TOOTH & NAIL — Technical Design Document (TDD)

1. Project Overview & Vision

Tooth & Nail is a multiplayer martial arts arena fighter inspired by directional combat systems similar to those popularized by games like For Honor. The project began as a technical replication experiment but has evolved into a broader exploration of martial arts–inspired combat systems designed around reaction, positional advantage, and readable combat.

The core vision of the game is to create intense one-on-one duels where players feel like disciplined martial artists reading and reacting to an opponent. Combat should feel deliberate and skill-driven rather than chaotic or spam-heavy.

The project also serves as a technical portfolio piece demonstrating robust multiplayer combat architecture, server-authoritative combat validation, and scalable gameplay systems.

Primary experience goals:

- Reaction-based combat
- High readability and clarity
- Short, intense matches
- Character identity based on martial arts disciplines

Tone & Audience

The tone should be a fun, fast paced fighting environment. Should be able to be both fun and light (leaning more towards Straftat and SuperHot), with the option to lean towards skill expression with a competitive skill cap.

The target audience is a player who enjoys a fighting game with an approachable, understandable moveset. That being said, similar to For Honor, T&N should have space for a deeper skill expression. Someone who understands their characters move set entirely should have access to creative mixups.

2. Design Pillars

The following design pillars guide all development decisions.

Readable Combat

Combat must communicate clearly what is happening at all times. Attack directions, timing, and defensive responses must be visible and understandable.

Reaction-Based Gameplay

Players should win engagements through timing, anticipation, and reading opponents.

Martial Arts Identity

Characters should feel rooted in real martial arts disciplines such as Muay Thai, Wrestling, Boxing, Judo, etc.

Short Competitive Matches

Matches should be intense and quick to encourage replayability. Ideally anywhere from 3-5 minutes.

Martial Arts Theming & Character Representation

While T&N will try to pay homage to the roots of real martial arts, at the end of the day the game being fun is more important. Moves will be chosen to both highlight the identity of a martial artist while still being “gameafiable”.

In the first version we will likely have a muay thai fighter, and [someone else tbd].

3. Core Gameplay Loop

The core loop represents the moment-to-moment flow of combat between two players.

Neutral Phase

Players maneuver for position and observe opponent guard stance.

Engagement

One player attempts to attack based on guard direction. They can choose to attack, feint to goad an attack, bash, or use the environment if applicable.

Defense

Opponent reacts with block, dodge, or parry.

Advantage

A successful read or reaction creates a temporary advantage window. Blocking successive lights results in a turn change (defender has a chance to attack). Blocking a heavy results in continued minus frames, but you can dodge or light out. A guard break can engage an advantage.

Resolution

Damage is applied or advantage state is gained.

Return to Neutral

Both players reset to neutral combat. To return, you can escape a players advantage with the "Zone" input (heavy + light) during correct timing. One example could be after blocking two lights, you get your chance to attack. Here you can push off. Another example would be in a clinch if you sustain enough damage, it's capped and the attacker throws you to the side.

4. Combat System Architecture

The combat system is designed around directional guard states and server-validated attacks.

Guard System

Players enter a guard stance allowing directional attack selection.

Directional Combat

Players choose attack directions matching guard stance. The opponent must match guard direction to block.

Attack Pipeline

Player input → Combat component → Rules engine validation → Server execution → Replication to opponent UI.

5. Neutral Combat Design

Neutral combat is the most common gameplay state and must feel responsive and balanced.

Neutral Elements:

• Guard stance

• Directional attacks

• Basic blocking

• Player spacing

Neutral should reward patience and reading the opponent rather than constant aggression.

Observed Playtest Notes:

• Reaction-based exchanges felt similar to early For Honor testing

• Continuous attacking currently lacks penalties

• Camera distance becomes problematic during close combat

6. Offensive Systems

Offensive combat mechanics determine how players apply pressure.

Light Attacks

Fast strikes used for probing and pressure.

Heavy Attacks

Slower attacks with higher damage and feint potential.

Combo Strings

Each character should have at least one directional string.

Feints

Heavy attacks may be cancelled to bait defensive reactions. One thing to test here- I think it would be interesting rather than true feints to do soft feints- if you want to feint it can change guard direction, but the attack will always send.

Combo lengths will vary by character, with some characters having longer strings than others based on their skills.

Advantages

Advantages are character specific scenarios that you earn by capitalizing on a few scenarios. Currently, I had considered the For Honor framework of a guard break leading to this scenario, but after playing one of the inspiring games- Sifu, I considered a posture bar. This way, neutral play is forced, and things like parries, dodges, and blocks all feed into the bar progression. If a player's bar is full, they are then vulnerable to an advantage attack. This could be off of parry or Gb imo.

