

INTRODUCTION TO GAME DESIGN

CSD2511 – Week 03

Lecturer . Jonathan Kwek

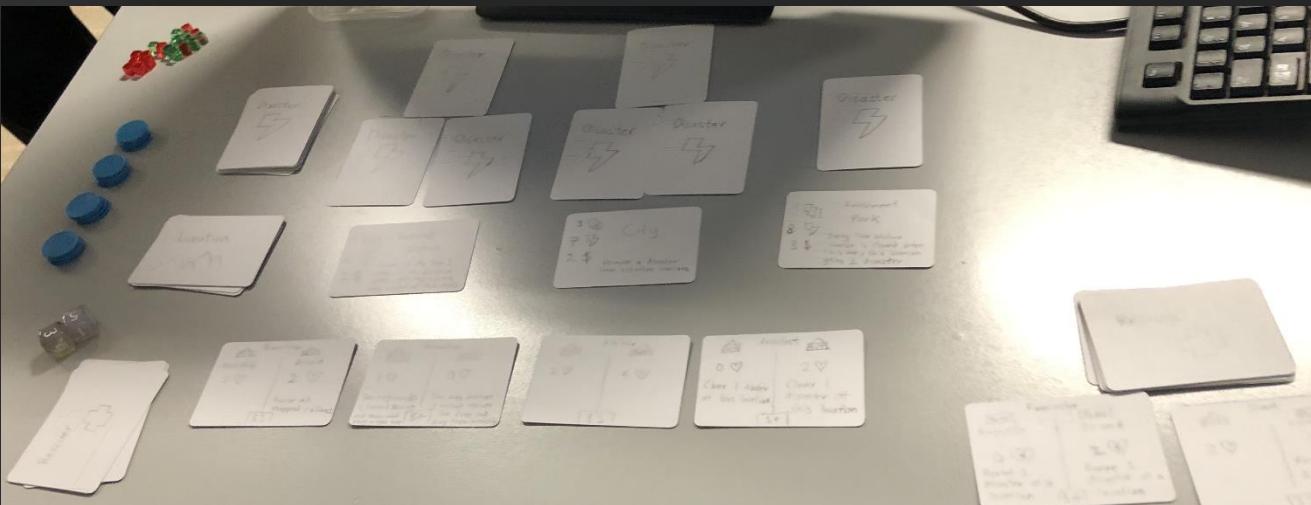
Before we begin



- Use the first 15 minutes to settle in
 - Sign your attendance
 - Log into your workstation
 - Log into Moodle, specifically CSD2511 module
 - Log out from your game, application, communication, chats
 - Prime yourself physically for the next hour, ie. Finish your food, fill up your water, visit the restroom, get comfy
 - Prime yourself mentally for the next hour, ie. Recall what happened during last week's session, put a save point on any ongoing conundrums, meditate on what to do this morning

Lab Activity So Far

- Your objective is to iterate quickly
 - Start playing so you can “feel” it
 - Components should be easy to produce and change
 - Let others help catch your blindspots
 - Free up space from your head



- Mid Point Check A
 - Next Tuesday, 23rd May, 9am-10am
 - Show your progress to an assigned TA
 - TA will verify and check off a list on Moodle
 - Grades will only be given if all items are completed

Module Matters

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Question 1

Not yet
answered

Not graded

Flag question

Edit
question

This is team number .

Question 2

Not yet
answered

Points out of 5

Flag question

Edit
question

Please present your game progress to the TA assigned to your team, as well as this Multiple choice screen. TA will check and click the Submit button after review. Grades will only be given for full completion.

Select one or more:

- A working title
- A work-in-progress rulebook that is shared with all team members
- A Figma page where assets are shared with all team members
- 4-panel narrative pitch
- Game is set within a modern context
- Demonstrate a core game loop, ie. engage obstacle > resolve > system update > repeat
- At least 20 cards in draft stage, ie. details complete, graphic design incomplete
- At least one randomisation mechanic with 16% probability or less
- A 2-liner suggestion feedback from each team member on what the game still needs

Question 3

Not yet
answered

Not graded

Flag question

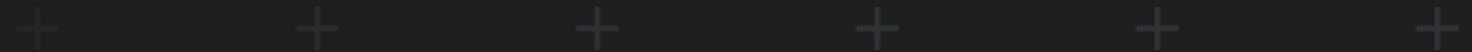
Edit
question

Have all items in the checklist been checked off?

Select one:

