Combat Mechanics

All actions must feel responsive and dynamic. We don't want to fight the controllers. The animations must flow into each other nicely, and this may require some special transition animations for specific combinations, to maintain logical rotations.

# Stances

Stances provide a way to attack more quickly starting from a stance that corresponds with the beginning of the attack, eliminating the need for a transition.

Possible stances with controls to get into the stance:

|  |  |  |
| --- | --- | --- |
| **Stance** | **Corresponding attacks** | **Controls** |
| Right Vom Tag an der Schulter | Right Zornhau, Right Zwerchhau, Oberhau | Release mouse2 + drag up right. |
| Left Vom Tag an der Schulter | Left Zornhau, Left Zwerchhau, Oberhau | Release mouse2 + drag up left. |
| Vom Tag | Oberhau/Scheitelhau, Zwerchhau | Release mouse2 + drag up. |
| Left Nebenhut | Left Unterhau, Krumphau | Release mouse2 + drag down left. |
| Right Nebenhut | Right Unterhau, Krumphau | Release mouse2 + drag down right. |
| Right Ochs | Stab from above |  |
| Left Ochs | Stab from above |  |
| Pflug | Stab from center |  |
| Langort | Stab from center | Release mouse2, no mouse movement |

# Attacking

All these attacks are triggered by different mouse movements, in combination with a mouse button click, and in some cases keyboard buttons as well.

Attacks are decided after a short calculation of how the mouse was moved. After that they can be aimed within a certain threshold using upper body rotation.

Possible attacks:

|  |  |
| --- | --- |
| **Attacks** | **Controls** |
| Left Zornhau | Mouse1, drag left down. |
| Right Zornhau | Mouse1, drag right down. |
| Left Zwerchhau | Mouse1 + ctrl, drag left up. |
| Right Zwerchhau | Mouse1 + ctrl, drag right up. |
| Oberhau | Mouse1, drag down. |
| Scheitelhau | Mouse1 + ctrl, drag down. |
| Left unterhau | Mouse1 + drag right up. |
| Right unterhau | Mouse 1 + drag left up. |
| Stab | Middle mouse. |
| Krumphau.  Can be interpreted as a short edge attack as well, given the right aim. | See parrying section. |
| Unassigned | Drag straight up |

**Combo Attacks**

Clicking the mouse again at any time will restart the attack from the direction you chose. The speed of the transition will be slower at "unlogical" combinations that would be slower in real life as well. There may be a hidden limit to how long you can "combo" effectively.

**Winding**

When an attack gets parried, winding is interpreted as going into a stance. For example a displaced zornhau can be made into a mutieren by going into the ochs stance. This may get dedicated animations in combinations with holding the attack button upon impact (and thus seeking to bind on their weapon).

**Stabbing**

Stabs can come from a pflug position or an ochs position. Which one is chosen depends on the stance, or if the longsword is held low or high when starting. The stab button is also used to stab after a wind.

**From Attacks to Stances**

Every attack ends in a stance. Overhead attacks naturally end in a Nebenhut type of stance, Unterhau ends in an upper stance like Vom tag or Ochs and so on. Though every attack type is possible from any stance, starting an attack that naturally goes along with your current stance is faster and doesn't require the additional time of a transition to get there.

# Parrying

As opposed to attacks which are decisive and specific motions, parrying is a fluent motion that needs more influence from the player. In order to allow the player to manually set aside stabs and strikes, it must be possible to go from a left parry to a right parry at will.

Some ways to parry:

|  |  |
| --- | --- |
| **Parries** | **Controls/Context** |
| “Straight” parrying – from left to right, mid to high | Mouse2 + mouse left/right – then right/left/up/down |
| Left hanging parry – from left to right, low to high | Mouse2 + CTRL. |
| Right hanging parry – from left to right, low to high | Mouse2 + CTRL. These cannot interpolate directly between each other, but can do so via the straight parry. |
| Direct lower left parry | Mouse2 + drag down left. |
| Direct lower right parry | Mouse2 + drag down right. |
| Upper parry | Mouse + drag up |
| Krumphau | Mouse2 + Mouse1 + left/right |

**The Straight Parry**

The most natural way to parry Zornhau and other overhead attacks, and stabs. It gives more strength and support to set a stab aside than a hanging parry. It should be able to catch most strikes, but has trouble reaching what is aimed at the lower part of the legs.

**The Hanging Parry**

A hanging parry to (for example) the left can block attacks to all four openings, but it uses the same parry for all its interpolations – it does not transition to the right hanging parry without going via the straight parry (releasing CTRL).

**The Direct Lower Parries**

Even though the hanging parries cover the feet, the rotations required to get there are not ideal for an immediate lower parry, coming from a straight rotation. Going from a straight parry to a lower parry in the form of Hengen creates a risk that you'll be too late to stop the strike, since your blade would rotate the opposite way of the one that would naturally oppose their strike.

For that reason, you can do a lower parry directly, and it would have the rotation of Alber, and can be made to block any lower strikes as well as waist-high strikes. Anything above that would require another keypress on the parrying button.

**The Upper Parry**

Transitioning in one motion from a straight or hanging parry to an upper parry would break the interpolations required to set aside stabs and binds. For that reason it needs to be triggered by a motion of its own, requiring the parry button to be clicked down again.

**The Attack as Defense**

Any strikes that cover the line of an opposing attack will naturally block it, such as Zornhau blocking Zornhau. Attacking is just a more clever approach to defending against certain strikes or directions. Aiming becomes necessary to make sure you're actually safe behind your strike.

**Krumphau**

Though Krumphau is a form of attack, with either the long or short edge, it is used to deflect potential stabs/strikes downwards to quickly restrict their angle. It is done by clicking attack while already holding parry, and choosing the appropriate direction. If the sword is already on the left, the only possible direction would be right, for the Krumphau. This is extra powerful when coming from Nebenhut, but can of course be initiated from any stance.

# Technical Approaches

**Weapon Collision**

**Approach #1:**

Every weapon has 3-4 collision boxes, representing the strong and the weak. Every collision point can have a child transform that can be read by the opposing weapon, which places itself along the weapon at the point of impact. This only happens during the impact, not every frame of collision, unless there is a new collision.

The weapon that hits the other, follows the position of the hand as usual, but the hand only rotates as far as allowed by the angle between the hand and the impact point on the opposing weapon.

**Against a 'static' object/weapon**

As long as there is no collision, the animation will carry out. After the collision, the rotation is locked towards the point of impact.

**Beating a weapon out of the way**

A weapon gains force by the speed and duration of the strike, and this gets applied to the weapon it hits, with various impact depending on where the hit lands. The attacker's weak on the opponent's strong applies the least amount of force on their weapon. The attacker's ideal place to apply force *from* is somewhere between the middle and the weak of the blade, and hitting the weak with this point applies the greatest amount of force.

The calculation involves the velocities of the attacking and the defending weapons (and probably the duration it has been swung), the collision boxes that are involved, and the sword hand's rotation will then be made to interpolate to a point offset from the collision point, according to the direction it was hit.

**Binding**

If a longsword pushes with the strong collision box against another longsword so that it is stronger, the pushed blade will be forced to rotate towards the collision point on that collider. If there is free space again, it will interpolate back to the rotation of the animation.