Unblockable Attacks

In For Honor, if you are hit with an unblockable attack you just take flat damage. In T&N, to enhance the state-based combat flow experience, I'm considering having different types of unblockable attacks that each need to be dealt with differently (kind of like Doom Eternal's mastery of combat). Some considerations:

Low Sweep: This would be a slow, highlighted attack that must be parried or dodged (specifically dodged backwards or forwards). If you dodge backwards, you just avoid it, making it the safest option, but there is no punishment. If you dodge forwards, the player gets a "mikiri counter" from Sekiro, guaranteeing high posture damage. If it's parried, it acts as a normal parried heavy, dealing slight posture damage and guaranteeing a light attack.

Push Attack: This would be an unblockable attack that, if hit, pushes the player back x meters. An example could be a teep kick from a Muay Thai fighter, or a jumping double push kick from a pro-wrestler. I have two ideas here- this move could either be unparriable, but can be dodged in any direction bc/ of it's linear properties. The other idea was to have it be parriable in any direction, but undodgeable bc/ the attacks have enough windup to track you as the opponent runs up. I favor the prior.

7. Defensive Systems

Defense mechanics allow players to counter offensive pressure.

Blocking

Automatically occurs when guard direction matches attack direction.

Parrying

Occurs when a timed heavy input matches incoming attack direction. Parries give stamina, and guarantee damage and in some cases the ability to enter a character's advantage state.

Dodging

Movement mechanic with brief invulnerability frames. Dodges consume stamina.

8. Advantage System

Advantage states represent moments where one fighter temporarily controls the engagement.

Examples:

- Muay Thai clinch
- Wrestling takedown
- Judo Grips

Advantage states unlock additional attacks.

Design constraint: advantage states must remain simple enough to implement without complex animation systems.

While advantages are favored to one player, it's important that they follow these design rules:

1) Advantages must be (and feel) earned by the player. At no point should you feel "cheesed" by being put in an advantage. It should be clear how you got there, and it should be clear how to escape.
2) Advantages must be balanced to several constraints. These include A) time spent constrained (you should not be in someone's clinch for most/even half of a match). B) Damage given/received- an advantage entry at full health should not determine the match. It may do up to x percentage of your health, but it will never sentence a healthy player to an uncontrollable loss.
3) Even in a state of disadvantage, you still have tools and control. It's not easy, but you can still escape/reverse the position. (More on escape conditions later, tbd). One option here could be a timer that starts once in an advantage that counts down before automatic escape. This would be displayed to both players so the person being attacked could decide how passively they want to play. They may still be chip damage to incentivise proactive counterplay rather than turtling.

9. Resource Systems

Stamina controls offensive pacing.

Stamina System Goals:

- Discourage constant attacking (minus frames from consecutive blocking helps with this too)
- Reward careful engagement (stronger punishments when attacking opponents who are out of stamina.

Stamina Rules:

• Attacks consume stamina
• Stamina regenerates over time
• Attacking with insufficient stamina causes penalties- tbd if you can attack while out of stamina, for now we may just copy For Honor's approach.
• Blocking does not consume stamina nor halt its passive regeneration. Parries give stamina back to encourage offensive action.
• Advantage states drain the stamina of the attacker only. Attacks take additional stamina, though not much. Stamina consumption is the first level balancing protection- after that the timer is the second level.

10. UI Systems

UI communicates combat information clearly to the player.

Systems include:

• Guard direction indicator
• Incoming attack indicator
• Unblockable indicator (indicator stays the same, but we add a niagara effect to the attacking limb)
• Lock-on highlight
• Posture bar
• Health bar
UI must remain readable even during rapid combat exchanges.

• UI should generally fit our style aesthetic (once we choose one ;-;), but overall should be quick and easy to read, while not looking out of place or clunky on our UI.
• During key events such as finishers and advantage transitions, we will use a cinematic camera with a predetermined spline curve based on positioning. This way, combat transitions feel natural, avoid focus on any animation over correction, and keep the fight feeling cinematic and clear. What we don't want is an opponent to be taken down/advantaged gained and the player asking "what just happened" or "how did I get there".

11. Networking Architecture

Combat operates under a server-authoritative model.

Networking Flow:

Client input → Server validation → Replication to opponent → UI update

Important replicated data:

- Guard properties such as current posture, if a parry attempt was made,
- Attack properties such as direction, timing, damage, if it's parriable, etc.
- Damage resolution (hit, parried, dodged, deflected)
- Point of impact

Ideally at some point in the future we will add a prediction model for performance!

