

From HTML to PostGIS
Group project
Strategy Game Documentation

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Chapter 1

Specification

This document is a game specification, describing the game rules, technologies used and tutorial at the end. The idea of this game is based on a board strategy game Risk, it follows the main rules and goals, however there are some changes applied in order to make the gameplay faster and more exciting. The main objective and victory condition, is to conquer all tiles, which equals to elimination of other players. There are no restrictions regarding communication between players i.e. formation of alliances and scheming is allowed. Furthermore, after teaming up with somebody there are no obstacles to betray that person and attack his territory. Freedom of choice, strategic thinking alongside with diplomacy are the main aspects of this game.

1.1 Gameplay rules

The whole map is divided into territories, which depends on chosen map variation, taken from real world political regions for example US states. On each territory there is an army of minimum number size of 1. In effect, after the game starts, there are no empty tiles. Moreover, some territories are grouped up into big regions, where possession of all territories from one particular region gives additional bonuses described later. An important fact to note is that division of territories into regions is considered as an additional feature which can enhance the gameplay. Therefore, the game in its final release state doesn't support the ability to gain additional troops from occupying all territories which are grouped into one region. This, however, can be implemented in the future as one of the updates. An image based on example of United States map depicts how it should look approximately.

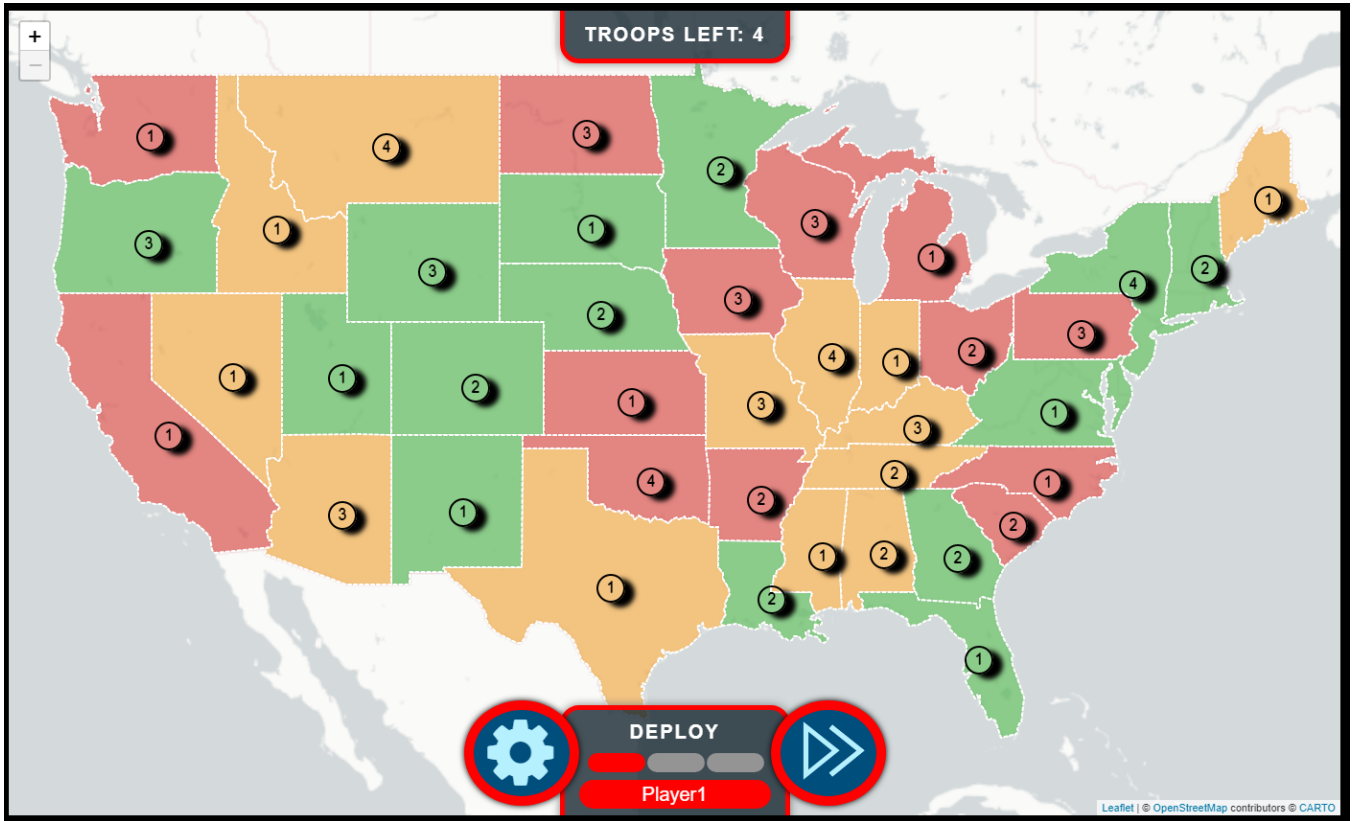


Figure 1.1: US map divided into territories. Screenshot from our game

1.1.1 Player connection

The project, in its initial state, anticipates the possibility of having from 2 up to 4 players, playing at the same time on the same device using chosen browser. That is there is no feature of other online player and the only possibility is to create a LAN party - hot-seat multiplayer mode. However, in the future, there are no restrictions to further develop the game and implement socket connections and web hosting to enable multi-device gameplay.

1.1.2 Game flow

The game is turn-based i.e. the game flow is divided into predefined states, called turns or moves. There is no forced time limitation regarding the length of player's move, and it is up to users if they want to define one. The main game flow is sequential i.e. players decide upon the order of executing turns and only one player can make a move at a time. The game initialization begins the process where players can deploy their initial troops on starting territories. Depending on a map the number of initial territories can vary, however each player receives the same amount of territories and, in effect, same amount of troops on game start. After the game is initialized the first player begins his turn.