- True
- False

Module Matters

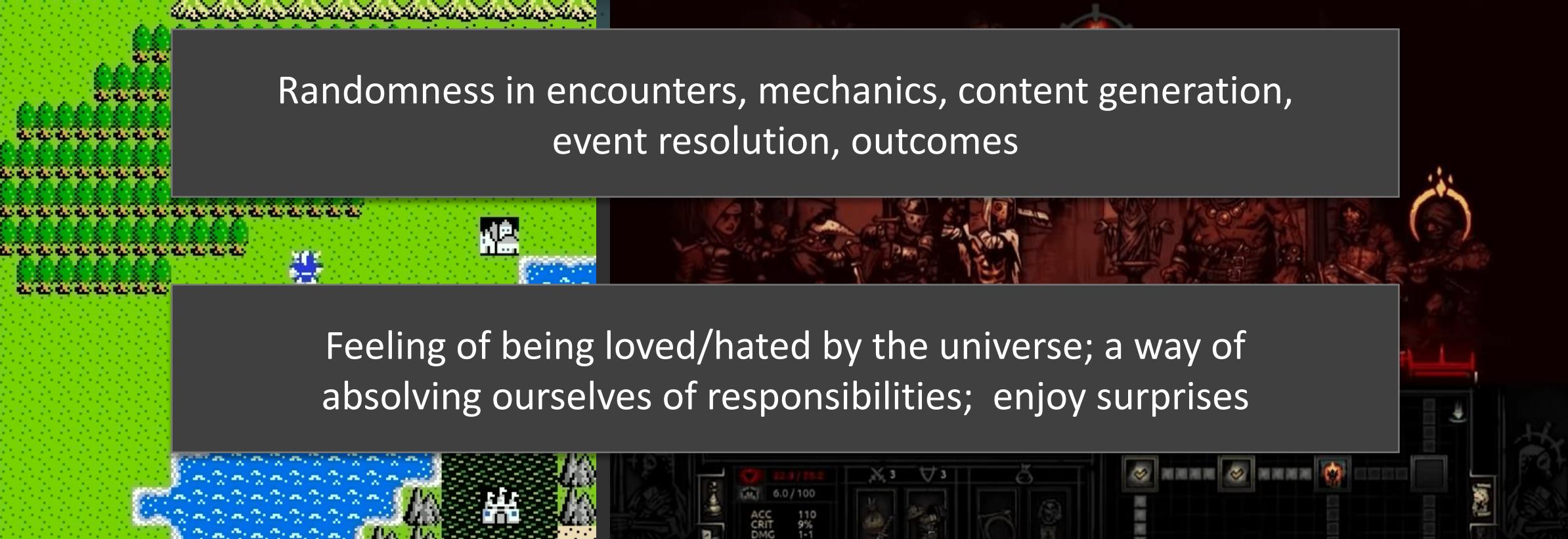


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Let's Recap

Recap

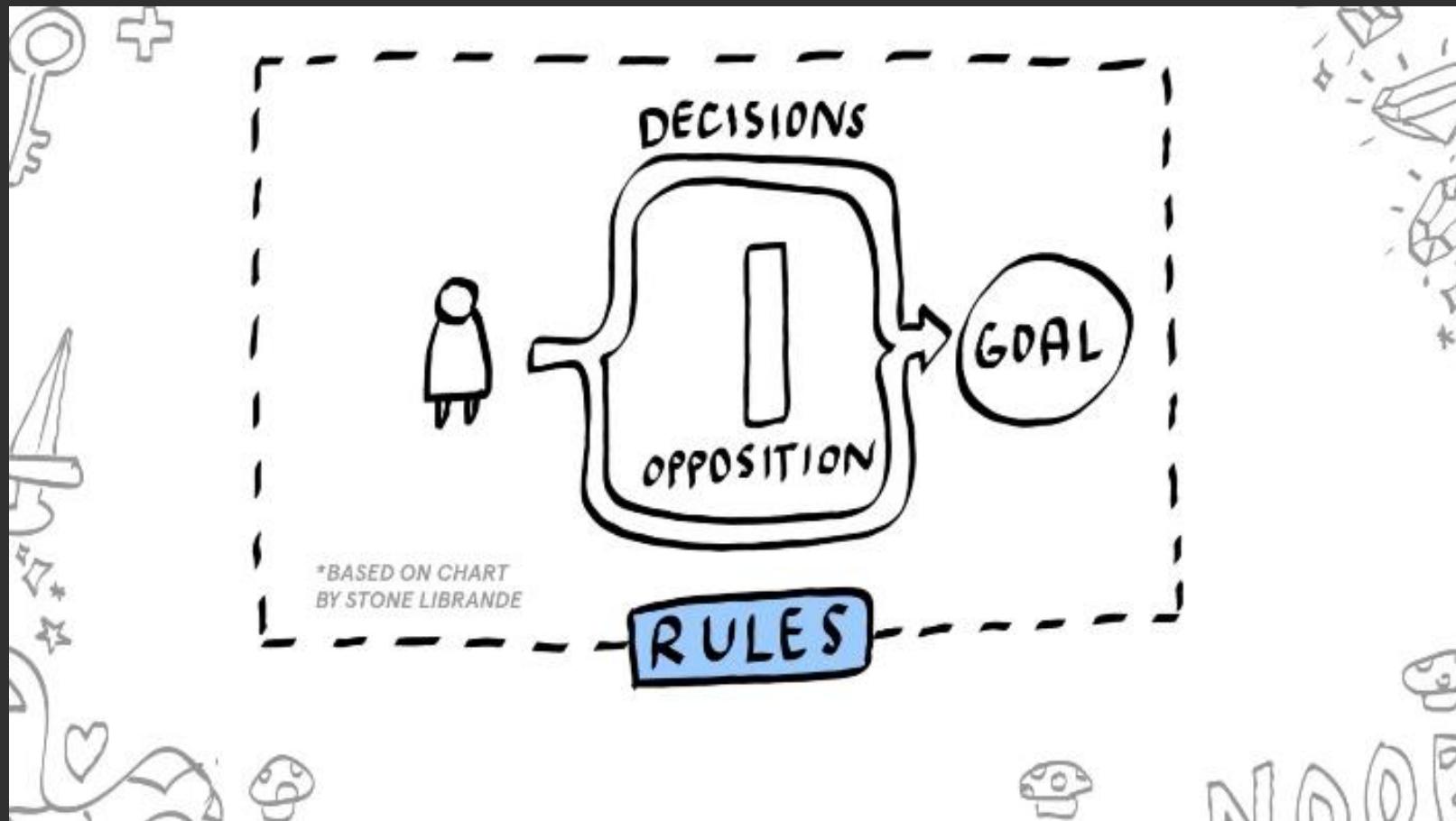


Randomness in encounters, mechanics, content generation, event resolution, outcomes

Feeling of being loved/hated by the universe; a way of absolving ourselves of responsibilities; enjoy surprises

What does having “luck” mean?

Recap



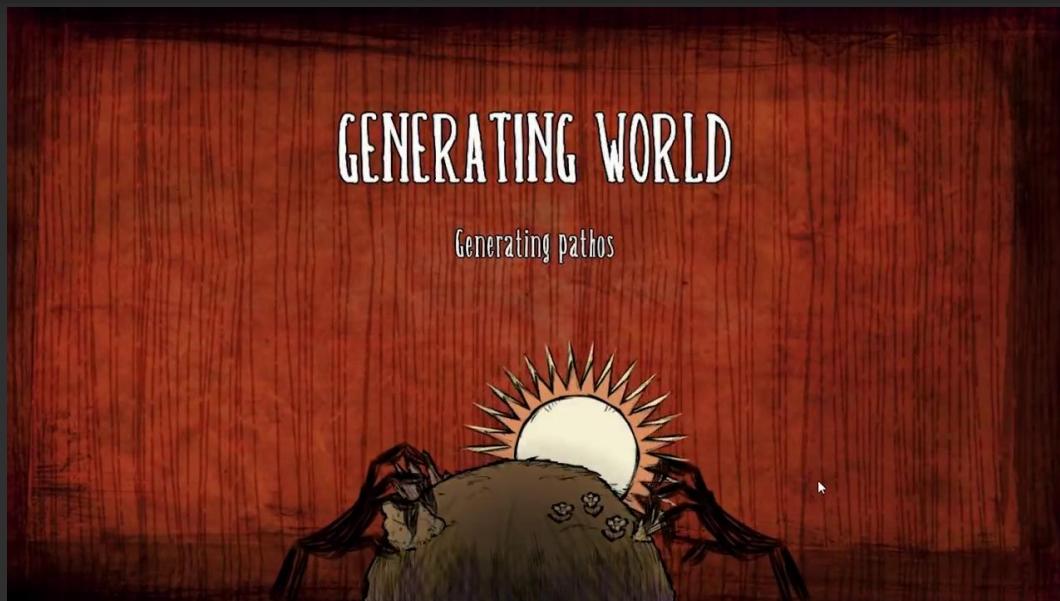
- Stone Librande, <https://en.wikipedia.org/wiki/Stone.Librande>
- So you wanna make games?? <https://youtu.be/yYYtBFSxoCg>

Recap



- Input Randomness

- Occurs **prior** to Player making a move
- Informs the decision, eg. procedural map generation
- Deterministic mechanics will allow players to gain control after the initial randomisation



Recap

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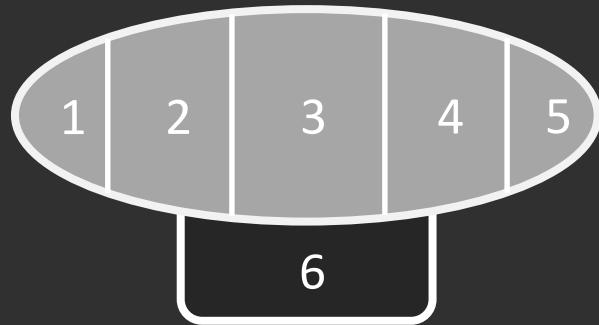
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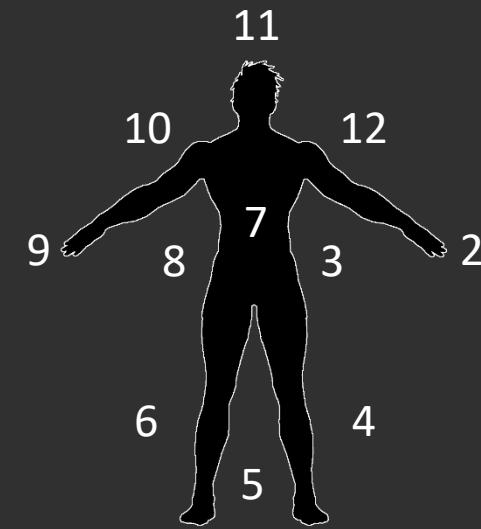
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1D6



2D6

Recap



ACTIVITY

- Let's roll for stats!
- Which method yielded more balanced/satisfactory results?

STAT	3D6	1D20
STRENGTH		
DEXTERITY		
CONSTITUTION		
INTELLIGENCE		
WISDOM		
CHARISMA		

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LUCK MITIGATION



Are luck-based mechanics a problem in games?



"In October 2020 Carlsen's 125-game undefeated streak came to an end (he scored 42 wins and 83 draws during this streak), setting yet another world record."

<https://youtu.be/eC1BAcOzHyY>



"In Hearthstone, in constructed, at this time, it's pretty much just about draw RNG, and that really dictates who wins the matches." ~ Kripparrian, 2014

What is a “Game”?