12. Major Design Considerations/Questions

Guard Directions: Playing around with the idea of our guard widget having 4 directions. This would be to differentiate the idea of a specifically low targeted attack (such as a sweep), versus a lower-mid attack to the side (such as a rib kick). More on the idea of 4 guard directions vs. 3- If we have 4 guard directions we could put "low evading" moves in, such as a flying knee or a double kick. This would be an optional counter to a read low-sweep, as it would avoid the sweeping properties while punishing with raw damage.

Grounded State: If we take a page out of Tekken's book here, we could have an official grounded state after being knocked down by a move. Players could stay down or try to get up (getting up granting momentary i-frames so as not to be looped). The bigger consideration is how much power do we want to give to a downed opponent. This could be character based (also like Tekken, example being Drag's ability to grab an opponent from the ground for damage). The last consideration with this would be this: do we want a player who is more wrestling adept to be able to **choose** to enter the downed state without taking damage to put them there? I would be mostly concerned here about players abusing the difficulty of approaching a grounded opponent. We would need to introduce grab counterplay so that someone could not ground themselves-> wait for approach -> reverse/grab -> loop.

Offense vs. Defense Approach: One idea was rather than having a true neutral that builds a posture bar based on a set of rules, we have a sort of slide state bar that each character shares between offense, defense, and advantage. It would look something like this:

Advantage < - > Defensive/Offensive < - > Neutral < - > Offensive/Defensive < - > Advantage.

This scale would work via guard breaks, transitioning players quicker to the advantage state, but is dependent on state based movesets (offensive vs defensive movesets). I don't hate the idea, but it would require a transformation on how we approach neutral, as well as clear indication of which state a character is in, and the balance to make sure it always feels fair.

While somewhat obscure, one example of this style of combat would be from Wii Sports Resort Fencing. Two characters start in neutral, if one is hit, they are put into a "reeling" state. If they cannot perform a block to exit the state, they continue being pushed back until they fall off the edge.

The benefits to this approach would be separate means to enter advantage states combined with another layer of complexity in combat.

4/21 - Thoughts on game direction

Previously, my vision for T&N was that of a realistic, gritty fighter. While I could certainly see this being successful, one major design flaw I'm wrestling with is my source inspiration- For Honor. Being a martial **tool** fighting game, For Honor naturally balances combat via weighted attacks- a sword, club, spear, etc. All take time to swing, and thus attacks feel heavy. This directly contradicts the planned design philosophy. Martial arts combat, especially hand to hand, is a series of fast trades and decisions. In order to emulate this, I am prepared to step away from a more methodical approach of combat resembling For Honor, instead adding complexity to a 3D fighting genre that already exists seen in games such as Dragon Ball Z or JoJo's.

To stay in theme, I'm leaning more towards a pacific rim design vibe. Attacks should feel slow, powerful, and weighty.

The most experimental thought I had was to blend a game like Armor Core with T&N. I would go as far as to grant certain abilities that characters could possess to aid their fight, with a "battery cell" that slowly recharges throughout the battle. This would help to turn the tide of a fight such as a "super", or provide enhanced abilities such as faster evasion cooldown, offensive pressuring tools, disorientation tools, etc.

The key differentiator here will remain a hybrid approach to fighting games. I want to following priorities:

- Simple movesets. I have a rough moveset in, but I actually think it feels too random. For now, I'd like to reel back and put in a very basic moveset. Each move should have a use case, so that rather than throwing stuff out randomly players choose strategically what to press. Something along these lines:
    - Jab : Distance control, pressure tool.
        - Cross : Reward for committing to a jab string. Higher posture damage on block, but can be evaded and punished
        - Hook : The "mid" of T&N. Used for stopping a dodge if direction matches. Heavily rewards leads.
    - Low Poke : Contingent on a 4th direction, a slow sweep that heavily rewards on hit (hellsweep), but on block/evade is heavily punishable.
    - Dodge attacks : Forward & Lateral for pressure or turn taking.

13. Combat Design Influence

What does winning mean in different fighting games, and how do we get there?

Tekken (8 specifically) :

Why reference Tekken : Winning in Tekken often feels like an exchange of mistakes and a player's opportunity to punish them. It's a transactional fighting game, where things like blocking determines a window, and thus a choice- will you punish? What can you punish with? Another example of this transaction is the use of 3-dimensional movement. Oftentimes in Tekken, certain moves can be side-stepped, walked, or avoided if predicted and timed correctly.

