



CHARACTER SKINS

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1.0 Overview

This document explains how to set up a new skin file for one of the existing models in SoF2 but only goes this far due to the complexity of the process. To actually get the new skin in the game, an NPC must also be created. For this, see the document SoF2_NPCFile.

There are ten basic body types (not including the dog and Osprey) and two face types, average face (male) and female face (female). Each gender also has an Asian version of the face although this is only a mesh change and the skins will work for both. Each body type will have its own independent shader set, and the faces and heads will be included with each body type according to the character. However, we do not recommend modifying the original SoF2 shaders. Create a new .shader file for your characters, including one body type (with face and head) per file.

The included body types are very versatile and you may never need to create your own model. Many body types have mesh parts called **surfaces** that can be turned on or off to get different looks. The naming convention for surfaces work with an “_off” at the end of the mesh name. If it has “_off” the surface will default to off. You can turn these parts on and off via the NPC file to get your character’s final look.

1.1 Base models

Included in Appendix A: Characters Material to Mesh is the details for each model’s surfaces. Following are the ten base body types:

- **Average_Armor** – Male, armored, with a military fatigues silhouette.
- **Average_Sleeves** – Male, with a military fatigues silhouette.
- **Chem_Suit** – Chemical suit silhouette.
- **Fat** – Male, with a heavy set silhouette
- **Female_Armor** – Female, armored, with a military fatigues silhouette.
- **Female_Pants** – Female, short sleeves, long pants silhouette.
- **Female_Skirt** – Female, short sleeves, and skirt silhouette.
- **Snow** – Male, heavy coat silhouette.
- **Suit_Long_Coat** – Male, long sleeves, long or short coat, long pants silhouette.
- **Suit_Sleeves** – Male, short sleeves, long pants silhouette.

Following are the two face types:

- **Average_face** – These are all the male faces and are included in the body type shaders.
- **Female_face** -- These are all the female faces and are included in the body type shaders.

Following are the six male hairstyles and five female hairstyles. Not all styles are included with all models. For instance, the chem_suit model cannot use any hairstyles but bald. The surface names for each hairstyle are listed in Appendix B: Hairstyle Surfaces.

- **Male**

- Bald (default)
- Medium length hair (bangs option) (**avmed**)
- Medium length hair but bald on top (designed to be used with hats) (**avmedhat**)
- Long Hair (**avlong**)
- Beard
- Mustache (**avmst**)
- **Female**
 - Bald (default)
 - Short hair (**fshort**)
 - Long hair (**flong**)
 - Bun hair (**_bun**)
 - Ponytail (**_pony**)

To make the skin you want, choose a body, a face, and a hairstyle. Make sure the model supports the hairstyle by checking the surfaces in ModView. Find a comparable texture, and paint it up however you want. For instance, if you wanted to create a female_pants model with a ponytail (which is valid), you would look for an arms texture, a body texture, a face texture, and a ponytail texture. All skin textures can be found in skins.pk3. For texture naming conventions, see section 3.0 Naming conventions.

2.0 Shader setup

Shaders are setup the same across all characters. Following is a sample as seen in a text editor.

```
models/characters/female_face/f_taylor
{
    q3map_nolightmap
    q3map_onlyvertexlighting
    hitLocation      models/characters/female_face/f_female_hit
    {
        map models/characters/female_face/f_taylor
        rgbGen lightingDiffuse
    }
}

models/characters/female_face/f2_taylor
{
    q3map_nolightmap
    q3map_onlyvertexlighting
    cull      disable
    hitLocation      models/characters/average_sleeves/neutral_hit
    {
        map models/characters/female_face/f2_nurse_w1
        blendFunc GL_SRC_ALPHA GL_ONE_MINUS_SRC_ALPHA
        rgbGen lightingDiffuse
    }
}

models/characters/female_face/h_taylor_bun
{
    q3map_material  Flesh
    q3map_nolightmap
    q3map_onlyvertexlighting
```

```

        hitLocation      models/characters/female_face/h_female_bun_hit
    {
        map models/characters/female_face/h_taylor_bun
        rgbGen lightingDiffuse
    }
}

models/characters/female_pants/a_taylor
{
    q3map_nolightmap
    q3map_onlyvertexlighting
    hitLocation      models/characters/female_pants/a_female_pants_hit
    {
        map models/characters/female_pants/a_taylor
        rgbGen lightingDiffuse
    }
}

models/characters/female_pants/b_taylor
{
    q3map_nolightmap
    q3map_onlyvertexlighting
    hitLocation      models/characters/female_pants/b_female_pants_hit
    {
        map models/characters/female_pants/b_taylor
        rgbGen lightingDiffuse
    }
}

