

Bilkent University

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ELEMENT WARS PROJECT

ANALYSIS REPORT

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1. Introduction

We are group-8 of CS-319 course. We name our course project as 'Element Wars'. It is a turn based collectible card game (CCG). Since it is not a well known term, we start our report by giving some information about collectible card games (CCG). Then, brief description of the game we try to implement is given. Requirement specifications are explained under two parts: Functional and nonfunctional requirements. After requirements specification section, system models are described in detail. System model section contains use case, sequence, state and activity diagrams. The last section demonstrates user interfaces mock-ups and game navigation buttons.

2. Overview

2.1. General Information about CCG Games

Collectible card games, also known as trading card games, are card games which uses set of cards specifically designed for a game. If they are compared with classical card games like solitaire, poker etc. these classical card games uses the same deck, generally consist of 52 cards. However, cards of a CCG game is unique for that game, another CCG game uses another set of cards. Also, players use the same deck in classical card games whereas every player in CCG games has its own deck. For example, if a CCG game is played by 2 players then there are 2 decks in the play.

CCG games do not have a very historical backgrounds, they started appearing in the last two decades. First of them was 'Magic the Gathering' developed by a game company, 'Wizard of the Coast'. Then, many of them were published by several companies, like Card Fight!! Vanguard, Yu-Gi-Oh, Illuminati and Hearthstone. Our project may seem as a digital clone of these games.

2.2. Element Wars

Element wars game is played by two player: A human player and an AI player. Player plays against the AI. Every player has a castle and castles have durability point representing players' health. The goal of the game is to reduce opponent's castle durability to zero.

Before starting to a game, player is expected to build a deck of his/her own. The player may select a deck he/she build before or create a new deck. After selecting a deck, the game starts. Every player draws a specific number of cards from his/her deck. Player playing first is selected randomly. Each turn players receive a energy crystals. Energy crystals are the substances used in order to play cards. Players can play a card only if they have enough energy crystals.

2.2.1. Game Board

Game board consists of 5 areas. 'Deck Pile' area contains the player's cards. In the beginning of the his turn, he draws a card from this area. 'Discard Pile' area the set of cards which are formed from dead character. When a character is killed, it is sent to discard pile. 'Hand' shows the cards that the player currently has, player plays cards from only his hand. 'Battlefield' is the area for played, active cards. Players use the characters on this area to attack and defend and the last area is 'Castle' which shows the number of durability of the castle of the player. This number can be considered as the health of the player.

2.2.2. Cards

Cards players play are generally represent a character. Characters have cost, attack and health points. Also, some character may have special abilities. Cost point determines the number of energy crystals the card consumes in order to play it. Attack point is the number of damage the card deals when it attacks to another character. Health points is the number of damage needed to kill the character.



Sample Card

At the top of the card, the name of the card and energy crystals needed to play the card are located. There is also an artwork of the related card. Type of the card appears in the middle of the card. If card has any special effect, it is located under type label. At the very bottom of the card, there are two number. The number at left represents attack point of the card and the number at right specifies defense point of the card. For example, The name of the card given as sample is 'Wings of Greed'. It is energy cost is 3 (There are 3 crystal symbol at the top-right of the card). It is represented by a red dragon image and its type is dragon. There is an extra condition of the card to be played. It has 5 attack and 8 defense points.

2.2.3. Turn Phases

Flow of the game is determined by turns. After a turn, another turns begin a turn passes to the other player. Each turn comprises of 4 different phases.

Draw Phase: First phase of the turn. Player who has the turn draws a card from his deck.

Beginning Phase: In this phase, players cannot take any actions. Any effect of cards containing 'at the beginning of the turn' keyword occurs in this phase.

Play Phase: Main phase of the turn. Player may play cards or use cards which are on the battlefield.

End Phase: Pretty much like beginning phase. Effects that contain 'at the end of the turn' keyword occur. After that, turn passes to the other player.

Also note that, if a player's health is reduced to zero or below at any time, the game is over and player who has more than zero health wins the game.

3. Requirement Specification

3.1. Functional Requirements

3.1.1. Play Game

This function is required and the most basic feature of the game for the players is starting the game. The user selects the play game button and Element Wars and player tries to beat to computer by playing card in his/her deck. If player didn't create a deck before, s/he starts the game with the default deck which is provided by the game.

3.1.2. Settings

Settings option is the part of the main menu where players can change the external effects of the game manually. For instance, user can change the background color. User can also change the back image of the cards. In addition, if player wants to use the deck s/he created before on other device, s/he can import it by choosing the file as well as export the deck that s/he created on this device. Player can also go back to the default settings.

3.1.3. Manage Decks

Since user needs a deck of cards to play the game, s/he would create a deck to play with his/own choice of cards rather than the default one. In order to create their custom deck, all of the cards on the game will be displayed to the player. Player will choose a certain number of cards to create his/her own deck. Just like creating a new deck, player can delete a deck that s/he created before. If player want to change some cards on her/his deck, s/he can also edit their remaining deck.

3.1.4. Help

Help option provides the necessary information about the Element Wars game. Users can find the rules of the game. Also instructions about how to play the game. This is an important function for new users who doesn't know how to play the game. Also old users can check the rules again to be sure.

3.2. Nonfunctional Requirements

3.2.1. Performance

Since the game is initially designed as single player game, there is no reason to make the player wait. Game menu transitions will not have long animation delay. Moreover, the game is played against an AI so AI should take its decisions quickly. However, right now it is not possible to predict this decision time. Design process of the project probably helps us at this point later. In short, game should respond fast enough to not make players bored.

