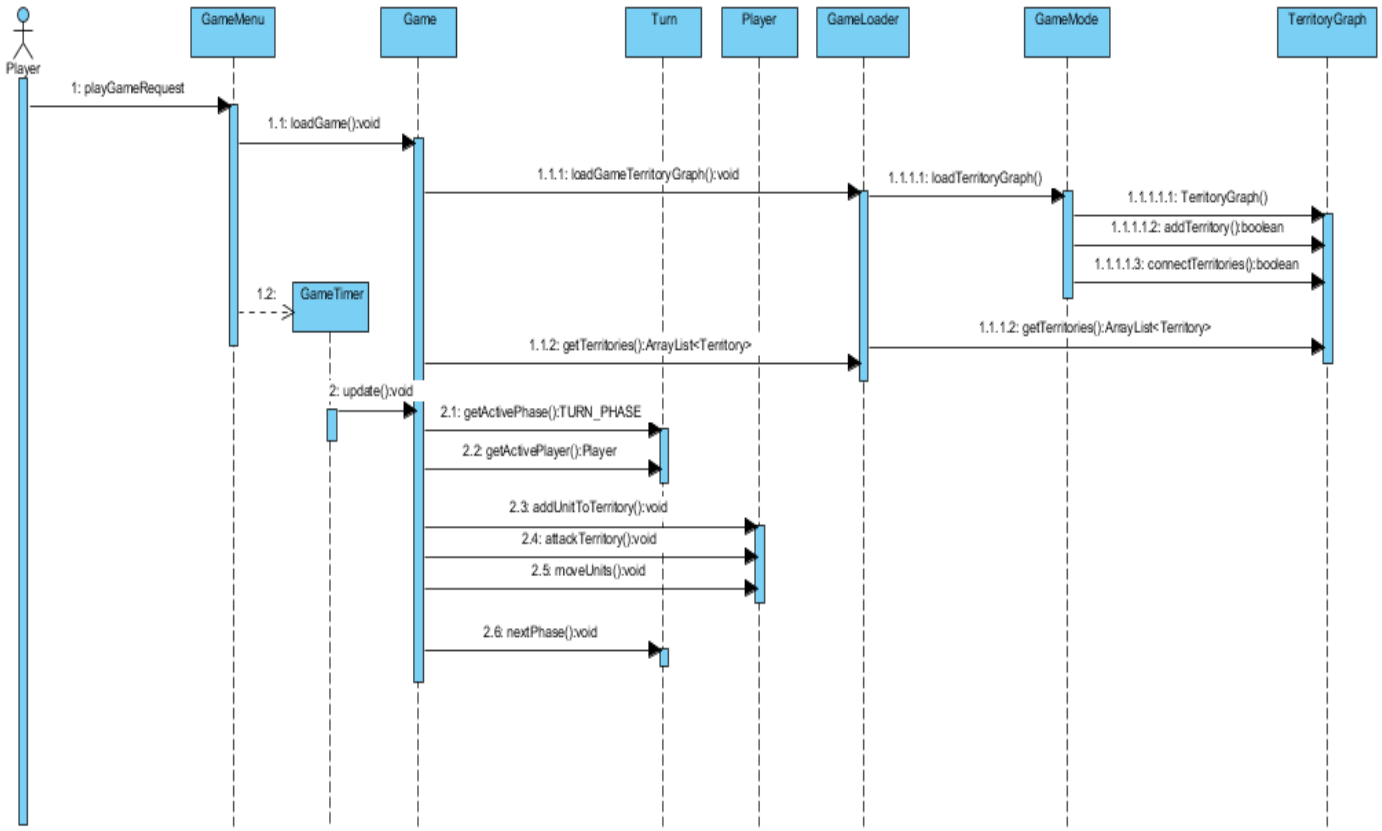
In use case diagram idea, we can define our actor as player. Here are the options that offered to the player as cases.