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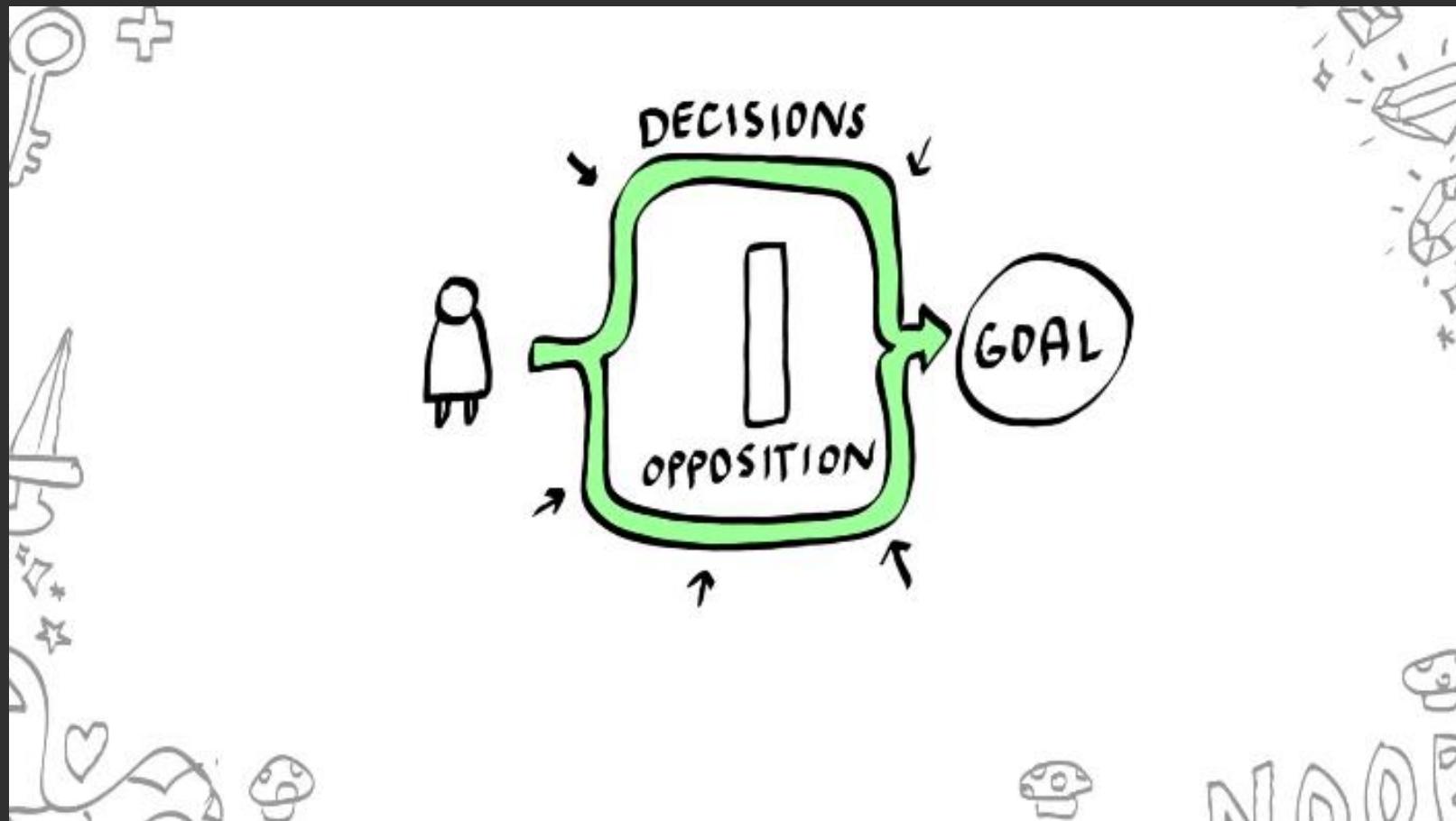
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Decisions must now be made by the player on what actions to take, in order to overcome or bypass the opposition.

Decisions with no information

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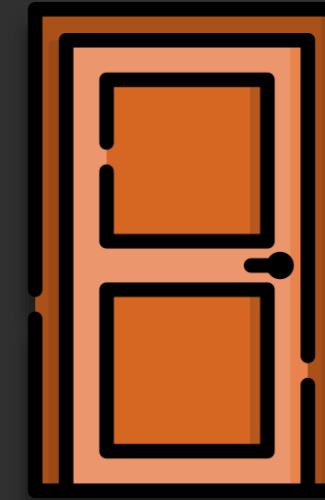
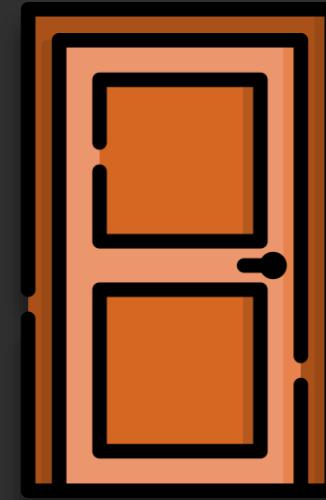
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- What if there was **no** information to base your decisions on?



Select one of the two doors:

One door gives you +2% bonus to your final grade

The other door gives you a -30% penalty to your final grade

Problems with luck-based mechanics+

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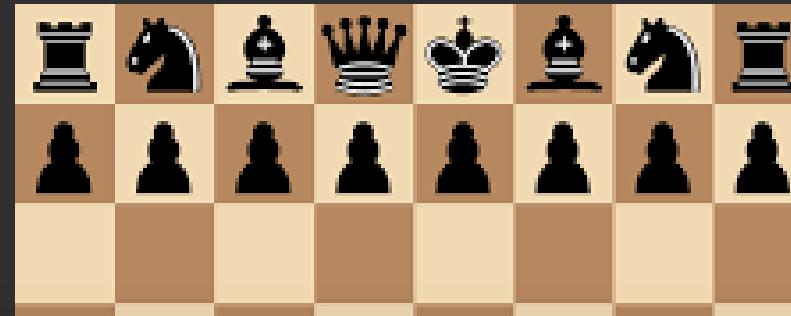
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Avoid reducing your players to a state of helplessness and frustration

How can we mitigate the effects of “luck” in games?



