CS148: Introduction to Computer Graphics and Imaging Final Project

Fall 2025

Timothy Yu and Thomas Li

The Idea

Our reference comes from a Clash Royale short animated film about the journey of two skeleton brothers and the crown.

We wanted to create the Clash (get it?) between warmth and cold by making the environment cold and the only source of heat and warmth from the cute little fire spirit.

Reference Image

Final Rendered Image

Variant A

Variant B

Main Geometries from Scratch

- Skeleton
  - Skull - Timothy
  - Ribs and Spine - Timothy + Thomas
  - Arms (Imported) - rearranged by Timothy
  - Legs (Imported) - rearranged by Timothy
- Fire Spirit
  - Body - Thomas and Timothy
  - Flames and particles - Thomas
- Bucket - Timothy
- Crown - Timothy
- Chains - Thomas
- Floor and Walls - Timothy

UV Mapping and Textures from Scratch

- Skeleton
  - Skull - UV Mapped and Painted by Timothy
  - Body - Painted by Timothy
- Bucket - UV Mapped by Timothy, texture from online
- Chains - textured by Timothy
- Fire Spirit
  - fire simulation - Thomas
  - glow texture - Thomas
- Crown - texture by Timothy
- Floor and Walls - texture from online

Blender/Cycles Advanced Features

- General: We used depth of field to highlight the focus of the interaction between the skeleton and the fire spirit, slightly fading out less important objects like the chains, walls, and crown.
- Fire Spirit - Thomas:
  - Particle Systems were used for the fire sparks around the fire spirit to make it seem like the fire was moving and lively
- Ray Tracing:
  - We used several sunlights from atop and created the general ambiance of the environment.
  - Then, Timothy went in manually and added several hand-placed lights to make certain parts of objects look more consistent or pop out more.
  - Thomas focused on the fire spirit glow, making it look almost spiritual and seemingly like the only source of warmth in a rather cold box.

Assets

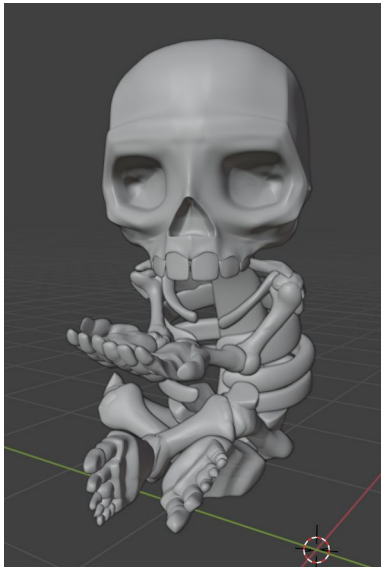
- Skeleton
  - Skull
  - Ribs
  - Arms and Legs
- Fire Spirit
- Crown
  - Base
  - Jewels
- Bucket
  - Base
  - Handle
- Chains
- Walls

Object: Skeleton

Geometry: Timothy + Thomas

Material: Timothy

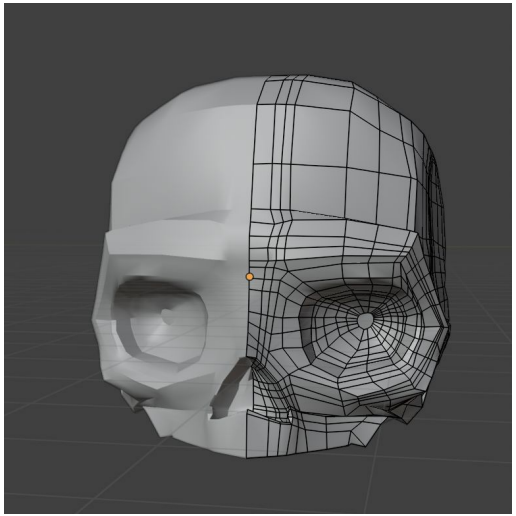
Description: The idea came from the animation so we wanted to make the skeleton as close as possible to the original.

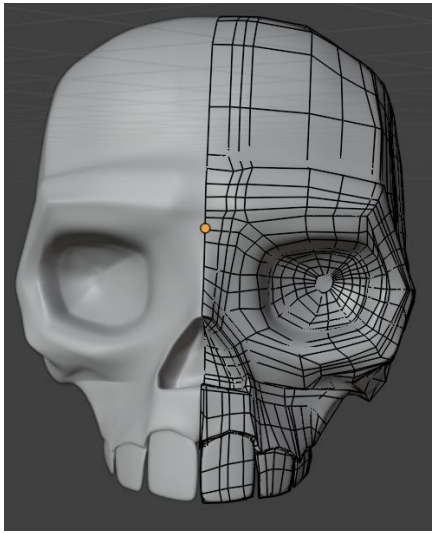


References:

- Body

Object: Skeleton - Skull





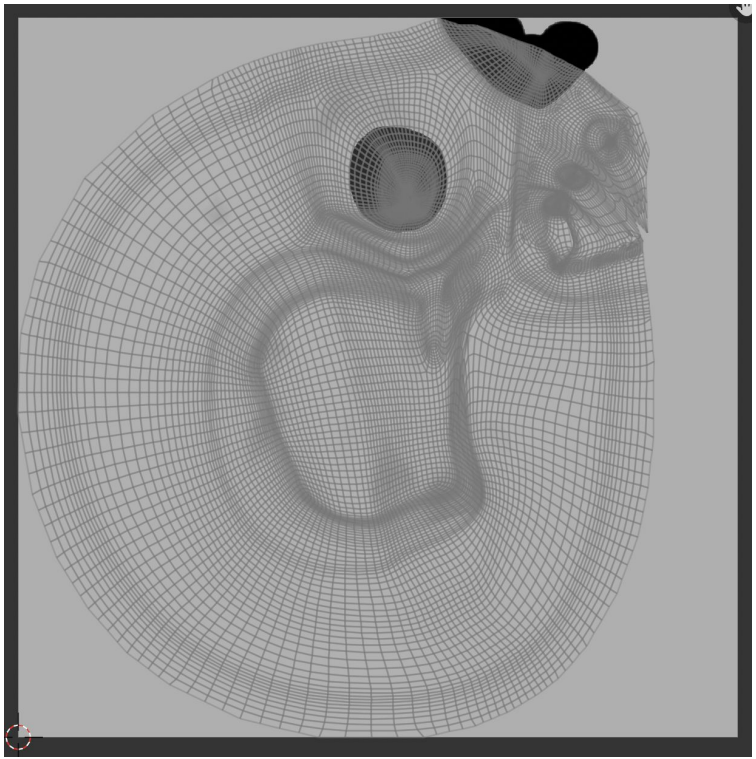
Geometry: Timothy
Material: Timothy
Description:

- We started with a plane and created proper topology for the skull so that we could extend it later.
- Slowly extrude around the head of the skull making sure to maintain topology so we can continue loop cuts and use proportional editing to push around parts of the skull
- After creating the topology, we merged the faces together on the underside to create one coherent object
- The only modifiers used here were mirror and subdivision, no other modifications.
- The skull modeling alone took 8 hours!