The most important fact is that each turn consists of three phases, each ending when user presses appropriate button:

1. Deploy phase

At the beginning of each new turn (including the first one) a player receives new troops and you put them on your territories

- The number of troops depends on the number of territories you already possess. This number is obtained by following equation: $number_of_territories/3$. For example when a player

possesses 9 territories he gets 3 new troops. When number of territories is not divisible by 3 player gets lower bound. For instance 10 equals to 3 new troops.

- Additionally, a player can receive more new troops by occupying whole region (occupy all territories which belong to particular region). Depending on a map variation, each region has its own predefined number of troops it can supply. For example US West Coast can supply 4 additional troops each turn. Bonuses stack so by having e.g. 2 regions player obtain bonuses from each of them.

2. Attack phase

After deploying all your new troops a player can decide to attack other players. If player decides to attack his/her goal is to take over the territory of another player by defeating all troops this player has on particular territory. This is achieved by computer simulations (throwing dice). In case of win of the attacker all of survived attacking forces -1 are moved to attacked territory and defending party lost all their troops including possessed territory. On the territory from which the attacker performed the attack, in case of win, there is only 1 troop.

There are several rules to be followed during the attack phase:

- Player can attack territories which are directly connected to his territories.
- Player can attack only one territory at a time by using his troops from one of his territories.
- Player has to possess at least 2 armies on territory from which he decides do attack.
- Player can proceed his attack any territory as many times as he wants and he/she fulfills the attack requirements.

Important: There is no need for a player to attack in this phase. This phase can simply be skipped by clicking next phase button.

3. Fortify phase

In this phase player can relocate their troops from one friendly territory to another without distance restrictions. This phase can be devoted to move troops in order to plan an incoming attack or defend against another player's aggression. It is important that there always must be 1 troop staying in one territory.

After player clicks next phase button in Fortify Phase his turn is ended and next player in queue begins their turn.