```

In ShaderEd2 these would be set up as follows:

- **Shader Tab**
 - NolightMap – Checked
 - Vertexlight –Checked
 - Hit Material – described below (Optional, will default to flesh material).
 - Hit Location – described below (Necessary)
- **Stages(Blending) Tab**
 - Stage 1 – Map
 - RGBGen – LightingDiffuse
 - Src Blend – none
 - DstBlend – none
 - Depth Func – lequal
 - Alpha Func -- none

3.0 Naming conventions and the .g2skin

The naming convention for textures is such that it should be fairly obvious what texture goes with what part. An average character is made up of four different textures; the arms, body, face, and head. Optional parts include hoods, scarves, backpacks, etc. Naming conventions are described in full detail below. However, how those textures are applied to a model is a little tricky. When a Ghoul2 model is created, each triangle on the model is given a group name. For instance, all of the triangles that make up the face are given the group name **face**. Each of the ten models has different groups, but many of them are similar. Every model has face, head, body, and arms. These of course,

match up to the corresponding textures. Listed below is each group name and which texture goes along with it.

- **arms**
 - Valid for: all models
 - Required: **yes**
 - Texture/shader naming: a_xxx
 - This is the shader for the arms. These images are found in the directory where the character's body type is.
- **avlong**
 - Valid for: suit_long_coat
 - Required: no (but then another head group is)
 - Texture/shader naming: h_avlong_xxx
 - This is the shader for the male long length hairstyle. These images are all found in models/characters/average_face.
- **avmed**
 - Valid for: average_armor, average_sleeves, fat, snow, suit_long_coat, suit_sleeves
 - Required: no (but then another head group is)
 - Texture/shader naming: h_avmed_xxx
 - This is the shader for the male medium length hairstyle. These images are all found in models/characters/average_face.
- **avmedhat**
 - Valid for: average_armor, average_sleeves, fat, snow, suit_long_coat, suit_sleeves
 - Required: no (but then another head group is)
 - Texture/shader naming: h_avmedhat_xxx
 - This is the shader for the male medium length hat hairstyle. The top is bald to fit a hat bolt-on. These images are all found in models/characters/average_face.
- **avmst**
 - Valid for: average_armor, average_sleeves, fat, snow, suit_long_coat, suit_sleeves
 - Required: no
 - Texture/shader naming: h_avmst_xxx
 - This is for a mustache surface group and actually ended up not being used at all. However, the surfaces are still there and can be used.
- **backpack_lrg**
 - Valid for: average_sleeves
 - Required: no
 - Texture/shader naming: backpack_xxx
 - This is the military style backpack. The image map for the only one used in SoF2 can be found here: models/characters/average_sleeves/backpack_lrg.
- **body**
 - Valid for: all models
 - Required: **yes**
 - Texture/shader naming: b_xxx
 - This is the shader for the body. These images are found in the directory where the character's body type is.
- **body_2sided**

- Valid for: average_sleeves
- Required: **yes**
- Texture/shader naming: b2_xxx
- This is the double-sided shader for the collars. These images are found in the same directory as character's body type. They use the same texture as the **body** image map but the shader is set with **cull disable**.
- **bun**
 - Valid for: female_armor, female_pants, female_skirt
 - Required: no (but then another head group is)
 - Texture/shader naming: h_xxx_bun
 - This is the shader for the bun female hairstyle. All images found in models/characters/female_face.
- **caps**
 - Valid for: all models
 - Required: **yes**
 - Texture/shader naming: caps
 - Every model uses the same gore cap shader and texture. The image map can be found here: models/characters/caps/caps
- **chem**
 - Valid for: chem_suit
 - Required: no
 - Texture/shader naming: hood_chem_xxx
 - This is the shader for the chemical suit hood. All images are found in models/characters/chem_suit. This shader is also **cull disable**.
- **chem_2sided**
 - Valid for: chem_suit
 - Required: no
 - Texture/shader naming: fplate_chem
 - This is the shader for the chemical suit faceplate. All images are found in models/characters/chem_suit. This shader is translucent and all SoF2 chem_suit characters use the same shader, models/characters/chem_suit/fplate_chem.
- **coat_long**
 - Valid for: suit_long_coat
 - Required: no
 - Texture/shader naming: lab_xxx, suit_xxx, or trench_xxx
 - This is the double-sided shader for the coat surfaces, so is set up with **cull disable**. The images can be found in models/characters/suit_long_coat.
- **eye_2sided**
 - Valid for: chem_suit, female_armor, female_pants, female_skirt
 - Required: **yes**
 - Texture/shader naming: f2_xxx
 - This is the double-sided face shader for females only. These images are all found in models/characters/female_face. This is for their eyelashes and teeth.
- **face**
 - Valid for: all models
 - Required: **yes**
 - Texture/shader naming: f_xxx

