Challenge 3

Game I’ve chosen:

Reasons I chose this game:

When first looking into this assignment I immediately thought of this game as it is the most recent game I played that used IK constraints, animation blending and animation transitions very well. Playing it more made me realize I would love to use this game for this challenge assignment

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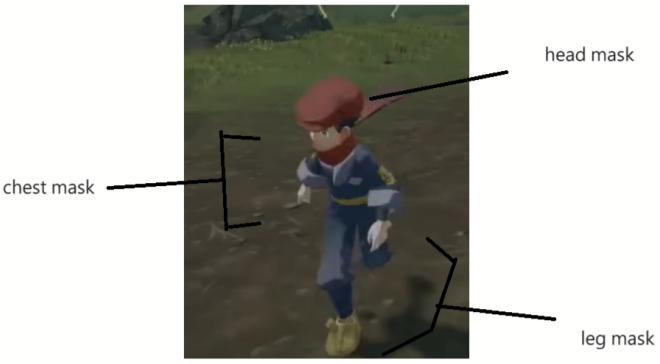
Models resource: Main character:
https://www.models-resource.com/nintendo_switch/pokemonbrilliantdiamondshiningpearl/model/49740/

Assets used: https://assetstore.unity.com/packages/tools/animation/homebrew-foot-ik-220358

Animation breakdowns:

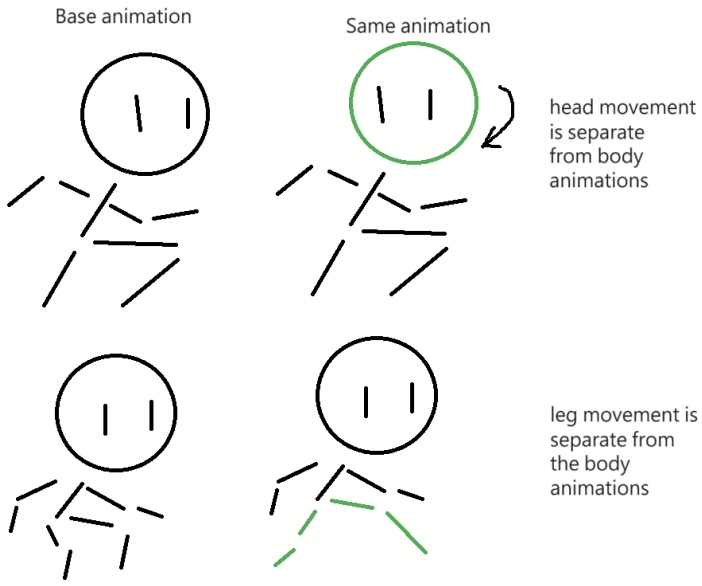
Animation layers and avatar mask usage

I have noticed the game uses animation layers and avatar masks to accomplish more realistic and fluent animations for moving or doing actions. Firstly is a diagram to the animation of him walking:



Here we can see how the character's avatar could be set up in the game. The head mask moves independently from the body, the body moves independently from the legs and legs move independently from the body. Having full control for this is essential for making animations for multiple scenarios without having to account for more permutations of the same action.

An example on how this can be useful is drawn below:

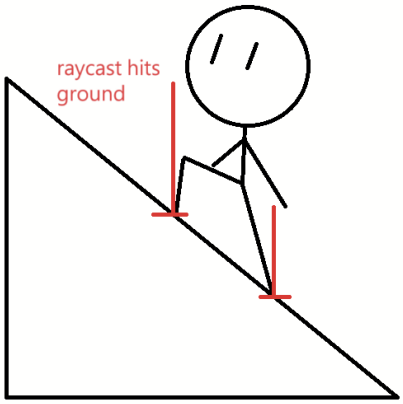


You can reuse the same animation for multiple actions while animating other parts freely without the need of making several different animations for each of these possible actions.

IK

IK Constraints is used throughout the body in a variety of ways. The easiest to spot is that the feet are able to stick onto any complicated surface.

Notice how his right foot responds accordingly? And how the rotation of the foot influence the leg? This is done so that there doesn't need to be any animations done for setting your foot on hard or uncanny surfaces.

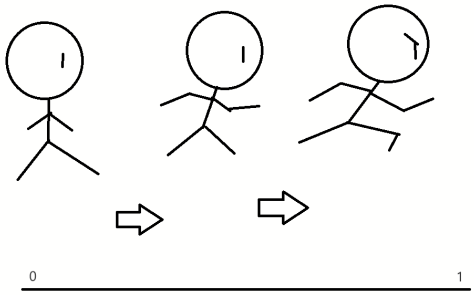


The image above shows how this technique can be done in unity. Shooting a raycast down from the foot bone and waiting until it reaches the ground. If the raycast hits something, the foot will position itself accordingly, either by rotating or moving the leg with it to fit the new position. It's similar to how we don't have to think about how to move our other joints when performing actions, for example, grabbing a cup. We just do! Fascinating. This is another thing that IK does in Pokemon Legends Arceus. When turning around in the game, the bones will rotate and influence the entire body to move that direction in a more organic way.

Just rotating the model can feel unnatural, rotating the target bone helps make it more realistic. After all, when rotating in real life, your body naturally twists and/or tilts in the direction it wants to go before being able to head in that direction.

Animation Blending and Transitions

Transitioning to animations is very common in 3D games, it helps make going from another action feel more realistic. It wouldn't make sense in some cases for animations to instantly go to another. Such as a running animation being cut short into a walk animation. It feels too sudden and may look jarring or off putting to people



This small illustration is just an example on how an animation can transition to another animation clip over time in unity, the default exit time (transition delay) is a second so editing the time is crucial for certain animations. This illustration can also be used to explain **animation blending** as well. An example of animation blending can be when crouching. As stated the body can be masked but in most game engines, you can use animation layers and blend the poses of one to affect the main pose. This is mostly used in games for crouching since crouching allows you to go low while still being able to move.