References:

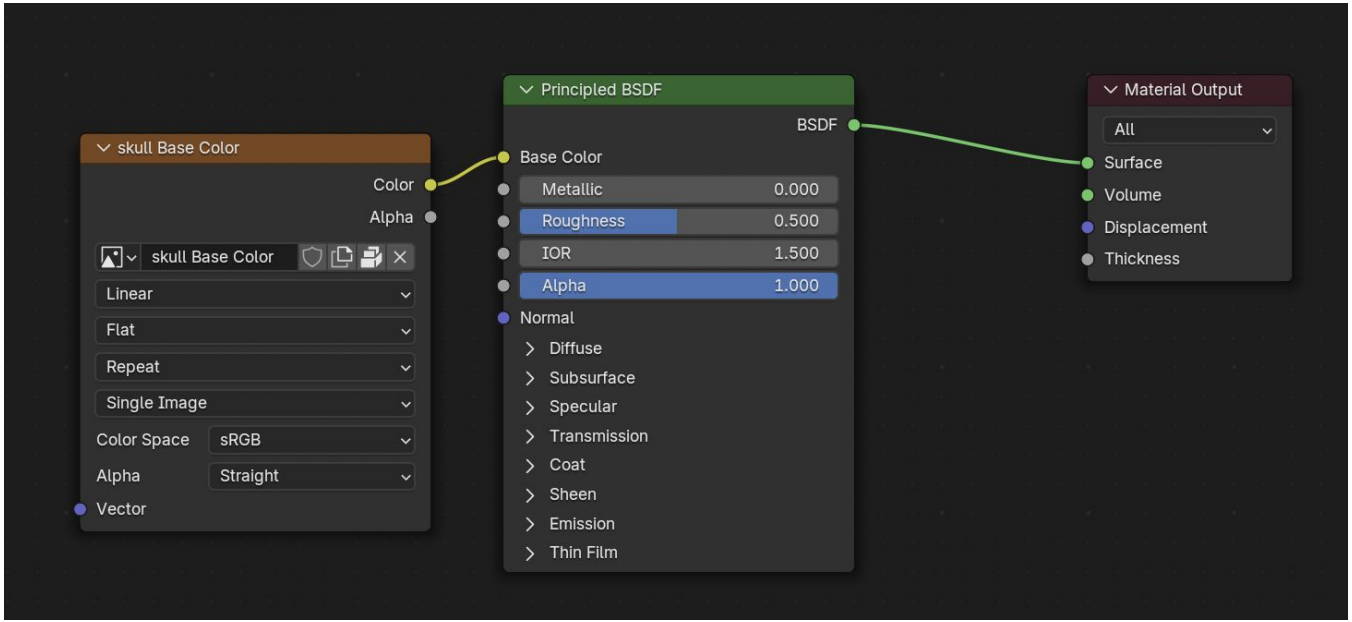
- Creating a Skull
- How to make Teeth

UV Unwrap: Skeleton - Skull



We UV unwrapped the skull to paint in the eyes (black), and also added some gray blemishes to the skull to make it look more realistic.

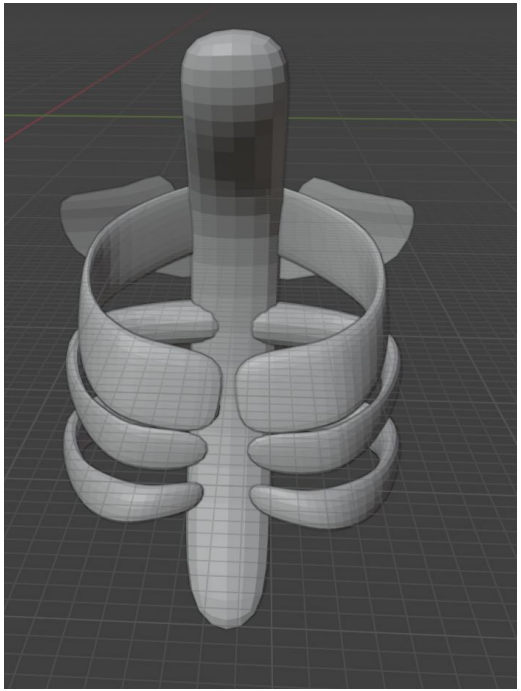
Material: Skeleton - Skull



Object: Skeleton - Ribs

Geometry: Thomas + Timothy
Material: Timothy
Description:

- We started with simple squares and extruded them while also grabbing parts to make the curves and applying the subdivision modifiers. We used the spine as a plane of reference to mirror across both sides.



References:

- Body

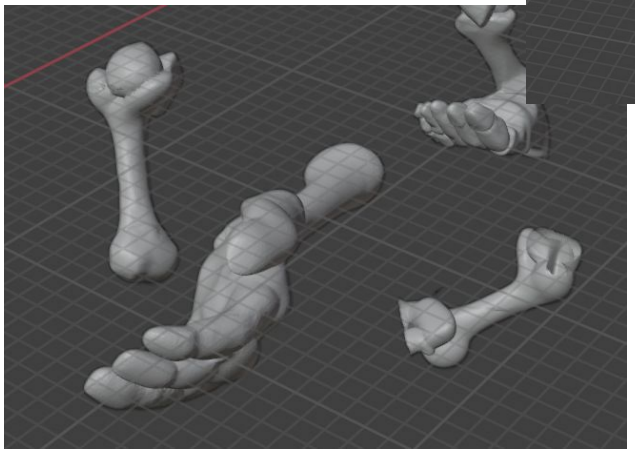
Object: Skeleton - Arms + Legs

Deconstruction: Thomas
Assembly: Timothy
Description:

- We began with the reference mesh from the existing skeleton and dissected it by taking parts of the mesh and filling it in with simple spheres while making sure to keep the mesh intact.
- Then, using those individual bone parts, we put them together in the pose that was desired (cross legged and with hands reaching out)

References:

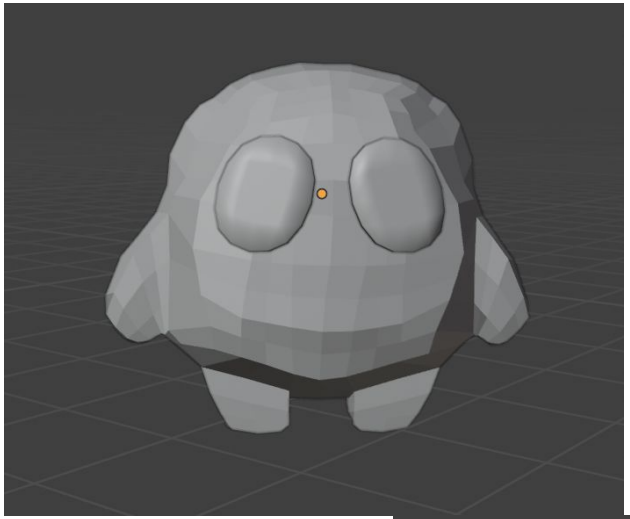
- Body



Object: Fire Spirit

Geometry: Thomas
Material: Thomas
Description:

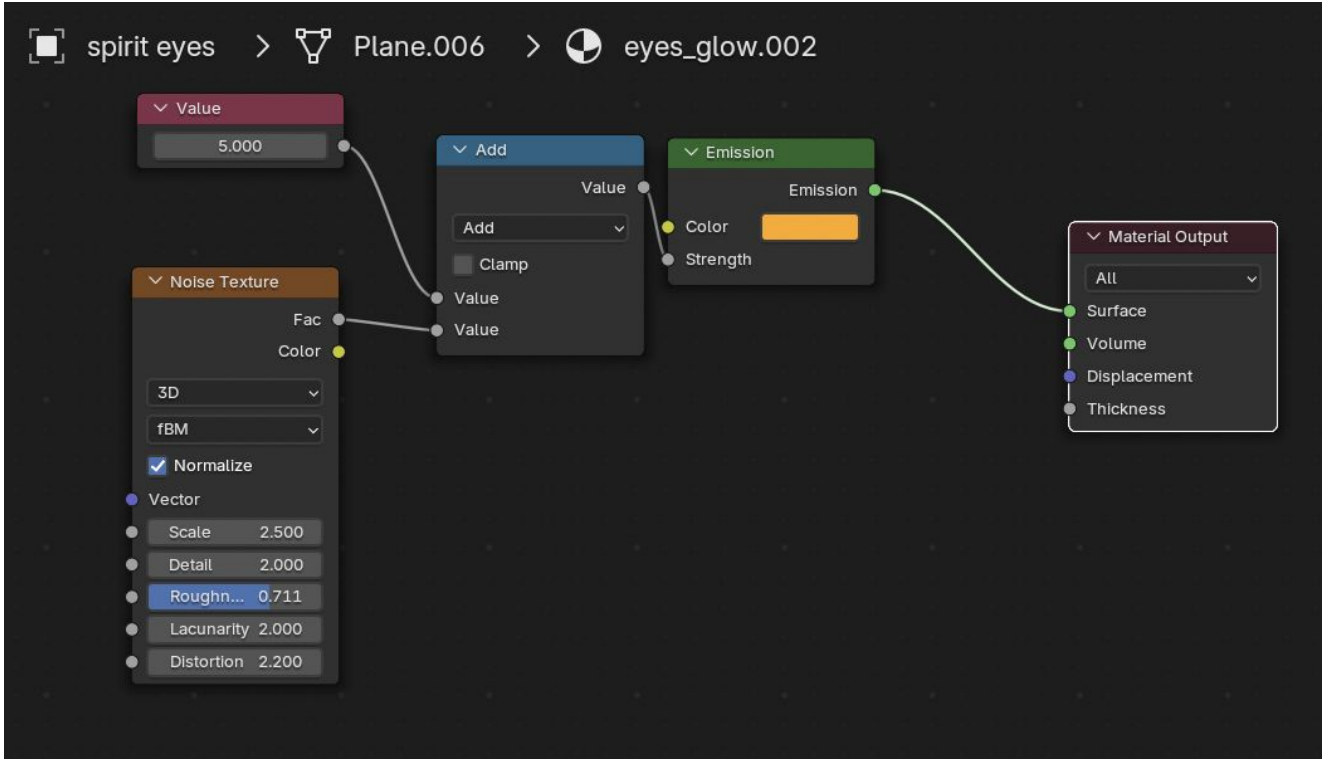
- We began with a simple icosphere, and subdivided and pulled out the geometries of certain faces to create the base of the arms and legs of the fire spirit, molding it to look more round and have a flatter face.



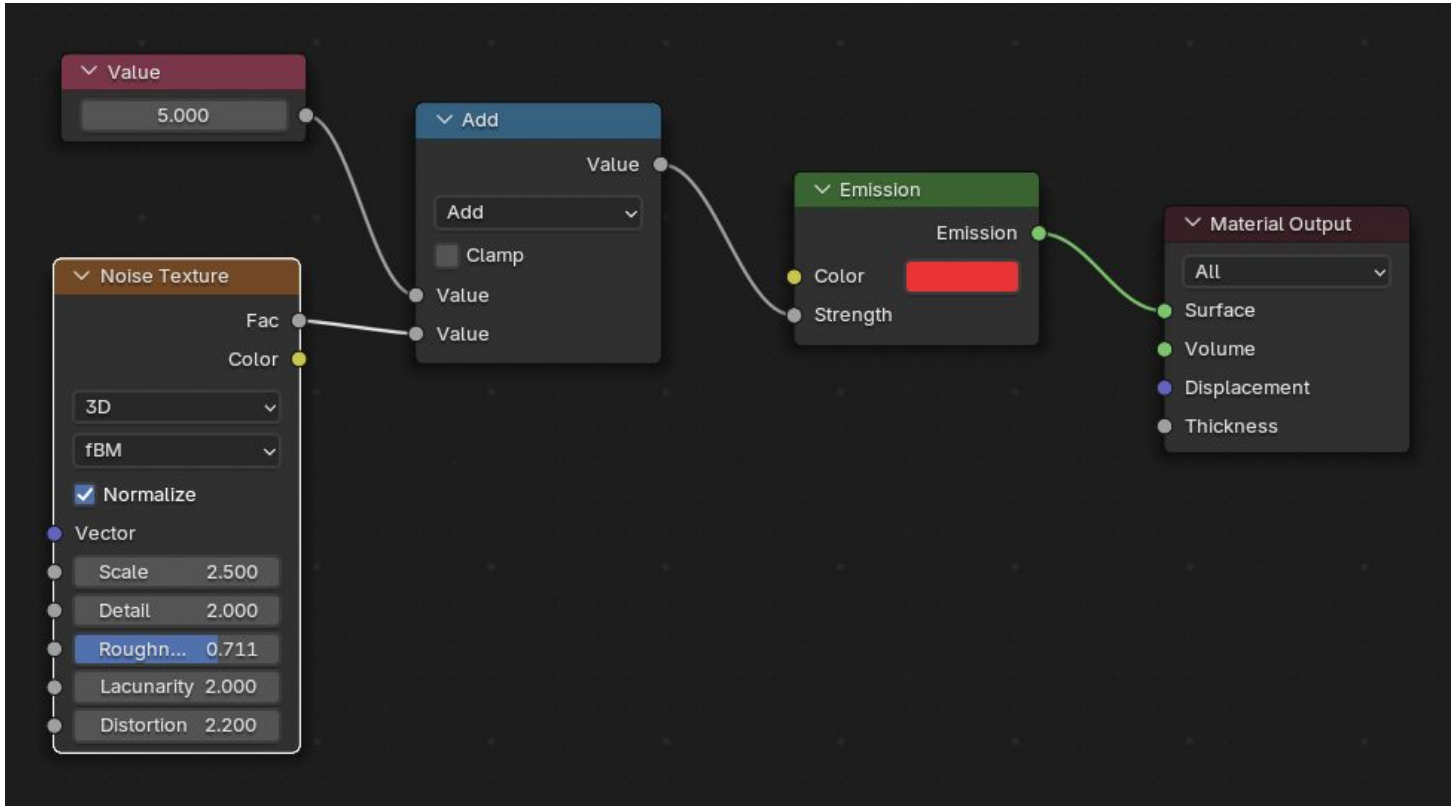
References:

- fire spirit image

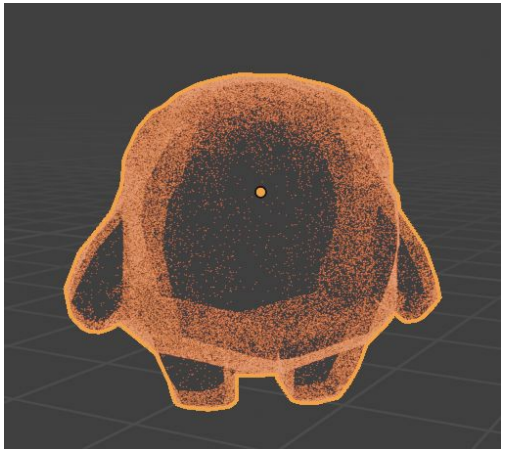
Material: Fire Spirit - Glowing Eyes



Material: Fire Spirit - Glowing Pupils



Object: Fire Spirit - Halo



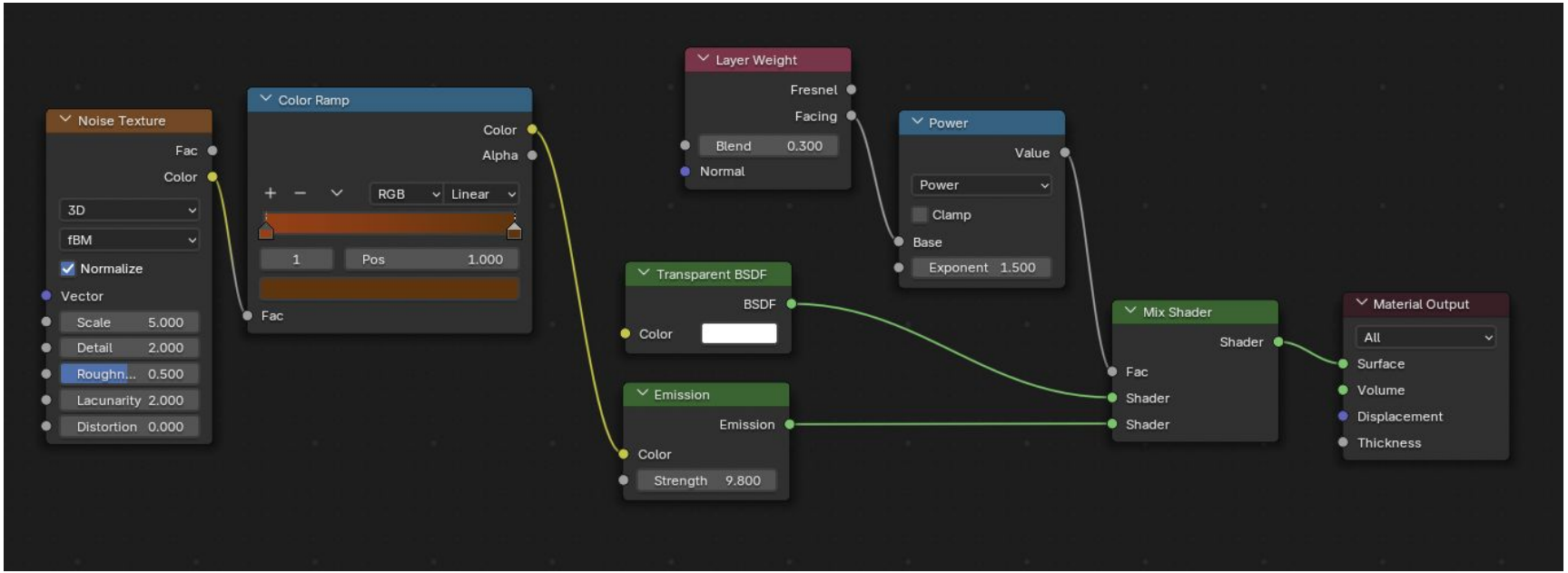
Geometry: Thomas
Material: Thomas
Description:

- We created a clone of the base body and sized it up just a little bit so the halo (see next slide) would encapsulate the entirety of the body and make it look like it was glowing

References:

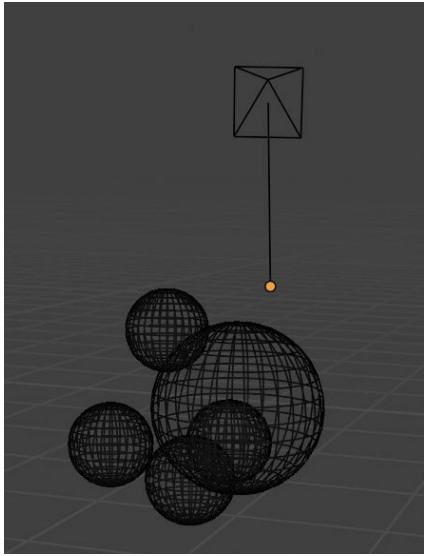
- fire spirit image

Material: Fire Spirit - Halo



The halo is a mixed combination of a emission shader and a transparent shader. It is mixed with a layer of facing (fresnel like) weight exponentiated which makes the edges glow out more in different angles. [Reference video]

Object: Fire Spirit - Flames



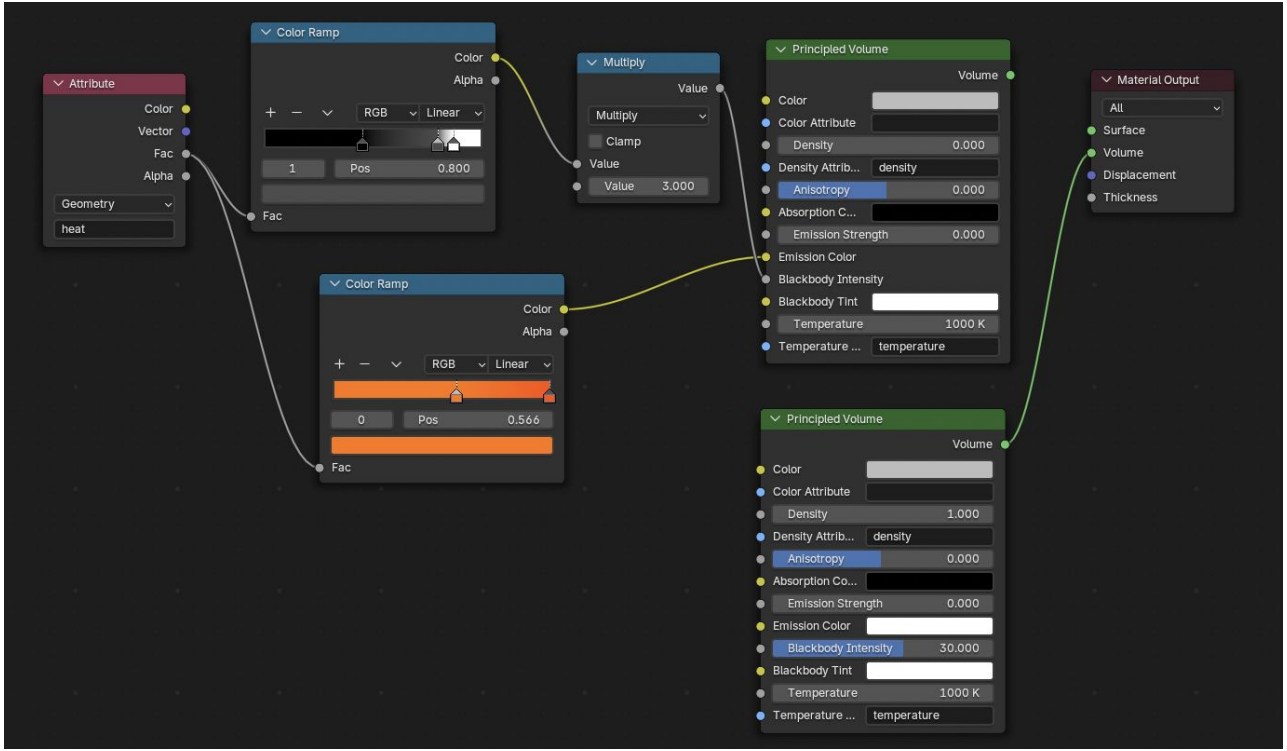
Geometry: Thomas
Material: Thomas
Description:

- We used Blender's fluid domain with multiple sources of flames to emulate the flames coming from each part of the limbs and the base body.
- We added turbulence, adjusted the combustion rate, initial velocity, vorticity, etc., and we picked the best-looking frame for the still capture.