At first actor is welcomed by the menu that he can decide to go ‘How to Play’, ‘Settings’, ‘About Us’ and ‘Play Game’. At settings actor can change music, difficulty or the volume of the music. At Play Game actor decides to play the game as solo or multiplayer and then the game starts. Actor plays the game by skipping

the phase, activating cards, adding unit or moving units and attacking to territory. Additionally actor can go to the in game menu that provides actor to look for how to play, restart the game, resume the game or go to settings menu. Result of attacking to territory is decided by dice that is implemented.

3.2 Sequence diagram

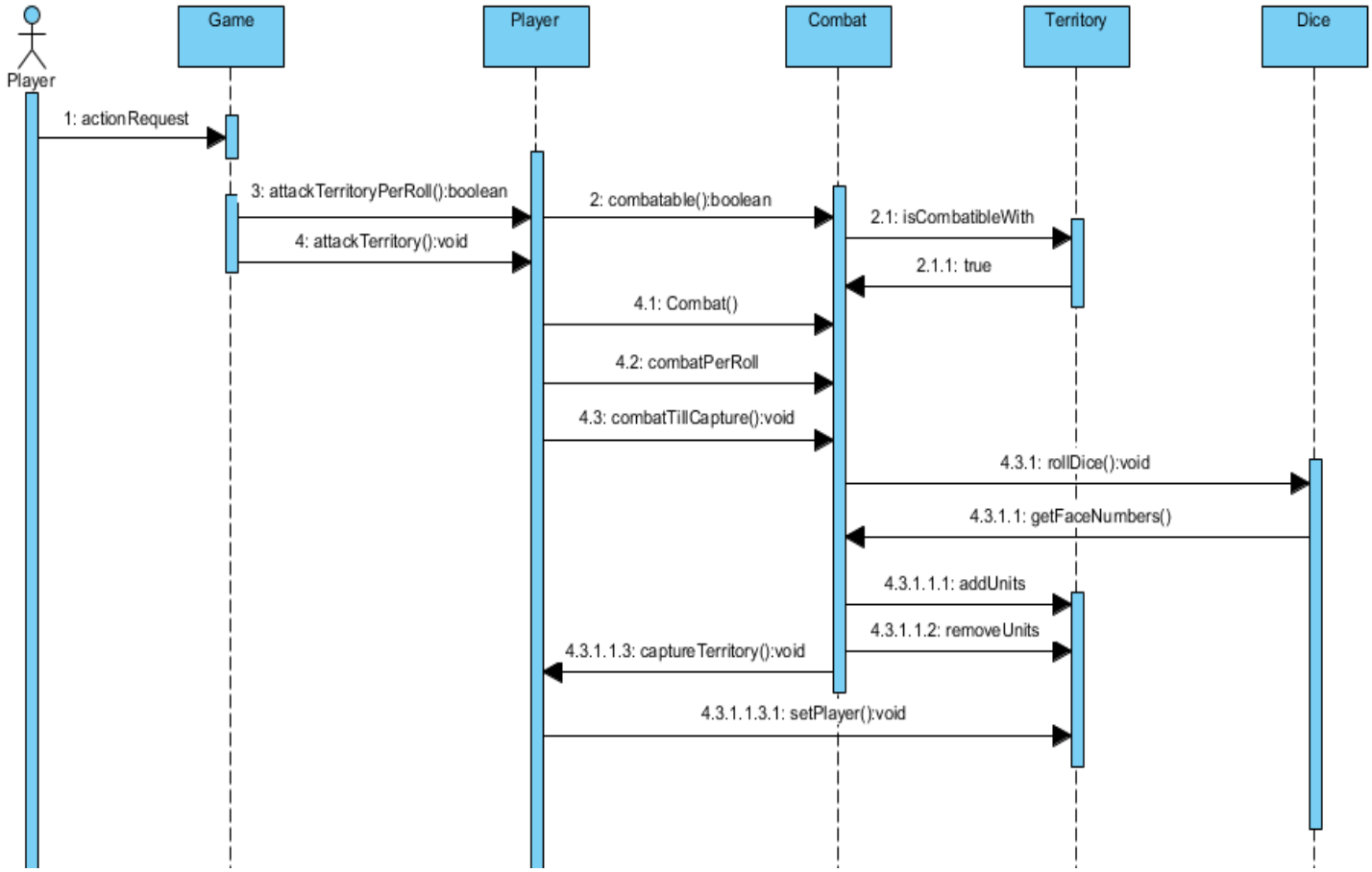
3.2.1 Game load



Here is how to work game load mechanisms in the background. When players send a playGameRequest. Game class first load the game as initial version depending on which game mode selected in which players randomly get their initial territory and one unit on them. After game initialized, game class is constantly updating the state of the game concerning with the inputs of players. According to the input and the

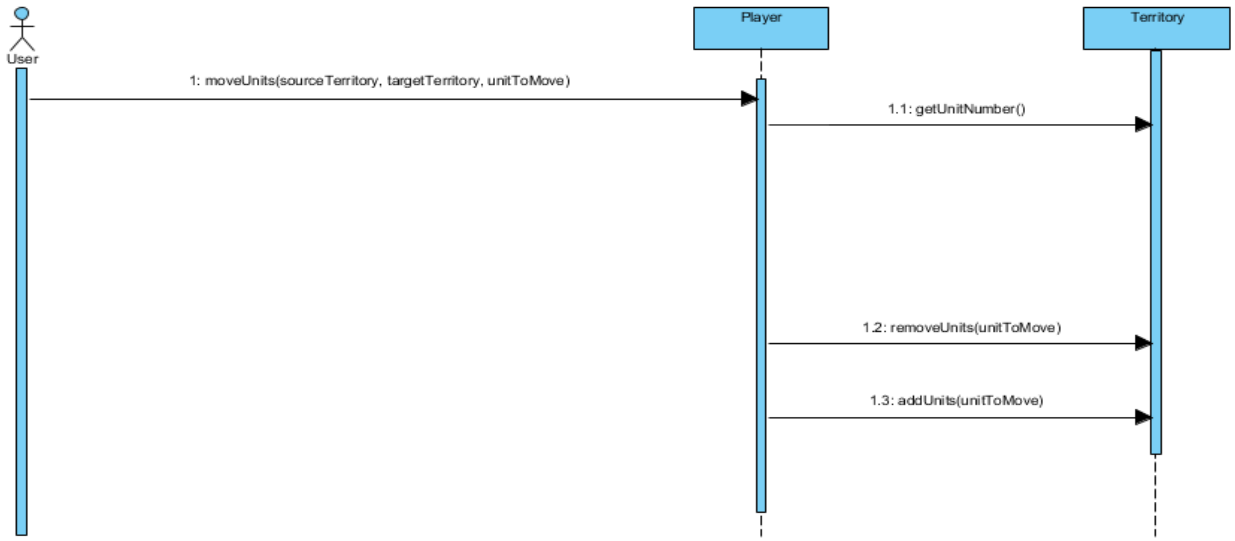
phase of game, there is several actions to be done. Game class handles such stuff properly.