#1 - REMOVE RANDOMNESS COMPLETELY



Symmetrical, Equal footing, Perfect information

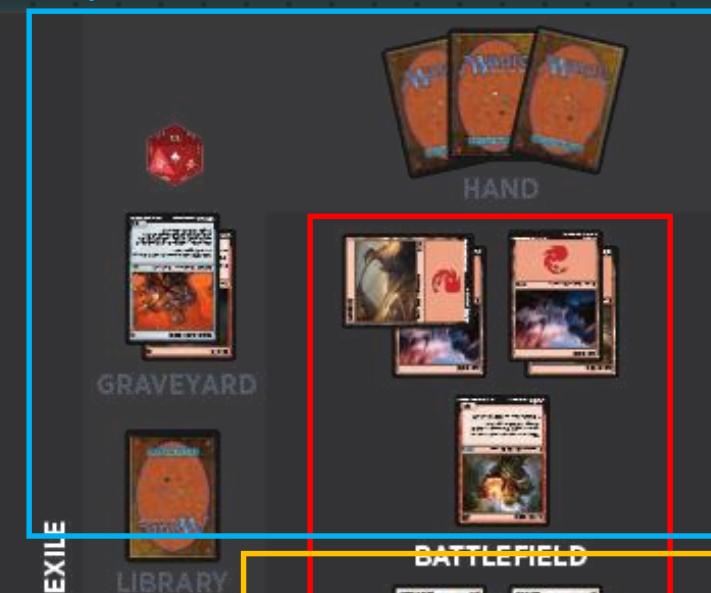
MTG

MAGIC THE GATHERING

- Collectible Card Game (CCG)
- Created by Richard Garfield in 1993



Player One



Player Two



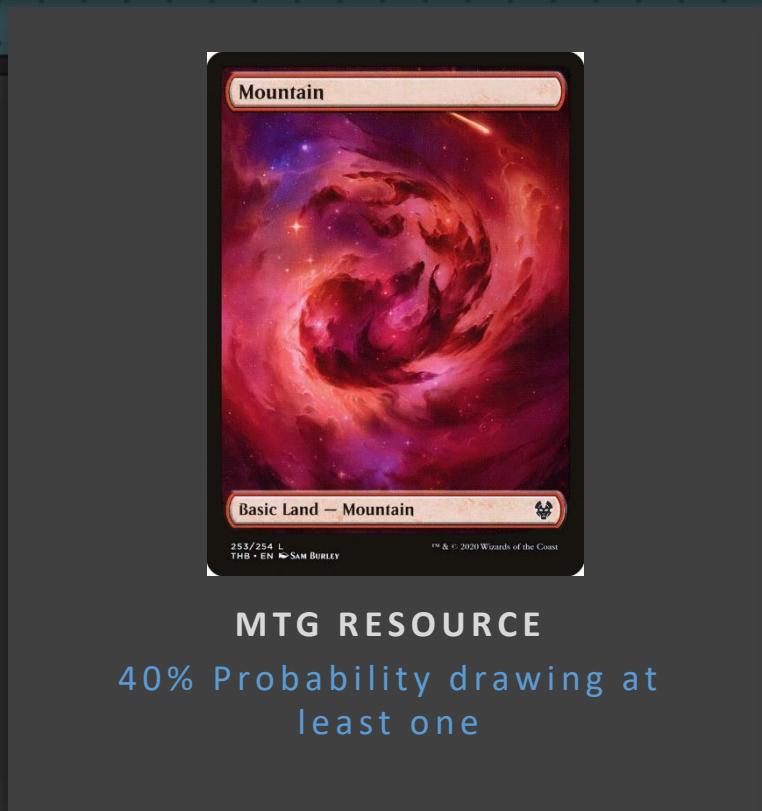
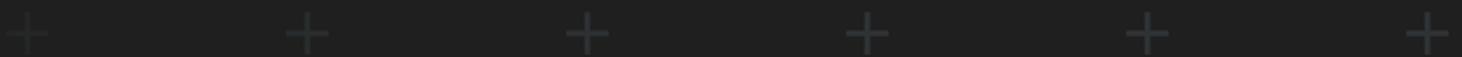
RESOURCE



SPELL

In a deck of 60 cards, there are roughly 24 RESOURCE cards, and 36 SPELL cards, drawn at random.
SPELLS REQUIRE RESOURCES TO CAST. No resource, no spells.

Hearthstone



In Hearthstone, resources are guaranteed and supplied at a constant rate by default. This greatly reduces the chance of having a “un-fun” start to the game

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#2 - REROLL



“One More” Man

Reroll



FREE 10 WISHES



Didn't get a good roll the first time? Sure, try again!

More tries = Better luck?

More tries = More willing to accept the outcome?

Reroll



"Flip 5 coins. Take an extra turn after this one for each coin that comes up heads."

"Best out of 3"



Changing the Perception of Luck

Pros and Cons



Mark Rosewater

- MTG Head Designer since 2003

PROS

- Create surprises, allow for unknowns
- Create variance, make each game different
- Ability to react requires a lot of skill
- Gives losing players or weak players a fighting chance

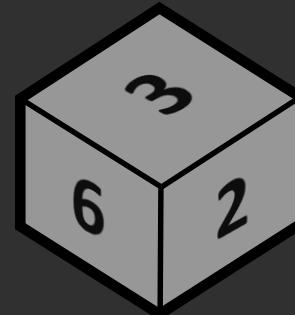
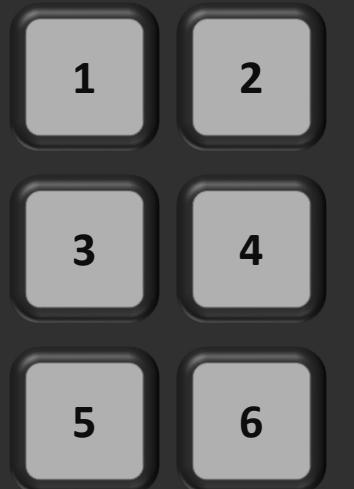
CONS

- Create feeling of powerlessness
- Create repetition of “un-fun” events
- Prevent game from advancing, eg. quest requires a random drop
- Destroys the efforts of a good player

Perception of Luck



All values on a 6-sided die



$$\frac{1 + 2 + 3 + 4 + 5 + 6}{6} = 3.5$$

Sum of values divided by
number of sides

Average Point Value

- The Average Point Value of a standard 6-sided dice is **3.5**
- You can calculate it by adding up all the values and dividing by the number of sides
- If the dice is rolled a **large number of times**, the average of all the results will be close to 3.5

Perception of Luck



In 2019, a truck spilled 216000 6-sided dice onto the highway in Atlanta, USA

Average Point Value

If the dice is rolled a **large number of times**, the average of all the results will be close to 3.5

Perception of Luck



Cost 1

Power 1 / Toughness 1



Cost 4

Power * / Toughness *

Let's play!

*“...roll a six-sided die twice.
Its base power becomes the first result
And its base toughness becomes the second result”*

Perception of Luck



Cost 1

Power 1 / Toughness 1



Cost 4

Power 4 / Toughness 4

Perception of Luck

Cost 4



Power 1 / Toughness 1

Cost 4



Power 6 / Toughness 6

Perception of Luck

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**Cost 1****Cost 4****Power 1 / Toughness 1****Power 3.5 / Toughness 3.5**

- Based on Average Point value, the power/toughness is **3.5/3.5** (*can be 4/3 or 3/4*)
- Designer > This is fair and balanced
- Players > Highly random and undesirable; unpopular card to use

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Probability vs Perception

Mitigation Techniques

#3 – Let players choose their fates

Let's Play – SHIP CAPTAIN CREW

- Five 6-sided dice (5d6) for each player
 - Player with the most points at the end of 3 rounds wins
 - Player gets to roll dice at least once, and up to 3 times per round
 - For the first roll, player must roll ALL the dice
 - After which, player decides which dice to roll, and which to “freeze”, or whether to end the round
 - The numbers “6”, “5” and “4” must appear and be “frozen”, before points can be tabulated
 - Once “6,5,4” have been assembled, the remaining two dice values are added for points
 - The round ends after 3 rolls, or when the player ends the round

6 5 4

Must have

10

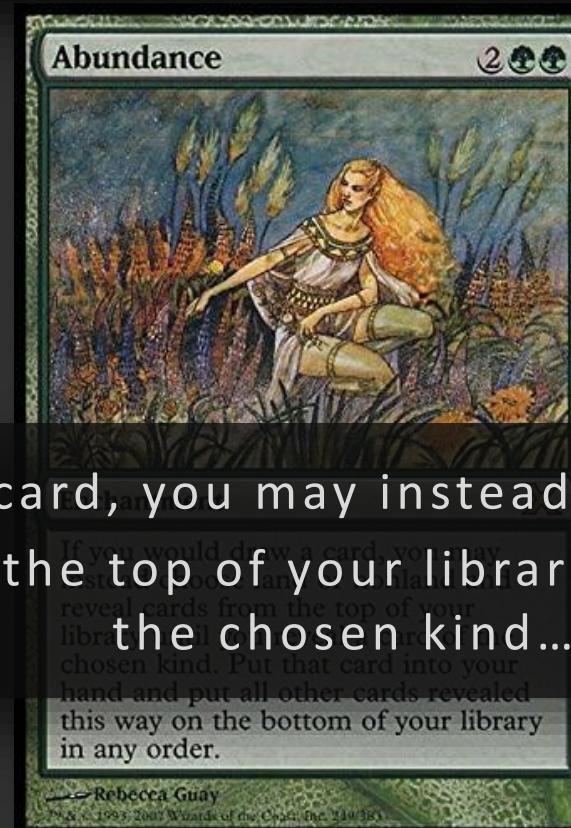
Sum of these two = points



Mitigation Techniques



#3 – Let players choose their fates



Players hold themselves accountable for the choice they made, even though it was random either way... or was it?