References:

- fire spirit image

Material: Fire Spirit - Flames

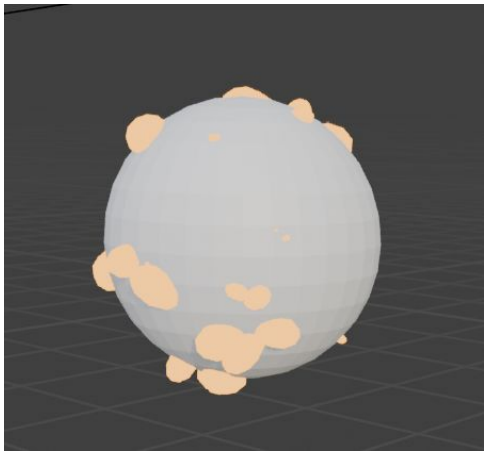


We experimented with using the heat attribute and creating our own color ramp (top), but in the end we decided that simulating using blackbody radiation is the best looking.

Object: Fire Spirit - Particles

Geometry: Thomas
Material: Thomas
Description:

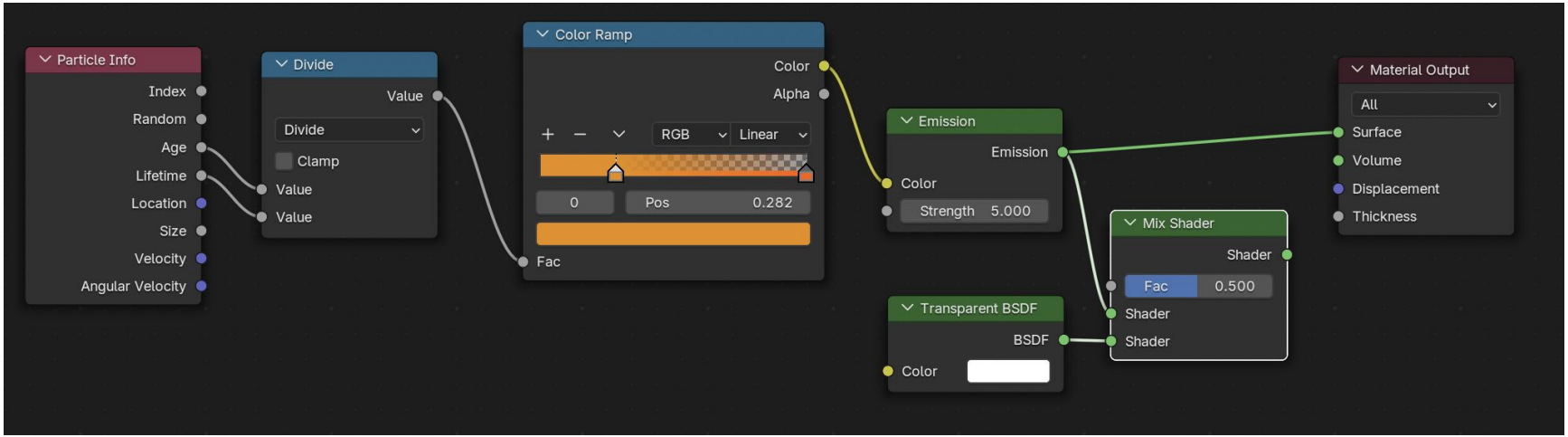
- We used a particle system to emulate the fire giving off sparks. It emits icospheres with the emission shader, with randomness in direction, size, and orientation of particles



References:

- fire spirit image

Material: Fire Spirit - Particles



This is the material for each individual particle. Similar to the halo they are a combination of emission and transparent shaders, but the math module divides the current age by the lifetime to make them more transparent as they age :D

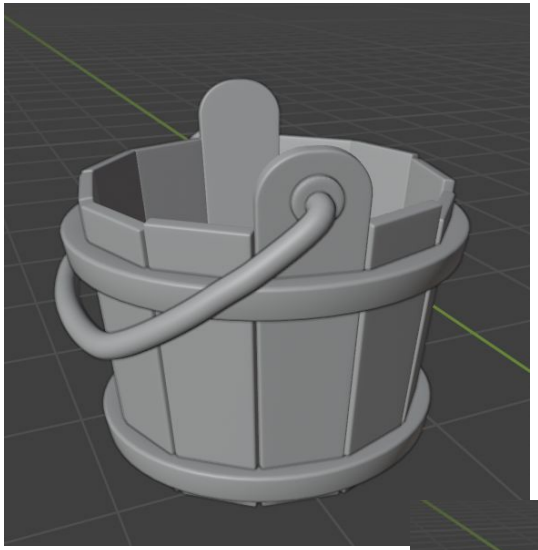
Object: Bucket

Geometry: Timothy
Material: Found Online
Description:

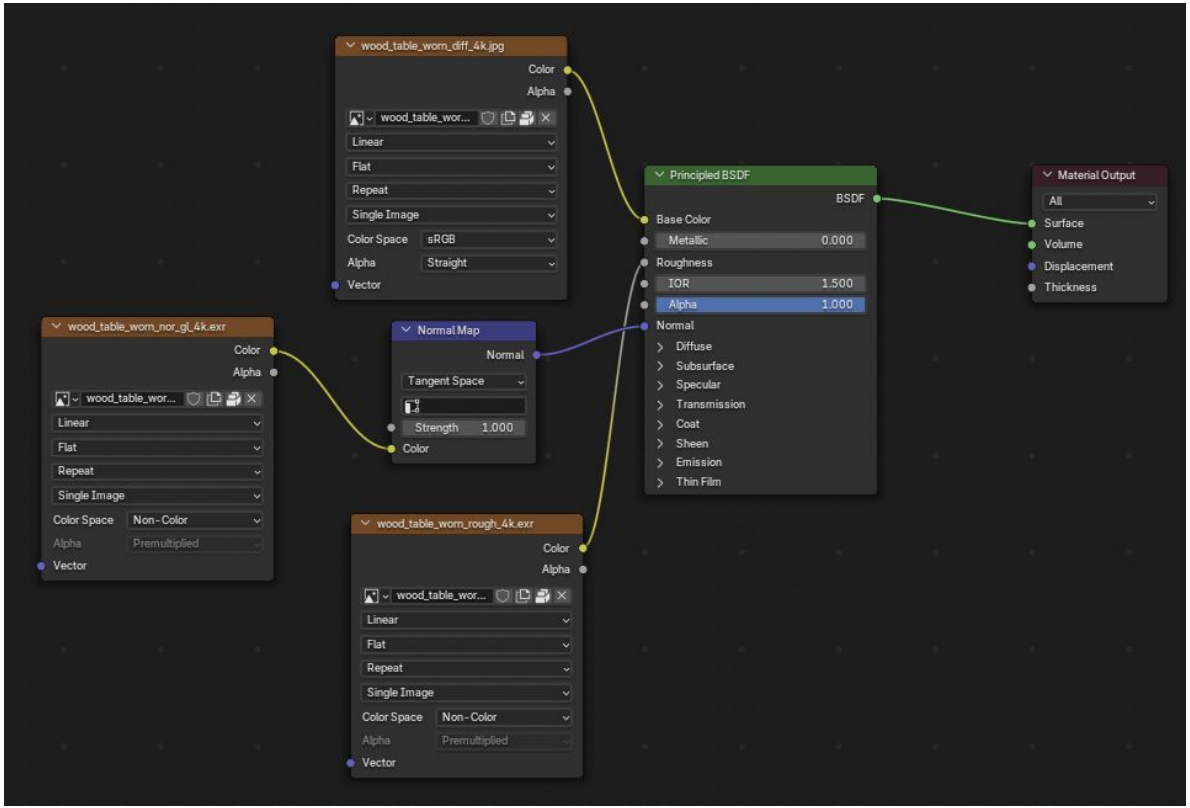
- We started with a simple circle and extended it upward to create the sides of the bucket, following the tutorial, and adding the metal rims as needed.
- We deviated from the tutorial with the handle, using a simple bezier curve and manipulating it and making it thicker.