3.2.2 Attack



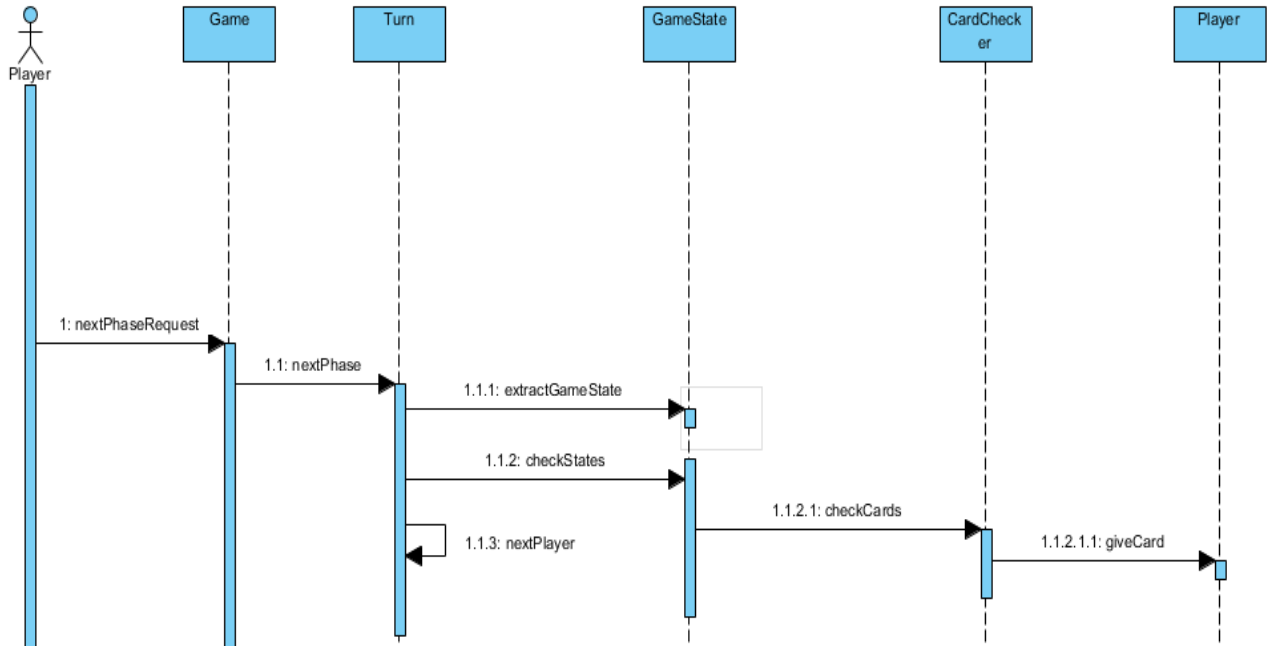
This is the sequence diagram of Attack action. As it can be seen from the diagram above in order o attack player needs to choose one of his own territories then choose any territory in border which can be possibly attacked, then roll the dice in order to start the combat. Dice object will determine the destiny of the game and that's the risk.

