

# Applied Pixel Art

*Maksim Surkov*

# Motivation (why pixel art?)

- Does not take much resources to produce
- Yet a distinctive and cool visual style
- Resulting products are lightweight and have low system requirements
- Allows you to concentrate on more important things than graphics

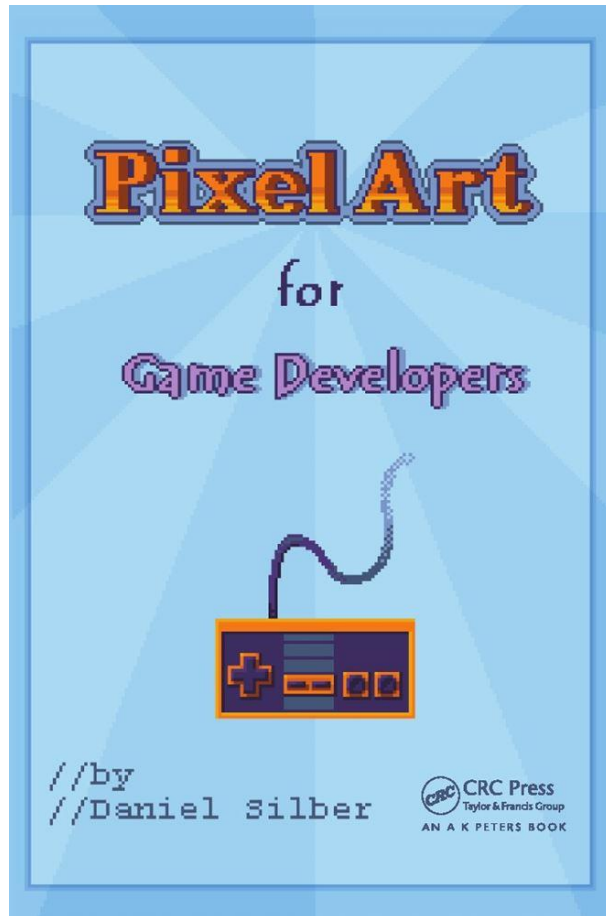
# Some clarification

- I can start making pixel art right away and it will be good.
- >With some art experience maybe
- Pixel art is just downscaled clipart.
- >No, it's a distinctive art style

# Quick intro to tools

- **Aseprite** – pixel art editor with simple interface and extensive functionality
- **Unreal Engine 4** – game engine, has built-in plugin (Paper2D) to work with tilesets and other stuff  
(we won't get in details into it)
- **MagicaVoxel** – free tool for voxel art creation
- **Some additional useful stuff** (Adobe Color, Gimp)

