

# Materials in Game Dev

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Electronic Armory

# What We'll Cover

- Materials in Blender
  - UV mapping and unwrapping
  - Adding materials to meshes
  - Materials slots
  - Light Maps and their UV slots
- Exporting Meshes and Materials
- Creating materials in Unreal Engine
- Problems with materials in UE4

# Verts, Edges, Faces, Polygons, N-Gons



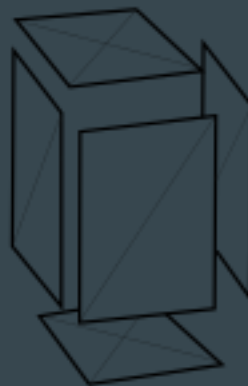
vertices



edges



faces



polygons



surfaces



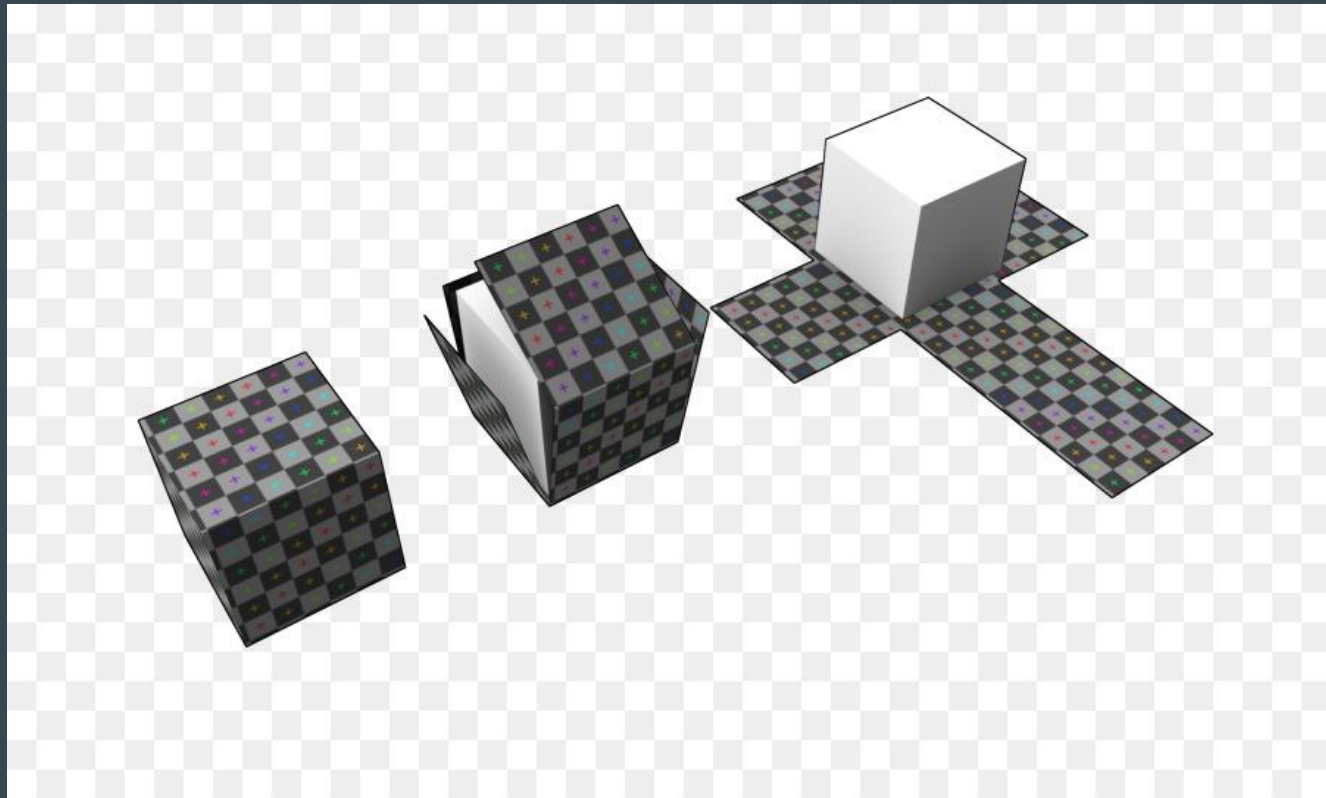
# Problems with N-Gons

<https://www.youtube.com/watch?v=BjnCV2PIkKA>

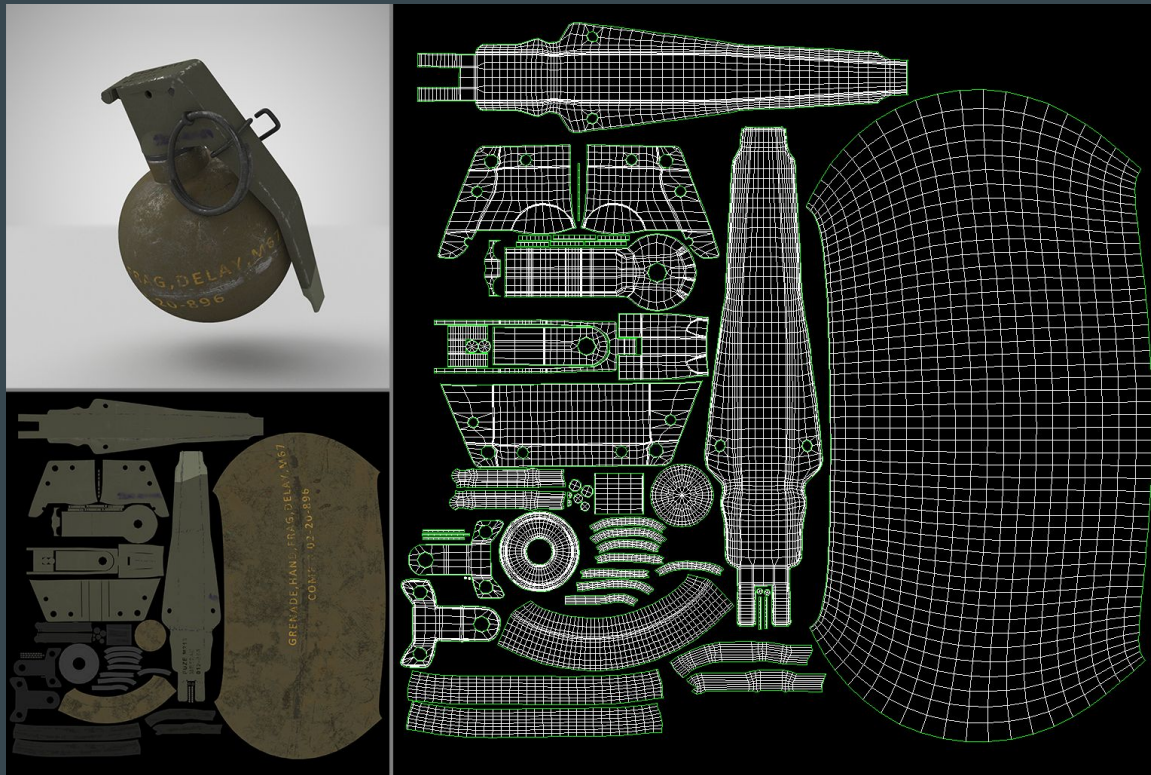
TLDR:

- Triangulation is undefined and haphazard
- Deformation causes issues
- Subdividing causes issues
- If your model is static, you may not have issues