References:

- handle
- bucket reference



Material: Bucket

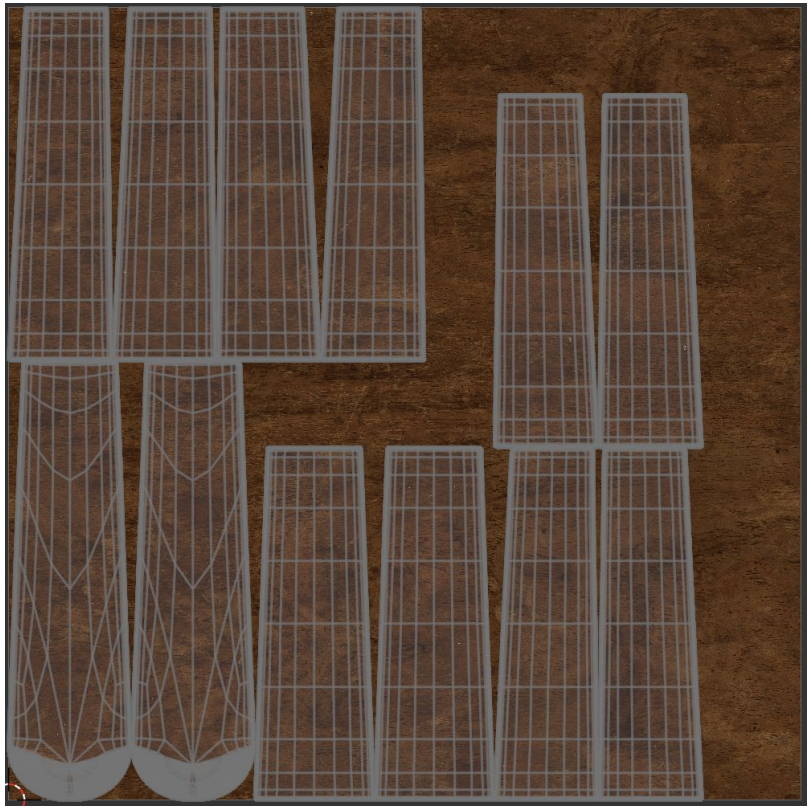


We downloaded a wood texture for the bucket (with surface, normals, and roughness) and mapped it onto our bucket.

References:

- texture download

UV Unwrap: Bucket



We downloaded a wood texture for the bucket (with surface, normals, and roughness) and mapped it onto our bucket.

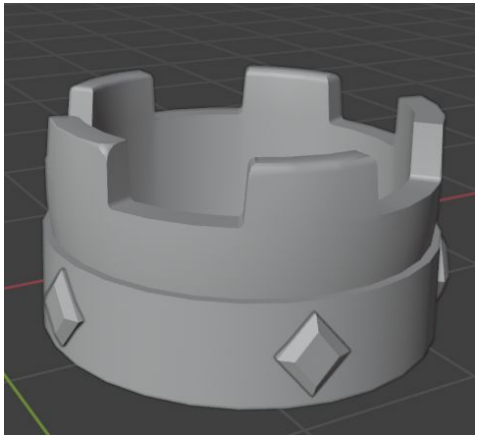
Object: Crown

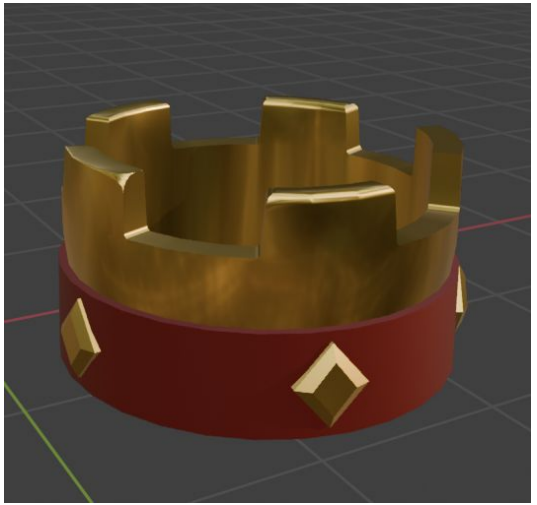
Geometry: Timothy
Material: Timothy
Description:

- We started with a 30-polygonal cylinder since we wanted 5 battlements on the crown so it would be easier with that geometry. We beveled the tops of the crown so that it would look more rugged and hand-beveled some of the battlements to give it more of an uneven feel.
- The jewels were created separately as simply squares that were extruded and beveled.