- These images are all found in `models/characters/average_face` or `models/characters/female_face`. The end of the name will have a race designation so skin tone organization is easier. The race designation is:
 - A = Asian
 - B = Black
 - H = Hispanic
 - W = White
- **face_2sided**
 - Valid for: `average_armor, average_sleeves, chem_suit, fat, snow, suit_long_coat, suit_sleeves`
 - Required: **yes**
 - Texture/shader naming: `f2_xxx`
 - This is a two sided shader needed for the teeth and mouth of the character. These images are all found in `models/characters/average_face`. Each male character has a two sided face shader that uses the same color map as the face shader. The only change in the shader from the matching “f_” is its culling is disabled. Females don’t use this, using **eye_2sided** instead.
- **fface**
 - Valid for: `chem_suit`
 - Required: `no`
 - Texture/shader naming: `f_xxx`
 - This is the shader for a female face on a chem suit body. These images are all found in `models/characters/female_face`.
- **fhead**
 - Valid for: `chem_suit`
 - Required: `no`
 - Texture/shader naming: `h_xxx`
 - This is the shader for a female head on a chem suit body. These images are all found in `models/characters/female_face`.
- **flong**
 - Valid for: `female_armor, female_pants, female_skirt`
 - Required: `no` (but then another head group is)
 - Texture/shader naming: `h_xxx_flong`
 - This is the shader for long female hairstyle. These images are all found in `models/characters/female_face`.
- **fshort**
 - Valid for: `female_armor, female_pants, female_skirt`
 - Required: `no` (but then another head group is)
 - Texture/shader naming: `h_xxx_fshort`
 - This is the shader for short female hairstyle. These images are all found in `models/characters/female_face`.
- **head**
 - Valid for: `all models`
 - Required: `no` (but then another head group is)
 - Texture/shader naming: `h_xxx`
 - These images are found in `models/characters/average_face` or `models/characters/female_face`. Hairstyles are also included in the naming convention, but the **head** group refers solely to bald heads.
- **helmet_chin_strap**
 - Valid for: `average_armor, average_sleeves, female_armor`

- Required: no
- Texture/shader naming: helmet_chin_strap
- This is the chinstrap for the helmets and is set up with **cull disable**. An example image map can be found here: models/characters/average_sleeves/helmet_chin_strap
- **hood**
 - Valid for: snow
 - Required: no
 - Texture/shader naming: hood_xxx
 - This is a hood for the snow characters and is set up with **cull disable**. Hoods can have a fur edge or no edge at all. An example image map can be found here: models/characters/snow/hood_snow1.
- **pony**
 - Valid for: female_armor, female_pants, female_skirt
 - Required: no (but then another head group is)
 - Texture/shader naming: h_xxx_pony
 - This is the shader for the ponytail female hairstyle. All images are found in models/characters/female_face.
- **scarf**
 - Valid for: average_sleeves
 - Required: no
 - Texture/shader naming: scarf_xxx
 - This is a scarf, only used on the average_sleeves model.

4.0 Hit maps

Hit maps are MANDATORY for all characters. A hit map is used to trigger animations, gore and more at a per-pixel accuracy. In reality, it is at a four-pixel accuracy, as the hit map is scaled down to a quarter of the diffuse map size for memory savings. There is a very strict set of rules regarding hit maps:

- Hit maps need to be INDEXED color depth.
- Each body type needs its own set of hit maps.
- The naming convention for hit maps is any file ending with “_hit”
- Hit maps need to use the, sof2_hit_location_palette.ACO included in samples/palettes. This palette is designed for use with Photoshop. However, the colors needed can be recreated in any program that supports palettes and are included in Appendix C: Regions – Index Keys
- The index colors need to correspond to the keys in the image in Appendix C: Regions – Index Keys. The index numbers start top left in the palette and read left to right.
- Very important not to compress this image using JPEG or other similar compressions. In order to work correctly, it can’t have anti-aliasing. SoF2 uses .PNG format.
- These maps are linked to the shader in the **Misc** section of the **Shader** tab of ShaderEd2. Enter the hit map image in the field designated “Hit location”.