# Basics

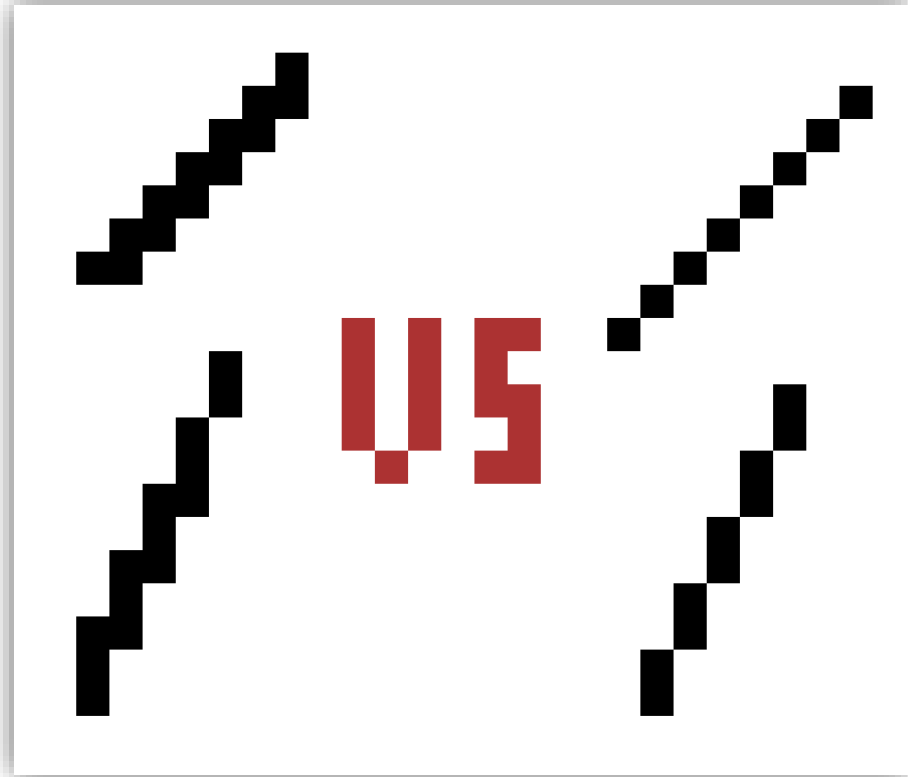


**Recommended reading**

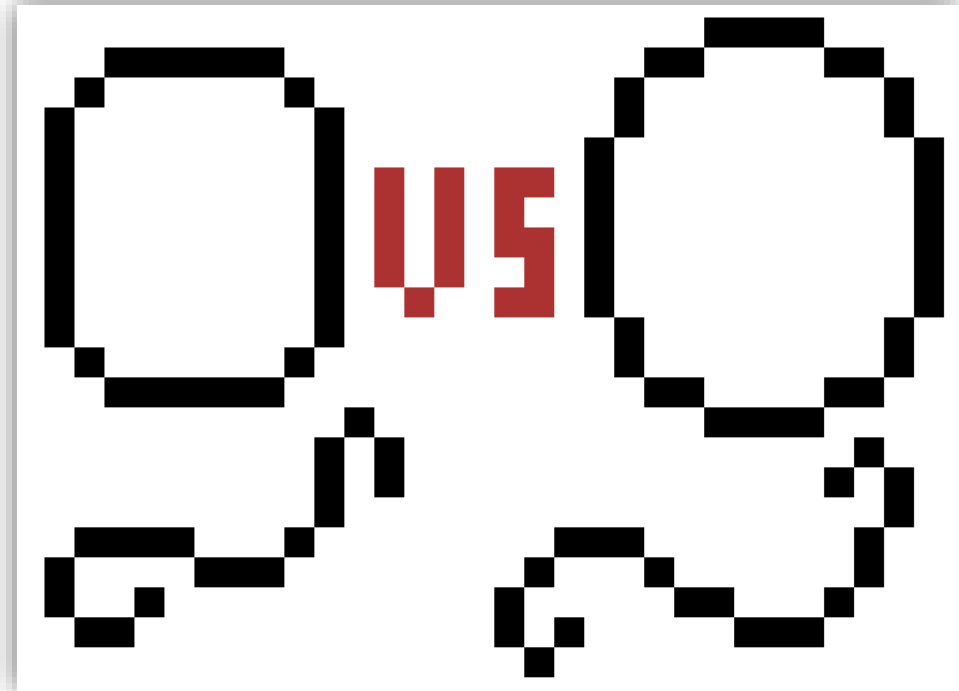
**We'll just cover few  
topics from this book**

# Don't be afraid of gaps

Lines (pixel-perfect)