3.2.2. Easy to Use

Element Wars is a hard game by its nature. Even without necessity to know cards, players have to know fundamentals mechanics, tradeoffs and making right decisions. If we also consider card effects, it's quietly difficult game to master. Therefore, other parts of the system should be as easy to use as possible in order to lighten this learning phase load. Graphical user interface should be prepared as simple. Players should be able to navigate any page they want by clicking a few buttons. Also, cards itself should be explanatory. Players should know effect of cards even if they don't play those cards before.

3.2.3. Robustness

The game has great replayability. A small changes in decks can create various gameplay. Addition to deck changes, adding new cards into the game collection provides enormous variations. Therefore, the game should be designed carefully so that adding new cards, effects or mechanics should not affect the cards that exist already.

4. System Model

4.1. Use Case Model

4.1.1. Use Case UC1: Play the Game

Scope: Element Wars

Level: Subfunction

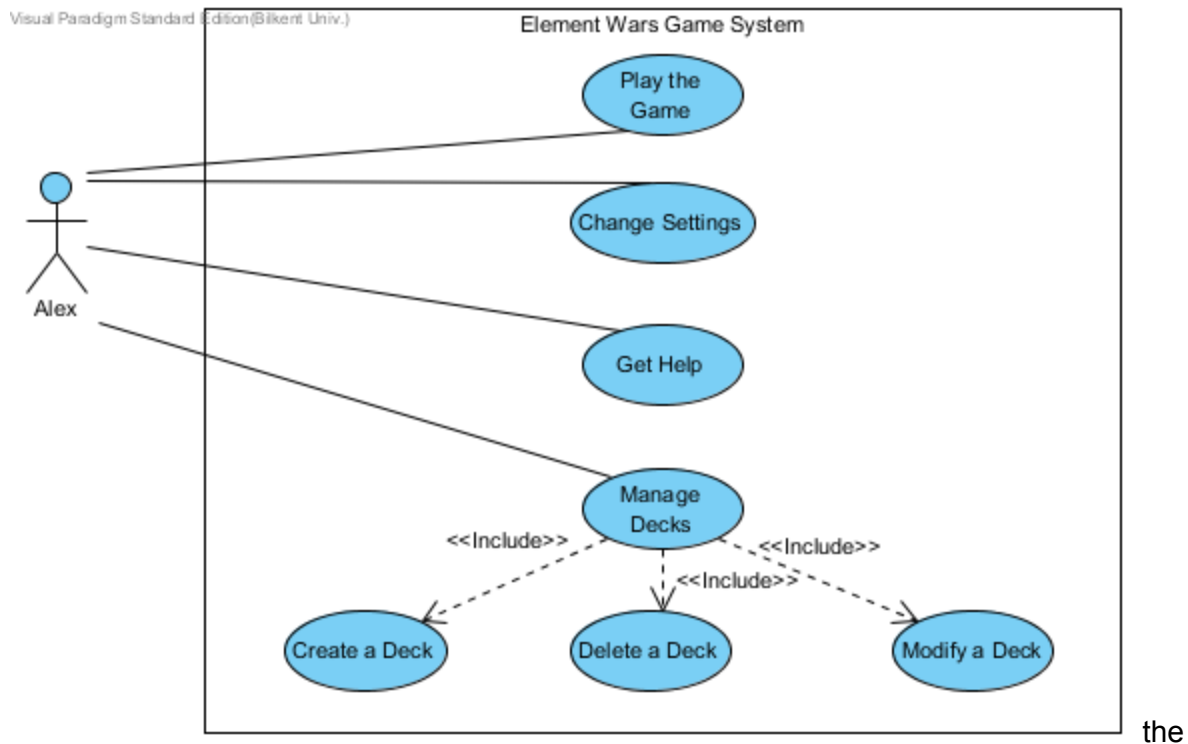
Primary Actor: Player

Stakeholders and Interests:

- User: Wants to start and play the game..

Precondition: Player has already opened the game and is on the main menu.

Success Guarantee: Player plays the game and



game is over, result screen appears.

Main Success Scenario:

1. Player selects "Play Game" option in the main menu, deck selection screen appears.
2. The player selects the deck he/she wants to play with and then press "Start the Game" button and the game starts.

Extension:

- A. Player changes his decision and wants to return the main menu. Clicks "Back" button on the screen and then returns the main menu.
3. The game gives each player a specific number of cards from their decks.
 4. Coin flips and starting player is chosen randomly.
 5. Turn starts and the owner of the turn draws a card from his/her deck.
 6. Beginning phase of the turn starts and any related effect resolves.

7. Play phase starts. If it is AI player's turn, it plays its turn by looking its predefined rules. If it is player's turn, he/she also play his/her turn.

A. Player chooses to not play anything and clicks "End Turn" button.

B. Player chooses to play cards and clicks the card he/she wants to play and then clicks "End Turn" button.

1) Player has enough energy crystals to play the card and card is played on the battlefield. Any effects related to this action resolve.

2) Player does not have enough energy crystals to play the card and a warning message appears.

8. Player also may use his characters on the battlefield to attack.

A. Player should first choose which character he wants to attack with.

B. Then choose an enemy character he wants to attack.

Extension:

1) If the player chooses a wrong target such as a friendly character then a proper warning message appear and game expects the player to choose a valid target.

8. After all actions play phase ends, end phase starts. Any related effect resolves.

9. Turn ends, it passes to the other player.

10. Turns are passed until one of the players' health reduces to zero or below.

Extension:

A. Before players' health reduces to zero, all of the cards in one of the deck are depleted. If so, the character whose deck is empty loses the game and game is over.

11. The game is over. A victory or lose result screen appear.

12. The player clicks "Return to Main Menu" button and main menu appears.

4.1.2. Use Case UC2: Change Settings

Scope: Element Wars

Level: Subfunction

Primary Actor: Player

Stakeholders and Interests:

- User: Wants to change settings of the game.

