

Cinematic sword combat prototype

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1. Introduction

1.1 Overview

The aim of this 3D sword fighting design is to create a system where the flow of combat is designed to appeal visually so that momentum of attacks can create a kind of fluid, cinematic, choreographed-looking fight. Less of a realism approach, and more cinema inspired.

Usually in video games, connecting an attack into a blocking or parrying enemy doesn't advance the fight; instead, you must wait for an opening to damage their health directly. Therefore, the way my system achieves the aim proposed in this submission is to make the interaction of attack and defence an as-equally meaningful advancement of combat, conducive to the overall back and forth of a sword fight. This is done by introducing a stamina mechanic where the primary aim of the fight is to whittle down the opponent's stamina until they can no longer defend, creating an opening to *then* attack their health (a concept similarly employed in Sekiro: Shadows Die Twice (Sekiro: Shadows Die Twice, 2019), although to a less cinematic, more game-ified, Dark Souls (Dark Souls, 2011) stylisation). This makes enemy defending a part of the fight, as opposed to an obstacle or brake to it, which is usually meant to be avoided. Usually if there is a guard break feature in a fighting game, it's not made to be a part of the fight, but rather as something to punish someone for defending too often. In this system however, it *is* the back-and-forth, and would be communicated in-engine as such with unique animations, which I will expand on further below (see 2.1). Another aim of this design is for the mechanics to be flexible and adaptable to different games with different goals. For example, I personally wanted to make it so the player will struggle to take on many enemies at once, and would ideally have to pick the battles worth fighting. With simple stat changes to stamina reserves however, or tweaks to enemy behaviour such as when they do or do not attack, or adding of mechanics, the system can be adapted so that this challenge is changed in nature to be easier, or even entirely different if the player character was an expert swordsman or a novice.

This system is designed specifically for Player vs Enemy play, although the system does actually have potential for Player vs Player testing. Although ultimately, I think there isn't

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enough skill barriers, room for technical proficiency or learning curve (in this specific design iteration) for it to work properly that way.

In order to rapidly prototype a sword-fighting simulator, I am submitting the rules for a playable paper prototype, illustrated with screen-captures of animations from an earlier digital iteration.

2. Rules for Paper Prototype

In order to play the paper prototype, the player will need a six-sided dice, two or more counters to represent characters, measured paper or board, such as squared paper and a pencil and note paper to keep track of health and stamina numbers.

2.1 Rules for player

Overview

- In gameplay, the player may attack whenever and whoever they desire and move where they want, except when they are themselves being attacked. If an enemy attack is incoming, the player should attempt to parry it, or perhaps strategically take a hit at specific times.
- While defending a connecting attack, or performing an attack, the player cannot move manually, but can after the attack is finished. Just like the player can control the direction of an initial attack, they can turn and control the direction of the follow up secondary and tertiary attacks, although once the direction has been chosen these will again carry the player forwards in the direction of the attack.
- The enemies are positioned at the beginning as the player sees fit. The area of aggression (spanning outwards from the player character by radius) is 30 meters.

Movement

- All characters may move up to 1 meter in each second of a round, and cannot attack and move manually at the same time; therefore, the player and enemies must close distance between each other before connecting a successful attack.
- A character must be within two meters for an attack to connect.
- While 'vulnerable' (see 1.4), the can move (unlike enemy characters), but at a penalty – 'stumble'; player is restricted to half a meter each second, for a total of one meter per round.
- Player cannot move into same meter of space as another character.

Attacking

- Regular attack: The player can only target one enemy per attack, and each attack takes one second, and can be followed up with another combo attack for added benefits (see '1.6 Stats', below). This 'follow up' state can be cancelled by performing any other action. When the player is attacking, they move forwards one meter, and the enemy moves back one.
- Execution: In addition to regular attacks, the player can 'execute' 'vulnerable' enemies (once their stamina has been worn through) with critical (20% or less)

health. In the time that an execution is happening (two seconds), other enemies cannot attack. If they have already rolled to attack, and the roll was successful, the attack will be cancelled nonetheless.