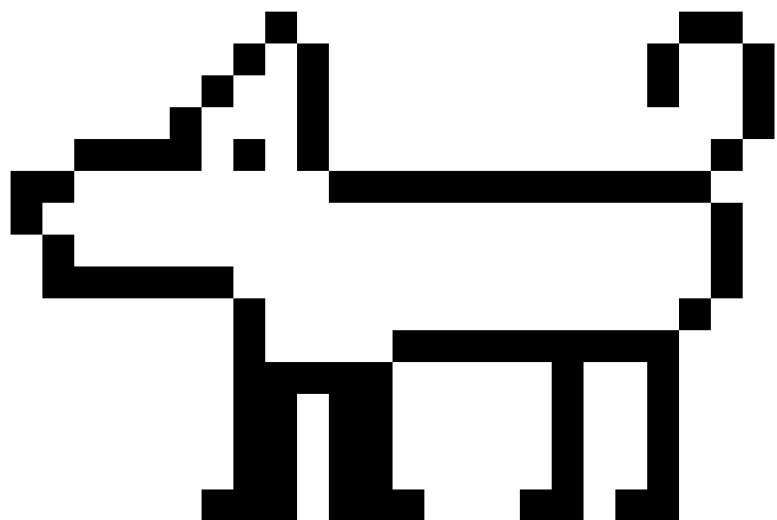


Shapes

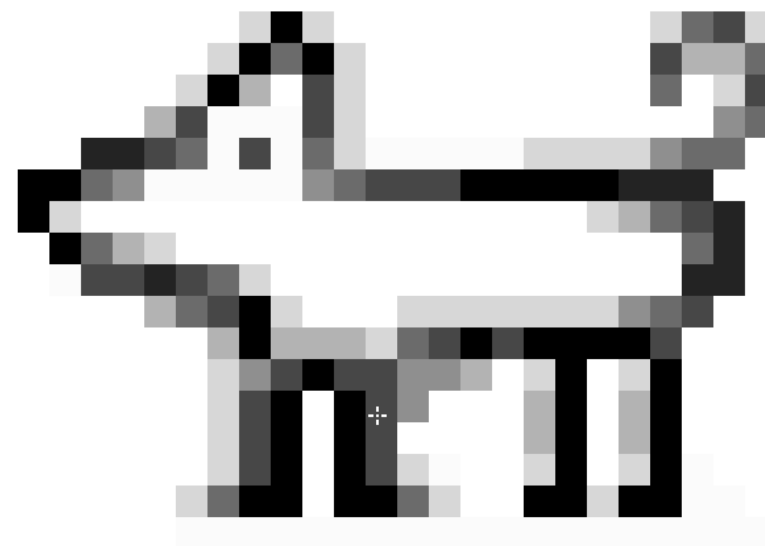


# Anti-aliasing

Before



After



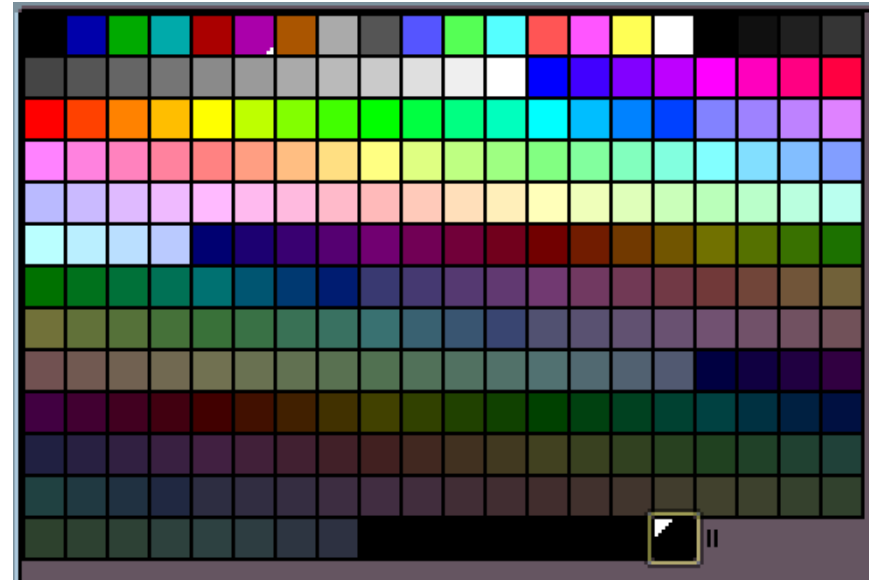
# Palettes

$n$ -bit palette gives you  $2^n$  colors

PICO-8



Example of 4-bit



Example of 8-bit  
(VGA 13h)



# Palettes

Draw a boot example

Color Ramp (Gradient)