Precondition: Player has already opened the game and is on the main menu.

Success Guarantee: Options set the game according to requests of the player. After that, player returned to main menu of the game.

Main Success Scenario:

1. Player selects "Settings" menu from the main menu.
2. A menu containing all options and settings for the game is showed up.
3. Player arranges the settings and options according to his/her choice.
4. User clicks to "Save" button.
5. New setting are applied.
6. Player is returned back to main menu.

Extensions:

1. Player clicks “Cancel” button.
2. Changes are not applied and player is returned back to main menu.

4.1.3. Use Case UC3: Get Help

Scope: Element Wars

Level: Subfunction

Primary Actor: Player

Stakeholders and Interests:

- User: Wants to learn how to play the game or get information about the game.

Precondition: Player has already opened the game and is on the main menu.

Success Guarantee: Player saw the instructions to play “Element Wars” . Next, player returned to main menu of the game.

Main Success Scenario:

1. Player selects “Help” menu from the main menu.
2. In “Help” menu, controls and instructions of the game is introduced.
3. Player reads and comprehends the instructions and rules, s/he clicks the “Back to Main Menu” in order to return to main menu.

4.1.4. Use Case UC4: Manage Decks

Scope: Element Wars

Level: Subfunction

Primary Actor: Player

Stakeholders and Interests:

- User: Wants to manage his/her decks.

Precondition: Player has already opened the game and is on the main menu.

Success Guarantee: Player did changes his/her wanted on decks and returned back to the main menu.

Main Success Scenario:

1. Player selects “Manage Decks” menu from the main menu.
2. In “Manage Decks” menu, there are three options listed which are “Create Deck”, “Delete Deck” and “Modify Deck”
3. Player clicks one of the options and selected menu appears.

A. Create Deck

- 1) All of the card in the games are represented to the player. Player selects a certain number of cards that s/he wants use add to his/her deck.
- 2) Player clicks the “Save” button. A deck created from his/her selection and returned back to then “Manage Decks” menu.

Extension:

- 1) User clicks “Cancel” button either before, after or during the selection and returned back to the “Manage Decks” menu.

B. Delete Deck

- 1) Player is asked if s/he wants to delete the deck.
- 2) Player clicks the “Yes” button. The saved deck is deleted and returned back to the “Manage Decks” menu.

Extension:

- 1) Player clicks “No” button. No changes are made and returned back to the “Manage Decks” menu.

C. Modify Deck

- 1) All the card in player’s deck are showed to the player on the bottom of the screen and the rest of the all card are showed on the top.
- 2) Player clicks on a card which s/he want to delete for his/her deck and selected card is removed.
- 3) Player clicks on a card from the list on the top which s/he wants to add to his/her deck.
- 4) Selected card is added to the player’s deck. Player clicks “Yes” button. Changes made in his/her are saved and returned back to the ”Manage Decks” menu.

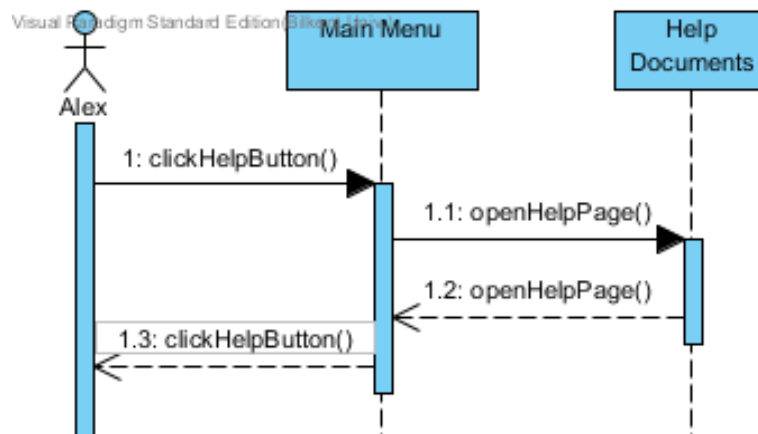
Extension:

- 1) User clicks “Cancel” button either before, after or during the selection and returned back to the “Manage Decks” menu.

4.2. Sequence Diagrams

Help

Alex executes the program, he sees the opening window of the game, then he chooses the help document to read. He gets information about how to play the game (i.e. the instructions) and game rules.

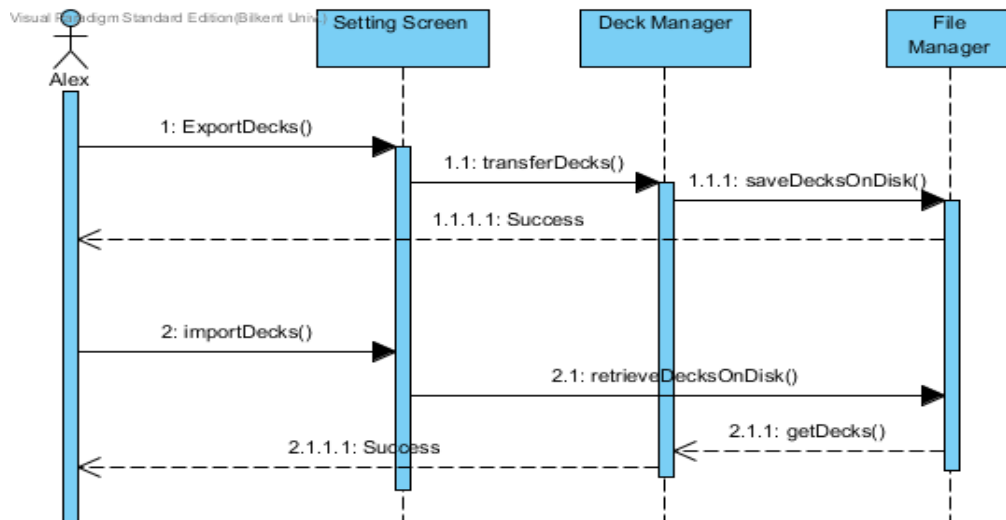


In this sequence diagram, player executes the game. Then he requests to see the help document related to the instructions of the game. Main Menu contains the main window of the game. Main Menu is in interaction with the Help Window and its contents. The player sends a request for opening the help window. Main Menu responds to the player and after opening the

help window, player can see the help page which contains the related information about the playing instructions and rules of the game.