# UV Mapping



# UV Example





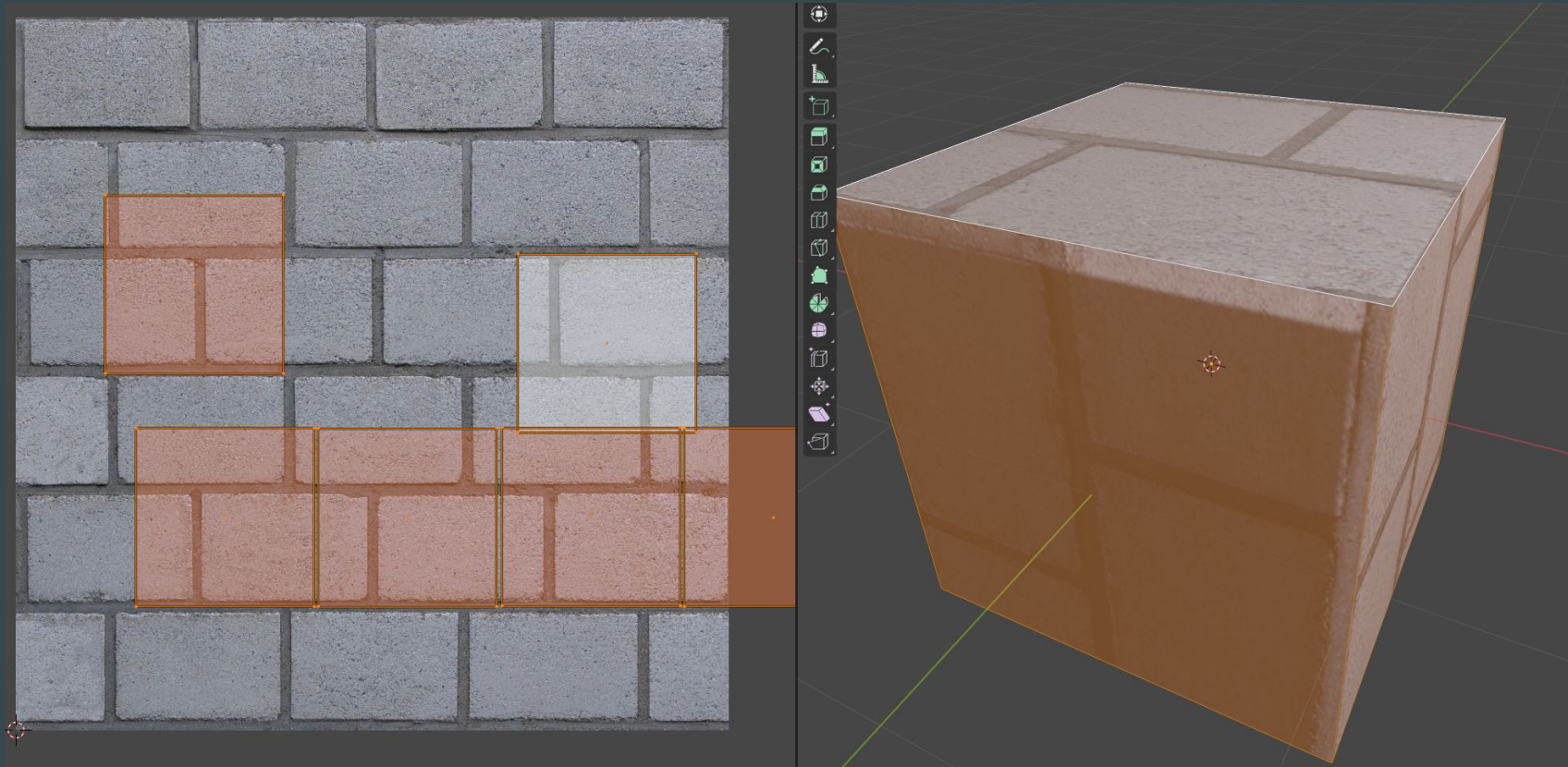
# UV Unwrapping Demo



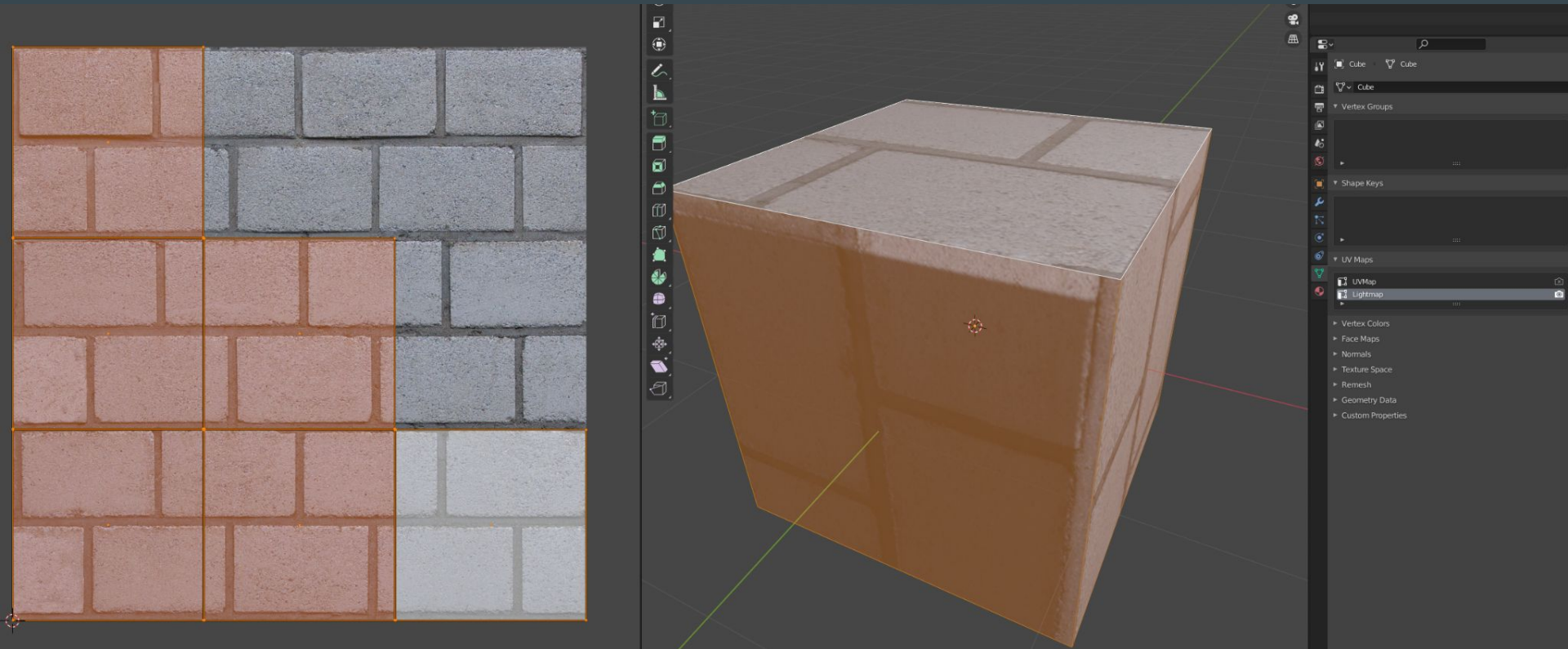
# Basic Steps to Unwrapping in Blender

1. Edit Mode
2. Mark Seams (Ctrl-E -> Mark Seam)
3. Select mesh and press U to unwrap.
4. Choose the unwrap type.
  - a. “Unwrap” will perform a basic unwrap based on your seams
  - b. “Smart UV Project” will attempt to unwrap based on what it thinks would be good.
  - c. Align UV islands
  - d. Use V key to rip apart attached UVs or mark that as a seam and redo the unwrap
5. Add a UV slot for Light Maps