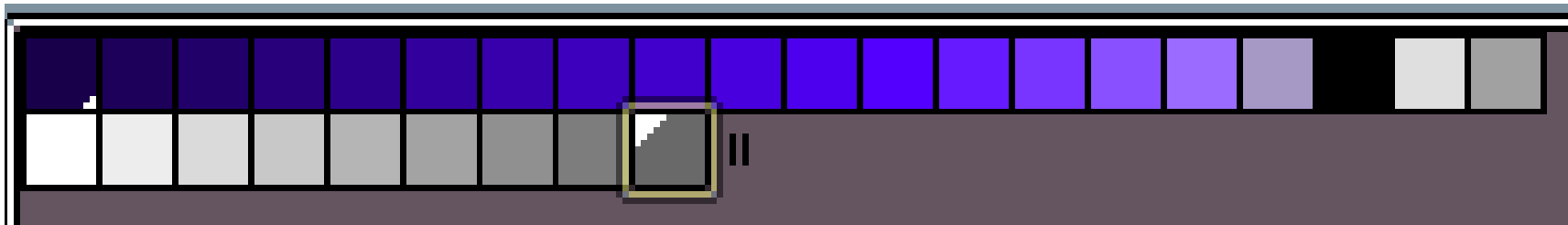
# Palettes

**Adobe Color can help you with palette selection  
for various objects**

<https://color.adobe.com/ru/explore/>

# Palettes

Night sky example

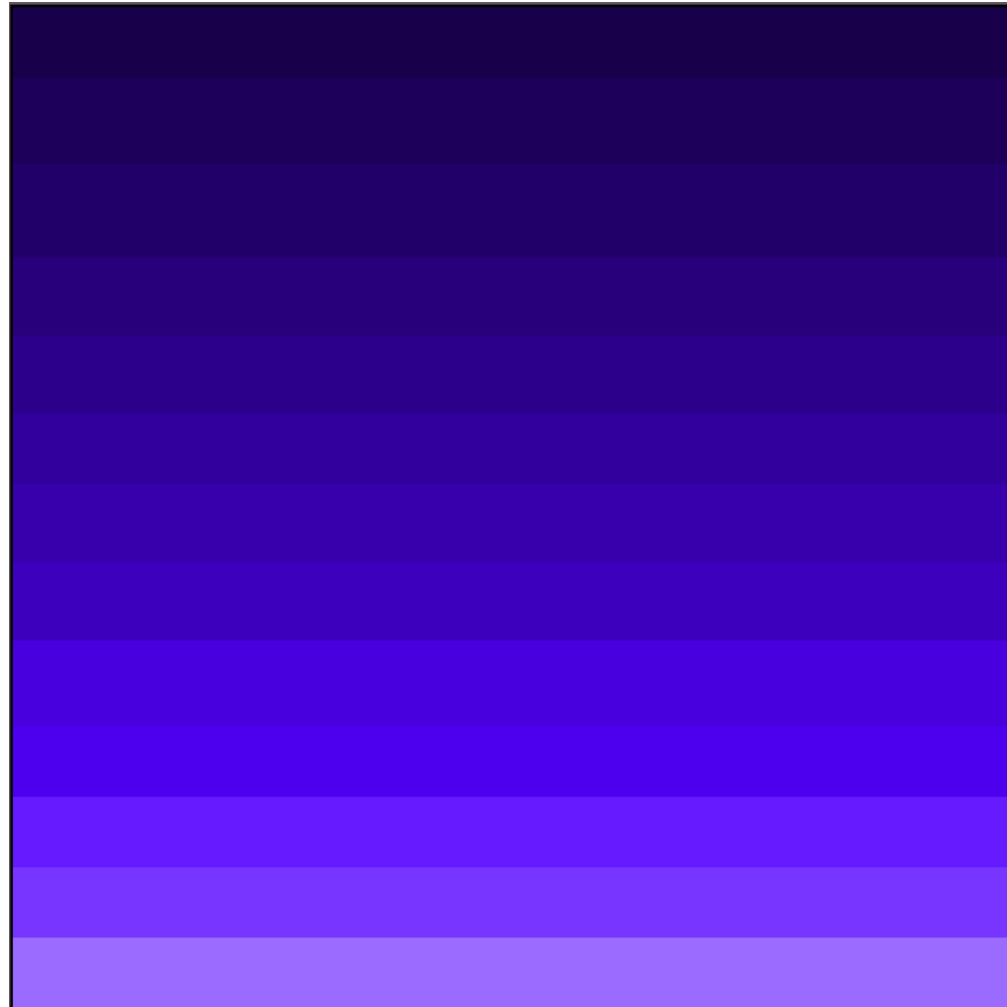


# Palettes

## Night sky example



128x128



# Palettes

## Night sky example



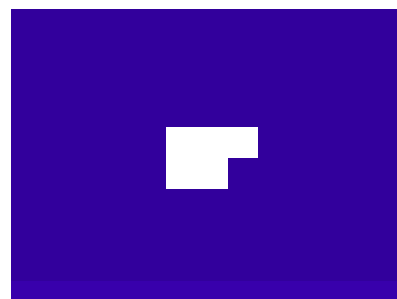
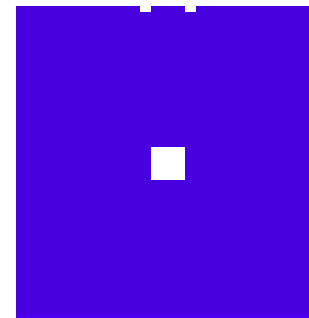
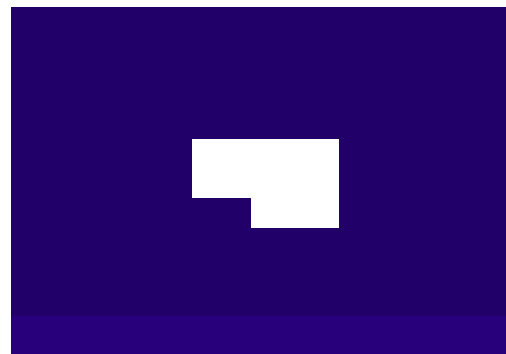
# Palettes

