

Greedy Algorithm for Weiß Schwarz(PSP)

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Abstract— *Weiß Schwarz* is a Japanese Trading Card Game (TCG) published by Bushiroad. This game creates a battlefield that allows you to pit various characters from various anime series against each other, crossing the boundaries of genre and age. Currently, these expansions are divided into two sides, *Weiß* and *Schwarz*. In this game the point is damaging your opponent until the last level in significant amount. Greedy algorithm is used in this game for determining how to play the game best with showing the best card that can be played into the game.

Index Terms—Algorithm, Greedy, Trading Card Game, *Weiß Schwarz*

I. INTRODUCTION

Weiß Schwarz is a Japanese Trading Card Game (TCG) published by Bushiroad. This game creates a battlefield that allows you to pit various characters from various anime series against each other, crossing the boundaries of genre and age. Currently, these expansions are divided into two sides, *Weiß* and *Schwarz*. Greedy algorithm is used because the point in this game is to damage your opponent in a large amount. In that case, greedy algorithm can be use because of characteristic to use the best solution in the moment to choose the best card or the most functional card in the moment of the game.



Pic 1.1 Weiß Schwarz Decks

Weiß Schwarz is played on a field like a board game, the board consisting the position and the use of the card. The difference of *Weiß Schwarz* and other card game is *Weiß Schwarz* uses character that already exist(not original). In case of taking damage, the player is getting stronger in this means player can use stronger cards in case got damaged.

Weiß Schwarz also has an unique way of describing its cards. There is no clear difference between Effect card and Character card, so character card can have the attribute of an effect card and Character card. The only different card in this game is an Event card or a Climax card. An event card is works as an additional effect, and a Climax card as damage canceller and a chain effect before battle.

Weiß Schwarz's decks usually are made from 50 cards and there is only can be filled with 8 events cards and 42 character cards, there is no limitation to character card, but there is a limit only 8 cards for climax card. For the kinds only 4 of the cards of the same kinds can be used in one game.

II. WEIß SCHWARZ

A. RULES

There 4 basic rules of *Weiß Schwarz*:

1. You must get your opponent to get a total of 28 damage, or make it level up to level 4 for win.
2. You can only use the cards in your level. In exception of effect cards.
3. The color cards you can use depends on the situation.
4. If you damage the enemy and flipped an Event card then the damage get nullified.

For now the rules of *Weiß Schwarz* is inserted as it is in the next page.



トリアルデッキ クイックマニュアル



What is Weiß Schwarz?

The battles of existing series participating in a battle through beauty gathered in one game! Weiß Schwarz (Denoted as WS from hence forth), bring together this dramatic dream battles in the form of trading cards (TCG).



How do you win in this game?

Of the two players, both players battle using their specialised decks. Players gain a Level when 7 cards are placed into their Clock slots:
THE PLAYER WHO REACHES LEVEL 4 FIRST LOSES!

How do i get more information?

The rule book included in every Trial Deck should suffice for beginners. However, for more detailed rulings and information about specific cards, please visit the Weiß Schwarz website (<http://ws-tcg.com/>) for more information!

Reading a Card

Chara

Appearing characters from works. They are able to use their abilities on the Stage.



Event

Incidents that appear in the original work. Convenient cards for quick use.



Climax

Memorable scenes from the original works recreated! Only 1 card is enough to shift the tide of the game.



Effective use of these 3 types of cards will be crucial to the outcome of the game!



- 1 **Card Name** - Name of the card.
- 2 **Level** - To play this card, your Level number must be at least this number.
- 3 **Cost** - When playing this card, this exact number of cards must be sent to the Waiting Room from your Stock.
- 4 **Counter Icon** - When this icon is present, the Ability of this card is able to be used when suffering a Front Attack.
- 5 **Trigger Icon** - This icon represents the additional effect triggered when determining the outcome of Trigger Checks.
- 6 **Text** - The Ability of this card.
- 7 **Power** - This card's battle capability. The higher this number compared to the opponent, the more advantageous.
- 8 **Soul** - This card's will power. The icon represents how much this card can contribute to a victory.
- 9 **Trait** - This card's special trait. This is often used in reference to the Abilities written in the Text.
- 10 **Colour** - The colour attribute of the card. The more cards of the same colour, the more advantageous the player has.
The colours **Yellow (Speed)**, **Green (Power)**, **Red (Technique)** and **Blue (Advantage)** are the four colours in the game.