Settings

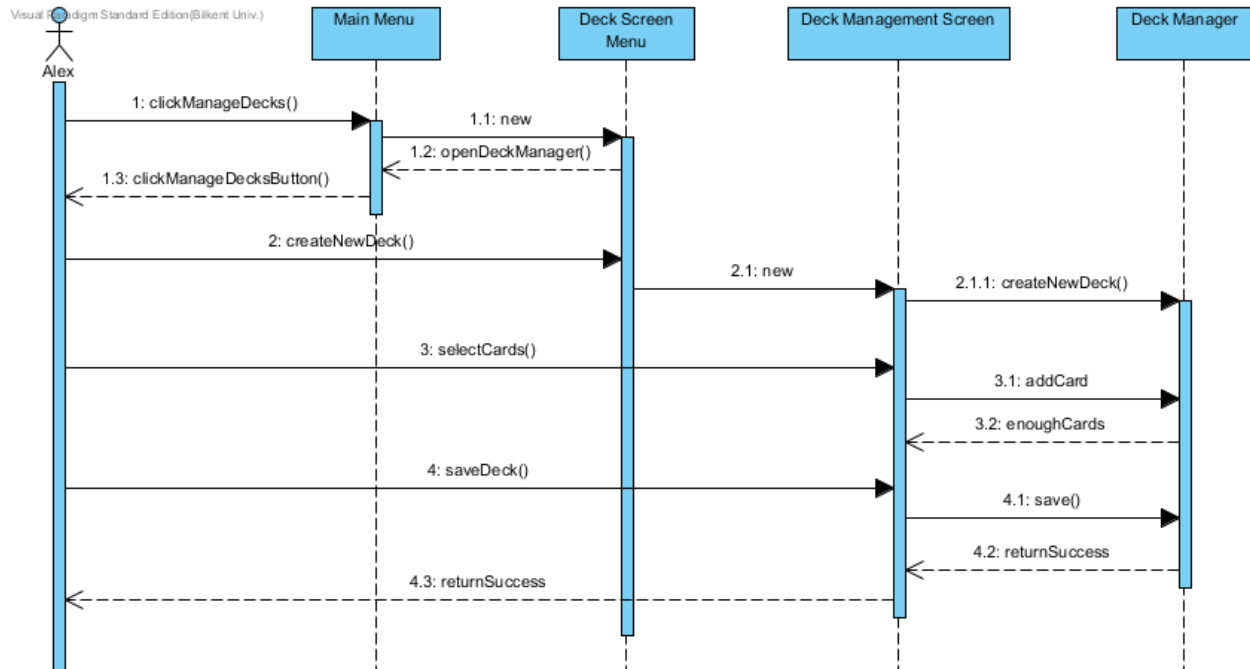
Alex is already in the Settings Menu. First he chooses to export his current custom deck to the computer and the file is saved. Then, he exports a previously saved deck which is already in the computer.



In this sequence diagram, player is already in the Settings Menu. He requests to export his custom deck to the computer. He clicks on “Export Deck” button on Setting Screen and then his request processed by the Deck Manager. Deck Manager gets the request and send the deck to the File Manager which will save the deck on the computer. After the export operation, Alex want to import a saved deck from the computer. He clicks “Import Deck” button on Setting Screen and he is asked to select the file from the computer. File Manager gets the file from its place and sends it to Deck Manager where it will be implemented to the game.

Deck Manager

Alex executes the program, he sees the opening window of the game, then he chooses Deck Manager to create his own custom deck.



In this diagram, Alex clicks Manage Decks on the main menu then “Deck Screen Menu” is displayed. On this menu, Alex clicks on “Create” button on Deck Screen Menu to create a new deck. Deck Manager creates a new deck to be filled. “Deck Management Screen” is displayed to Alex to let him make his card choices. Alex selects card until a certain card number to complete the deck. Then again on the Deck Management Screen Alex clicks on the save button which leads deck manager to save the deck.

Play the Game

Alex is already started the game and made his selection of deck. Game has already started and it is Alex’s turn. He will chose a card to attack his enemy.