## Night sky example



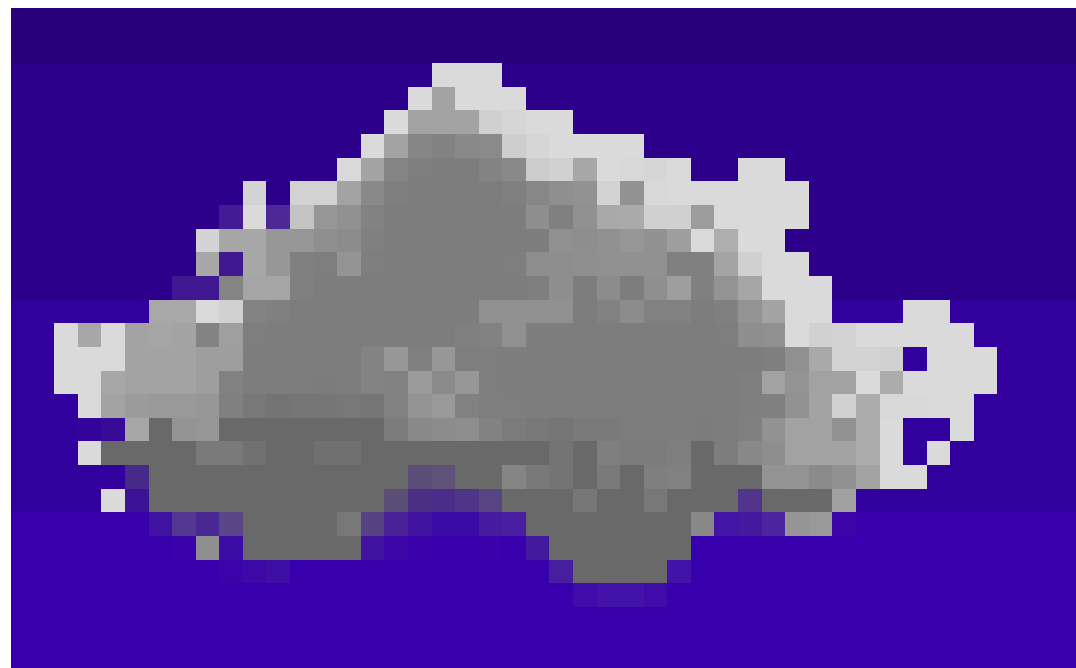
# Palettes

Night sky example



# Palettes

Night sky example