# Align UV Islands



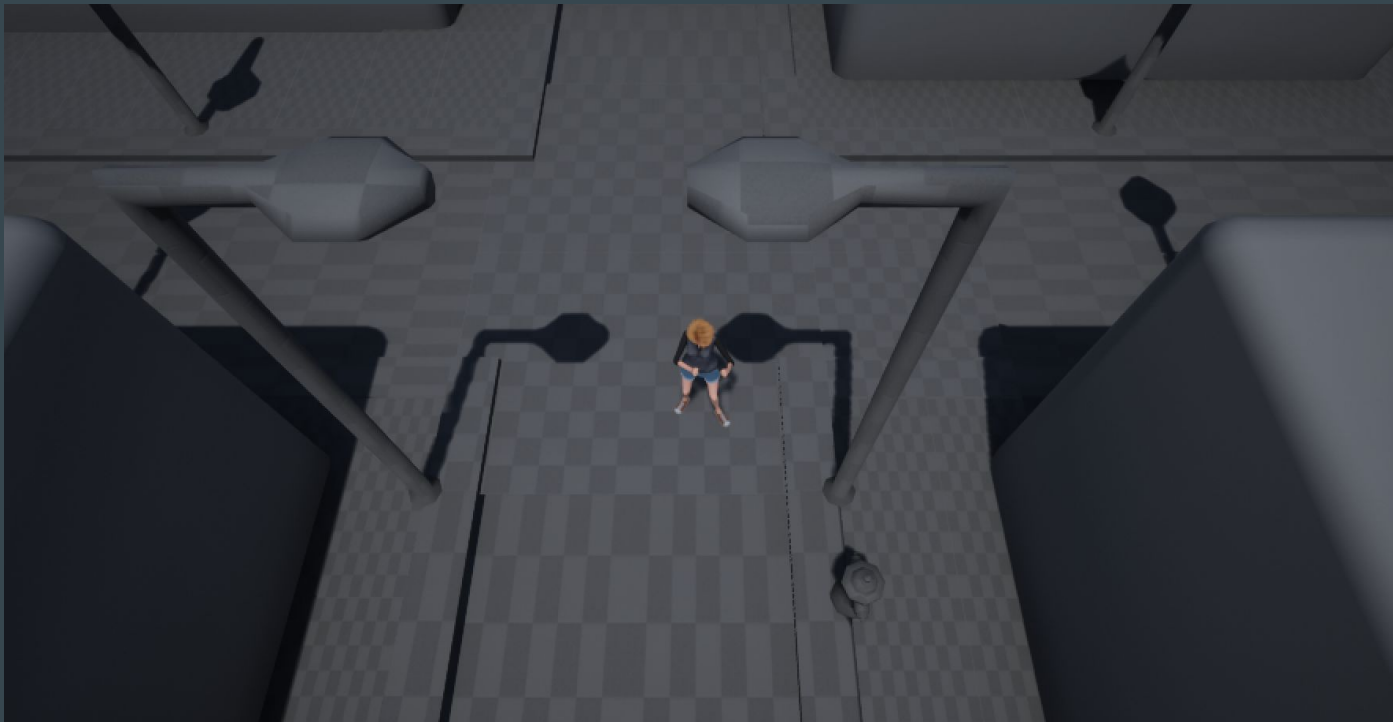
# Add a new UV Map Slot for the light map



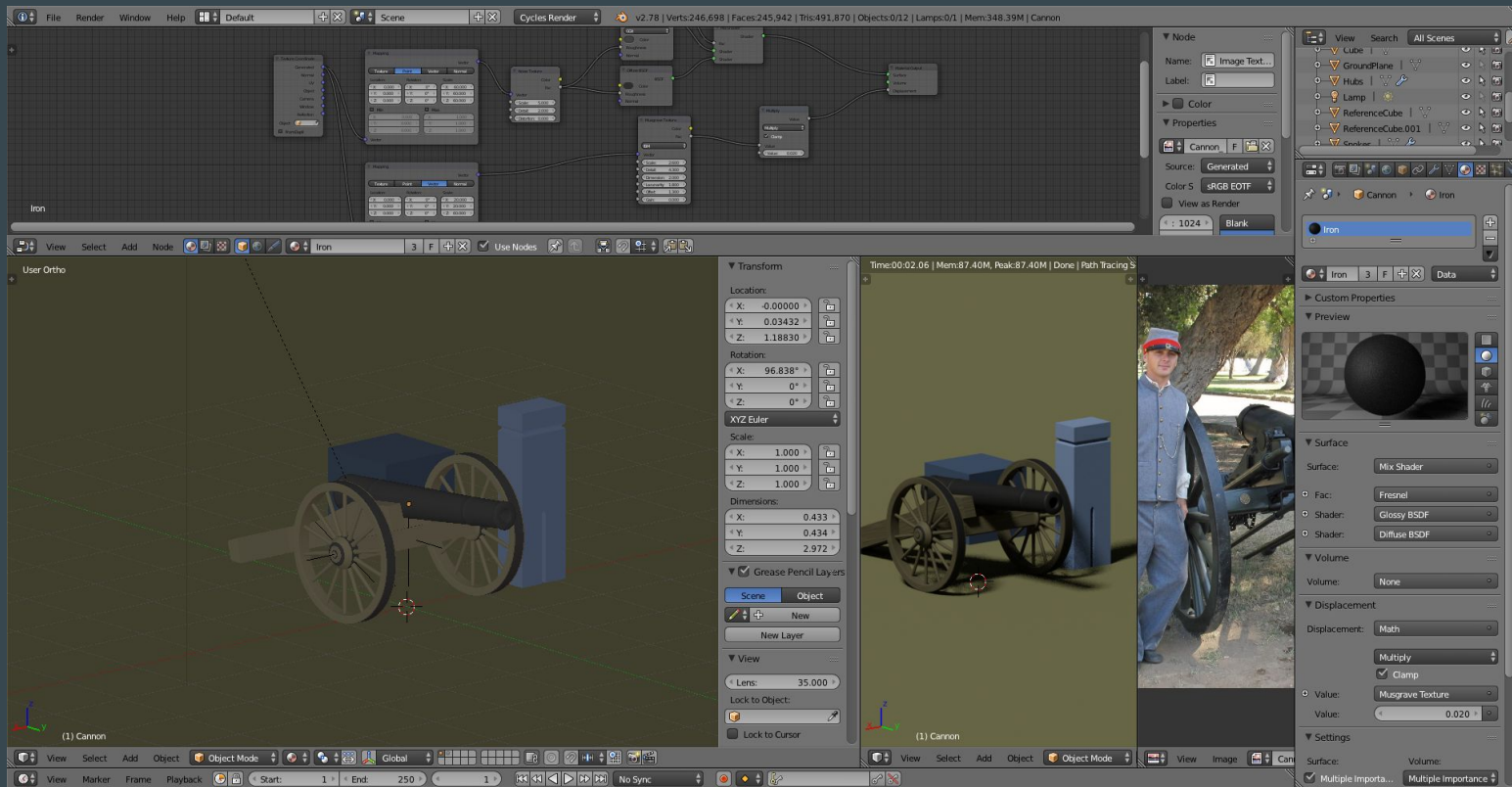
# Creating your own textures

1. Select the UV Shading tab
2. After unwrapping, select all UVs:
  - a. Select UV -> Average Island Scale
  - b. Select UV -> Pack Islands
3. UV menu -> Export UV Layout
4. Edit the image in Photoshop or similar tool