5.0 Material maps

Material maps are optional textures that will give different areas of the base texture different material properties. For example, you can designate an area to have metal

properties (i.e. belt buckle) and another area on the same base texture to have a completely different material.

If a shader doesn't have a material map associated with it, it will default to using the flesh material properties on the whole texture. The materials available are the same as those listed in the document SoF2_Shaders. Other rules for material maps:

- The naming convention for material maps is the file ending with “_mat”.
- Material maps need to be INDEXED color depth.
- Material maps need to use the, material_effect_palette.ACO included in samples/palettes. This palette is designed for use with Photoshop. However, the colors can be recreated in any program that supports palettes and are included in Appendix D: Material Index Keys.
- The index colors need to correspond to the keys in the Appendix D: Material Index Keys. The index numbers start top left in the palette and read left to right.
- Very important not to compress this image using JPEG or other similar compressions. It can't have anti-aliasing in order to work correctly. SoF2 uses .PNG format.
- These maps are linked to the shader in the **Misc** section of the **Shader** tab of ShaderEd2. Enter the hit map image in the field designated “Hit material”.

6.0 Setting up a .g2skin files

Now that you have images made and the appropriate shaders set up, you need to create a .g2skin for your character. Once a .g2skin is created, the name of that file can be added to an NPC in a .NPC file. These skin files are used to link the shaders you've created to the hard-coded group names embedded in the models and explained in full in section 3.0. Parts of an example skin file follows. Blue text is not included in the file.

```
prefs
{
    models
    {
        1      "female_pants"      Tells which model this skin belongs to.
    }
}
material
{
    name      "face"              Tells the name of a surface group (from
                                section 3.0)
    group
    {
        name      "white"         The name of the group. No longer needed,
                                but valid values are asian, black, hispanic,
                                and white.
        texture1  "models/characters/female_face/f_taylor"  The path to the shader
    }
}
material
{
    name      "eye_2sided"
    group
    {
        name      "white"         Every group name must be the same
```

```
        shader1 "models/characters/female_face/f2_nurse_w1" Here shader1 is used instead of texture1. This doesn't matter and is totally interchangeable
    }
}
```

Additional note: Within a group, multiple texture entries can be made. So for **face** above, there can be texture1, texture2, texture3, etc. However, every other material in the skin file must have the same number of textures, even if it's just duplicated. So for **body** all entries can be exactly the same, but the **faces** can be completely different. This is good for randomness, but there is no direct control over which skin will be called. The NPC files have a better control system so this system was rarely used.

7.0 Conclusion

Once you have textures, shaders, and a .g2skin file, the final step is to create an NPC template so your skin can be seen in the game. Also, if you want your skin to show up in multiplayer, a menu icon must be created for your skin. For information on this step, see the document SoF2_Character_NPCFile.

Appendix A: Characters Material to Mesh

arms

- arm_lwr_l
- arm_lwr_r
- arm_uppr_l
- arm_uppr_r
- fingers_l
- fingers_r
- hand_l
- hand_r
- mitten_l_off
- mitten_r_off
- sleeves_r
- sleeves_l

backpack_lrg

- backpack_lrg_off

body

- foot_l
- foot_r
- hip_l
- hip_r
- leg_lwr_l
- leg_lwr_r
- leg_uppr_l
- leg_uppr_r
- torso_l
- torso_r
- labcollar_r_off
- labcollar_l_off
- trenchcollar_r_off
- trenchcollar_l_off
- skirt_frnt_r
- skirt_frnt_l
- skirt_bck_l
- skirt_bck_r
- fcollar_l_off
- fcollar_r_off
- mcollar_l
- mcollar_r

body_2sided

- collar_l
- collar_r

caps

- cap_arm_lwr_l_hand_off
- cap_arm_lwr_l_uppr_off
- cap_arm_lwr_r_hand_off
- cap_arm_lwr_r_uppr_off
- cap_arm_uppr_l_lwr_off
- cap_arm_uppr_l_torso_off
- cap_arm_uppr_r_lwr_off
- cap_arm_uppr_r_torso_off
- cap_foot_l_off
- cap_foot_r_off
- cap_hand_l_off
- cap_hand_r_off
- cap_head_bck_lwr_l_off
- cap_head_bck_lwr_r_off
- cap_head_bck_uppr_l_off
- cap_head_bck_uppr_r_off
- cap_head_frnt_lwr_l_off
- cap_head_frnt_lwr_r_off
- cap_head_frnt_mid_l_off
- cap_head_frnt_mid_r_off
- cap_head_frnt_uppr_l_off
- cap_head_frnt_uppr_r_off
- cap_head_side_l_off
- cap_head_side_r_off
- cap_hip_l_off

