The Philosophy of Paint Weights

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What is Painting Weight's anyways?

"Painting Weights" is the process we go through after Rigging and Skinning a character to determine which vertices are affected by which joints and by how much.

The value of all those joint influences on a vertex must always equal 1, whether that's a value of 1 for a single joint, or multiple joints all adding up their influence to 1. Maya will never let you have any less than a full value of 1, and will assign influence from random joints if it has to.

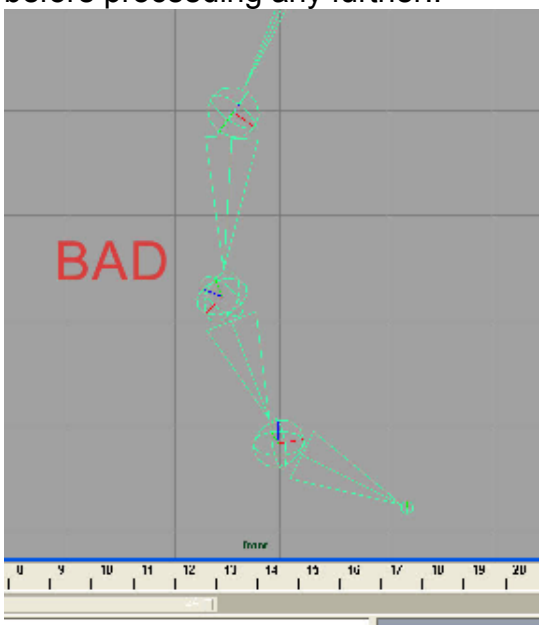
When a vertex associated with a joint is painted bright white in the Paint Skin Weights Tool that value is at 1. When it is pure black, then that joint's influence value is 0. Grey is any value between.

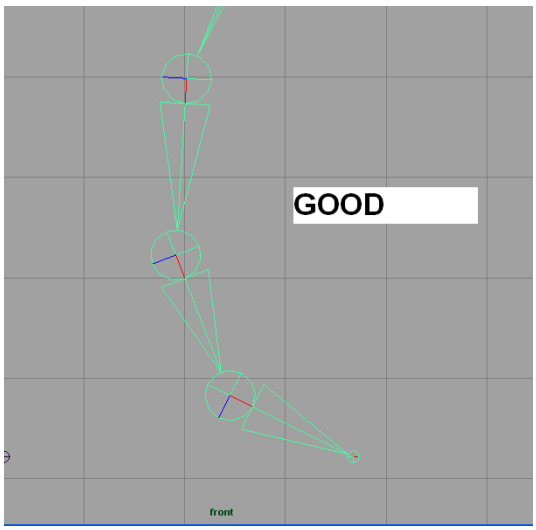
Obviously we don't want our vertices to be completely without influence, otherwise how would it move?!?

How decide which vertices belong to which joint?

The part of the mesh that needs to move with a joint should belong to that joint. When you bend your elbow, your forearm comes with it, so the vertices below that elbow and down the forearm need to belong to the elbow joint. When you turn your head your neck moves with it, so the vertices along the neck should belong (at least partially) to the neck joint.

STOP! Do not proceed until you have checked your joint orientations!! Does the red line point straight down the bone towards the next joint? Is the blue line facing consistently in the same direction, all the way down the limb? No? Fix them now before you spend hours painting weights! Bad joint rotations will affect how your joints respond to IK Handles, Set Driven Keys, Constraints, etc. Detach Skin on your mesh now if you have to, but fix those joint rotations before proceeding any further!!





Step by Step Workflow Tips:

Keep in Mind: Always work on one section of the body at a time. Example: Move your character's arm into a raised position, and fix its paint weights before moving on to another section of the character.

Good workflow tip: When you're done fixing the paint weights of a joint, click Toggle Hold Weights on Selected to HOLD that joint. What that does is locks that joints influence so that a) the vertices it is currently influencing won't be changed at all as you work your way around the model, and b) that joint can't accidently affect vertices that it has no business effecting.

Step 1: Decide which two joints you're going to work between. Select your mesh and go to **Skin > Edit Smooth Skin > Paint Skin Weights Tool > Options** (make sure you have shaded mode on in your viewport, so you can see the tool updating). Start by using Replace with a Value set to 1 to make sure that the vertices between your two joints belong fully to one or the other. Select the joint in the Paint Skin Weights Tool window, click on Replace, set your Value to 1, and paint over the vertices on your mesh that should belong to that joint.

> **Example**: Say you decide to work between the shoulder and elbow joint to fix that nasty squishing effect you get when you bend the character's arm. When in the Paint Skin Weights Tool with your mesh selected, you would first select the Shoulder Joint in the joint list, click on Replace and set the Value to 1. You would then paint over all the vertices between the shoulder and the elbow, stopping right at the line of vertices that bisects your elbow (you DO have a line of vertices there, don't you?!?). When finished and all those vertices are bright white, select the Elbow Joint and paint Replace Value 1 along all the vertices bisecting the elbow, and down the forearm to just before the wrist (unless you have a Forearm Joint, at which point you would stop at that joint).

Step 2: After you've made sure that all those vertices between the two joints you're working on belong to one joint or the other, it's time to start adding a bit of influence between the two. Click Add at this point (rather than Replace) and set your Value to .1. Paint one or two lines of vertices into the influence area of the OTHER joint.

> **Example**: With the Shoulder Joint selected in the Paint Skin Weights Tool, paint Add with a value of .1 along the first line of vertices bisecting the elbow, and along the line of vertices below that one. If you want to go REALLY crazy, paint across those same vertices, increasing that Shoulder influence by another **.1**! (Which equals **.2** by the way, for those of you who skipped math class). Select the Elbow joint, and do exactly the same thing, only adding into the Shoulder Joint's influence area this time.

Step 3: Continue this process across the body, hitting Toggle Hold on Selected when you've finished with a joint. Work on two attached joints at a time, for example Shoulder and Elbow, then Elbow and Forearm, then Forearm and Wrist, etc etc.

> **Example**: Now that you're done with the Shoulder and Elbow influencing, move on to the Elbow and Wrist influencing. Toggle Hold on Selected Joint with the Shoulder Joint selected in the Paint Skin Weights Tool before continuing the process mentioned in Step 1 and Step 2 between the Elbow and the Forearm joints. When you're ready to work between the Shoulder and the Clavicle joints, you can Toggle Hold off again on the Shoulder.

Ta Da!! You're painting skin weights! How cool is that?!?

Bet you didn't think you'd be having this much fun three months ago when you signed up for a 3D Animation course 8P