# UV Stretching

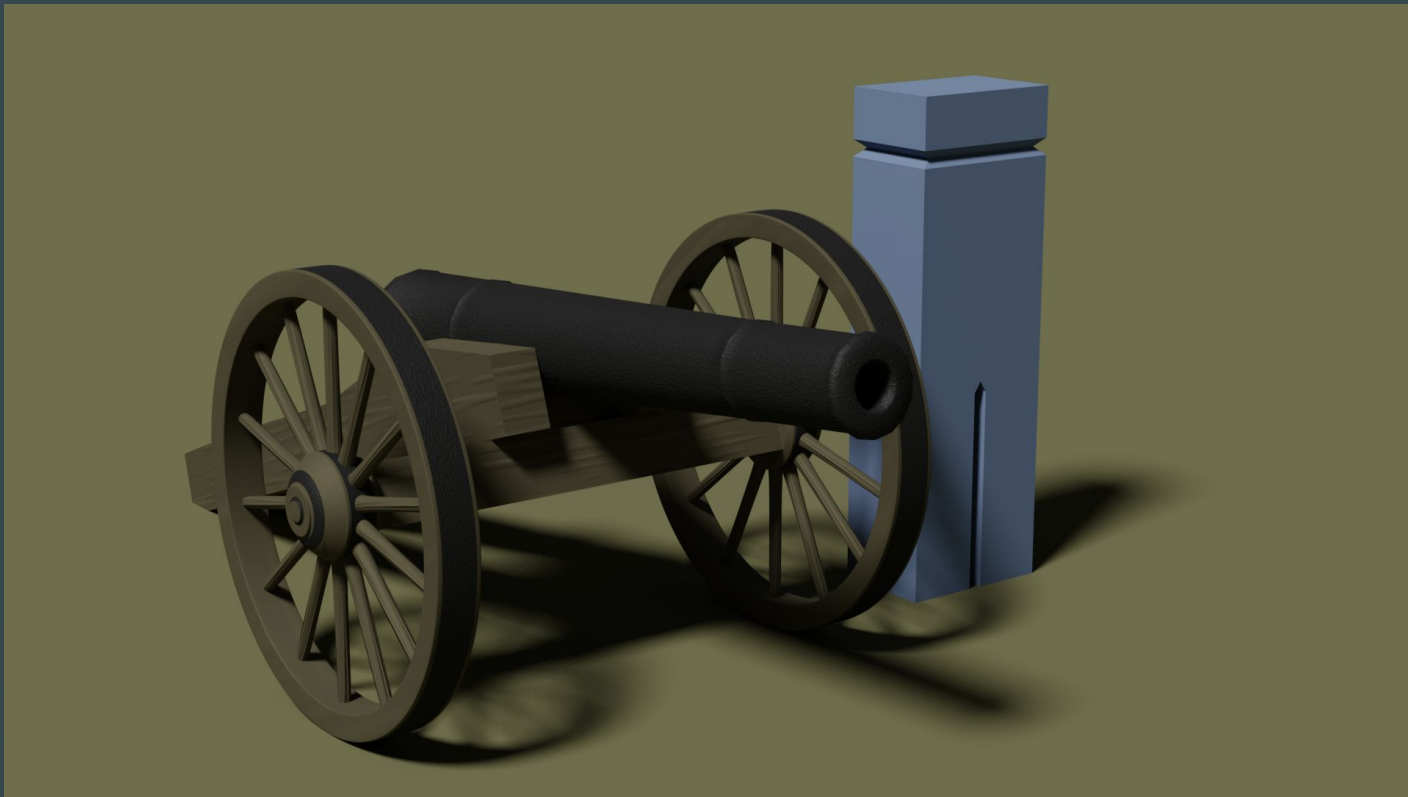


# Need Reference Images

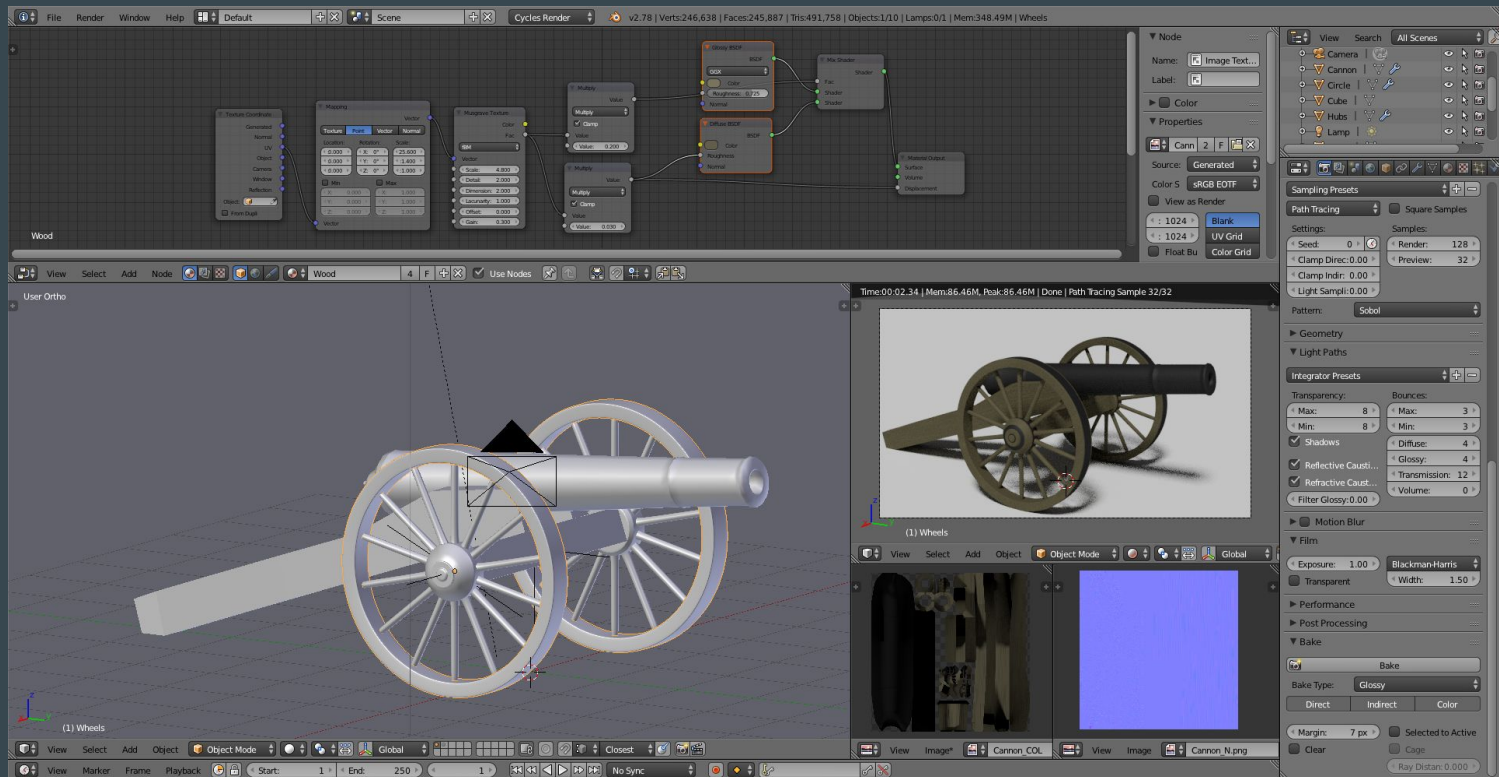




# Mesh Scale

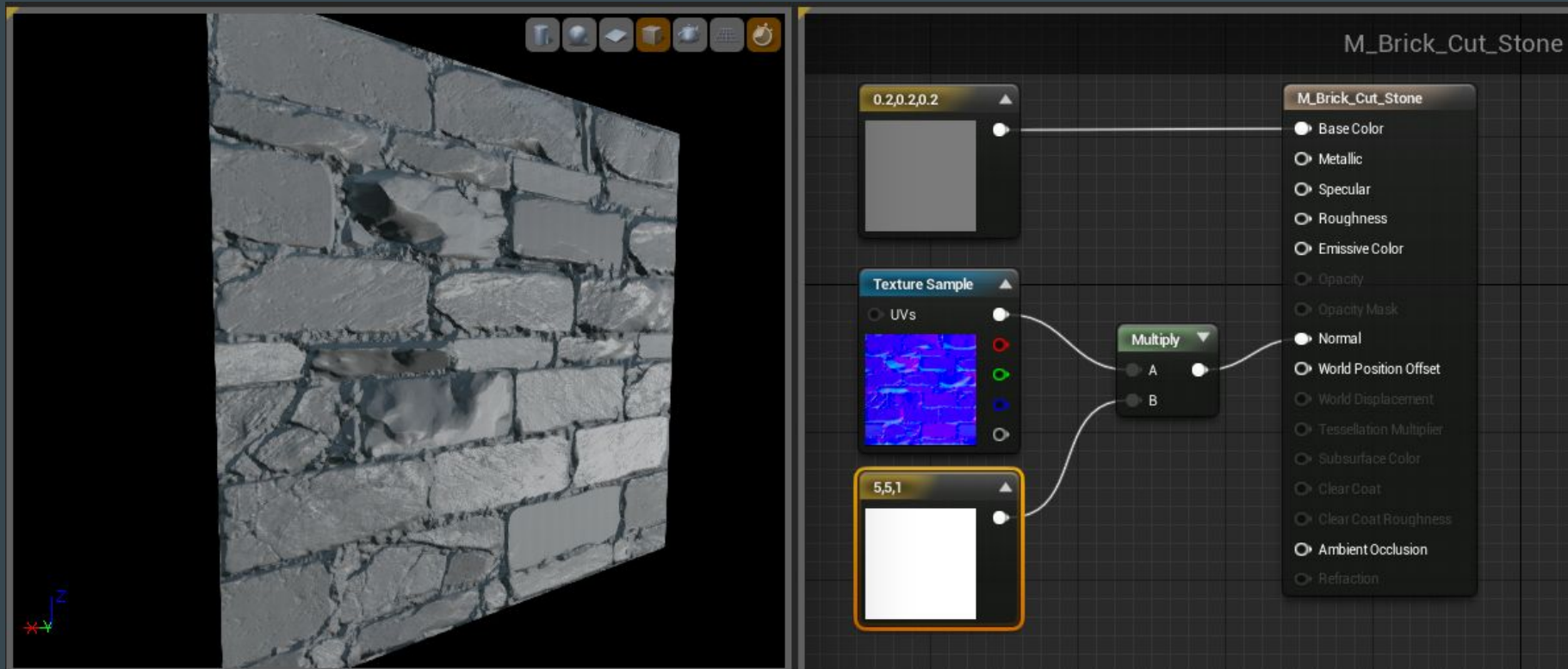


# Baking Your Own in Blender

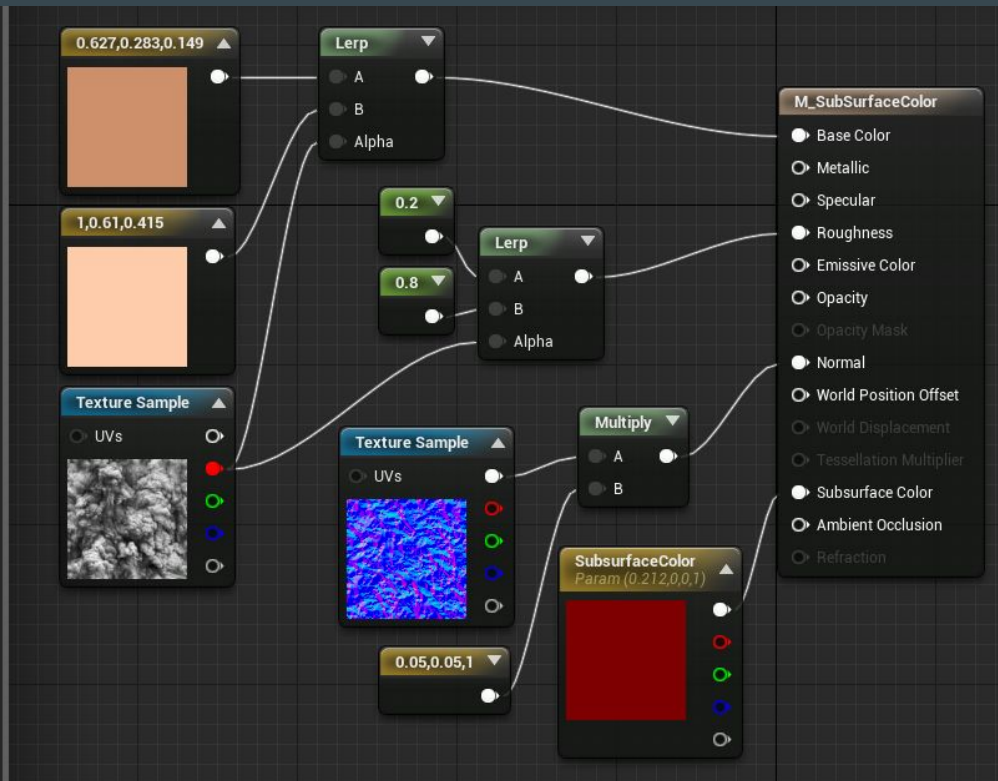




# Normal Map



# Materials



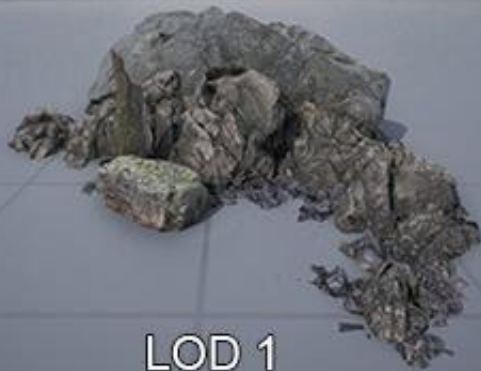