1.2 Technology

The Application is planned to be divided into two components client and server. The client side is a web app which is written in HTML, CSS and JavaScript. The main feature of this application is interactive map with whole interface and dynamically painted polygons. Therefore, the technology used for map implementation is: Leaflet as map API, Esri and Turf plugins for markers and polygons logic, additionally to improve the readability of code - jQuery library. Moreover, to implement real world polygon borders we used json objects which contain world data coordinates to paint polygons on map. The client side communicates with the server side using REST services, AJAX calls in JavaScript and HTTP requests are handled by the C# server application written in .NET core framework.

1.3 User stories

In our project the main and for now the only Actor(in UML sense) is Player. For any Player of Risk game we summarized and listed the following User Stories that will be helpful during production and deployment stage. Player's stories are presented in descending order of priority i.e. features on the bottom are optional ones.

- As a Player I want to see who's turn is now to know when is my turn.
- As a Player I want to see how many troops there is on a territory to plan my strategy.
- As a Player I want to see what phase it is to play the game.
- As a Player I want to place new troops on my territories to improve my strength.
- As a Player I want to know how many troops I got every turn to be able to locate them on map during Deploy phase.
- As a Player I want to attack other players to gain new territories.
- As a Player I want to see tiles that are near my territories to know which I can attack during Attack mode.
- As a Player I want to see who won the battle to proceed with my turn.
- As a Player I want to relocate my armies to execute my strategy.
- As a Player I want to select one territory to be able to move my troops to new selected location.
- As a Player I want to see the number of territories with number of troops that each player has to know who is the strongest.
- As a Player I want to see which territory belongs to which region to prepare my strategy.
- As a Player I want choose a color for my territories to distinguish them from other Players.
- As a Player I want to have an option to return to main menu when I have to finish game quickly.
- As a Player I want to see Settings button to pause the game or see lookup the game rules.

Chapter 2

Game tutorial

All of game rules were in detailed described in previous chapter, however, this part contains user interface explanations and how to make moves in the game.

1. **Game initialization** In order to start the game user has to click NEW GAME button when having start game menu open.

