Tips/Wayback Machine - https://web.archive.org/web/20090203215145/http://www.michaeldashow.com:80/tips_texturepainting.html
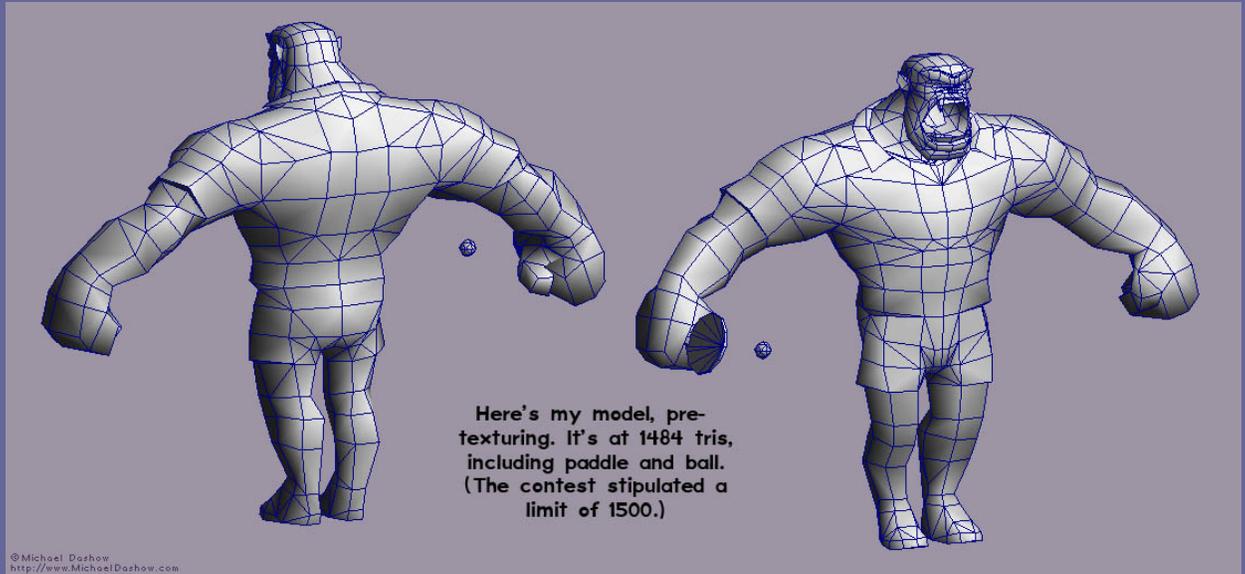
texture painting