# Level of Detail



# LOD



Base LOD  
7 Draw Calls



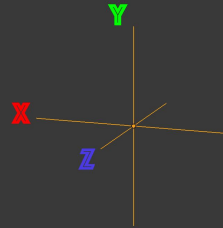
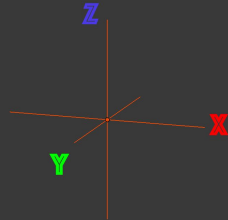
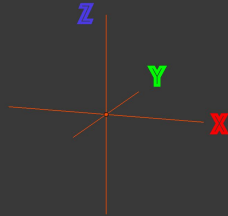
LOD 1  
7 Draw Calls



HLOD  
1 Draw Call

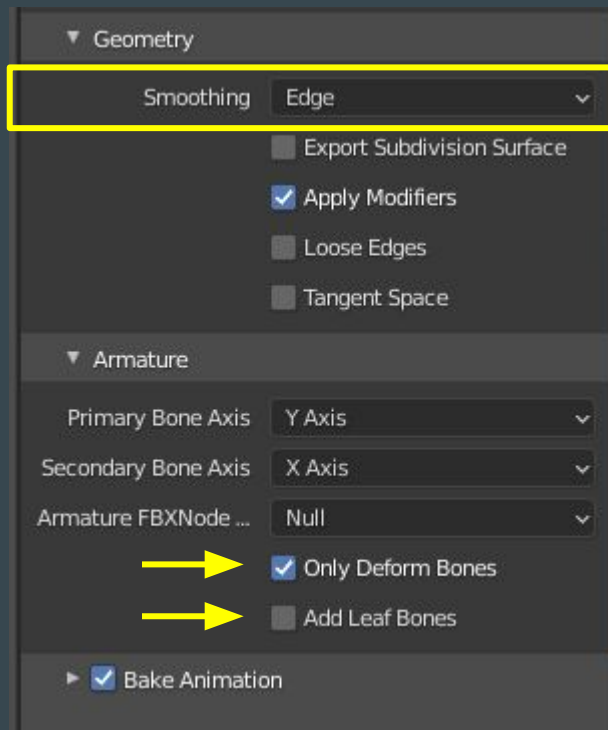
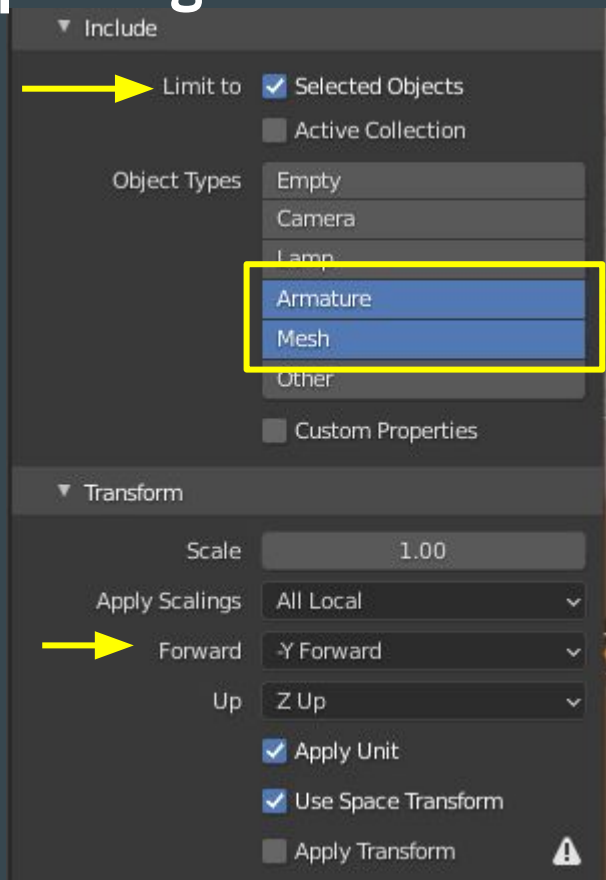
# Exporting from Blender to UE4