- Offensive movement: Whenever a character, including the player, attacks, they move forwards by one meter.
- Position Trading: If two opposing characters attack each other at the same time, they clash swords and swap positions with each other, standing one meter apart afterwards. This is called a 'positioning trade'. This takes two seconds to happen, and, like executions, any queued enemy attack (except for the enemy engaged in the positioning trade) is cancelled. Unlike normal attacking, this takes stamina from both participants (for specifics, see further below in the 'Stats' section). The strategic advantage of this is closing towards an enemy range without the risk of attack for a round.



Positional trading as described above, exemplified in Kurosawa's film 'Harakiri' (1962)

- Grapple and Grab: Within one meter of an enemy, player can initiate a Grapple. A grapple is a struggle between two characters, which when won, results in a Grab, which offers two opportunities: Attack and Throw. Player grapple has a 2/3 chance to succeed. Grapple bypasses an enemy's defence, and fails if performed against an attacking swing. Grab lasts for two seconds of time. If roll fails, enemy grabs player and attacks twice. Enemies can still attack player during player grab (but not during enemy grab).
 - Attacking from grab is used to damage health directly, using the pommel of their sword to hit the enemy over the head. This deals a small amount of damage directly to health (see Stats) for a maximum of two hits (one per second) before enemy will free themselves of grab.
 - Throwing from grab throws an enemy backwards two meters. Their movement backwards takes one second, or half a round, and their time spent on the ground is a full two seconds of round time (the enemy picking themselves up provides an additional second of (decreased) vulnerability). If the round ends before their time on the floor is over, their time spills over into the next round. An enemy can be thrown in any direction, and any characters they come into contact with during their stumble downwards are also knocked over for a full length of round time (the beginning of which is counted from the same moment the originally thrown enemy hits the ground), and fall on the spot without moving into a different space. In this

time that an enemy is on the ground, the player can attempt to attack the downed enemy, for a 5/6 chance of success (2/3 chance to succeed if the enemy is picking themselves up). If the attack roll succeeds, the player can deal the normal amount of health as any undefended attack. If the roll fails, the downed enemy performs a block (see below) from the ground (without a chance to perform a counter attack or counter grab).

- **Falling:** Normally, two enemies won't ever be in the same meter of space. If an enemy is thrown and ends up on the ground in the same meter of space as another, that one falls down too, but the latter one which was knocked over will stumble one meter backwards, left or right of the incoming thrown enemy (but not towards the direction they were thrown from). Roll to determine direction; 1/3 chance for each direction. If one of those directions are taken up by an enemy, adjust roll chance accordingly; if the backwards meter of space is taken, roll between the remaining two spaces on a 1/2 chance between either. If only one space remains, no roll is necessary. If no spaces remain, assign each character two numbers and roll on a 1/3 chance to decide which enemy will step aside to let the stumbling enemy fall. Once character has been selected, perform another 1/3 chance roll using the same backwards, left or right principle as previously described to see which way they will step aside. Do not roll on a standing character which themselves cannot move to another meter of space, unless none can, at which point the player themselves can just simply select a standing character to move appropriately to a free space so that another may step into theirs, to make way for a falling enemy.

Defence

- In order to defend an attack, the player must parry or block any time before the enemy attack lands (before or during the enemy's wind-up phase of an attack) (the player is also able to cancel any inputted action at any time in order to assume a parry or block).
- **Parry:** A parry is when a character deflects an attack with their own movement, and is the go-to defence in this game.
- **Block:** A block uses strength to interrupt an enemy swing, stopping them from using a follow-up combo attack, and setting up opportunity for two specific moves: The Counter Attack, and the Counter Grab. Blocking uses significantly more stamina than parrying, (detailed below with the other stat numbers), and is best used nearer the end of a combat scenario with fewer enemies and therefore less risk to stamina conservation.
 - Counter attacking targets an enemy's health bar directly, and takes half a round (one second of round time) to complete.
 - Counter grabbing allows the player to perform a grab without the risk of grappling.