Mitigation Techniques

#3 – Let players choose their fates

STAT	3D6
STRENGTH	

DEXTERITY

Roll 4D6

Add the three highest results

Perform this 6 times

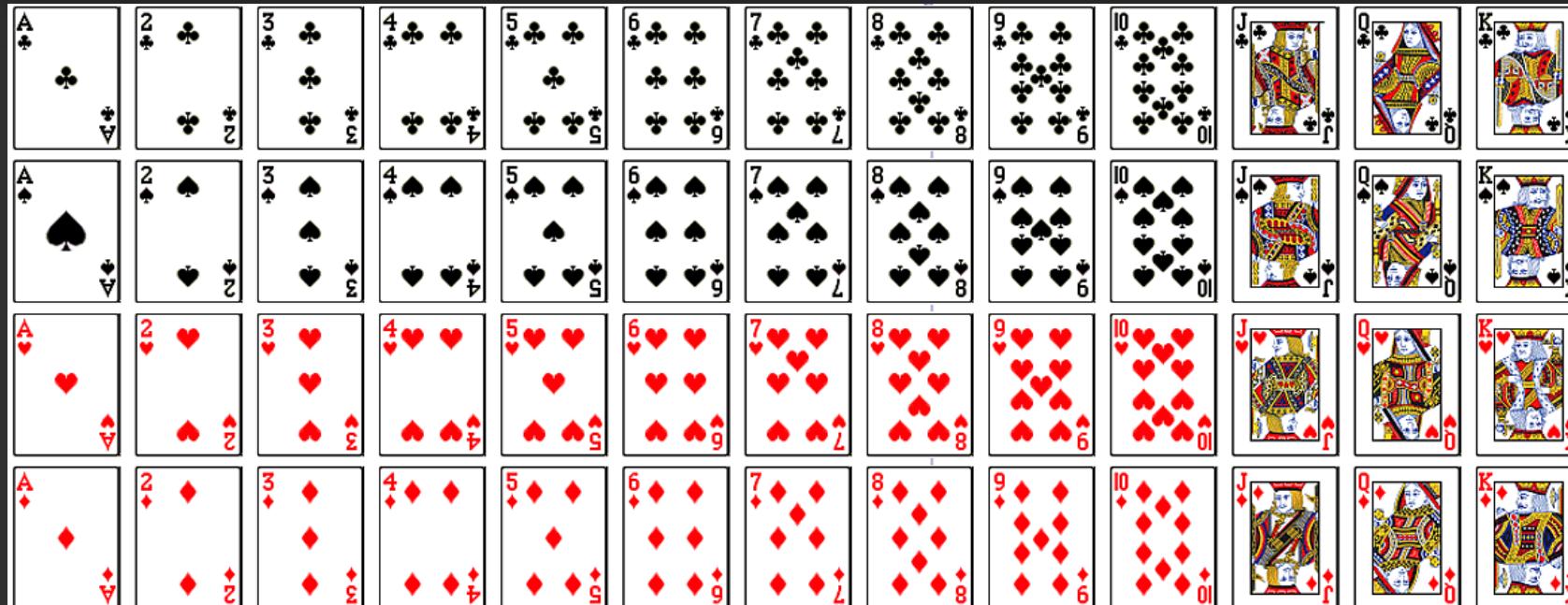
Assign the results to the parameters of your choice

Let's play!

WISDOM	
CHARISMA	

Mitigation Techniques

#4 – Let players control their probabilities



- 52 Cards
- 2 Colours – Red, Black
- 4 Suits – Spades, Hearts, Clubs, Diamonds
- 13 cards per suit – Numbers, Face cards

A Poker Deck has fixed probabilities, eg. 25% chance of drawing a Hearts card, 50% chance of drawing a Black card, 23% chance of drawing a Face card

Mitigation Techniques

#4 – Let players control their probabilities

Different Format, Different Deck Size

How many cards you can play in Magic deck depends on the format. There are many different Magic formats, but mostly the rule is 40 for **Limited** (Draft and Sealed) and 60 for **Constructed**. You can find the rules for specific formats in the table bellow.

FORMAT	MINIMUM DECK SIZE	MAXIMUM DECK SIZE
Draft	40	no limit
Sealed	40	no limit
Standard	60	no limit
Pioneer	60	no limit
Modern	60	no limit
Legacy	60	no limit
Vintage	60	no limit
Pauper	60	no limit
Brawl	59+1	59+1
Commander	99+1	99+1



*Games like Magic The Gathering allow players to construct their own deck, and choose what goes into it. Often, the recommended minimum deck size is **60 cards** with no upper limit.*

Mitigation Techniques

#4 – Let players control their probabilities



Mana



RESOURCE
40%

SPELL
60%

The official recommendations for new players are to construct decks with 40% land/resource cards, and 60% spells/creature cards. However, players do not need to follow this strictly!

Mitigation Techniques

#4 – Let players control their probabilities



35 spells – 25 Land

This deck focuses on bringing large creatures to the battlefield, and thus requires a lot of mana



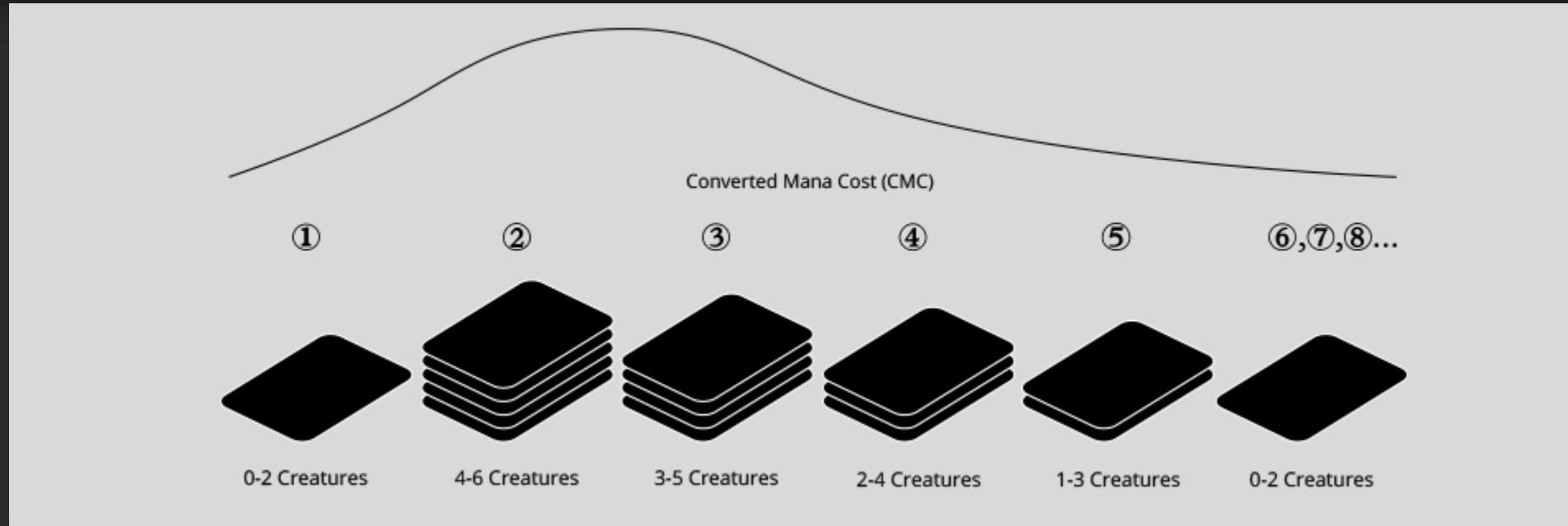
40 spells – 20 Land

This deck focuses on casting the right spells at the right time to disrupt the enemy and control the game pacing; spells are less costly in comparison, and getting the spells you need is key



Mitigation Techniques

#4 – Let players control their probabilities



Deck-builders will even construct their decks based on a Cost-Curve, knowing that high cost cards have a low chance of being played early in the game