Reading the Game Mat

The Game Mat is the playing field where players are able to see what is being used in the game. When practicing, it is not required to play using the Game Mat.



Any cards displayed face up are available for the opponent to browse.

- 1 **Deck** - This is where the player's own deck is placed faced down. Players are not allowed to switch cards within this pile
- 2 **Level Slot** - The player's Level number is indicated by no. of cards face up.
- 3 **Clock Slot** - The player's Clock number is indicated by each card in each slot. Players are not allowed to switch cards within these slots.
- 4 **Stock Slot** - The player's Stock available is indicated by face down cards in each slot. Players are not allowed to switch cards within these slots
- 5 **Climax Slot** - The slot to display in play Climax cards face up.
- 6 **Border** - The slots for the player's Charas. There are a total of 5 Borders.
 - **Stage** The name of the 5 Borders as a collective.
 - **Frontline** The name of the front 3 Borders as a collective. The main fighting force against the opponent are placed here.
 - **Backline** The name of the hind 2 Borders as a collective. Backline cards are placed as reinforcements for Frontline cards.
- 7 **Waiting Room** - Cards which have finished their play are sent to this slot face up.
- 8 **Memory** - Cards that are removed from game are placed in this slot face up.

Preparing a deck

Before the start of a battle, both players require a deck that they will each use respectively with a certain motive in winning. This product has the cards required to battle. Booster packs are also available for purchase. Players can create their own original decks or modify existing Trial Decks. Keep in mind the following restrictions for original decks

- Each deck must contain 60 cards
- A maximum of 4 of the same card are allowed.
- A deck can contain a maximum of 8 Climax cards.

Let's begin the battle!

- 1) Respective players shuffle their own decks and put it face down on top of their Deck slot.
- 2) Decide the starting player by means of scissors paper stone.
- 3) Both respective players draw five cards. After that, the player may choose to discard any number of cards into the Waiting Room and draw an equal number of card(s) from the Deck. This is often used when there are no Level 0 cards in the player's hand.

So now both players are ready for battle! After deciding who goes first, the player will begin his turn with the following order. (Proceed to the next page's 1)

I Stand Phase

Change all Charas on turn player's Stage from their fired state (horizontal orientation) to active state (vertical orientation),

When in horizontal orientation, cards are said to be in [Rest] while in vertical orientation, cards are said to be in [Stand].



Chara Modes

There are 3 types of modes for Charas on the Stage.



II Draw Phase

Turn player draws 1 card. (Regardless of who begins first)

III Clock Phase

Turn player may choose to place 1 card from his hand into his Clock slot. (Player cannot choose which slot to place in)
When this is fulfilled, draw 2 cards!

Level Up!

Whenever a player has 7 or more cards in his Clock slots, he Levels Up! Choose 1 card amongst the previous 7 cards in his Clock and place it in the Level slot. Following that, place the rest of the 6 cards into Waiting Room. (When there are 8 cards or more, the new cards are spill over to the new set of Clock.)

Level up!! Level +1

Player loses when there are 4 cards in his Level slot!

IV Main Phase

Turn player may activate ①~④ as many times and in any order he desire.

- ① **Play an Event** Turn player may activate an Event card in his hand. After the effects of the card resolves, send the card to the Waiting Room.
- ② **Play a Chara** Turn player can play a Chara card from his hand onto the Stage and place it in any Border. Replace occupied Borders and send them to the Waiting Room
- ③ **Move a Chara** Turn player is free to move or exchange positions of Charas within any Border. It is possible to move a Chara played in the same turn but not alter Chara Modes.
- ④ **Activate an Ability** Turn player can activate his own Chara's Abilities.