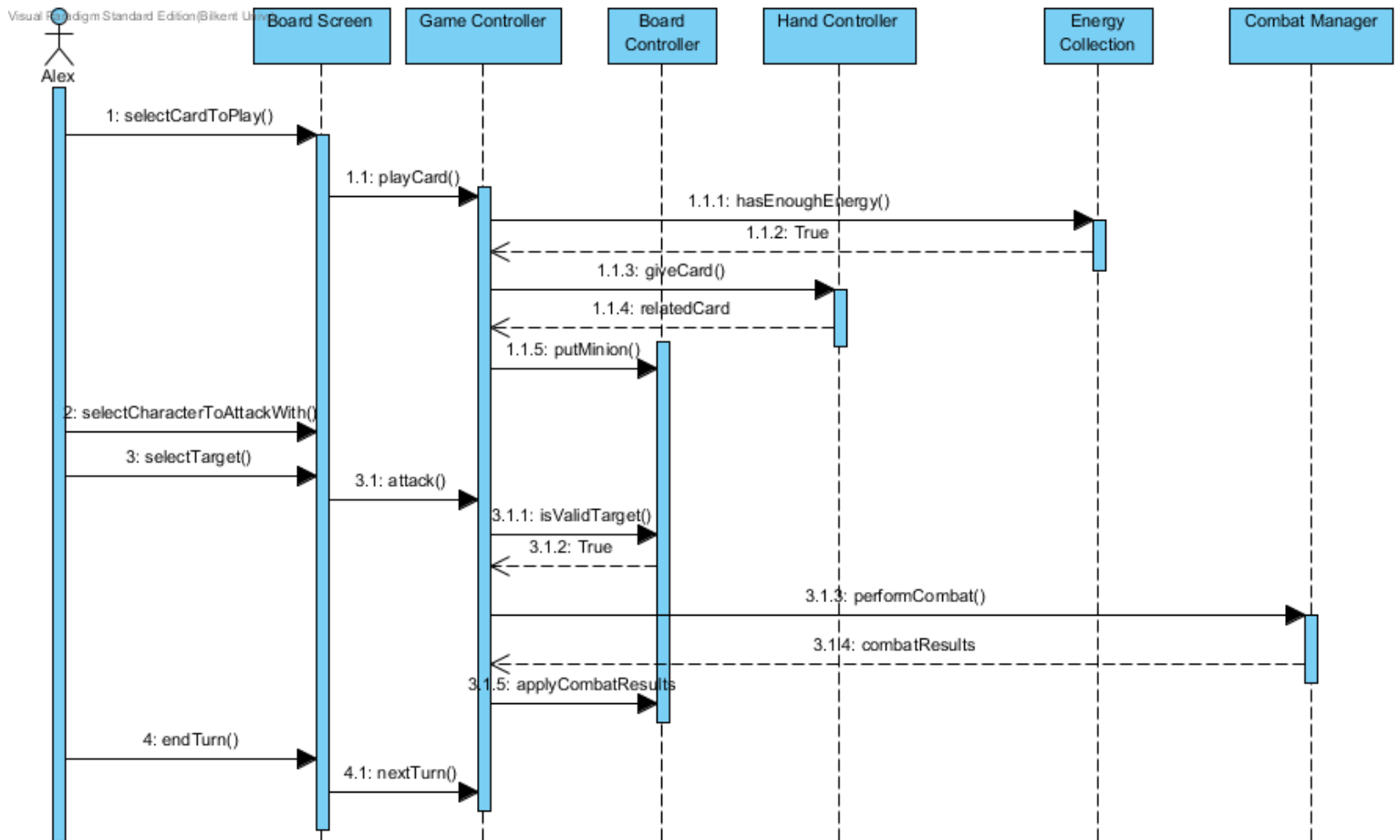
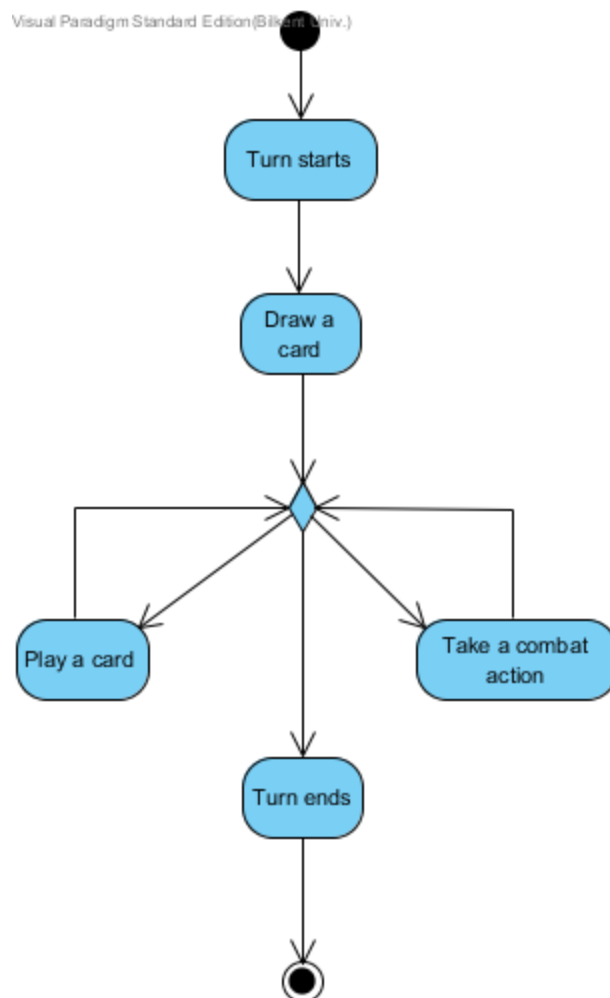


Diagram shows that he chooses a card to play at the beginning on the “Board Screen”. Then “Game Controller” gets the card and checks if there is enough energy to play the card or. After the control of energy, “Hand Controller” determines card to play and Game Controller puts a minion . Next, Alex chooses a character to attack with on the Board Screen and selects target to attack. Game Controller sends the selected target to the Board Controller to see if it is a valid one or not. Since it is a valid one, combat is performed by the “Combat Manager”. Then combat results are applied on the Board center and user clicks to end turn.