Mitigation Techniques

#5 – Using “Gates” to prevent extreme scenarios

STAT	1D20
STRENGTH	1
DEXTERITY	1
CONSTITUTION	1
INTELLIGENCE	1
WISDOM	1
CHARISMA	1

Mitigation Techniques



#5 – Using “Gates” to prevent extreme scenarios

Your opponent
plays this



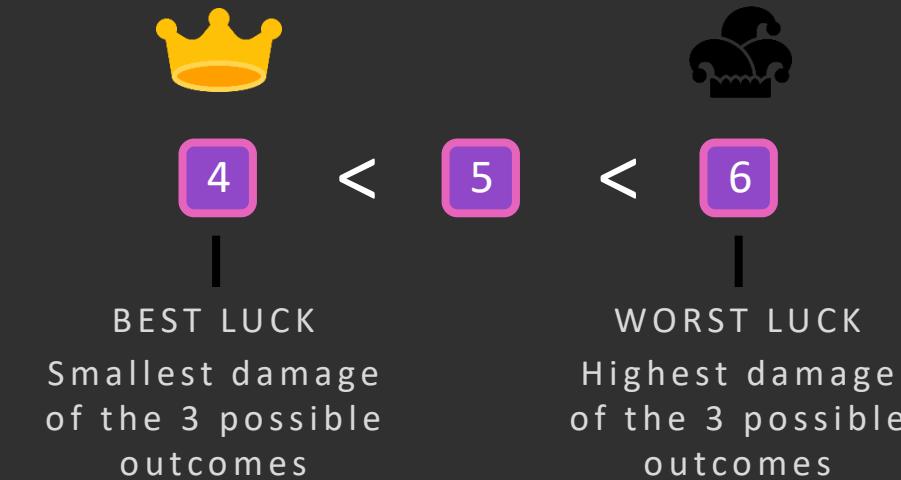
randbetween

```
{ 4 5 6 }
```

Instead of a fixed value, a random value is picked from a small range of possible values

Mitigation Techniques

#5 – Using “Gates” to prevent extreme scenarios



Small variance can mitigate the perception of even a “bad” outcome

If luck does not impact the overall outcome in a dramatic way, it can be fun and challenging

Mitigation Techniques

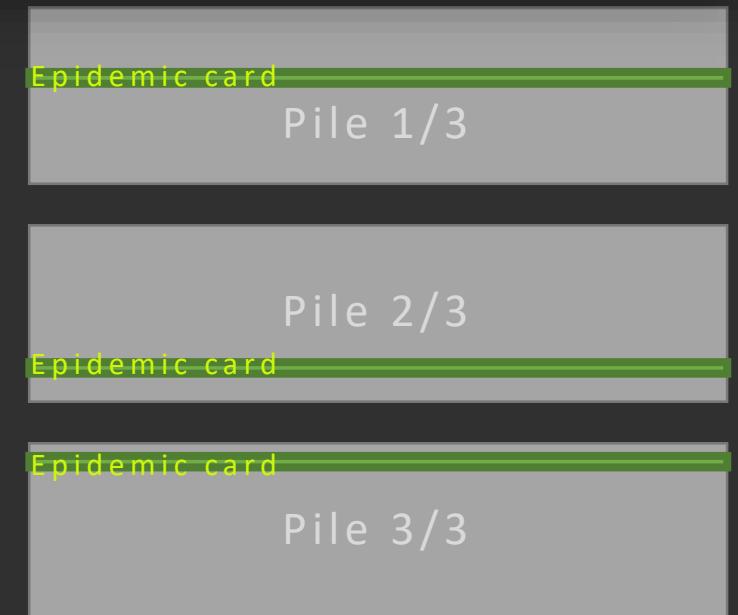
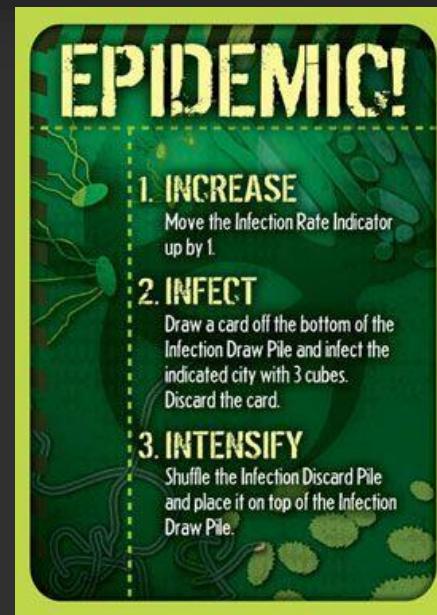
#5 – Using “Gates” to prevent extreme scenarios



In the card game “President”, where subsequent players have to play in accordance to the previously played cards, you may play a single “2” card to reset the round

Mitigation Techniques

#5 – Using “Gates” to prevent extreme scenarios



In the setup phase of “Pandemic”, a deck of infection cards are split into piles equal to the number of Epidemic cards used

A single Epidemic card is shuffled into each pile, and the pile is combined after that

Mitigation Techniques

#5 – Using “Gates” to prevent extreme scenarios



Rogue Legacy



Dead Cells

In *Rogue-lite* games, the player is prevented from proceeding unless all resources are spent or surrendered.

Mitigation Techniques

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#6 – Consolation Luck



CHOOSE



+\$5



-\$5

How do you feel playing this game?

Mitigation Techniques

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#6 – Consolation Luck



CHOOSE



How do you feel playing this game?

Mitigation Techniques



#6 – Consolation Luck



A category of overall luck		
Kanji	How to read	Meaning
大吉	Daikichi	Great blessing
中吉	Chūkichi	Middle blessing
小吉	Shōkichi	Small blessing
吉	Kichi	Blessing
末吉	Suekichi	Future blessing
凶	Kyou	Bad fortune
大凶	Daikyou	Great bad fortune

Omikuji

<https://www.atago-jinja.com/lot/>

Mitigation Techniques



#6 – Consolation Luck



How to read	Meaning
Daikichi	Great blessing
Chūkichi	Middle blessing
Shōkichi	Small blessing
Kichi	Blessing
Suekichi	Future blessing
Kyou	Bad fortune
Daikyou	Great bad fortune

Mitigation Techniques

#6 – Consolation Luck



Maybe you didn't get the best roll, but you got something at least out of it!

Mitigation Techniques

#6 – Consolation Luck



Diablo Rift Simulator

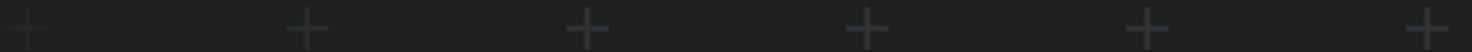
<https://dimi777.github.io/diablo-rift-simulator/>

Luck Mitigation



- Pros and Cons of Randomness
- Controlling Luck/Randomness (?)
 - Remove it completely
 - Offer more chances
 - Let players choose their fates
 - Let players control their probabilities
 - Use “gates” to limit the effects of randomness
 - Offer “good” luck when players don’t get “best” luck

Luck Mitigation



- Pros and Cons of Randomness
- Controlling Luck/Randomness (?)
 - Remove it completely
 - Change the player's perception of luck

Luck Mitigation



Using RNG to:

- Create variance in the starting states of the game
- Generate events/encounters
- Resolve conflict/outcomes
- ...

Use luck mitigation techniques where appropriate to ensure the best possible experience and reduce frustration

(...or hate towards the designer)

HOMEWORK

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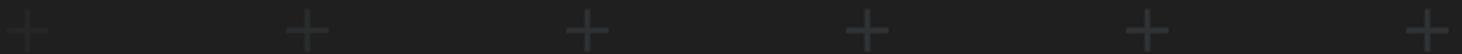
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WAR



- WAR is a 1v1 game played with a single deck of 52 cards. Shuffle and deal 26 cards to each player.
- Players hold their cards face down in one hand and do not look at their cards.
- The objective of the game is to win all the cards.
- When the game begins, both players reveal the top card of their decks onto the table.
- The player with the higher value card takes both cards and puts them at the bottom of the deck.
- If both cards have the same value, they go to WAR!
 - Both leave the revealed cards on the table
 - Both draw three cards and place them on the table, face-down
 - Both reveal one more card and compare values
 - Repeat until one side wins; winner collects all the cards and puts them at the bottom of the deck

The Umbrella Academy



- Objective of the game is to survive 5 rounds
- Each round consists of 6 Villain Attacks that you may contest with your own cards
- You must respond to the Villain Attacks from left to right
- After you have responded to all the attacks, evaluate the results and check if you are still alive
- <https://tabletopia.com/games/the-umbrella-academy-game>
- <https://youtu.be/qQveVdtBjYo>

The Umbrella Academy

Step 2 :

Shuffle and draw 6 cards into your hand. You may not have more than 6 cards in your hand.