V Climax Phase

Turn player may choose a Climax card from his hand and place it in the Climax slot to activate the card. During this turn, the game Climaxes to scenes from the original works! During this turn, an extremely powerful ability is activated! This overwhelming advantage may just shift the tide of the game.

VI Attack Phase

The turn player's Frontline Stand mode Charas' attacks will damage the opponent during this phase. The attack proceeds in order from ①~⑤ while the last ⑥ only proceeds at the end of all Attacks.

① Attack Declaration Step

Change the mode of a Frontline Chara into rest to declare an attack! There are 3 ways to attack.

Front Attack
A dramatic clash between Charas to determine the winner! Adjacent Charas performs a battle.

Side Attack
Avoid the adjacent Chara and attack the player! Soul is determined after minusing off the opponent Chara Level.

Direct Attack
When unobstructed, this is the type of attack performed. A chance to attack directly! During this turn, that Chara gains +1 Soul.

During the first turn of the player who goes first, he can only attack once. After that attack, he proceeds to step ②.

② Trigger Step

When the player attacks, flip over the top card of his own deck and trigger the Trigger Icon's effect indicated on the top right of the card! Stack that card face down on top of his own Stock slot.

- During this turn, the Chara gains +1 Soul.
- Choose an opponent Chara and return to his hand.
- Place the top card from Deck and put into Stock.
- Add a Chara card from Waiting Room to hand.
- Draw a card.

③ Counter Step

During a Front Attack, a Counter is possible!

The opponent who is suffering from a Front Attack can use a card with 助太刀 (Assistance) or 援手 (Assistance), helping the Chara under attack.

Power +2000
Use Assistance!

④ Damage Step

When the attack is successful, deal damage according to the Soul of the Chara which successfully attacked. For each point of damage received, flip over cards from the top of the opponent's deck in order. Place all cards that are flipped over this way into the Clock slots. (The player who reaches Level 4 loses the game!)

When flipping over cards for damage and a Climax card is flipped over during this process, prior damage during the same attack are sent to the Waiting Room and further damage is stopped.

4 damage is received and no Climax cards are flipped

4 cards are sent to Clock

4 damage is received and Climax card is flipped on 2nd card

3 cards are Cancelled and sent to Waiting Room

⑤ Battle Step

During a faceoff with an adjacent Chara, place the card with lower Power into Reverse (Upside down). Put both cards into Reverse should the Power be equal.

Power 4000 → Lost in battle → Change to Reverse

Power 5000 → Won in battle → No change in mode

If desired, go back to ① for Charas who are still able to attack.

⑥ Encore Step

When all attacks have concluded, send all Reverse mode Charas into respective Waiting Rooms.

A way to Encore characters

Whenever you send a Chara to the Control Room, you may remove 3 cards from Stock to Waiting Room to trigger an Encore! That card is set back onto the same border in Rest mode.

VII End Phase

Send any Climax card in play on the Climax slot into Waiting Room. If there are 7 or more cards in turn the player's hand, select cards until he has 7 cards left and send those cards into Waiting Room.



Refreshing the Deck

When a Deck runs out of cards, shuffle all cards in the Waiting Room and create a new Deck, placing it face down (The game has not ended). Following that, place the top card of the deck into Clock. When putting this card into Clock, the damage cannot be cancelled if a Climax Card is flipped over.

B. CARDS



Pic 2.2.1 Character Card



Pic 2.2.2 Effect Card

1. Name, Type, and Card No.

This is the name of the card. When referenced in the card text on another card it will have 「」 around it. There are 3 Types of cards in Weiß Schwarz; they are the Character Cards, Event Cards, and Climax Cards.

Character cards are denoted by "CH" above the card name and are your primary means of combat in the game. They are mainly played in the Main Phase of the game.

Event cards are denoted by "EV" above the card name and are cards with varying effect; their play requirement is the same as that of character cards, but are generally fire and forget and do not stay around on the battlefield.

Climax cards are denoted by "CX" above the card name and are cards with powerful abilities that could change the tide of battle; all climax cards only last the turn they are played, and can only be played during the active player's Climax Phase. They are also the only cards capable of negating soul damage, for this reason, each deck is restricted to a maximum of 8 climax cards.