4.3. Activity Diagrams

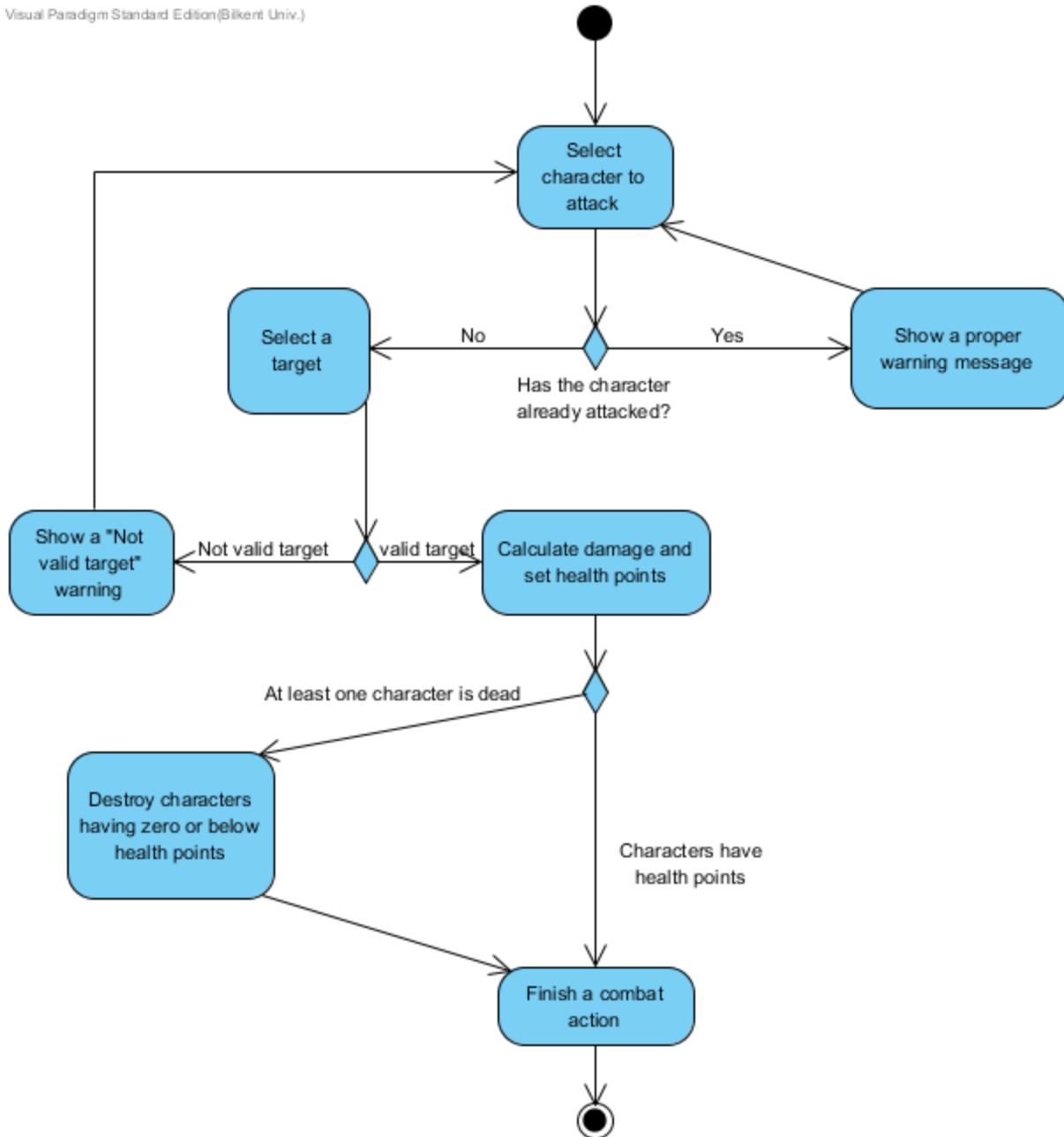
Our game is a turn based game so the main activity is a start of a turn state. After the turn state starts user draws a card from his/her deck. After the draw, player may play card(s),

take combat actions or just ends the turn. After the player decides to end his turn, turn ends after the player press “End Turn” button. Then turn ends.