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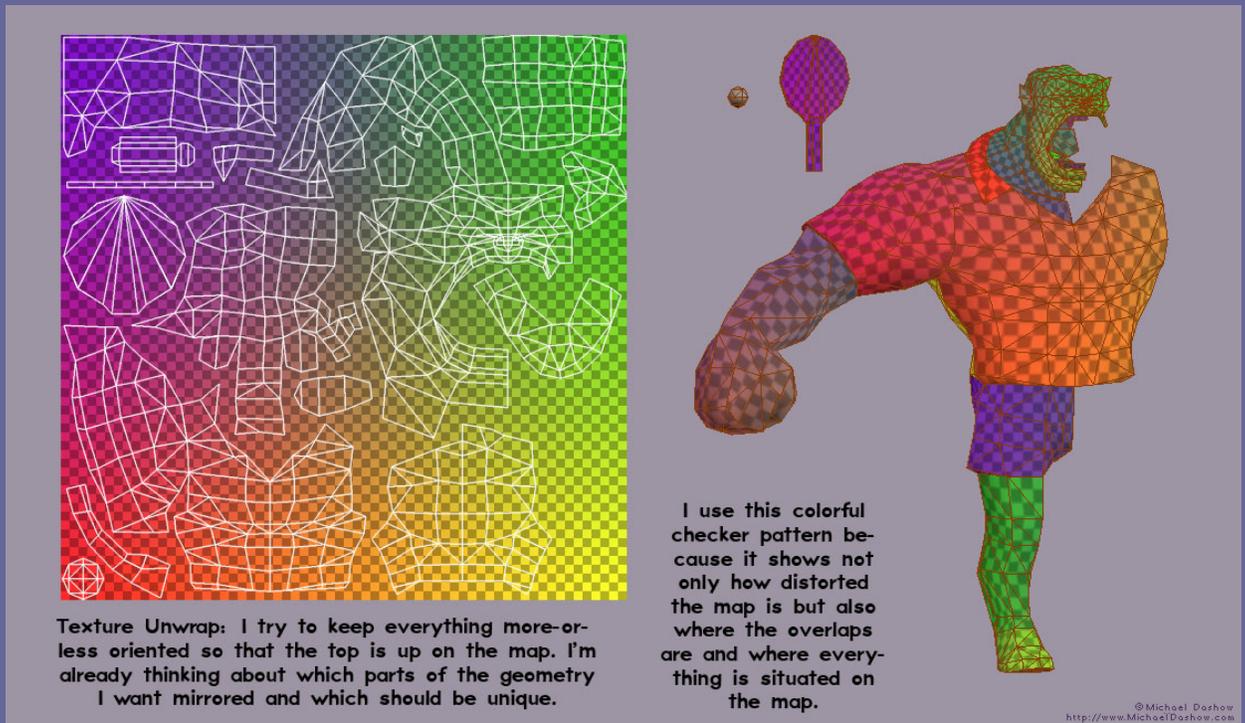
People have lately been asking me how I paint textures for Diffuse Maps for 3D models. I currently am using Photoshop and 3DSMax 7. Here's what I do. One small note: I've scaled down the iamges to fit on the page reasonably, but it makes the text and UV outlines harder to read. 'View Image' to see the full detail, if you need to.
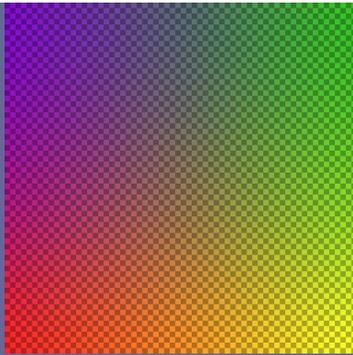
Here's the model I am starting with. It's a Table-tennis-playing troll for a contest over on GameArtisans.net with a poly-count limit of 1500 tris:

Here's my model, pre-texturing. It's at 1484 tris, including paddle and ball. (The contest stipulated a limit of 1500.)

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When I unwrap the model, I think about which areas can be mirrored and which should be unique. I want the chest and back to not be mirrored because they will have text on them. The face will look a lot more alive the less mirroring happens: It's more acceptable for a minor character but not for a main or hero character. You'll see I only created unique UVs for part of the face, where it counts. No one will ever see both ears at the same time so they can be mirrored.

Texture Unwrap: I try to keep everything more-or-less oriented so that the top is up on the map. I'm already thinking about which parts of the geometry I want mirrored and which should be unique.

I use this colorful checker pattern be-cause it shows not only how distorted the map is but also where the overlaps are and where every-thing is situated on the map.

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Here's the checker grid I use for unwrapping, in case you'd like to use it:

Next I bake some lighting and Ambient Occlusion into the map. Bobo the Seal has an [excellent tutorial](#) for this on his site.
It's for an even older version of Max than mine so here is my modified version of his steps to work in Max 7 and include Ambient Occlusion baking:

* Make sure renderer is set to Default Scanline
* Put a dull white material on your model
* Turn off all lights and ambient
* Place in a skylight.
    -Enable shadows
    -set a reasonable amount of samples - 10 for testing, 20 for render.
* Open the Render>Render to Texture dialogue box.
    -Output: set desired path
    -Render settings: Choose 3DSMax Scanline.no.advanced#2
    -Objects to Bake: Make sure your object is selected.
    -Selected Object Settings: enabled
    -Set Padding to somewhere from 5 to 10 (this makes the rendered lighting bleed over the UV lines)
    -Projction Mapping - skip
    -Mapping Coordinates: Object - use Existing channel #1
    -Output: 'ADD' to add a Diffuse Map. Set file name and size. Element = Lighting Map, Target = Diffuse color
    -Selected Element Unique Settings - enabled
    -Baked Material, set to 'Output to Source', render to files only
* Render
* Wait