## 3D AND GAME ENGINE AXISES

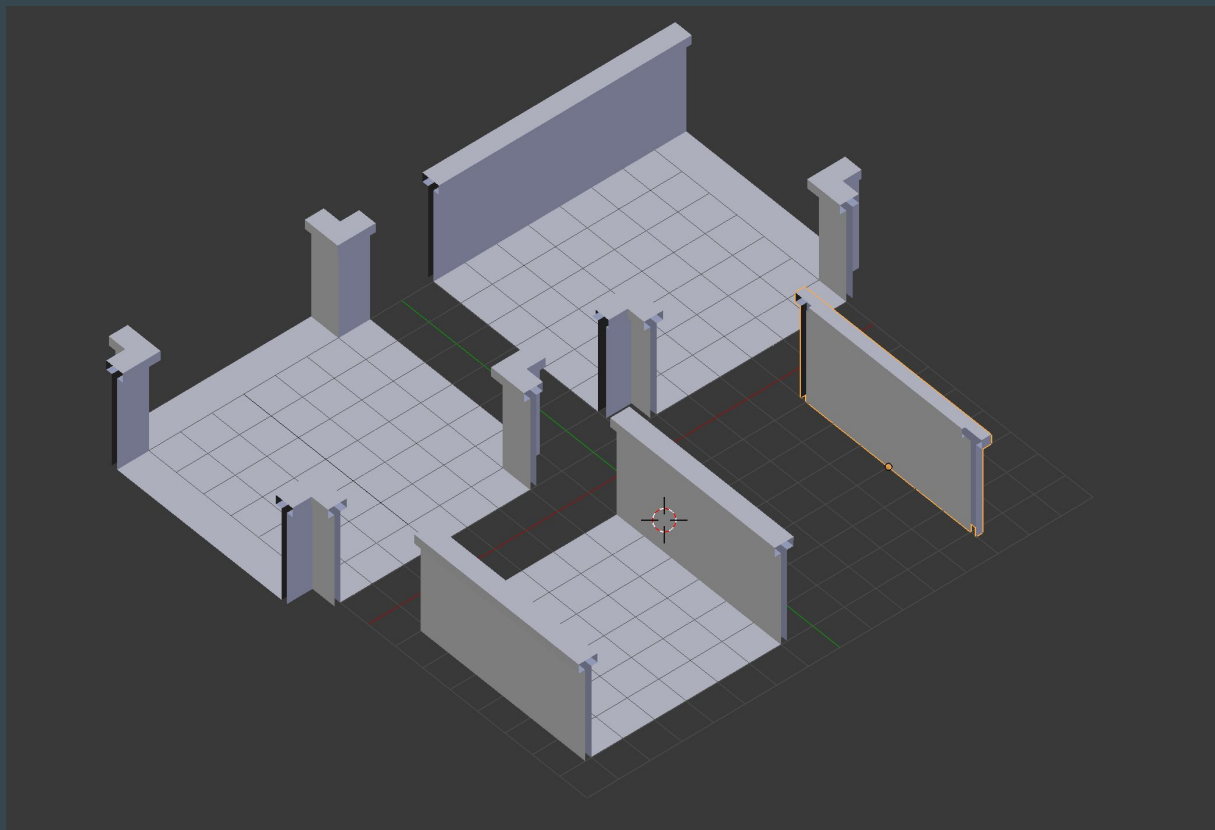


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# Exporting from Blender to UE4



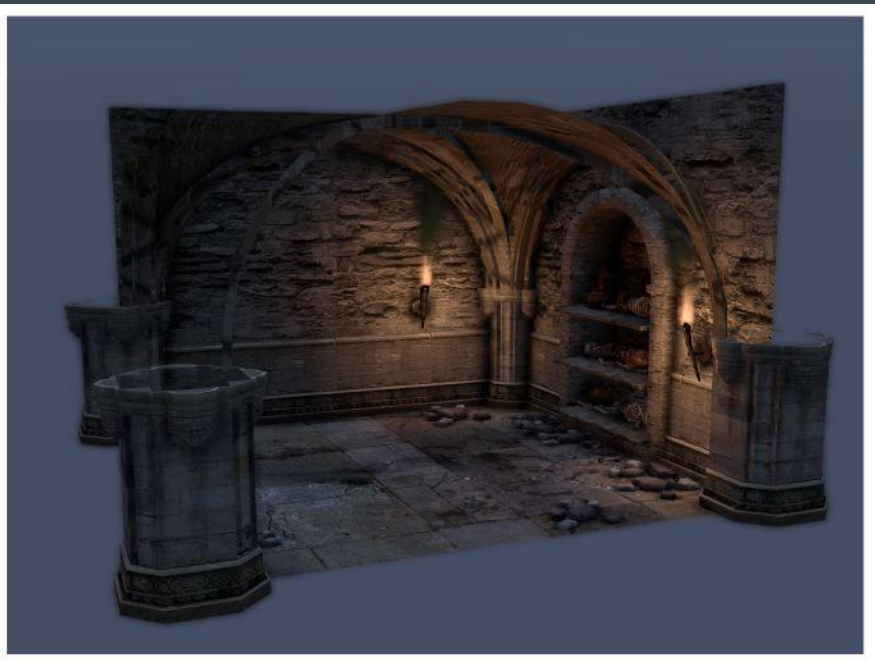
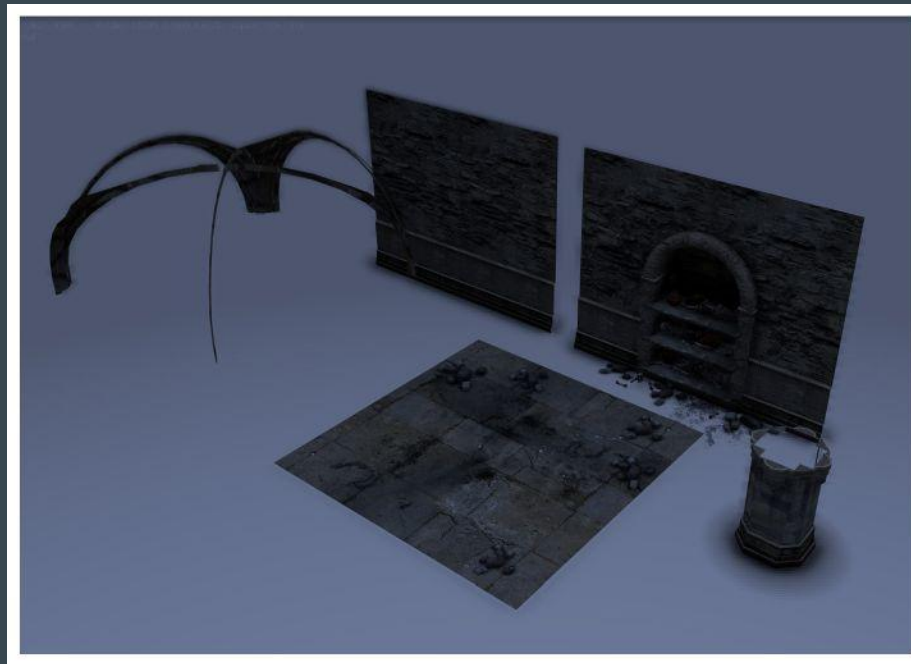
# Modular Level Design