3.2.3 Move unit



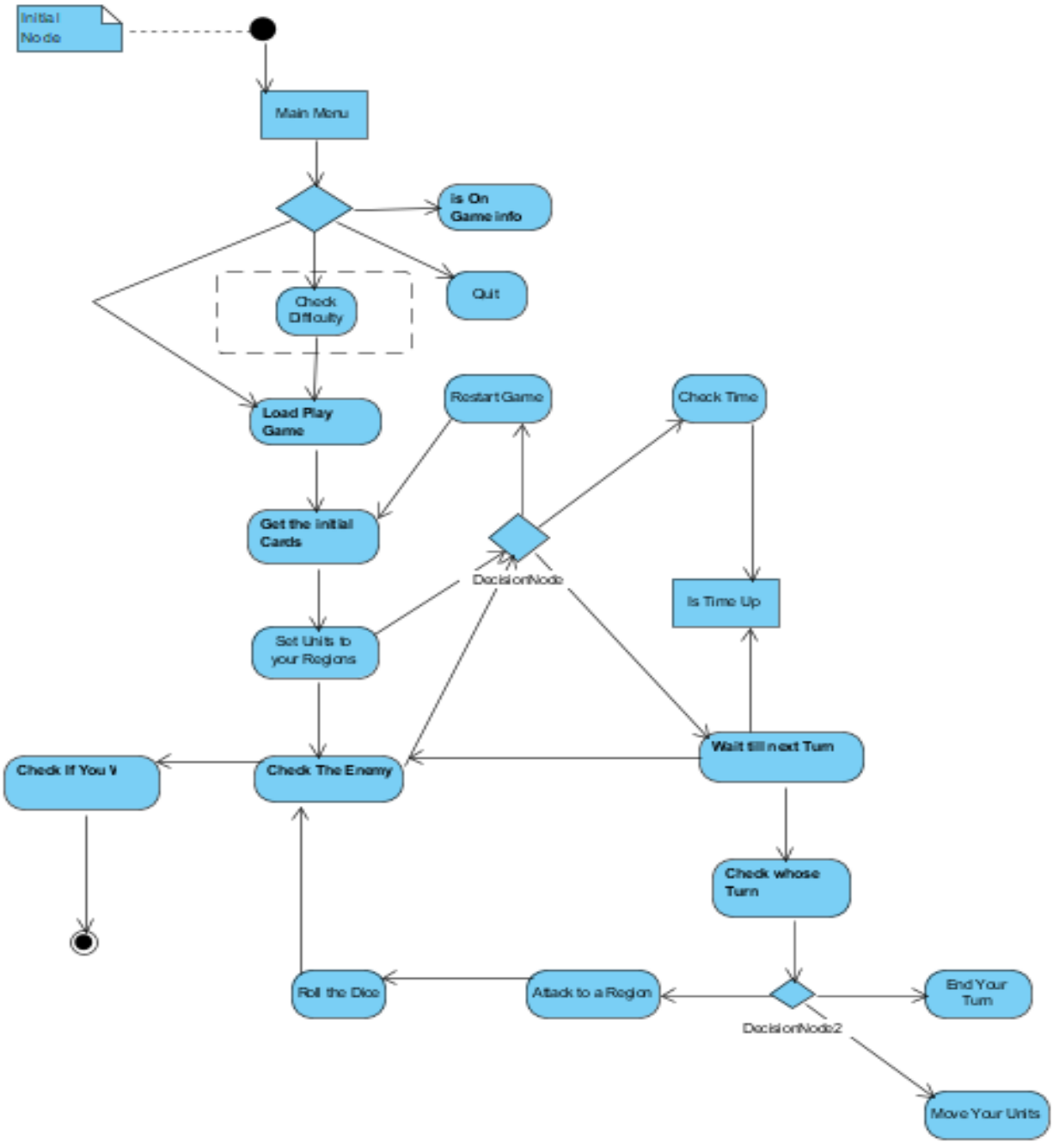
This is the sequence diagram of Move unit action. As it can be seen from the diagram above in order to move units from one territory to another, player can choose one of his territories, whose number of units is more than or equal to 2, then specify another one to move into.