To render lighting to Diffuse Map, do the same as above, except, don't use a sky light, just use an ordinary Omni. Your shadow settings, such as Shadow Map vs. Ray Traced, are valid. Material settings, like specularity, also affect output, so tweak them to your liking. I found it useful to tesselate and then render for more subtlety. Just make sure that your tesselation doesn't screw up your UVs!

It's important to note that this process should output a file with correct lighting and the texture bleeding over the UV borders by the number of pixels you set in Padding above.
If you save the bitmap image rendered to a window, it will not include the padding and the lighting will be different.
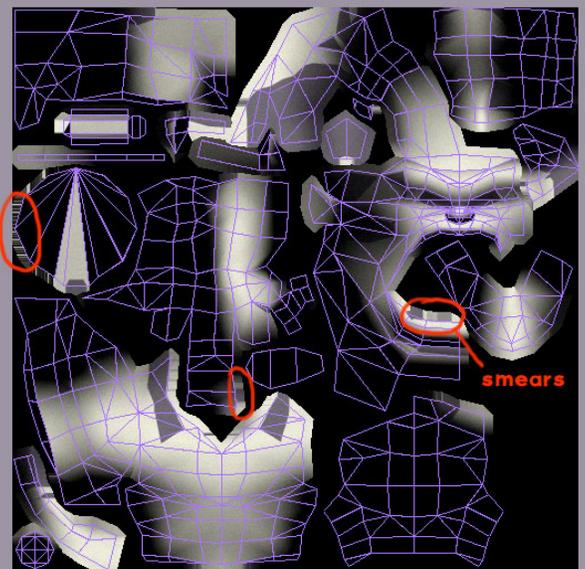You can save this if you like, but don't overwrite the file that was saved!
If you want to see a more detailed step-by-step of this one part of the process, check out [this walkthrough](#) by Draxxuss in posts #24 and 35, as they are really useful.

Anyhow, when you bake these into the maps, here's what they look like:
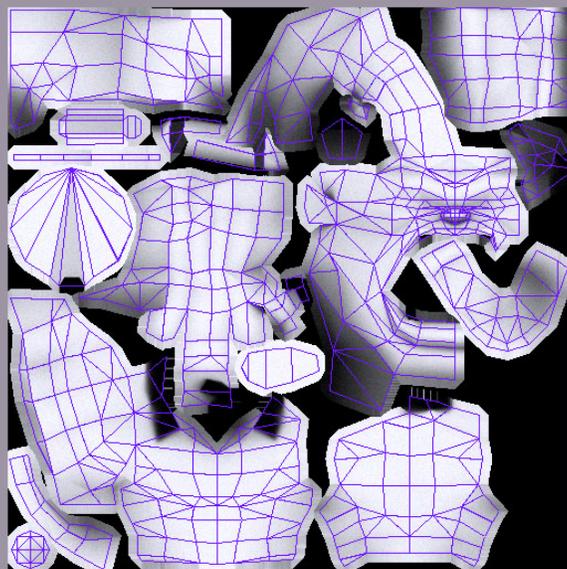
Ambient Occlusion Render-to-Texture:
Just the sky-light on.

Lighting Render-to-Texture:
A single light placed in the scene.

You'll see that the lighting above goes over the edges of the UVs because we set the Padding value higher.
It smears in a few places where the normals turn sharply, but it's easy to paint over them to fix them up.

I used Texporter to export the UV lines, and in a Photoshop file, give each distinct color a solid fill in its own Layer:

Flat colors. Each color is a separate layer so that it's easy to Adjust Hue/Saturation and change a single color without affecting anything else.

In the PSD, I layer the flat colors, the ambient occlusion map, and the lighting map.
Despite how it looks, I *don't* flatten the UV lines onto them. They stay in a separate layer to be turned off later.