cap_hip_r_off
 cap_leg_lwr_l_foot_off
 cap_leg_lwr_l_uppr_off
 cap_leg_lwr_r_foot_off
 cap_leg_lwr_r_uppr_off
 cap_leg_uppr_l_hip_off
 cap_leg_uppr_l_lwr_off
 cap_leg_uppr_r_hip_off
 cap_leg_uppr_r_lwr_off
 cap_torso_l_arm_off
 cap_torso_l_off
 cap_torso_r_arm_off
 cap_torso_r_off
 cap_fhead_bck_lwr_l_off
 cap_fhead_bck_lwr_r_off
 cap_fhead_bck_uppr_l_off
 cap_fhead_bck_uppr_r_off
 cap_fhead_frnt_lwr_l_off
 cap_fhead_frnt_lwr_r_off
 cap_fhead_frnt_mid_l_off
 cap_fhead_frnt_mid_r_off
 cap_fhead_frnt_uppr_l_off
 cap_fhead_frnt_uppr_r_off
 cap_fhead_side_l_off
 cap_fhead_side_r_off
 cap_beardhead_mid_l_off
 cap_beardhead_mid_r_off
 cap_beardhead_frnt_lwr_l_off
 cap_beardhead_frnt_lwr_r_off
chem
 hood
chem_2sided
 clear
coat_long
 labcoat_r_off
 labcoat_l_off
 trenchcoat_r_off
 trenchcoat_l_off
eye_2sided
 eyelash_l
 eyelash_r
 teeth_l – female/male
 teeth_r – female/male
 eyelasha_l_off
 eyelasha_r_off
 fteeth_l_off
 fteeth_r_off
face
 ear_l
 ear_r
 eyeball_l
 eyeball_r
 head_frnt_lwr_l
 head_frnt_lwr_r
 head_frnt_mid_l
 head_frnt_mid_r
 head_frnt_uppr_l
 head_frnt_uppra_l_off
 head_frnt_uppr_r
 head_frnt_uppra_r_off
 mouth_l
 mouth_r
 head_frnt_mida_r_off
 head_frnt_mida_l_off
 beardhead_frnt_mid_l_off
 beardhead_frnt_mid_r_off
 beardhead_frnt_lwr_l_off
 beardhead_frnt_lwr_r_off
face_2sided
 teeth_l

teeth_r

fface

feyeball_l_off
feyeball_r_off
fhead_bck_lwr_l_off
fhead_bck_lwr_r_off
fhead_bck_uppr_l_off
fhead_bck_uppr_r_off
fhead_frnt_lwr_l_off
fhead_frnt_lwr_r_off
fhead_frnt_mid_l_off
fhead_frnt_mid_r_off
fhead_frnt_uppr_l_off
fhead_frnt_uppr_r_off
fhead_side_l_off
fhead_side_r_off
fmouth_l_off
fmouth_r_off

fhead

fhead_bck_lwr_l_off
fhead_bck_lwr_r_off
fhead_bck_uppr_l_off
fhead_bck_uppr_r_off
fhead_side_l_off
fhead_side_r_off

head

head_bck_lwr_l
head_bck_lwr_r
head_bck_uppr_l
head_bck_uppr_r
head_side_l
head_side_r

helmet_chin_strap

helmet_chin_strap_off

hood

collar_off
fur_off
hood_down_off
hood_up_off

scarf

scarf_off

Specifically for Dog model

Dog

body_l
rot_lleg_front
body_r
rot_rleg_front
bottom_jaw
fangs
head_l
head_r
hip_l
rot_lleg_back
tongue
torso_r
rot_rleg_back

Appendix B: Hairstyle Surfaces

Male

Bald (default)—

Head_bck_lwr_l
Head_bck_lwr_r
Head_bck_uppr_l
Head_back_uppr_r
Head_side_l
Head_side_r

Medium length hair (bangs option) (**avmed**)