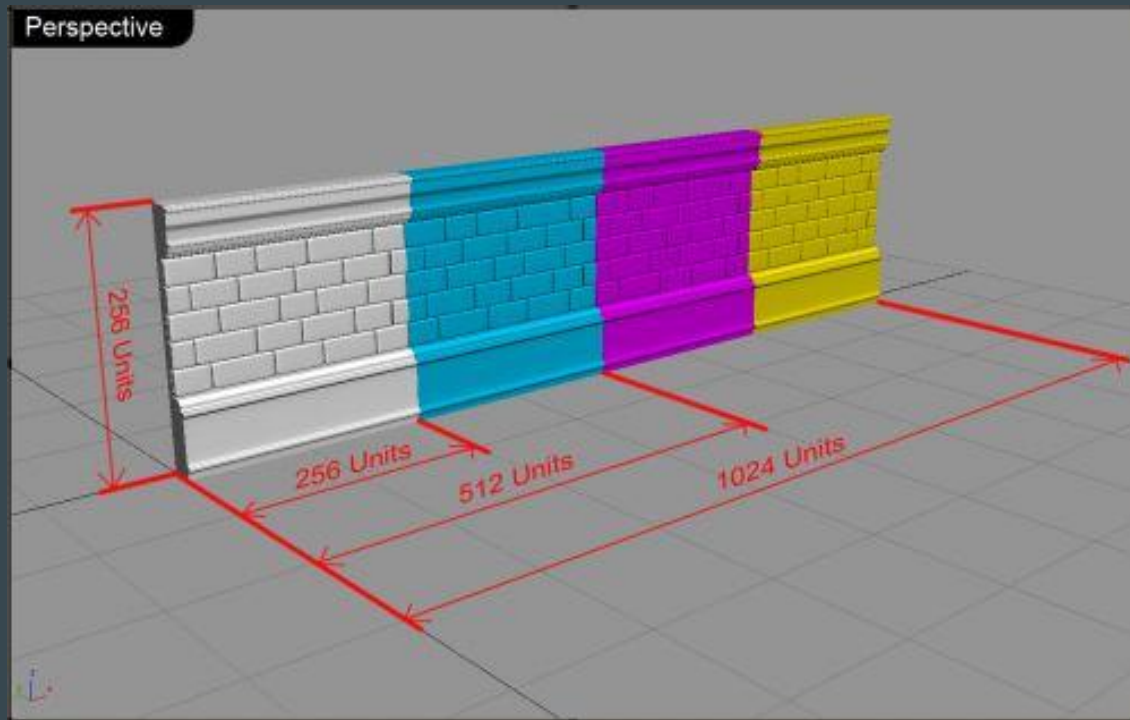








# Modular Construction



$2^x$  = Grid size

$2^0$  = 1 Unit

$2^1$  = 2 Units

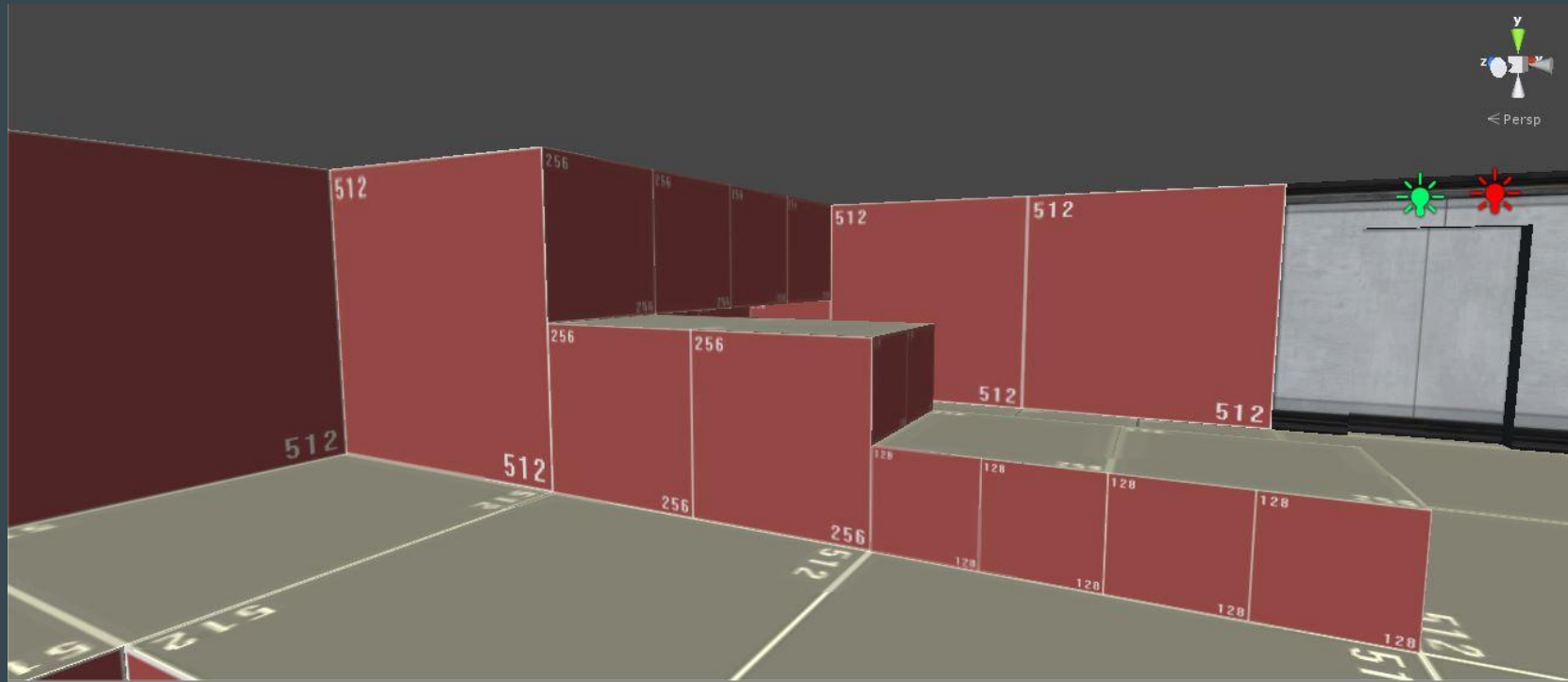
$2^2$  = 4 Units

$2^3$  = 8 Units

$2^8$  = 256 Units

$2^{10}$  = 1024 Units

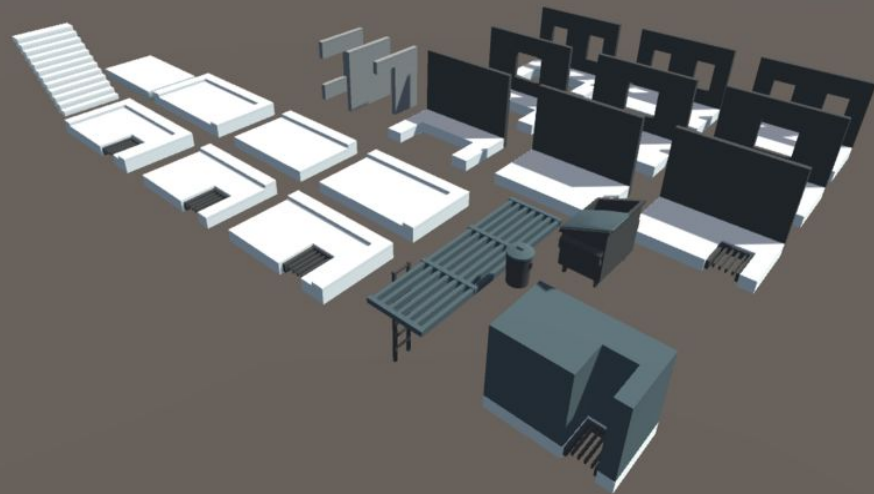