- Defensive movement: Whenever they parry a connecting attack, they move backwards one meter. Do not move when blocking. If another character is in the meter of space the defending character is about to move to, roll using the same rules as detailed in 'Falling' section of 'Throws' in 'Attacking' section of player movement to determine which space the in-the-way character should move to.

2.2 Rules for Enemy Behaviour

>Every round accounts for two seconds of in-game real time, and each round serves to govern the checks of which and when enemies will do what.

>Only two enemies may perform an attack roll each round. If there are more than two enemies within attack vicinity, assign each one a number, and roll your dice twice. The two respective numbers are the two enemies who will perform attack rolls that round. If the dice throws up the same number twice, reroll until a different number from the first result appears.

>Base enemy has three states: 'Aggressive', 'Afraid', and 'Vulnerable'.

- 'Aggressive' is the standard state for an enemy when they have the stamina necessary for attack and defence.
 - Enemy rolls to attack once each round. Chance to attack is 1/2.
 - While in Aggressive state and not performing an attack, enemy is in defensive stance, to which an incoming attack will be parried. Enemies do not block.
 - If an enemy who is rolling to attack is able to then attack, another roll is performed immediately afterwards (one for each attacking enemy) to see when this attack will take place in the two second time frame of the round. There is an equal $\frac{1}{2}$ chance for the attack to take place initiate at the start of the 1st second or at the start of the 2nd second. The player can parry two attacks at once. Only once the enemy combo is finished can the player attack back.

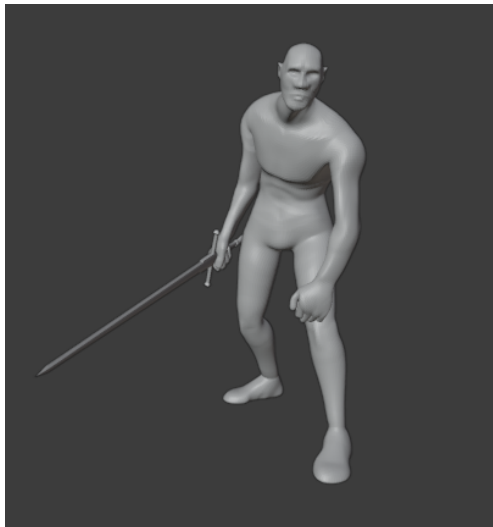


Defensive stance

- If enemy has started parrying a player attack, the time of which to perform spills from one round over into the next, the defending enemy will not roll to

attack in the same round. All initial attacking rolls must take place at the start of the round.

- If enemy has attacked in the previous round, they will not roll to attack in the next.
- Enemy can however perform a combo of two or three hits as part of one attack (despite the attack time spilling over into multiple rounds – the final round of which is counted as an attack round and thus won't lead to another roll in the round following their combo attack). If attack roll is successful, they roll again; 1/2 chance to perform a second follow-up combo attack. If successful, they roll again; 1/2 chance to perform a third follow-up combo attack. Each roll is performed after the previous attack has followed through, while the enemy is in a 'follow-up' stance (a window in which the character holds their stance of attack for half a second, during which is the window to initiate a secondary or tertiary follow-up combo attack, before dropping back into a neutral or defensive stance).
- Each enemy who is Aggressive and not within attack vicinity (within two meters) at the start of the round will roll to reposition once. 1/3 chance to move closer to the player. If successful, they will move closer by one meter. An enemy cannot be more than one meter close to the player.
- Each enemy who's Aggressive, doesn't have full stamina, and is within attack vicinity at the start of the round will also roll to reposition away from the player. 1/6 chance to reposition back a meter. If the roll fails, they stay put.
- 'Afraid' is a state which lasts for one round. In this state, the enemy will not roll to attack, defend or move.
 - Each enemy rolls for Afraid each time an enemy is killed; Afraid has a 1/6 chance of being applied upon the player normally killing an enemy, and a 1/3 chance of being applied upon the player executing an enemy.
- 'Vulnerable' is a state which lasts for three rounds. In this state, the enemy will not roll to attack, defend, or move. Vulnerable is induced in the respective enemy when the player reduces their stamina to zero, breaking their defence and exhausting them. After the three rounds, stamina starts to regenerate again. The rationale behind three rounds of vulnerability is that it should take a while, especially in more numerous fights, to whittle down a specific opponent's stamina. I wouldn't want the player to miss this window of opportunity to perform an execution because they have to defend a series of incoming attacks and deal with another enemy, when the point of the execution is to keep the fight satisfying and rewarding. The vulnerability window isn't so long that it can be ignored, however; and therefore, it should still inform and press player action – it demands attention. If the enemy is not in critical health while vulnerable, the player should also have some time to whittle their health down to critical point first. Moreover, when translating this state into engine, three rounds equating to six seconds seems about a realistic time for someone to catch their breath.