Avmedbangs_l_off
Avmedbangs_r_off
Head_bck_lwr_l_avmed_off
Head_bck_lwr_r_avmed_off
Head_bck_uppr_l_avmed_off
Head_bck_uppr_r_avmed_off
Head_side_l_avmed_off
Head_side_r_avmed_off

Medium length hair with bald on top (designed to be used with hats) (**avmedhat**)

Head_bck_lwr_l_avmedhat_off
Head_bck_lwr_r_avmedhat_off
Head_bck_uppr_l_avmedhat_off
Head_bck_uppr_r_avmedhat_off
Head_side_l_avmedhat_off
Head_side_r_avmedhat_off

Long Hair (**avlong**)

Head_bck_lwr_l_avlong_off
Head_bck_lwr_r_avlong_off
Head_bck_uppr_l_avlong_off
Head_bck_uppr_r_avlong_off
Head_side_l_avlong_off
Head_side_r_avlong_off

Beard

Beardhead_frnt_lwr_l_off
Beardhead_frnt_lwr_r_off
Beardhead_frnt_mid_l_off
Beardhead_frnt_mid_r_off

Mustache (**avmst**)

Avmst_l_off
Avmst_r_off

Female

Bald (default)

Head_bck_lwr_l
Head_bck_lwr_r
Head_bck_uppr_l
Head_back_uppr_r
Head_side_l
Head_side_r

Short hair (**fshort**)

Head_bck_lwr_l_fshort_off
Head_bck_lwr_r_fshort_off
Head_bck_uppr_l_fshort_off
Head_back_uppr_r_fshort_off
Head_side_l_fshort_off
Head_side_r_fshort_off

Long hair (**flong**)

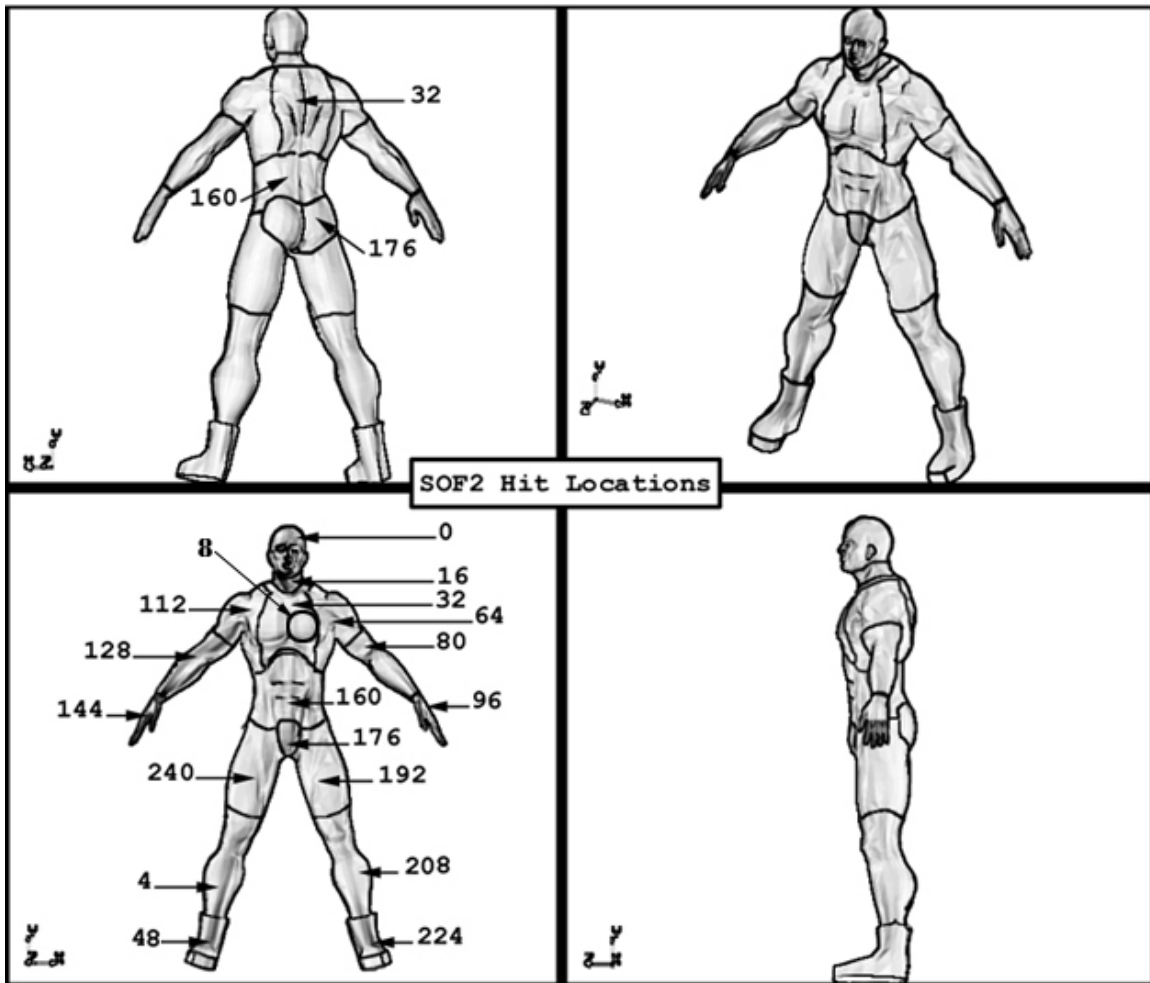
Head_bck_lwr_l_flong_off
Head_bck_lwr_r_flong_off
Head_bck_uppr_l_flong_off
Head_back_uppr_r_flong_off
Head_side_l_flong_off
Head_side_r_flong_off