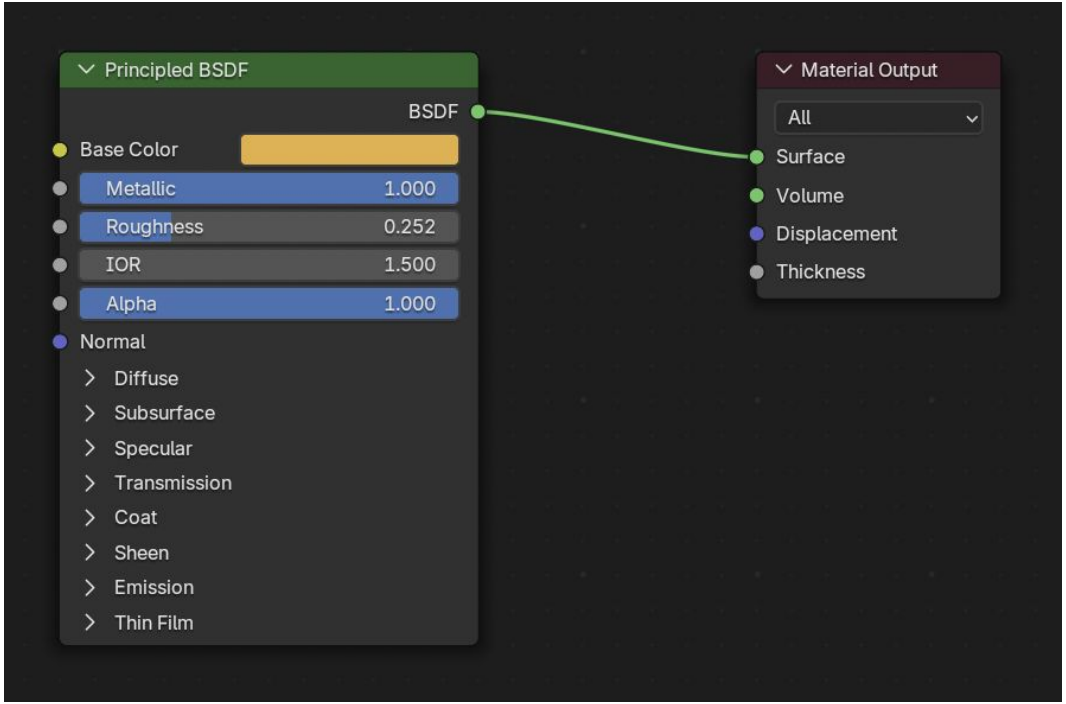
References:

- crown





Material: Crown



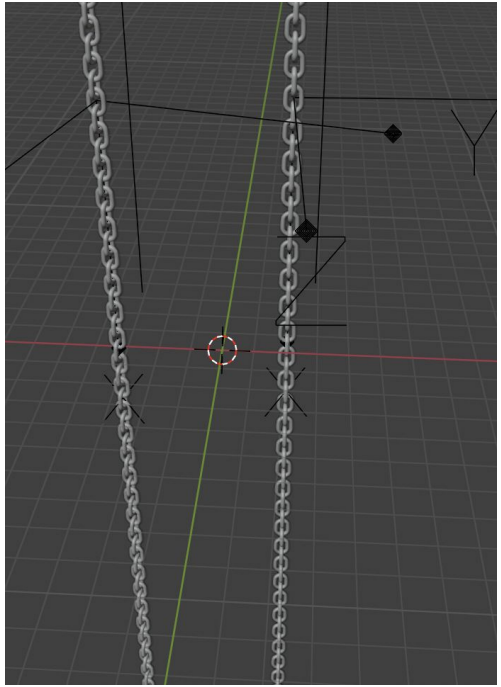
Object: Chains

Geometry: Thomas
Material: Timothy
Description:

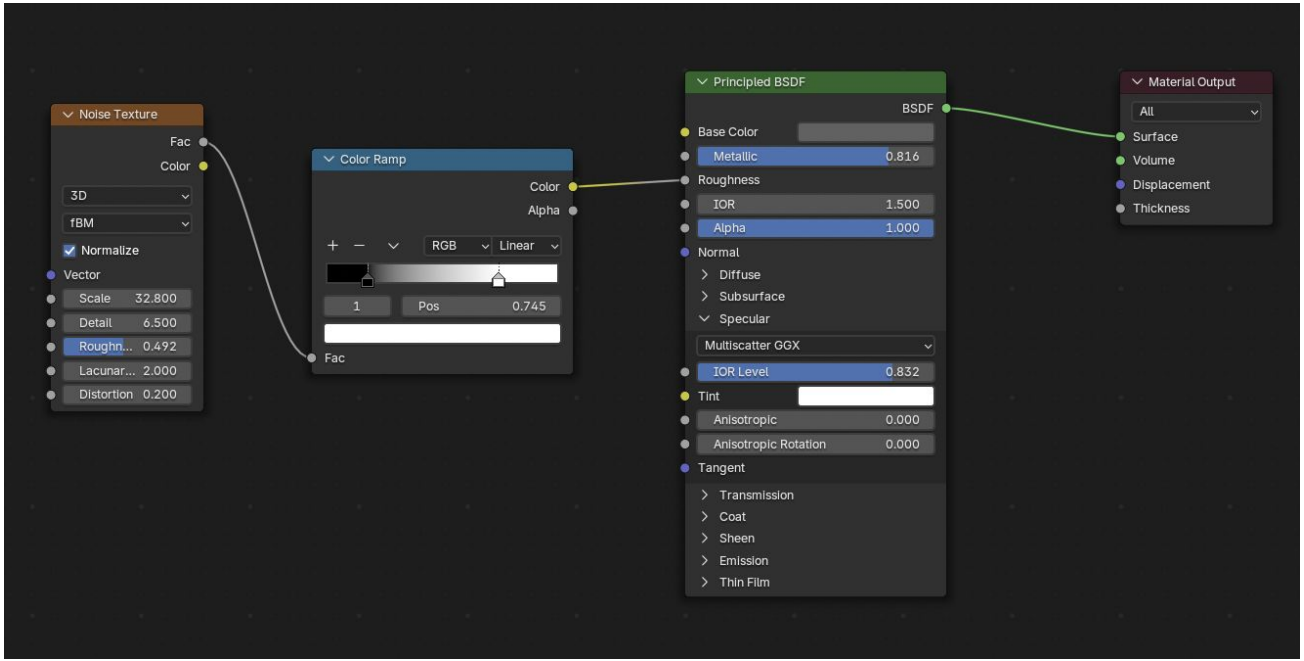
- We used a simple guide and followed it, making toruses and a chain axis for it to follow.
- We used a metal PBR to make the metal look worn down and rugged.

References:

- chains reference



Material: Chains



Object: Floors and Walls

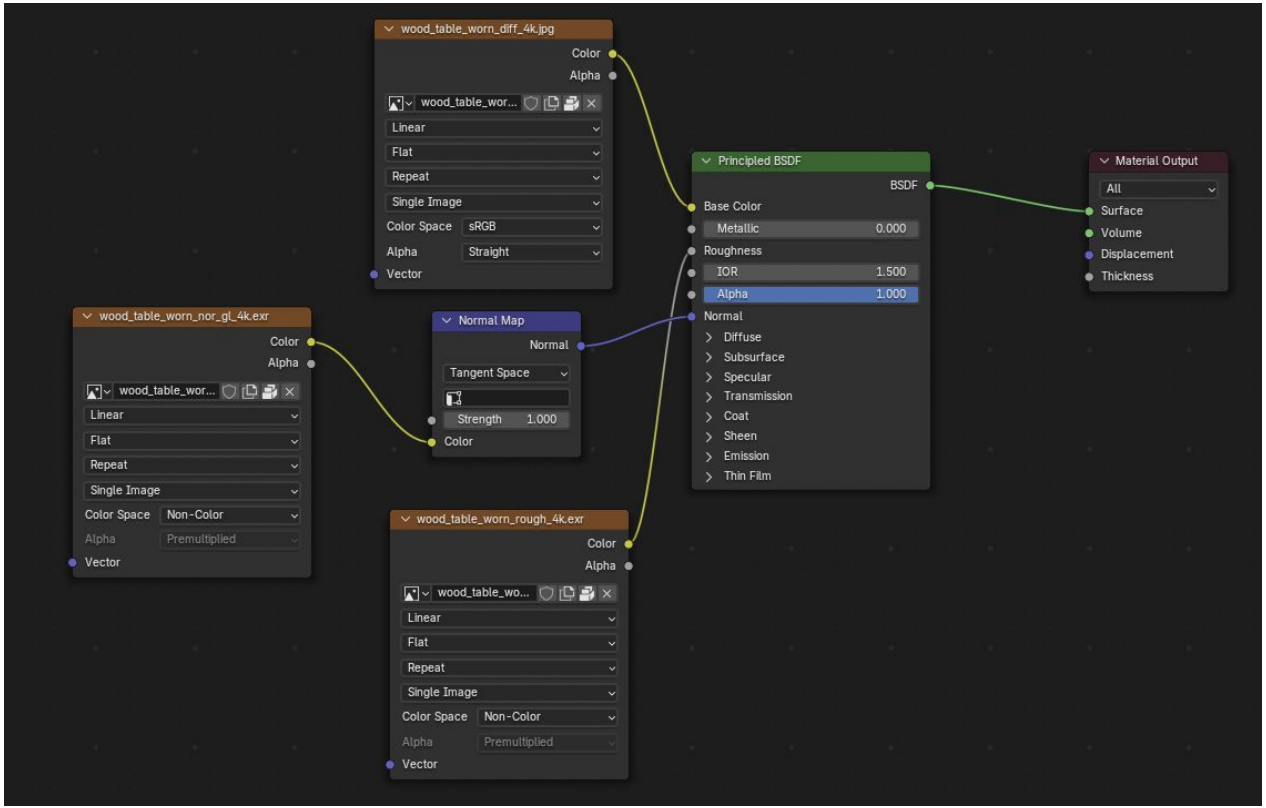
Geometry: Timothy
Material: Timothy
Description:

- The floor is a simple plane with a flat texture laid on top of it
- The walls are beveled rectangular structures laid in line next to each other to create the shadow and panel effect. We used a similar wood texture for it.
- The metal baseboard was a simple rectangle stretched across the floor, and the material was the same material used for the bucket metal.

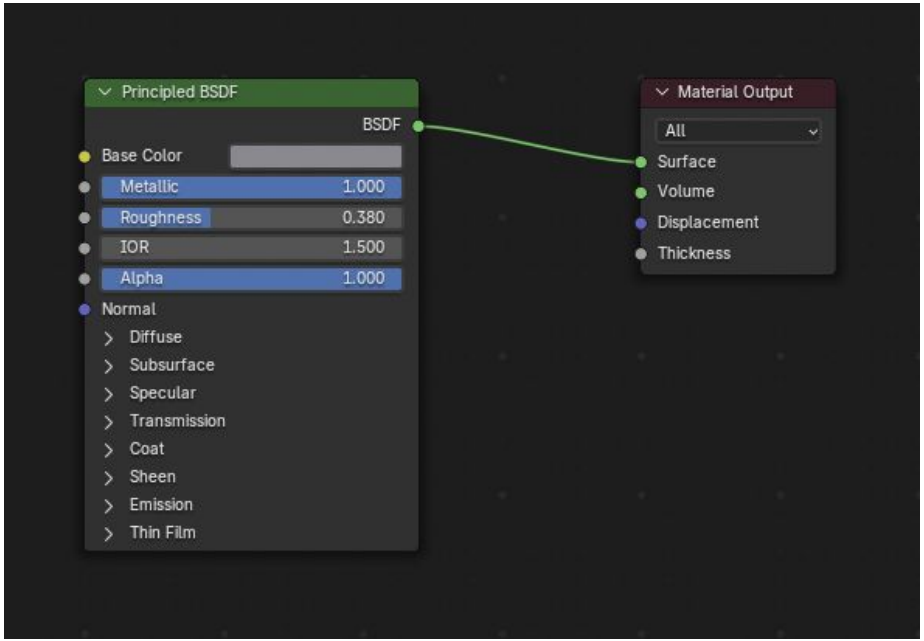
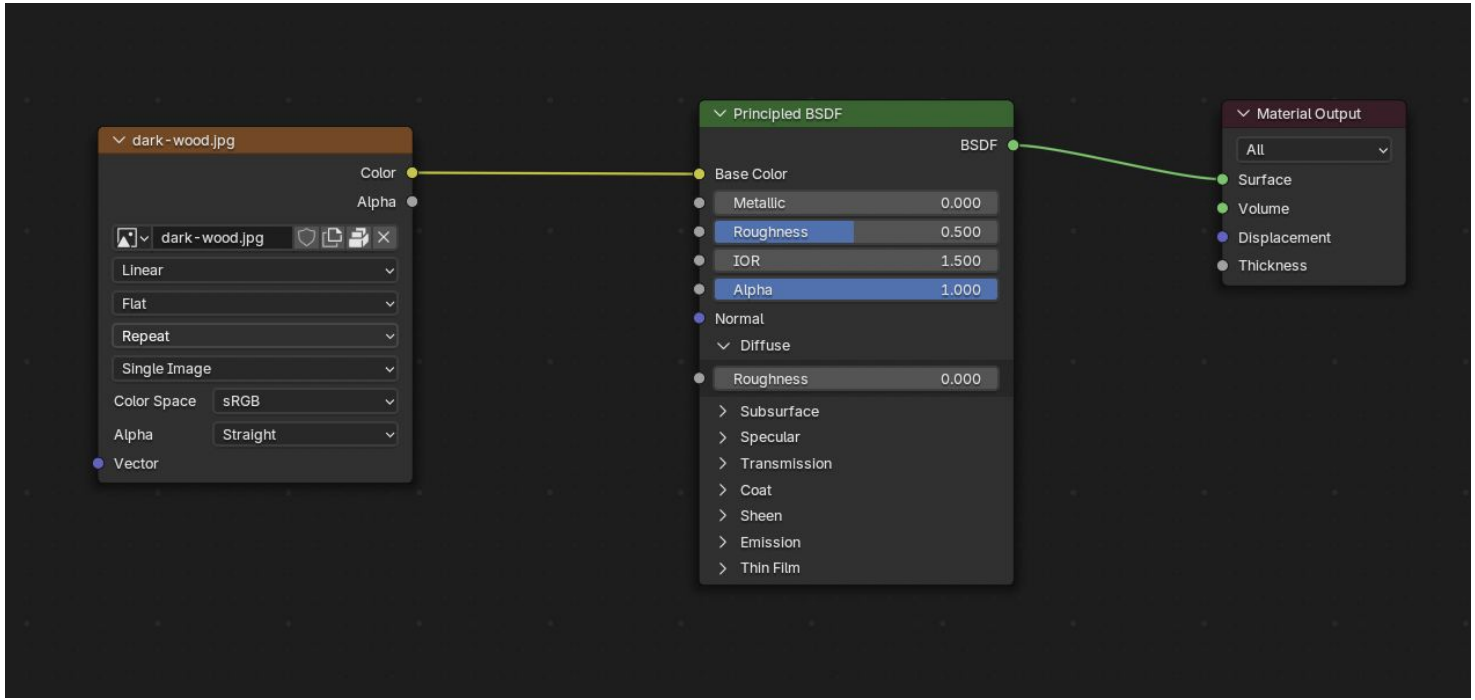
References:

- original reference image

Material: Walls



Material: Metal Baseboard



Material: Floor