# Prototyping



# Epic Games Modular Level Set



# Complex Levels from a few pieces

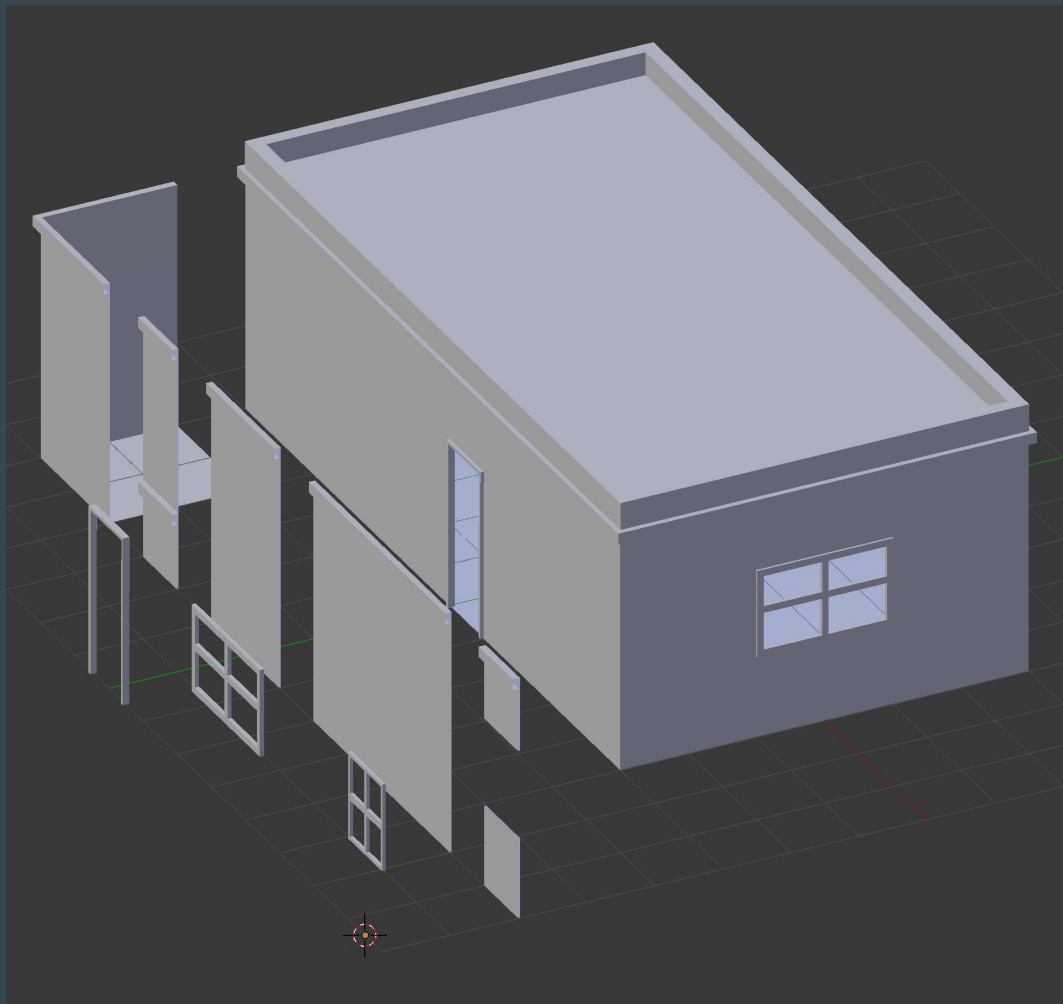


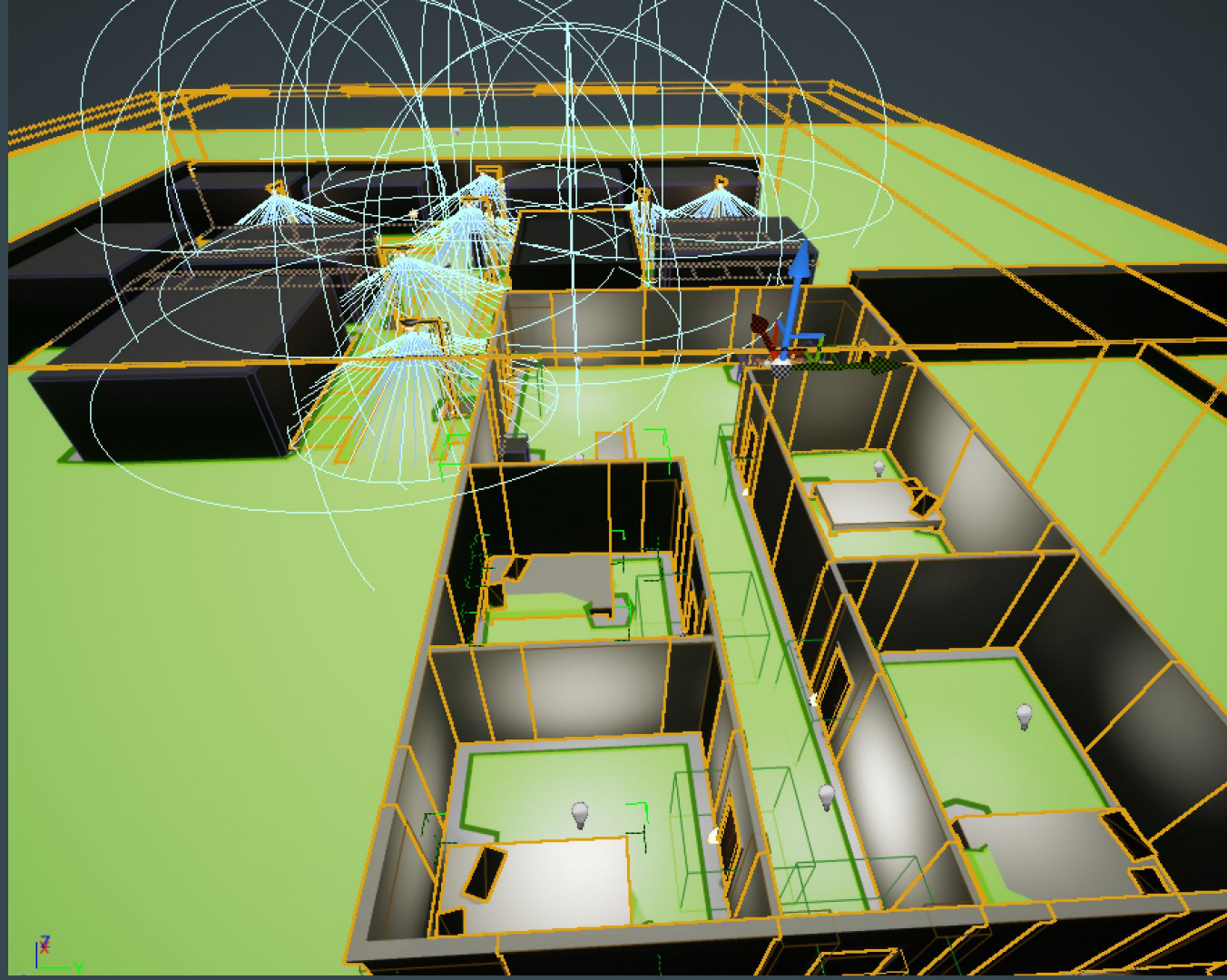
# Kit Bashing



***Retro Modular Sci-fi Environment Kitbash***







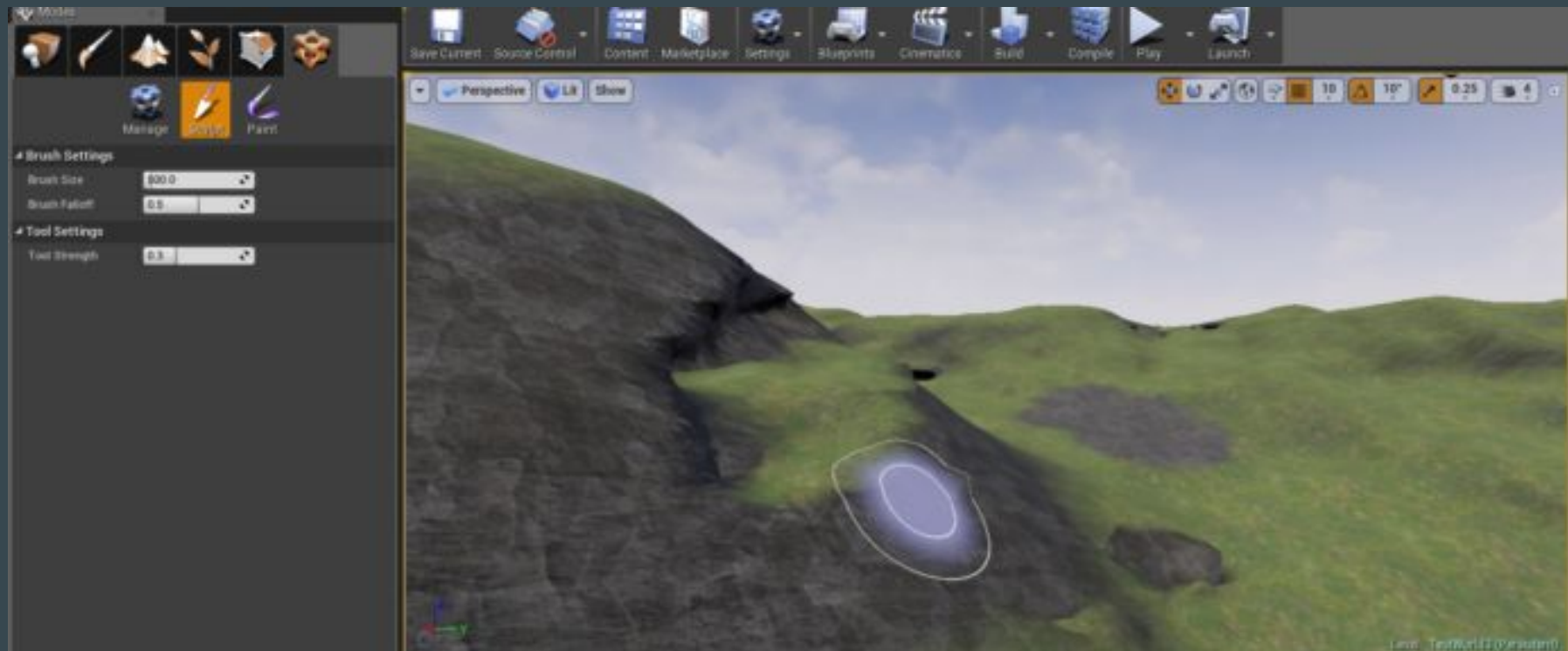


# Procedurally Generated Levels



*Daggerfall (1996)*

# Terrain Editor



# Terrain