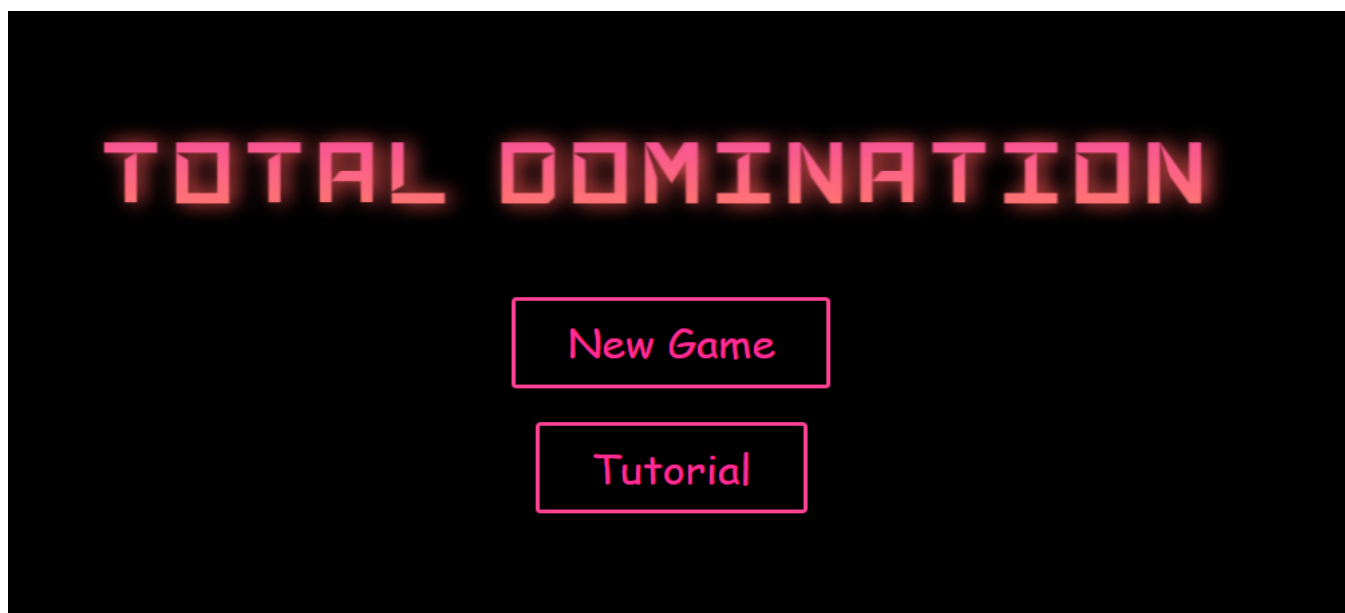
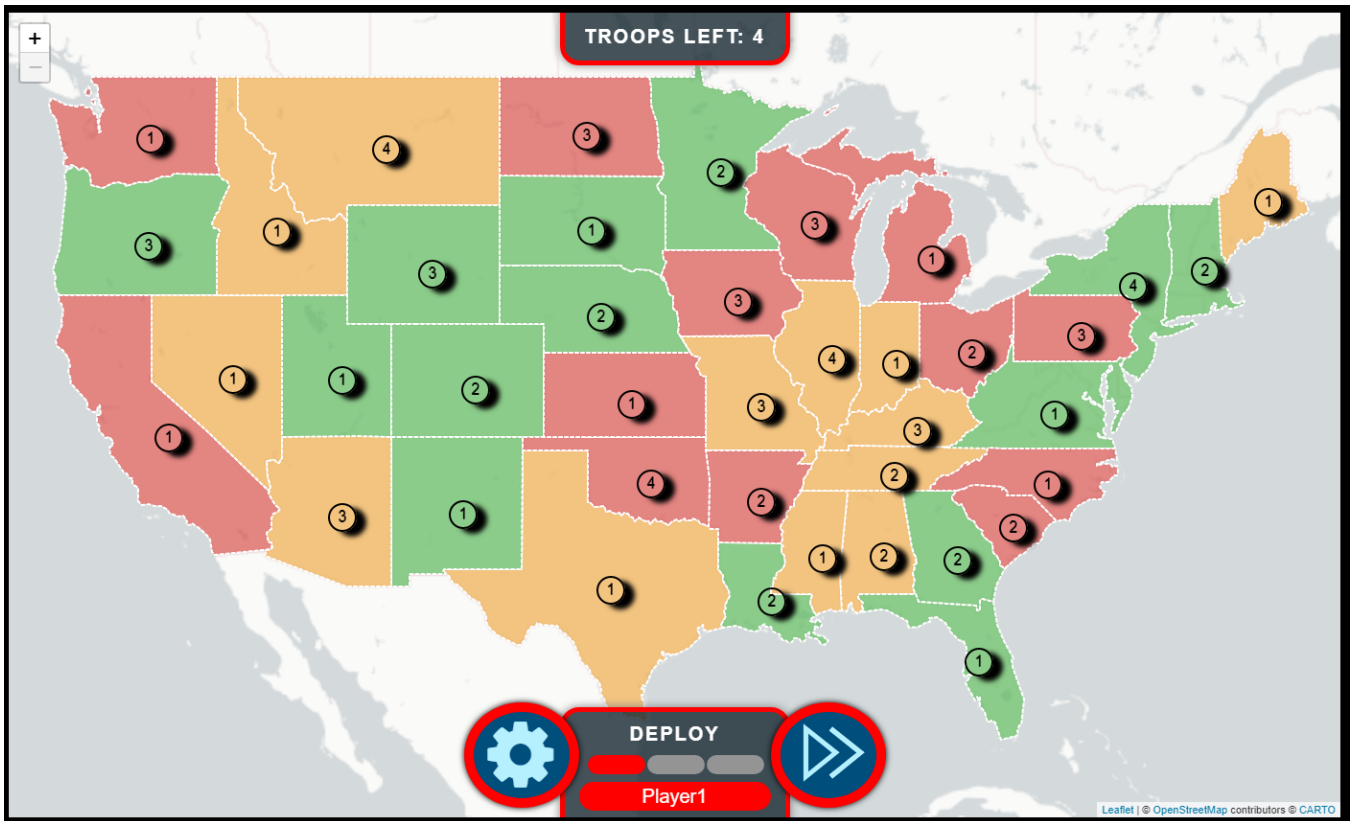