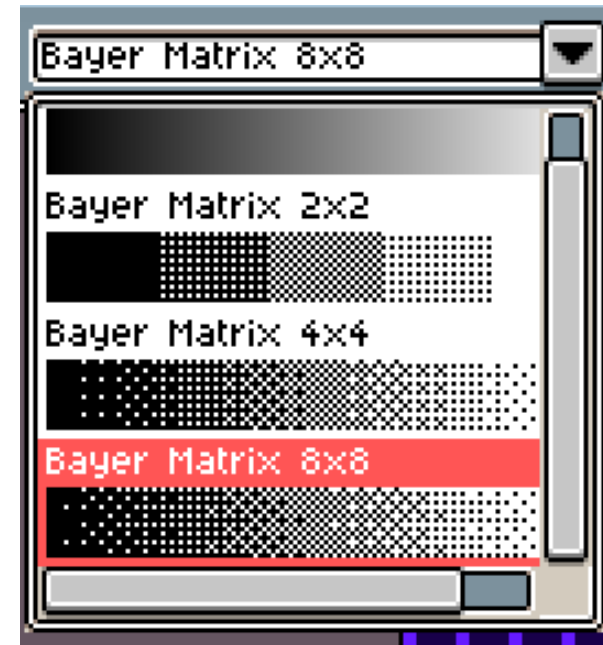
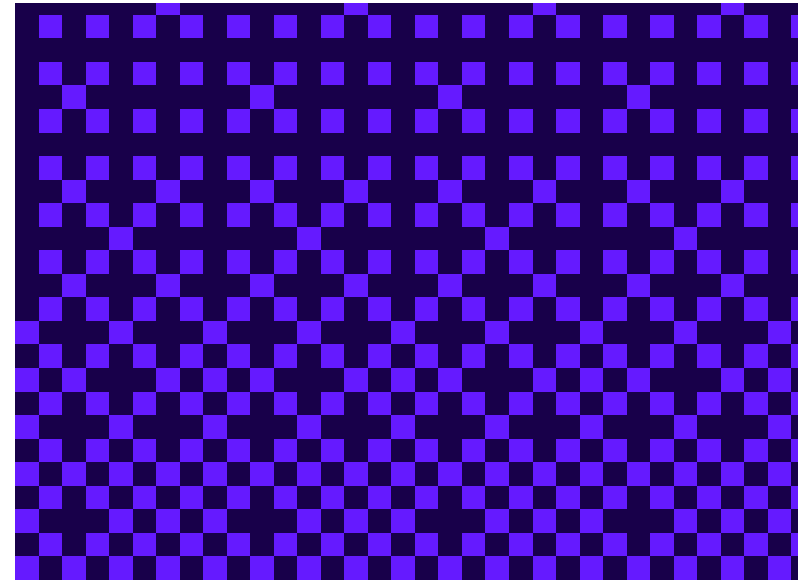
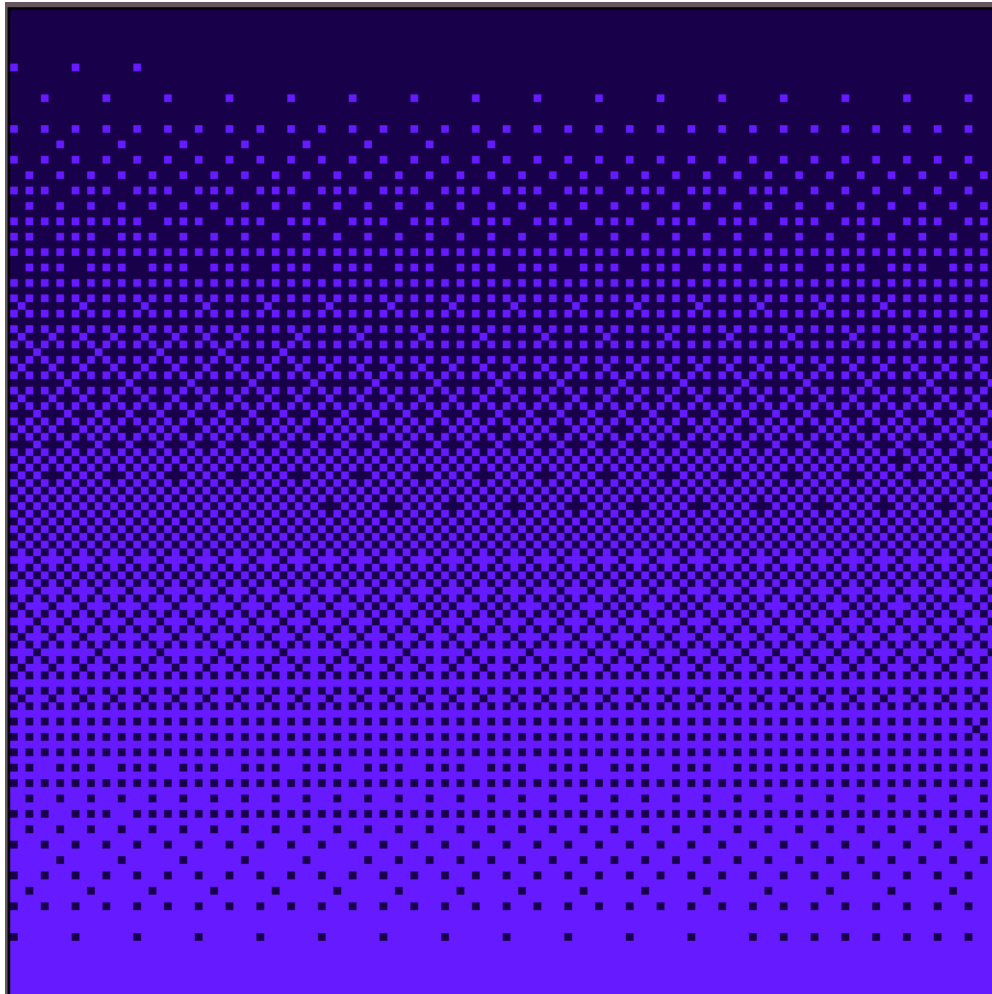