3.2.4 Next phase



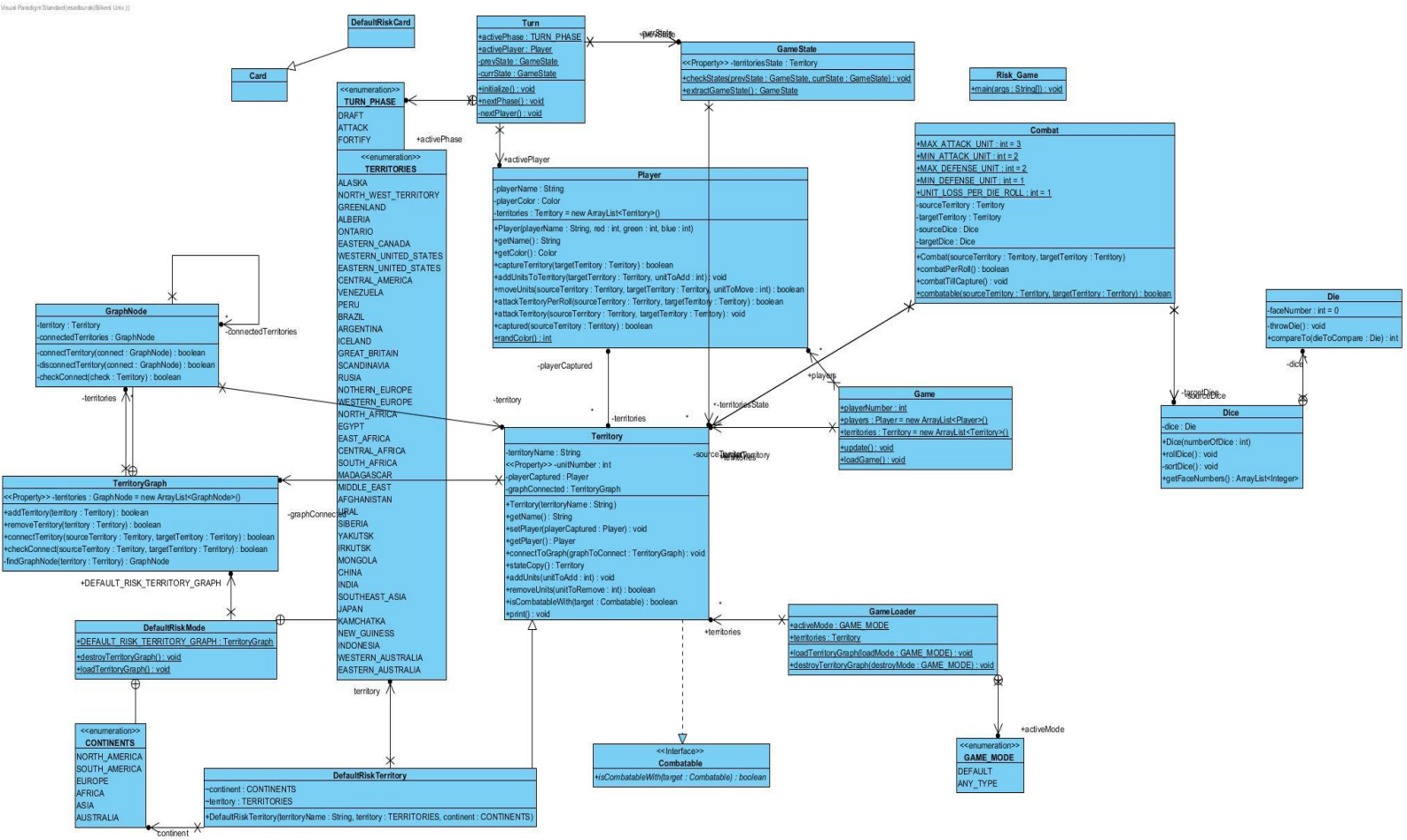
This is the sequence diagram of next phase action. In the next phase action there are three possible options. Which are Draft, Attack and Fortify options. As it can be seen from the diagram above after all these three stages executed it skips to the next player.

3.3 Activity diagram



In the matter of activity diagram, there is initial node and goal node of the player. The diagram above defines the initial node as to start a new game and the goal node as to win the started game. Along the path from such nodes, there are many decisions for the player to make, like checking difficulty and which action needs to be taken further through evaluating the state of game and enemies' positions.

3.4 Class diagram



3.4.1 Game

Game class executes operations for the essential functionalities of the game. For instance, while initializing the game it interacts with GameLoader according to chosen game mode. This class decides the game's direction depending on incoming actors' inputs.

3.4.2 Player

All actions of player are controlled with this class. For instance, in implementation, territorial actions called over player not directly from territory class.

3.4.3 GameLoader

This class initializes the territory graph of game class according to specified game mode.

3.4.4 GameState

This class determines which card is given to the which player by comparing the previous state and the current state.

3.4.5 Territory

Territory class holds the information about the territory such as the units inside and which player is holding the territory.

3.4.6 Combat

Combat class decides the result of the attack by using dice class.

3.4.7 Dice

Randomly generated dice implementation.

3.4.8 TerritoryGraph

In a map it specifies all the present territories and which territory has a bounding with which territories.

3.4.9 Turn

Turn has 3 stages which are Draft, Attack and Fortify. Such class determines which phase to go and which players are waiting.

4 References

[1] http://www.ultraboardgames.com/risk