2. Level

It shows when you can call it. You only can call it if your level is equal or more than the card.

3. Cost

Only Character and Event Cards have cost, and they cannot be played if the player does not pay the cost.

4. Counterattack Icon

This icon is present on some Character Cards and Event Cards, and it indicates that the card or its Startup Ability may be used during the Counter Step of the Attack Phase of the active player's turn.

5. Trigger Icon

It adds as additional damage or effect if there is any.

6. Card and/or Flavor Text

The Card Text provides additional information on card functions and abilities. Cards with no additional functions or abilities will not have any Card Text. Flavor Text provides additional information about the card that has no effect on the game mechanics. Not all cards will have Flavor Text.

7. Power

Only Character Cards have this attribute, and it is used to determine the outcome of battles between two characters in the Battle Step of the Attack Phase.

8. Soul Points

Soul Points is used in the calculation of the amount of damage to the opposing player when the active player attacks.

9. Characteristic

Each Character Card is given up to 2 characteristic based on its series, although rare, there are also cards with no characteristic, and cards that could gain a third characteristic via its ability.

10. Color and Pack

All cards in Weiß Schwarz belongs to one of the four colors, Yellow, Green, Red and Blue, each of which generally contain cards that specialize in certain areas. It does not mean that only Yellow cards have bounce abilities or only Red cards have removal abilities. It is also important when playing cards, as a card cannot be played unless a card of the same color is in the Level Area or the Clock Area (unless it is a Level 0 Character or Event card).

III. GREEDY APPLICATION

In Weiß Schwarz there is already an trial deck and some deck that is already chosen for the game(except for player). And in the actual game there is too many effect and so it cannot be made by choosing the best attributes without concerning the effect.

In this game there is 4 point of attributes that concludes the equation:

1. The power of the card
2. The card level
3. The Climax card
4. The cost of the card

After calculating by the base of that four attributes(effect is ignoreable) we can made it into a algorithm by the rules of Weiß Schwarz for phase per phase like below:

- **Draw phase**
 1. Choose the most useable card in the start of the battle(throw off the un useable card).
- **Clock phase**
 2. If there is less that 7 cards in hand, while the level is still low(below 3) throw the useless cards into clock.
- **Main phase**
 3. Put the character support card(if any) to the back row.
 4. Put the most powerful character card on the front row.
 5. If there is stronger opponent card is facing weaker card and there is card in field that has power more than opponent card then change the arrangement into the stronger card facing the opponent card. If there is no stronger card in field, choose the arrangement into the biggest damage.
 6. If there is an effect then call it.
- **Climax phase**
 7. Use Climax card(if any/ useable). If there is stronger card on the opponent field then use it on the faced card.

- **Battle phase**
 8. If opponent character card's power is higher, then not attack directly. Else attack directly.
 9. Case if level opponent is 3 then all cards attack directly.
- **Counter phase**
 10. If there is a card to counter and it's enough to deflect opponent attack then it is used.
- **Encore phase**
 11. If cost available, then if there is no stronger card in hand revive the strongest card in field.
- **End phase**

IV. CONCLUSION

1. *Greedy Algorithm* is used for searching the best solution in the current event and expected to be the best for all of the events
2. if we compare the greedy algorithm with the actual game it could be succeed if the opponent does not have a grand strategy. This algorithm has been used in the actual game. And by experimenting on it. It has 80% win percentage if the card does not have exaggerate effect.

REFERENCES

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- [4] [psp] Weiß Schwarz portable
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PERNYATAAN

Dengan ini saya menyatakan bahwa makalah yang saya tulis ini adalah tulisan saya sendiri, bukan saduran, atau terjemahan dari makalah orang lain, dan bukan plagiasi.

Bandung, 29 April 2010

ttd

A handwritten signature in black ink. The signature consists of a stylized star symbol followed by the name 'Adhid' in a cursive script. A horizontal line is drawn underneath the entire signature.

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