What works : Tekken feels at its best when these systems work with clarity. You can understand why you got hit- what you did wrong, or vice versa, **you are rewarded for intentional, meaningful play**. This is the core of the fighting game I would like to build. *A series of transactions between players that change the state on a micro level to varying degrees*- be it punishing, getting punished, mid combo route, or round loss. It should be clear how you got into this circumstance on both sides. This rewards learning from the defender- i.e., don't press after this move, and offensive pressure on the attacking side, i.e., side step kick launches bc/ my opponent always presses after a jab string.

What does not: Tekken feels at its worst when this clarity is muddled. It introduces several new concepts such as grabs, massive movesets, and complicated combo routes requiring a minimum investment of hours to play effectively. Playing a match with minimal knowledge can feel frustrating because it's hard to discern why you may have gotten hit, launched, punished, etc. While there are tools for experienced players to study this data, we move away from the "easy to understand, difficult to master" category, and more towards "difficult to understand, even more so to master".

Tekken's Dance: Tekken makes you work to earn your advantages, here's how it shows up. A simple example- in Tekken, if you get launched, you are in for a combo. Check your phone, pick your nose, does not matter, you're locked into that punishment period until the player drops you. This makes mistakes feel extremely punishing in Tekken. I do not like this. However, what I do like is how hard people work to get the reward. Advanced mixups, setups, reads, it all plays into what an earned advantage should feel like. I would like to facilitate a technically in depth neutral- "small tekken" if you will. The main difference will be rather than a punishment turning into a snowball- full combo execution, it's momentum based. Attacking players will use resources to continue their mix, measured to ensure there is no 100 - 0 possibility.

For Honor :

For Honor is a unique fighting game. There are none other like it for a multitude of reasons, between animation technology, depth of character, several game modes that work, dedicated servers, etc. At its core however, For Honor's gameplay and plan is simple. You can attack from 3 directions. You can parry all attacks besides bashes, which can be dodged. It's simplest and rawest form of gameplay would revolve purely around reaction- who can block the opponents attacks more accurately, thus lasting longer. Ubisoft adds complexity to this combat system by forcing decisions however. Unblockable attacks are introduced that you must parry or avoid. Feints are introduced to force a more predication-based gameplan. Guard breaks serve as a form of guaranteed "punishes" when timed correctly. Overall, a combat system has been built that features a "rock-paper-scissors" gameplan.

RPS and turn taking : Naturally, the safest option of a player is to only react to attacks. Safe however, does not mean fun. Furthermore, you do not win by parrying attacks, you win by landing attacks. Ubisoft has introduced a game loop which forces players into two roles- attack, or defend. If both players try to attack, they prioritize the first hit, giving that player "priority". Priority can be taken back at any point- a dodge attack to turn the tide, a parry with a follow up punish into your own mixup, even blocking several attacks in a row will drain attackers' stamina with minimal punishment on your end. The key here is "priority". For Honor players understand their characters, and what they want to do. The goal is to get into their mix-heavy flow. What I like about this state is that everything is reactable and read based. In Tekken, if you are launched, there's no "let me react to your combo route". You're in for however much damage that guy labbed on his character for who knows how many hours. In For Honor however, every single damage point is earned because a player can react to everything. Any move can be blocked, any move can be parried.

Allow me to give a brief example of For Honor's combat RPS:

Light Attack → Character Specific String/Finisher. Lights cannot be feinted
Light Attack → [On hit] keep prio until string ends.
Light Attack → [On block] Turn switch, attacker is now minus, defender has a change to start their offense.

Heavy Attack → Feint [Option for goading a parry] → Optional feint into GB
Heavy Attack → Landed [Keep priority, attack again]
Heavy Attack → Parried [Defender is guaranteed a light attack, may start their offense]

So in essence, every attack can be parried, blocked or dodged (ignoring bashes for simplicity right now). Since both parties have access to these same simple but effective tools, we see complex mind games, advanced reaction speeds, and clarity in matches.

RUSH:

Rush is an indie fighting game made in Unity by a solo developer (jealous tbh). It features a stripped down, Tekken-esc fighting game focusing on efficient rollback net-code, extremely simple movesets, and clean hit validation. There are many technical aspects and inspirations I take from this game that I plan to implement in my own. The netcode on its own is something worth looking at, not to mention the quality of combat flow and states.