Character in 'Vulnerable' state, with their guard down. In engine, clear and expressive animation should communicate vulnerability.

2.3 Stats

The objective of the combat system is to whittle down the enemy's stamina count so that they no longer have the energy to protect their health, or to find an opening in which you can attack their health directly.

- Health Points
 - This stat determines three factors: Stamina reserve, Stamina regeneration, Execution window ('critical health') and alive or dead states. A character with lower health will have their Stamina reserves shortened, so that it cannot regenerate past a certain point. This regeneration will also be slower. Stamina reserves and regeneration efficiency are directly proportional to health until 33%, at which point stamina is no longer punished further. For example: 35% health results in 35% stamina reserves, and 35% the stamina regeneration rate; 12% health would not further effect stamina, which would remain 33% reserves and regeneration rate.
 - This stat is determined by one factor: Connecting attacks which aren't parried.
 - Health does not regenerate until a fight is over.
 - 100 health points.
 - Initial attacks take 10 points.
 - Secondary and tertiary attacks take 15.
 - Counter attacks take 25 points.
 - Attacks from grab take 10 points each – this is because you can only perform two attacks, and the stamina cost of blocking and then counter grabbing is punishing. Attacking from a grab shouldn't be too unrewarding, but is most worthwhile to be performed after blocking an initial enemy attack.
 - Critical health opens a character up to an execution. Critical health is communicated by a flashing health bar in-engine, and in the paper prototype the player will have to keep track of stat numbers themselves.

- Stamina Points
 - This stat determines one factor: Character state. When Stamina = 0, 'Vulnerable' is forced on the respective character.
 - This stat is determined by two factors: Health, and parried connecting attacks.
 - 100 stamina points.
 - Initial parried attacks take 15 points.
 - Secondary and tertiary attacks take 20.
 - Engaging in a Positioning Trade takes 20 points of stamina.
 - Blocking takes 40 points.
 - Performing a counter attack takes a further 20 points.
 - Performing a counter grapple takes 15 points.
 - Performing a throw takes 10 points.
 - Rate of regeneration = 10 points/second. Therefore, when HP=50%, StamRegen=5points/s.
 - Stamina only recovers when not performing any action except moving or holding defensive stance.

These base stats are the same for the player and enemies. It is important to consider that in a properly developed game with progression however, the player would most likely become stronger while enemies remained the same.

Of course, all these statistics can be adjusted as seen fit in engine development.

3. Translating the paper prototype to in-engine development

3.1 Combat

In order to create a system so described in the aim at the top, the design needs a way for the parrying character to predict the direction the next attack will come from so as to raise their sword and parry from the appropriate incoming direction. To accomplish this, the attack system is based off a 1 – 2 system. Each first attack always comes from the left, swinging rightwards. Each second attack always comes from the right. The third from the left, and so on if you add further attacks to the combo length. After an attack has followed through and a character has parried it, the parrying character's next animation (if attacked again), will be to move to the next parrying position, whether that's a position 1 or 2. Of course, this system can be built on to add any number of attacking and parrying positions and animations to transition between the said positions. When a character parries, they don't just snap to position, they have a transition animation where their sword goes to meet the attackers; every time an attacker attacks, they step forwards. Every time a character parries a connecting attack, they swing their sword to the relevant parrying position, and step backwards. This way, as each attacking swing progresses the struggle, the characters both move in the attacker is facing. Although the system is simple, and reminiscent of 'hack-and-slash' gameplay, it is not meant to too heavily emphasise technical mechanics or intricate sword fighting feel. It leans more towards the cinematic nature of Assassin's Creed (Assassin's Creed, 2007), which prioritises visual feedback and cinematic qualities, than the technical nature of, say, Kingdome Come Deliverance (Kingdome Come Deliverance, 2017). The type of game I would intend this for is a more general immersive action role-playing