Flat Colors + Ambient Occlusion + Lighting
(No painting yet - this is just lighting layered over colors)

Even for a non-human character like this, it's *really important* to remember that skin is never one solid color:
It gets a lot of subtle hues based on how close the blood is to the surface. I add in those color subtleties on a new layer.

Look how much more alive the guy on the right looks: The only difference is warmer shadows - purple instead of black - and all of the color accents that have been added to his flesh.

Here I've added color accents on a separate layer above the skin before flattening layers. Flesh is NEVER all just one color, because skin varies in thickness and more blood shows through in some places.

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I create a new layer above everything else, fill it with RGB [128, 128, 128] grey and set it to Overlay (which makes it invisible.) I start painting in details in black and white.

It's really useful to have a good understanding of where wrinkles tend to form on the face. Also note the asymmetry in the eye and forehead area: That makes it look more alive.

I paint in details in greyscale on a Layer set to 'Overlay.'

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Keep painting. There's no secret technique here, no magic tech tip that will instnatly make your texture look better. The key to this part is just to paint really well.

Study actual clothes or photos of clothes to get the wrinkles right, too. And in this case, lots of photos of table tennis players to get a feel fo what sort of details are on their outfits. Lots of sponsors' logos and piping and patches of alternate colors.

Further along in the process, I have painted more details on the greyscale Overlay layer. It's this painting that's the real key to creating a good texture. For this, it's helpful to have good anatomical references: I have Andrew Cawrse's excellent anatomy model from Freedom-of-Teach.com and also refer to photos of body-builders.

Here it is with the Overlay layer done. If you hide all of the layers except for this one, you have a greyscale image alone.
I want to change the shadows and hilights from being just black and white so I want to adjest them to be warm and cool.
To explain how I do that, I need to cover a little background:

When you save a selection in Photoshop, it treats it as an alpha channels, with 100% white being
0% white (a.k.a. black) as 0% selected, and every shade of grey in-between a level of how
100% selected, selected any given pixel is. So what I want to do is take a simple greyscale image
and make just the hilight part of it, and then just the shadow part of it, a selection.
If I just copy the greyscale image into a new channel, I have a selection set where everything will be selected
to some degree, except for the very blackest of areas. So for this I adjust levels and pull the black triangle over
to the center of the histogram (about 128) and then I have a selection set for just the lightest areas.
To make a selection channel for the shadows, I copy the grayscale image into a new channel again and invert it.
Inverting it turns black to white and white to black. So I'm turning the black shadows into white selected areas.
Then I do the same thing with the levels and now I have a selection set for just the shadows!

So back to the texture painting, I use those new channels to add layers to tint
the shadows purple and the hilights yellow, which is a more natural lighting scheme than black and white.

Here I've completed the greyscale Overlay layer. One problem with this overlay layer is that it doesn't affect parts of the map that are white, like the shoes and logos. So for those areas, I've created an additional layer set to Multiply just for affecting the white spots. Another problem is that it makes shadow areas black, when in reality they'd pick up ambient colors. I do some color correction to turn the shadows more purple than black.

Lastly I create a new layer and paint in any details needed, or make any adjustments I need to for anything else.
Sometimes I do most of my texture detailing work in *this* stage and only do a brief pass with the overlay.
But in this particular case I did most of my work in the Overlay layer.

teeth

saliva

net

RHÛN

GorMaster
721

Dashow '08

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On a new layer, I paint in any remaining details I need: Here it's the gums, shoe details, logos, and the table and net (in the lower right: I specifically left some room for them.) I squeeze in some drool for his mouth in another gap between two sections. In this case, the texture was mostly done before I started doing any paintover. (But sometimes, I'll only do a very brief Overlay map and do most of the serious work in the paintover layer.) With those details taken care of, I'm all done and ready to pose him!

Here is the final sheet from the contest so you can see the table too:
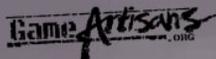
Also, special thanks to Dan Rickard (aka *Draxxuss*) for helping me figure out how to get the the render-to-texture padding working, which saved a whole step in the process.