What I admire about RUSH: Rush is an extremely simple yet well executed playable demo. It features custom input binding, session hosting, and quality gameplay that feels sound. I would like to take specific inspiration from which moves RUSH chose to give the player. They are as follows:

Attacks:

- Jab (for pressuring, with option to complete into 112 jab string)
- Mid (heavy mid, not a launcher. Significant damage with decent reach)
- Low poke (low poke string that does marginal damage, finishing with a mid. Blocking the low is mid/launch punishable).
- Low sweep (more damage, knocks opp down, forces Oki on hit. On block, launch punishable)
- Tracking high kick (good for predicting side-stepping)

Defense:

- Block (hold back, block highs and mids)
- Crouch (hold back down. Block lows)
- Parry (input with small frame leniency, automatically sidesteps an attack for you)
- Walk (the best defense in RUSH or tekken, 3D movement started when the opponent begins committing an attack resulting in a full whiff which can be punished)

And that's all! I think something I really admire about this (and I recognize it could be my own bias) is how simple it is to understand. You immediately realize what each input is, what it’s used for, and after playing for 10 minutes, what beats what. We circle back to that classic rock-paper-scissors. Jab is the fastest, and keeps prio on block, but if ducked can be punished to take a turn back. If you predict a duck, you can side step to punish with a mid dealing significant damage. If you block this mid, you can punish with your own mid or launcher. This cycle continues escalating with severity of move blocked/whiffed.

Summary (so far): I think it’s clear to say we want moves to have meaning. Each move should feel like a tool that has a specific use for a given scenario. Furthermore, earned advantages should be a state of combat- who is presently attacking, attempting to mixup, etc. NOT a guaranteed punishment period. At every point in our games combat, the defender should be able to turn the tide and remain offensive. It’s also important that we continue to work our advantage system into this. Everything I’ve described above is to

hone in a good "neutral" fighting game experience. There are other features which will continue to diversify our game.

JoJo’s FG: TBD- bought but not played.

13a. Planned MVP Combat Loop : Offensive Inputs

Jab
Purpose: Pressure, turn maintenance
Strength: Fastest move, +frames on block, chains into string
Weakness: Fixed direction (always high), avoidable with any dodge

Jab String (1-1-2)
Purpose: Damage confirmation off jab hit
Strength: Rewards hit confirming, more damage
Weakness: Blocked string is punishable by light. Cannot be started if the first jab is blocked, since that constitutes a blocked light which results in priority swap. Jab string is a hit-confirm punishment.

Directional Hook
Purpose: Punish predicted lateral dodge
Strength: Catches dodge startup if timed correctly (TBD on dodge startup before i-frame or slow enough to throw mid-dodge and land on dodge finish. Leaning towards first to keep momentum)
Weakness: Whiffs if guard direction doesn't match dodge direction (i.e., right hook catches a left dodge). Minus on block.

Sweeping Roundhouse
Purpose: Catch-all tracking punish, anti-movement
Strength: Wide tracking, big damage on hit
Weakness: Slow startup, interruptible, highly parryable

Forward Dodge Attack — Teep
Purpose: Aggressive neutral entry, space control
Strength: Unblockable push, closes distance with pressure
Weakness: Not feintable, parryable, easily read on startup

Lateral Dodge Attack — Spin Elbow (light) || Wide Soccer Kick (heavy)
Purpose: Escape pressure while counterattacking, priority reversal
Strength: Evades incoming attack, takes offensive turn. (Important distinction here: A dodge attack is a dodge with a queued attack input. For example, we can input an attack half way through a lateral dodge, and if it's during a given "morph window", we will attack. We keep the initial i-frame protection of a dodge, but choose to add an attack- higher risk of punishment, but rewarded if it lands)
Weakness: Parried = guaranteed heavy punish for defender

Gap: TBD which dodge attack to use- light or heavy. Light may be better fitted for a "slip attack", while the heavy is a legitimately queued dodge attack.

Low Poke
Purpose: Mix-up out of jab pressure, pace change
Strength: Keeps priority on hit, moderate damage, requires low guard to block. (TBD: Option to have a low poke chain into a low sweep).
Weakness: Any blocked low switches priority

Low Sweep
Purpose: Heavy low mix-up, later Oki setup
Strength: Good damage on hit, strong posture damage, leads to advantage state
Weakness: Very punishable on block, knockdown will distance players and protect their recovery in the meantime.
(Random idea: Knockdown will trigger a “come on” taunt emote from the attacker while the defender gets back up)

13b. Planned MVP Combat Loop : Defensive Inputs

Block → safe against everything, generates nothing, loses to posture drain over time

I-frame dodge → safe escape, loses to predicted hook or roundhouse

Slip dodge → high risk, high reward window, loses to mistiming entirely

Parry → highest risk, highest reward, loses to lights (very hard) and mistiming (eat full damage)

Backward dodge → always safe, always costs you ground, eventually punished by stamina and ring pressure