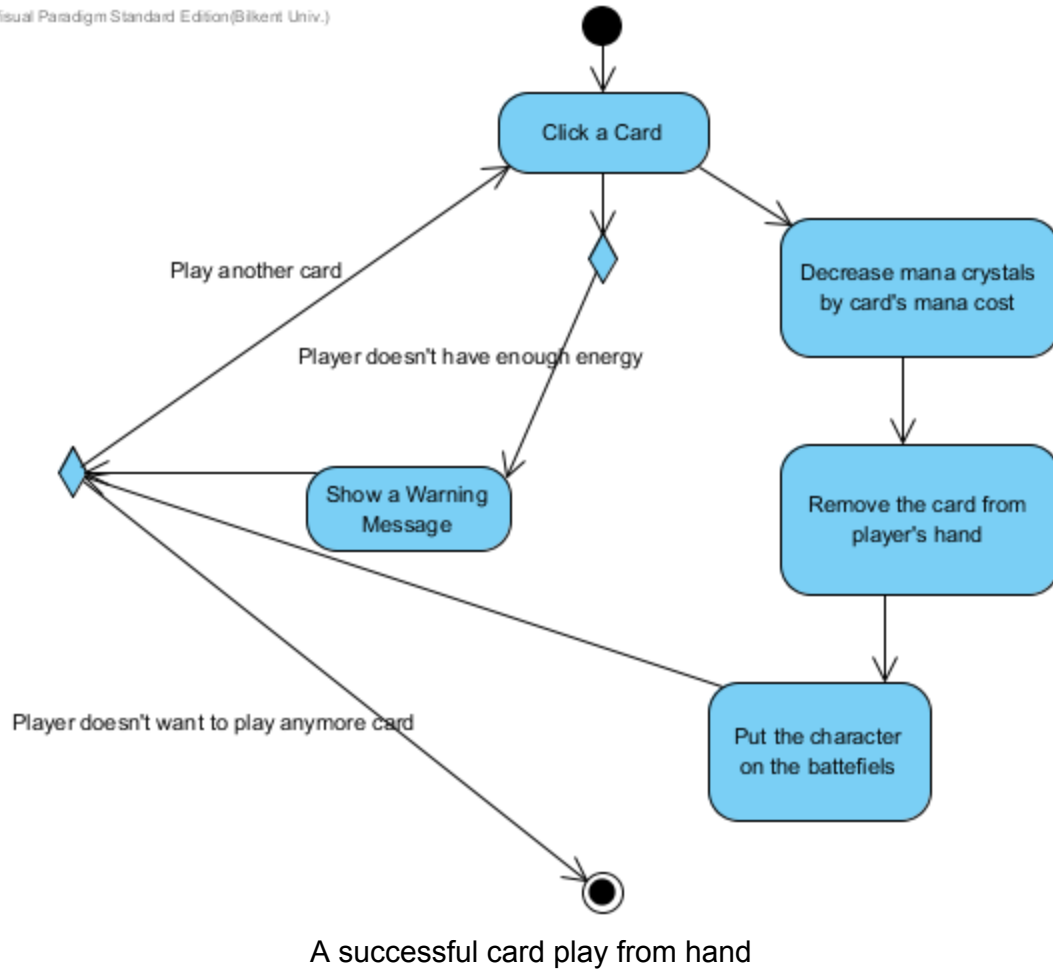
Turn activity diagram

One of the actions the player may perform on his/her turn is to attack. First, player select the character he/she want to attack with. However, each character can attack only once in a turn. So, the character the player chooses has already attacked then the player have to choose another character instead. If he/she manages to choose a valid character then it is expected for player to choose an enemy target. If the player choose an invalid target, a warning message appears and the player should choose another target. If the target is valid, damage calculations are done and by looking at characters' health points, dead and live characters are determined and lastly dead characters are removed from the battlefield and so a successful combat action is performed.

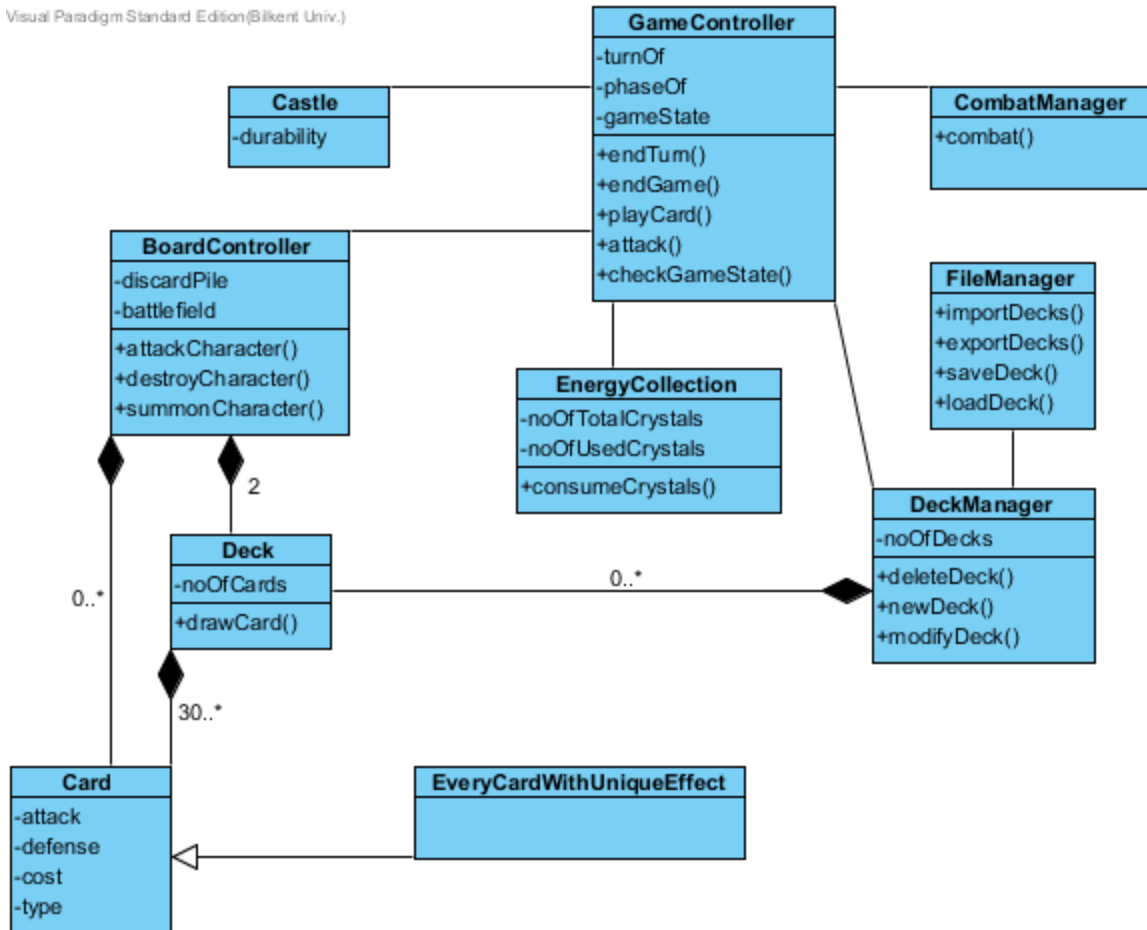


A successful combat action

The other action the player may take is to play a card from his/her hand. Condition of this action is to have enough energy crystal to meet the card's cost. If this condition is not satisfied, a proper warning message appears and wants the player to choose another card. If the player has enough energy then he can play the card. To do so, the game firstly decreases player's energy, then removes the card from player's hand and put it into the battlefield. By doing so card play action is completed successfully.