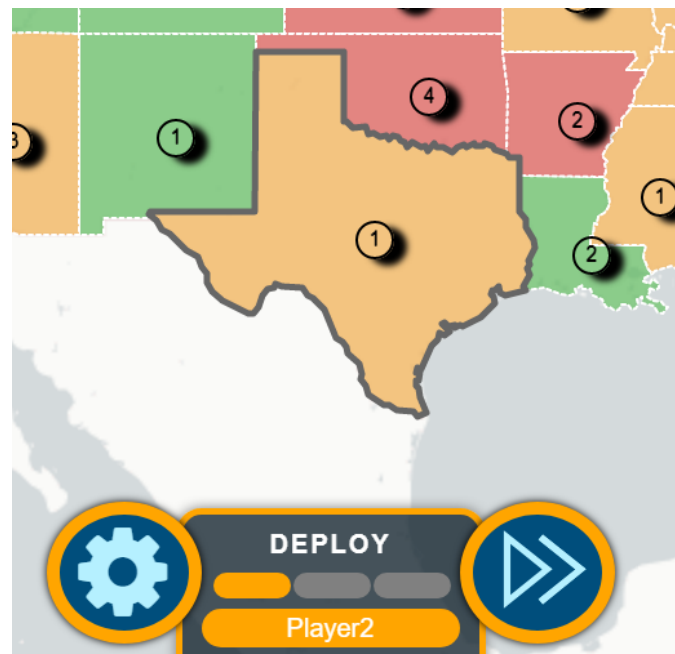