At the start of the next round, you will draw cards up to your hand limit

Step 1 :
Choose 1 of these
5 heroes

Note:
This is your Health bar, you have 8 health points

Note:
You can play this card anytime to restore your health to Full



The Umbrella Academy



Note:

You have to play a card with a higher Attack value to defeat this Villain.

You have to play a card with the same Attack value to block this Villain.

Step 1:

At the start of the round, shuffle, draw a card and reveal on the table. Repeat until there are 6.



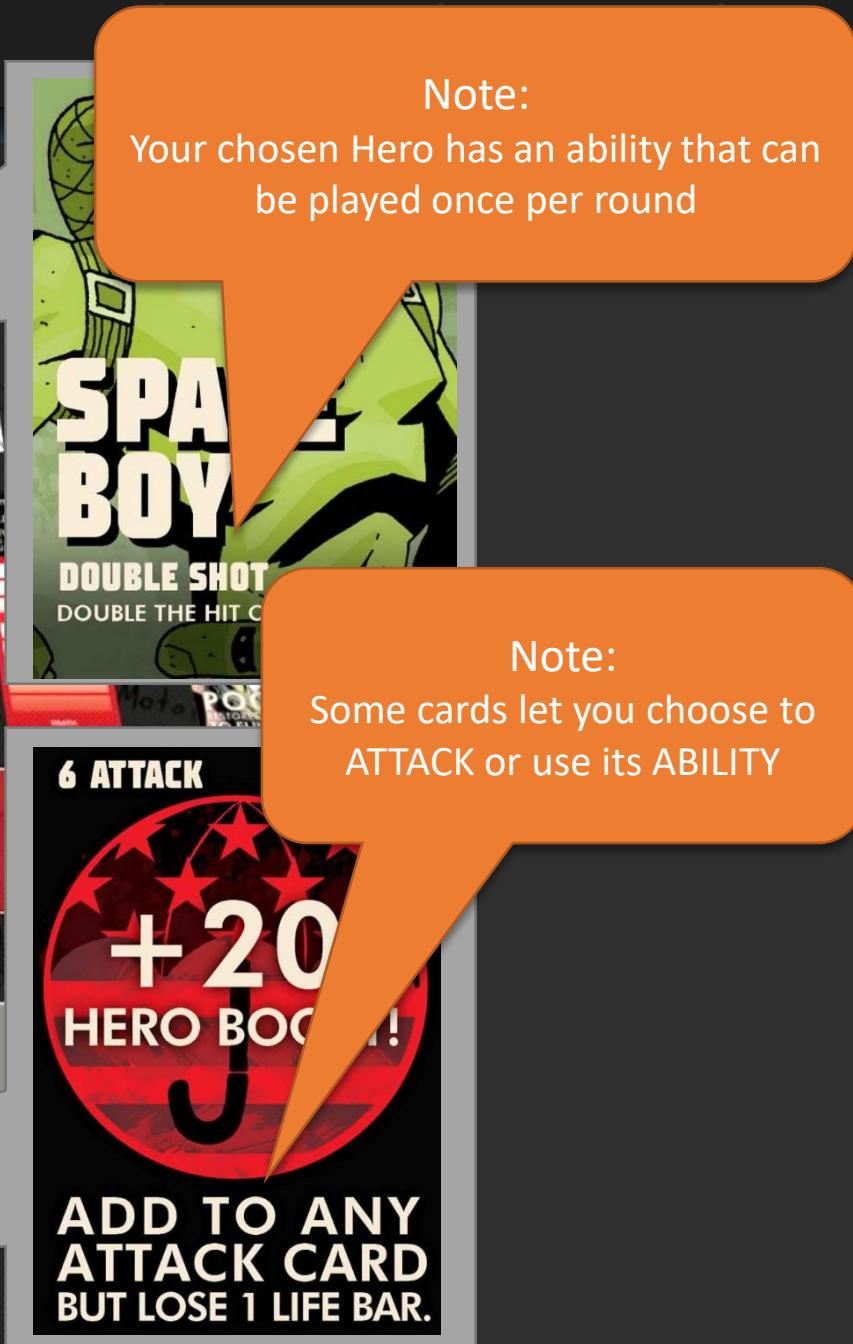
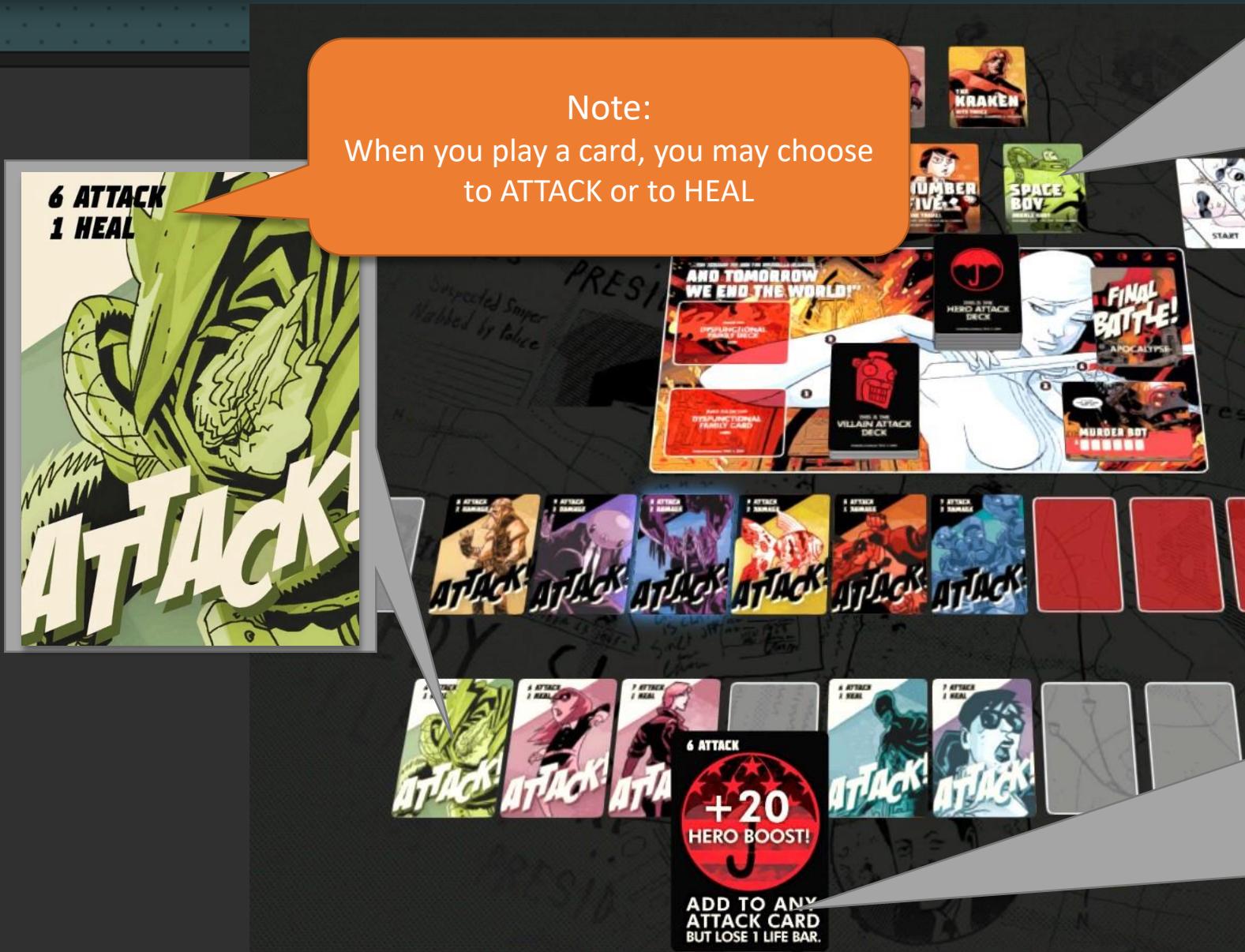
Note:

This is who you're fighting this turn. This card tells you how many Villain Attack cards to reveal

Step 2:

You will play your cards here, from LEFT to RIGHT. You may skip a slot, but you may not go back and play a card later.