Bun hair (**bun**)

Head_bck_lwr_l_bun_off
Head_bck_lwr_r_bun_off
Head_bck_uppr_l_bun_off
Head_back_uppr_r_bun_off

Head_side_l_bun_off
Bun_off
Ponytail (**pony**)
Head_bck_lwr_l_pony_off
Head_bck_lwr_r_pony_off
Head_bck_uppr_l_pony_off
Head_bck_uppr_r_pony_off
Head_side_l_pony_off
ponytail_off

Appendix C: Regions – Index Keys



KEY#	R	G	B
0.	255	0	0
1.	0	255	0
2.	0	0	255
3.	255	255	255
4.	251	0	0
5.	0	251	0
6.	0	0	251
7.	251	251	251
8.	247	0	0
9.	0	247	0
10.	0	0	247
11.	247	247	247
12.	243	0	0
13.	0	243	0
14.	0	0	243
15.	243	243	243
16.	239	0	0
17.	0	239	0
18.	0	0	239
19.	239	239	239
20.	235	0	0
21.	0	235	0

22.	0	0	235
23.	235	235	235
24.	231	0	0
25.	0	231	0
26.	0	0	231
27.	231	231	231
28.	227	0	0
29.	0	227	0
30.	0	0	227
31.	227	227	227
32.	223	0	0
33.	0	223	0
34.	0	0	223
35.	223	223	223
36.	219	0	0
37.	0	219	0
38.	0	0	219
39.	219	219	219
40.	215	0	0
41.	0	215	0
42.	0	0	215
43.	215	215	215
44.	211	0	0
45.	0	211	0
46.	0	0	211
47.	211	211	211
48.	207	0	0
49.	0	207	0
50.	0	0	207
51.	207	207	207
52.	203	0	0
53.	0	203	0
54.	0	0	203
55.	203	203	203
56.	199	0	0
57.	0	199	0
58.	0	0	199
59.	199	199	199
60.	195	0	0
61.	0	195	0
62.	0	0	195
63.	195	195	195
64.	191	0	0
65.	0	191	0
66.	0	0	191
67.	191	191	191
68.	187	0	0
69.	0	187	0
70.	0	0	187
71.	187	187	187
72.	183	0	0
73.	0	183	0
74.	0	0	183
75.	183	183	183
76.	179	0	0
77.	0	179	0
78.	0	0	179
79.	179	179	179
80.	175	0	0
81.	0	175	0
82.	0	0	175
83.	175	175	175
84.	171	0	0
85.	0	171	0
86.	0	0	171
87.	171	171	171
88.	167	0	0
89.	0	167	0
90.	0	0	167
91.	167	167	167