4.4. Class Diagram

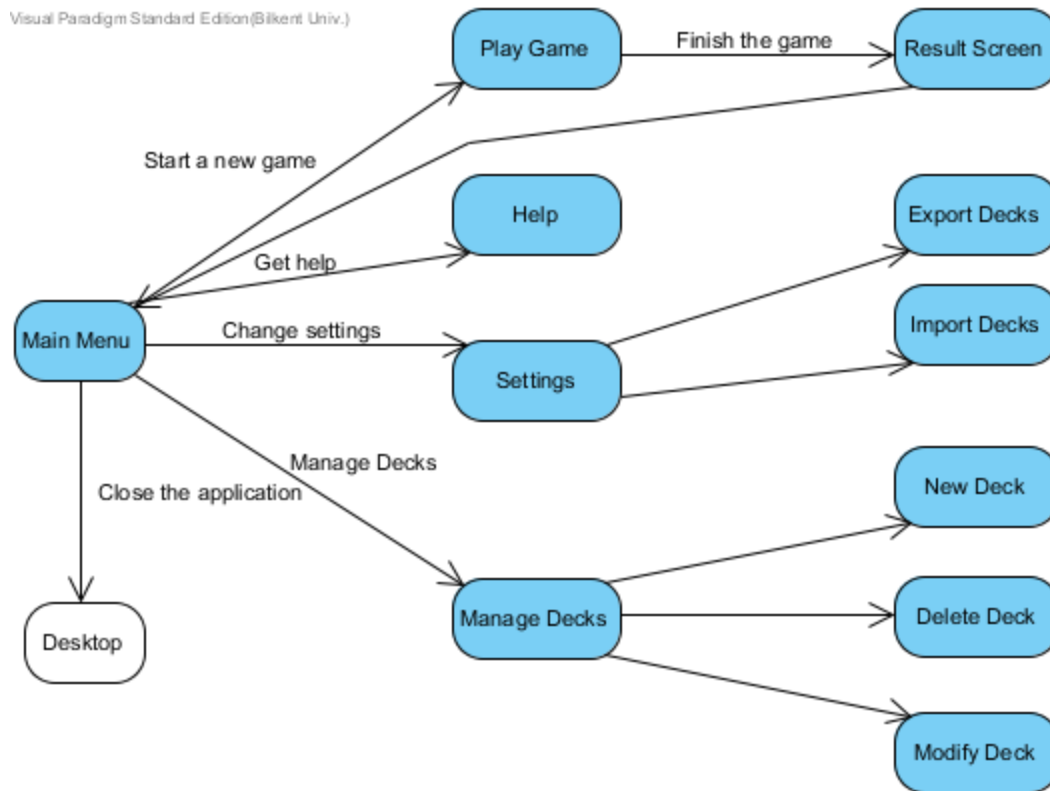


This is the very basic class diagram of the game. Although fundamental classes are represented, many details are omitted in order to keep diagram simple. There is **GameController** class at the heart of the system. This class is responsible for almost everything about gameplay. Most simplest element of the system is **Card** class. It presents a single card object, it has basic attributes like attack, defense and cost points. Although some of the cards in the game can be represented by this class, it might be insufficient to express some unique effects cards may have. Therefore, any card that has an unique effect should be written as new classes and these new classes have all attributes of **Card** class.

5. User Interface

The usage of the main menu of the game is very straightforward. In the main menu, player is expected to choose one of four options: Play game, help, settings and manage decks. Play game button starts a new game and player stays in the game until it finishes. Help button shows some useful information about how to play tips and rules of the game. Settings is the

screen that player may export and import deck information so that he/she can share it with someone else or can use deck of other people. Manage deck button opens another menu consists of three options: New deck, delete deck, modify deck.



Navigational Path of the Game

Gameplay screen shows the board of the game. For more information about board and its parts, you may visit 2.2.1 Game Board section.

Also note that, none of the screenshots below represent the actual view of the game. These screenshots are recorded in another CCG game called HEXTCG. However, since this game is a clone of this kind of games, user interfaces will be so similar.



The gameplay screen [1]

Card Collection 1,058													
Qty	Name	Type			Cost								
1	Suppressive Fire	Basic Action	0		1 	0	0	Up to two target troops can't block this turn.					
1	Bloodcrazed Zealot	Troop	0		5 	5	4						
1	Incite Fury	Basic Action	0		3 	0	0	Target troop gets permanent Rage 2 .					
1	Atrophy	Quick Action	0		4 	0	0	Target troop gets permanent -1/-1. Draw a card.					
					2			Target opposing champion reveals their hand. Ch					
<div><div></div><div></div><div>Orc Gladiator 60</div><div>Reserves 0</div><div></div><div></div></div>													
	14		11		3		3		2		3		1

Manage deck screen [1]

6. Conclusion

Element Wars is a turn based strategic card game. We try to design it by imitating some parts of the great CCG games and trying to put something new. Since it a course project not a

well designed commercial game, some features are omitted and some are limited. For example, most CCG games have more than 300 unique cards but it is not possible for us to create so various cards due to time limit. However, we planned to design extra features if we have enough time. Some of the planned features are listed below:

- Adding new card types.
- Designing a unique cost system.
- Improving user interface.
- Making the game multiplayer.

7. Reference

[1] <https://hextcg.com/>

For further information about CCG games, please visit
http://en.wikipedia.org/wiki/Collectible_card_game