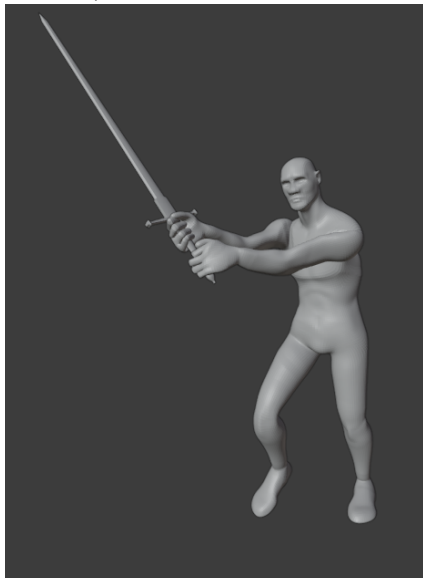
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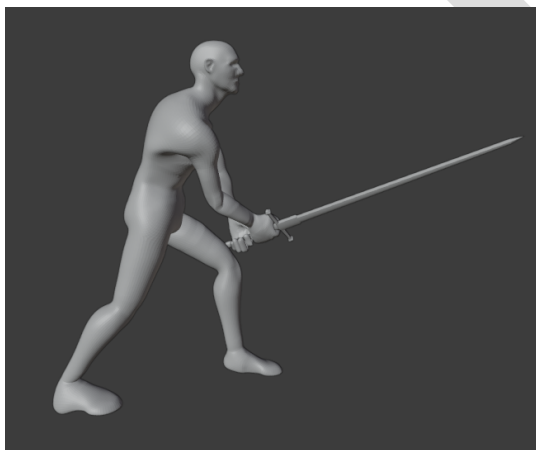
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game, rather than a solely combat-focused one, keeping the amount of inputs to a minimum and leaving potential controller mapping fairly open for other inputs, accommodating for a wide range of game designs.

After an attack has followed through, the attacker and defender hold the end pose, poised to continue the combo if the consecutive attack is initiated within the end pose time frame. If the attack is failed to be inputted during said timeframe, any following attack is not part of a combo, but a new initial attack.



Character attacking leftwards.



After following through a leftward attack, the character will then be poised to attack from the right, holding the position for half a second so as to allow the player to make a decision to carry on the combo. Step forward has been made.

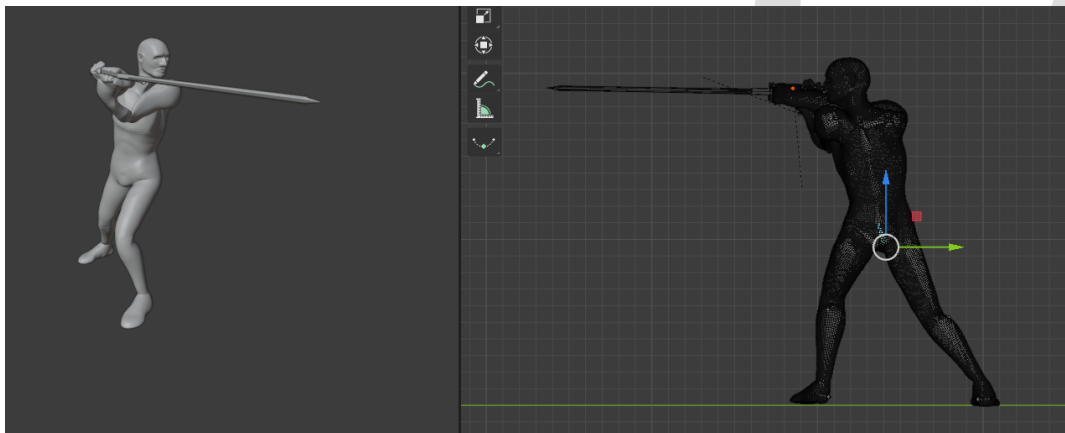
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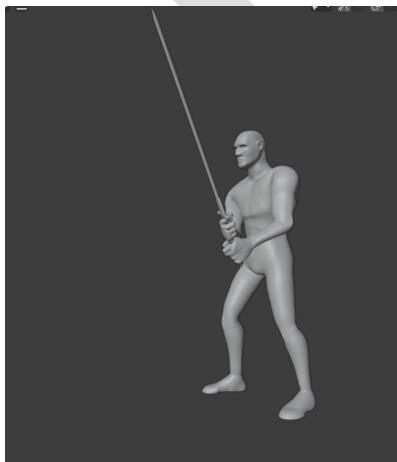
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Parrying character's sword has been moved to the left, following the attacker's swing. He has also stepped back, in accordance with the attacker's forwards step. If the character keeps parrying, they will immediately move to the second respective parry position in preparation for the rightwards attack.