92.	163	0	0
93.	0	163	0
94.	0	0	163
95.	163	163	163
96.	159	0	0
97.	0	159	0
98.	0	0	159
99.	159	159	159
100.	155	0	0
101.	0	155	0
102.	0	0	155
103.	155	155	155
104.	151	0	0
105.	0	151	0
106.	0	0	151
107.	151	151	151
108.	147	0	0
109.	0	147	0
110.	0	0	147
111.	147	147	147
112.	143	0	0
113.	0	143	0
114.	0	0	143
115.	143	143	143
116.	139	0	0
117.	0	139	0
118.	0	0	139
119.	139	139	139
120.	135	0	0
121.	0	135	0
122.	0	0	135
123.	135	135	135
124.	131	0	0
125.	0	131	0
126.	0	0	131
127.	131	131	131
128.	127	0	0
129.	0	127	0
130.	0	0	127
131.	127	127	127
132.	123	0	0
133.	0	123	0
134.	0	0	123
135.	123	123	123
136.	119	0	0
137.	0	119	0
138.	0	0	119
139.	119	119	119
140.	115	0	0
141.	0	115	0
142.	0	0	115
143.	115	115	115
144.	111	0	0
145.	0	111	0
146.	0	0	111
147.	111	111	111
148.	107	0	0
149.	0	107	0
150.	0	0	107
151.	107	107	107
152.	103	0	0
153.	0	103	0
154.	0	0	103
155.	103	103	103
156.	99	0	0
157.	0	99	0
158.	0	0	99
159.	99	99	99
160.	95	0	0
161.	0	95	0

162.	0	0	95
163.	95	95	95
164.	91	0	0
165.	0	91	0
166.	0	0	91
167.	91	91	91
168.	87	0	0
169.	0	87	0
170.	0	0	87
171.	87	87	87
172.	83	0	0
173.	0	83	0
174.	0	0	83
175.	83	83	83
176.	79	0	0
177.	0	79	0
178.	0	0	79
179.	79	79	79
180.	75	0	0
181.	0	75	0
182.	0	0	75
183.	75	75	75
184.	71	0	0
185.	0	71	0
186.	0	0	71
187.	71	71	71
188.	67	0	0
189.	0	67	0
190.	0	0	67
191.	67	67	67
192.	63	0	0
193.	0	63	0
194.	0	0	63
195.	63	63	63
196.	59	0	0
197.	0	59	0
198.	0	0	59
199.	59	59	59
200.	55	0	0
201.	0	55	0
202.	0	0	55
203.	55	55	55
204.	51	0	0
205.	0	51	0
206.	0	0	51
207.	51	51	51
208.	47	0	0
209.	0	47	0
210.	0	0	47
211.	47	47	47
212.	43	0	0
213.	0	43	0
214.	0	0	43
215.	43	43	43
216.	39	0	0
217.	0	39	0
218.	0	0	39
219.	39	39	39
220.	35	0	0
221.	0	35	0
222.	0	0	35
223.	35	35	35
224.	31	0	0
225.	0	31	0
226.	0	0	31
227.	31	31	31
228.	27	0	0
229.	0	27	0
230.	0	0	27
231.	27	27	27

232.	23	0	0
233.	0	23	0
234.	0	0	23
235.	23	23	23
236.	19	0	0
237.	0	19	0
238.	0	0	19
239.	19	19	19
240.	15	0	0
241.	0	15	0
242.	0	0	15
243.	15	15	15
244.	11	0	0
245.	0	11	0
246.	0	0	11
247.	11	11	11
248.	7	0	0
249.	0	7	0
250.	0	0	7
251.	7	7	7
252.	3	0	0
253.	0	3	0
254.	0	0	3
255.	3	3	3 - USE FOR BACKGROUND COLOR

Appendix D: Material Index Keys

Key#	R	G	B	MATERIAL
0	0	0	0	NONE
1	255	0	0	SOLID WOOD
2	255	0	144	HOLLOW WOOD
3	255	0	240	SOLID METAL
4	180	0	255	HOLLOW METAL
5	108	0	255	SHORT GRASS
6	0	0	255	LONG GRASS
7	0	108	255	DIRT
8	0	192	255	SAND
9	0	253	255	GRAVEL
10	0	255	114	GLASS
11	150	255	0	CONCRETE
12	255	240	0	MARBLE
13	255	180	0	WATER
14	255	102	0	SNOW
15	254	180	181	ICE
16	254	180	240	FLESH
17	212	180	254	MUD
18	180	205	254	BULLET PROOF GLASS
19	180	245	254	DRY LEAVES
20	180	254	208	GREEN LEAVES
21	210	254	180	FABRIC
22	254	248	180	CANVAS
23	109	75	75	ROCK
24	109	75	98	RUBBER
25	90	75	109	PLASTIC
26	75	93	109	TILES
27	75	109	105	CARPET
28	91	109	75	PLASTER
29	99	95	31	SHATTER GLASS
30	255	255	255	ARMOR

Appendix E: Dismemberment Diagram