Figure 2.1: Starting screen. At first, players can only see start menu with two options: New Game and Tutorial

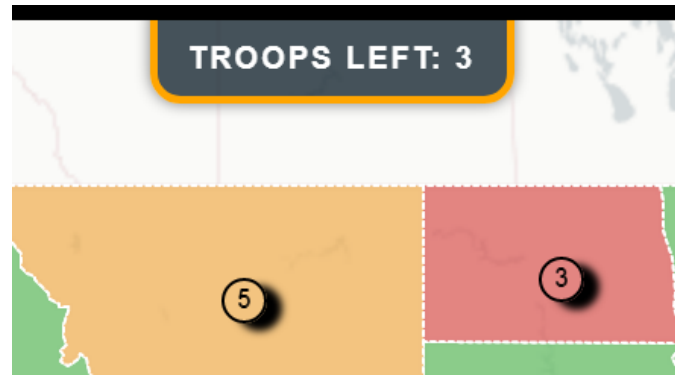
After the button is pressed the screen transition to a game map which starts immediately the turn of first player - red color. The colors of second and third player are yellow and green respectively. The player can easily distinguish whose turn it is by the border color of the interface. All borders' colors dynamically change depending on whose turn it is.



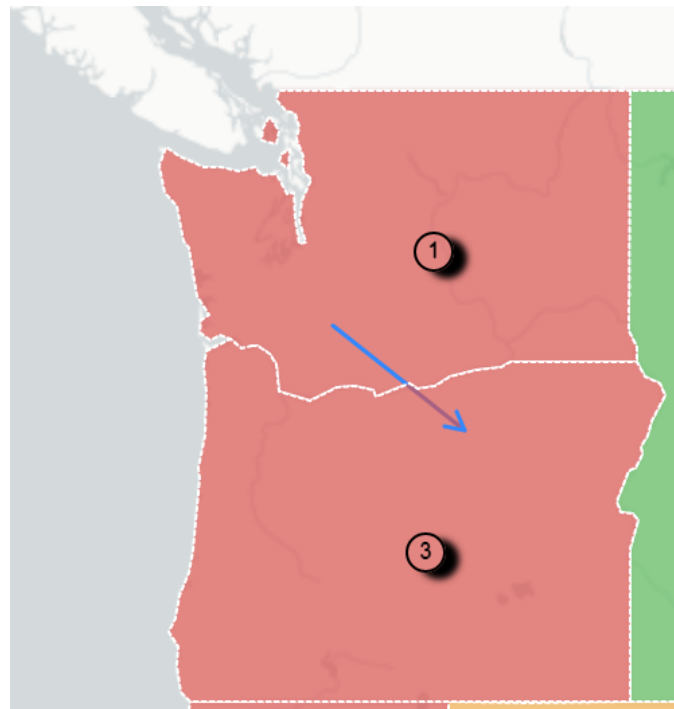
- 2. Deploy Phase** In this phase you can add your new troops to territories which corresponds to your player color. Additionally you can see with which territories you can interact by hovering on them. Territories which you can interact with are highlighted with grey border.



Moreover, you can see how many troops to deploy you have left by looking at panel on the top. It's displayed only in the deploy phase. After you finish adding your troops there is nothing else do to and next move is to press arrow button to go to next phase.

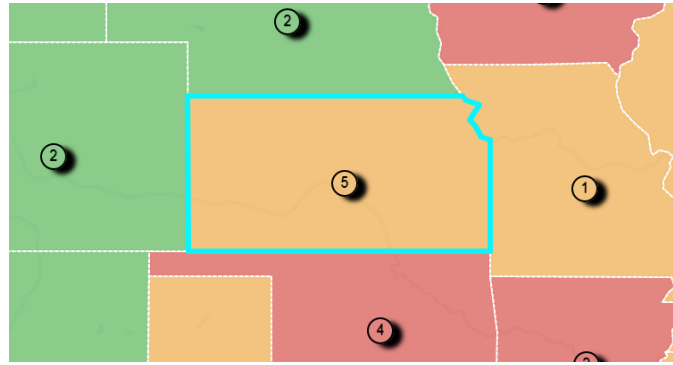


3. **Attack phase** In this phase you can attack other players' territories. You can do it by clicking on one of your territories from which you want to perform the attack. After you selected origin of the attack, then you have to click on one of enemies' territory which are directly connected to the attack's origin. After you click, some simulations are performed and, depending on the result you will see whether you won or not. Of course if you win you gain the attacked territory and most of your troops are relocated to this territory, while all defending forces are gone.

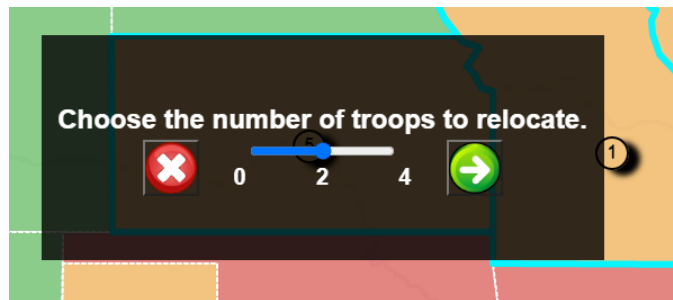


After the performed attack you can see an arrow which indicates the origin and destination of the attack. You have to remember that you can attack from the territories on which you have at least 2 armies. You can proceed the attack as many times as you want.

4. **Fortify phase** In this phase you can relocate you troops from one friendly territory to another. You can do it by clicking on one of your territories, which has at least 2 troops, and then you can choose the territories to which you want to relocate those troops. Selected territories will highlight in light blueish color.



After you selected second territory there will appear a window in which you can choose how many troops you want to relocate. Remember that at least 1 troop has to be present on first territory!



You can repeat this action as many times as you want. After you are finished press the next phase button which, in this case, will start next player's turn.

5. **Win screen** In the event of conquering all territories by one player the game is stopped and a message appears on the screen informing who has won and after clicking the button it redirects to the initial game menu.