Follow-up combo attack will then swing from leftwards follow-through position rightwards, then hold end pose, poised to swing to the left again for a third attack. Again, with a step forwards.



Parrying character's next position will finish with them blocking this rightward attack from a different respective position

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3.2 Features unique to development in-engine

Not all features would be communicated well in the paper prototype. One such feature is the perfect parry. The player can perform a perfect parry to conserve stamina, which is done by pressing parry as late as possible during the wind-up phase of a first attack, or, during a combo attack (which doesn't necessarily have a wind-up and goes straight into attack), releasing the parry re-inputting the parry command at the correct time; in-between the beginning of the follow-up pose and the start of the connecting frame of the attacker's swings next swing. If the player inputs too late for the parry animation to fully play, it will miss less prioritised frames or all of them if necessary. Depending on the perfect parry window, this could be relatively easy and common to execute (in a PvE context), or difficult and skillfull (high difficulty PvE or even PvP contexts). Primarily however, this is designed with PvE in mind.

As long as the parry button was inputted at the correct time, the player can release it for the duration of the connection parry and attack animation with no penalty.

The rounds still technically take place, in order to govern how often enemy AI rolls and decisions are made. However, they are much less apparent to the player, and AI are not restricted to attacking within one second intervals, and movement is not restricted specifically to by-the meter measurements.

Another feature which would be translated differently in-engine would be grapple. Instead of a dice roll, the player would have to hit a short random set of inputs in the correct sequence to successfully grab the enemy, the looser being hit in some way.

Blocking would function so that the player uses the same input to block as they do to parry, the difference being the move the directional stick toward the direction of the attacker as they do so, to kind of communicate the sense of pushing against an incoming attack.

As stated earlier, this designed to be easily built upon, especially so when translated into engine; for example, by adding additional combo attacks, unique unlockable attack and defence animations, or more moves such as a counter disarming and hostage-taking. Another way to change up the way the player approaches combat scenarios would be to introduce different enemies who can block, counter attack, grapple and throw, and introduce more advanced enemy behaviours such as surrounding the player.

3.3 Logic for Combat

>Game checks for potential connecting attacks by checking for hostile attacks within attack range of each character

>If yes, game checks for state of character who is in attack range of incoming attack

>If 'Aggressive', and potential connecting attack is true, game detects this and checks to see if it is a 1st or 2nd attack.

>If 'Aggressive', and potential connecting attack is true, game checks for defensive action (block or parry) for duration of the incoming attack wind-up phase.

>If defensive action is detected, spin character to face the hostile attacking character, and call the respective defensive animation for the incoming attack.

>After attack, game checks for actions during follow-up pose.

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>If a follow-up attack is initiated during follow-up pose, and action check was true, call respective animation.

>If 'Afraid', game needs no further checks.

>If 'Vulnerable' game checks for critical health.

>If critical health is true, call execution animation.

>If critical health is false, no further checks.

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