The Umbrella Academy



The Umbrella Academy

1

8 ATTACK
2 DAMAGE

ATTACK

6 ATTACK
1 HEAL

ATTACK

This set will resolve in the Player losing 2 bars, then healing 1 bar if the Player chose to Heal

The Villain is “alive”

The Umbrella Academy

4

9 ATTACK
2 DAMAGE



This set will resolve in the Player losing 2 health bars because it is uncontested.

The Villain is “alive”.

SKIP

DISCARD



6 ATTACK
+20 HERO BOOST
ADD TO AN ATTACK CARD BUT LOSE 1 LIFE

The Umbrella Academy

5

ATTACK



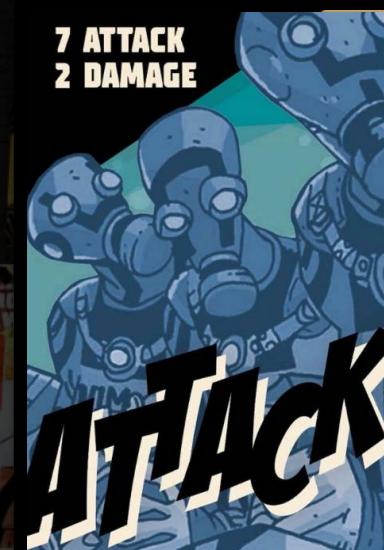
This set will resolve in the Player defeating the Villain and not taking any damage.

The Villain is removed and placed in the Discard pile.

The Umbrella Academy

6

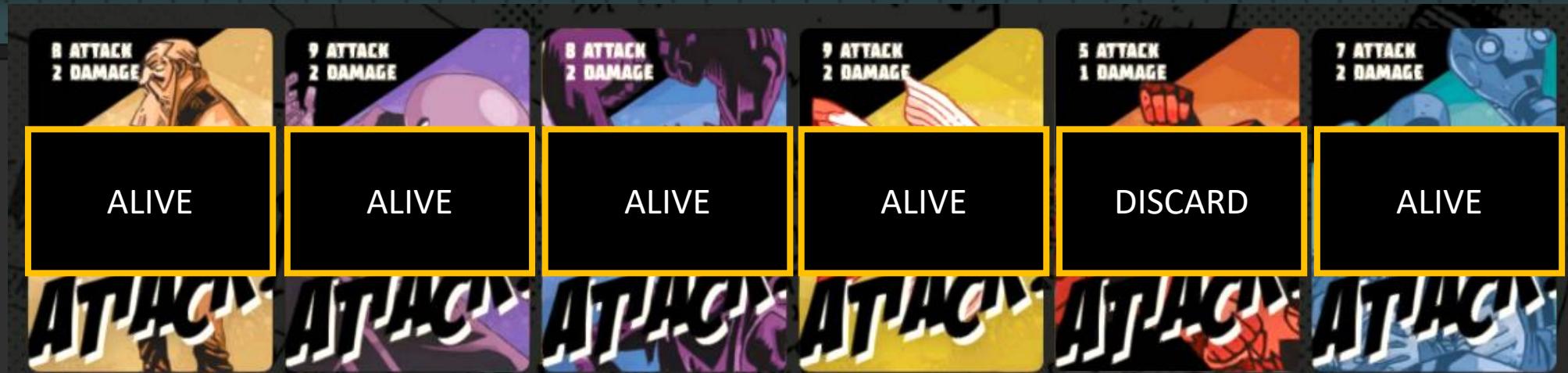
ATTACK (BLOCK)



This set will resolve in the Player losing 1(half damage rounded up) health bar, if the player chooses to Attack.

The Villain is blocked, but “alive”.

The Umbrella Academy



Lose 1 HP

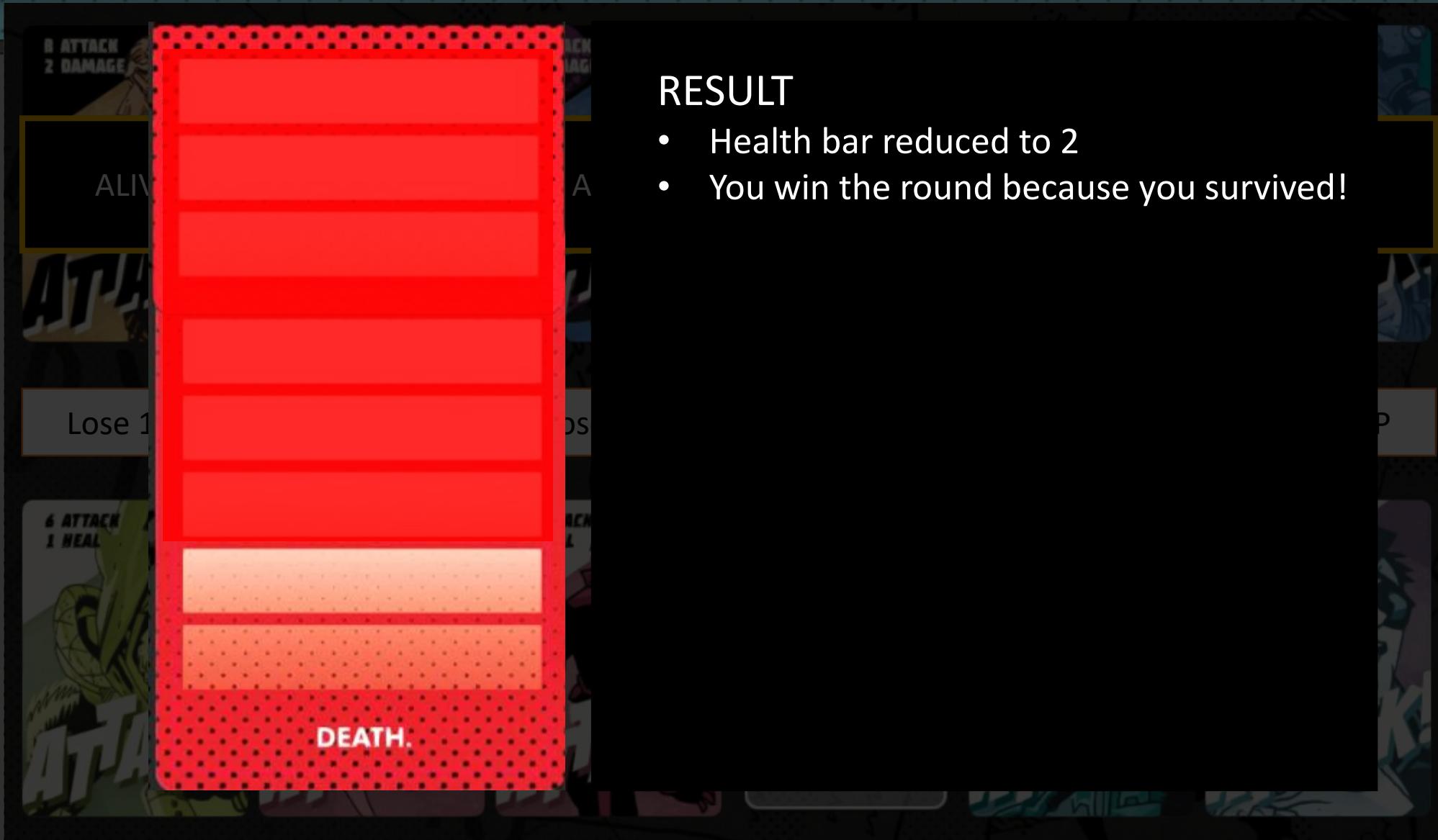
Lose 1 HP

Lose 1 HP

Lose 2 HP

Lose 1 HP





Links



- How to play President
 - <https://youtu.be/HYcH0bzsmI>
- Mark Rosewater GDC talk
 - <https://youtu.be/QHHg99hwQGY>
- Tabletopia Solo Games
 - <https://tabletopia.com/games?category=solo>
- <https://www.random.org/playing-cards/>

End

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