# Palettes

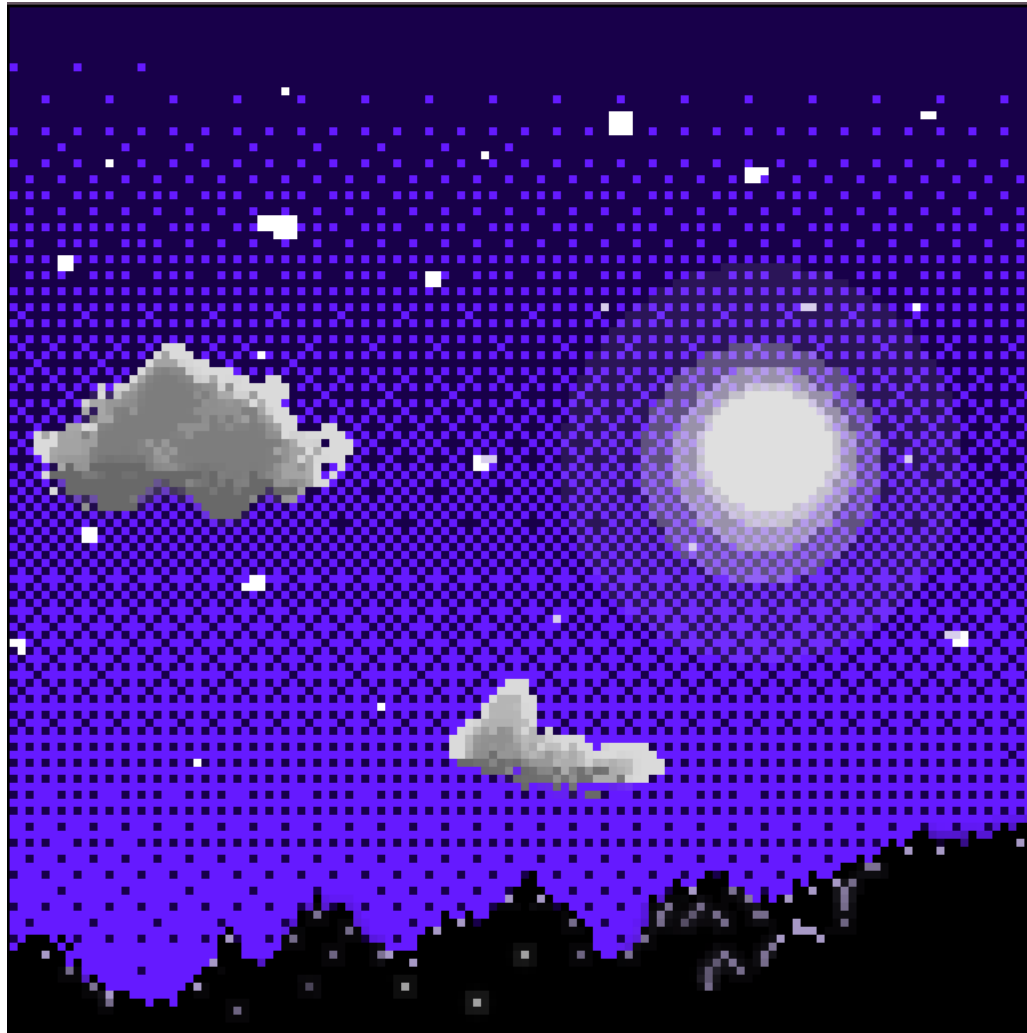
## Night sky example



# Dithering



# Dithering



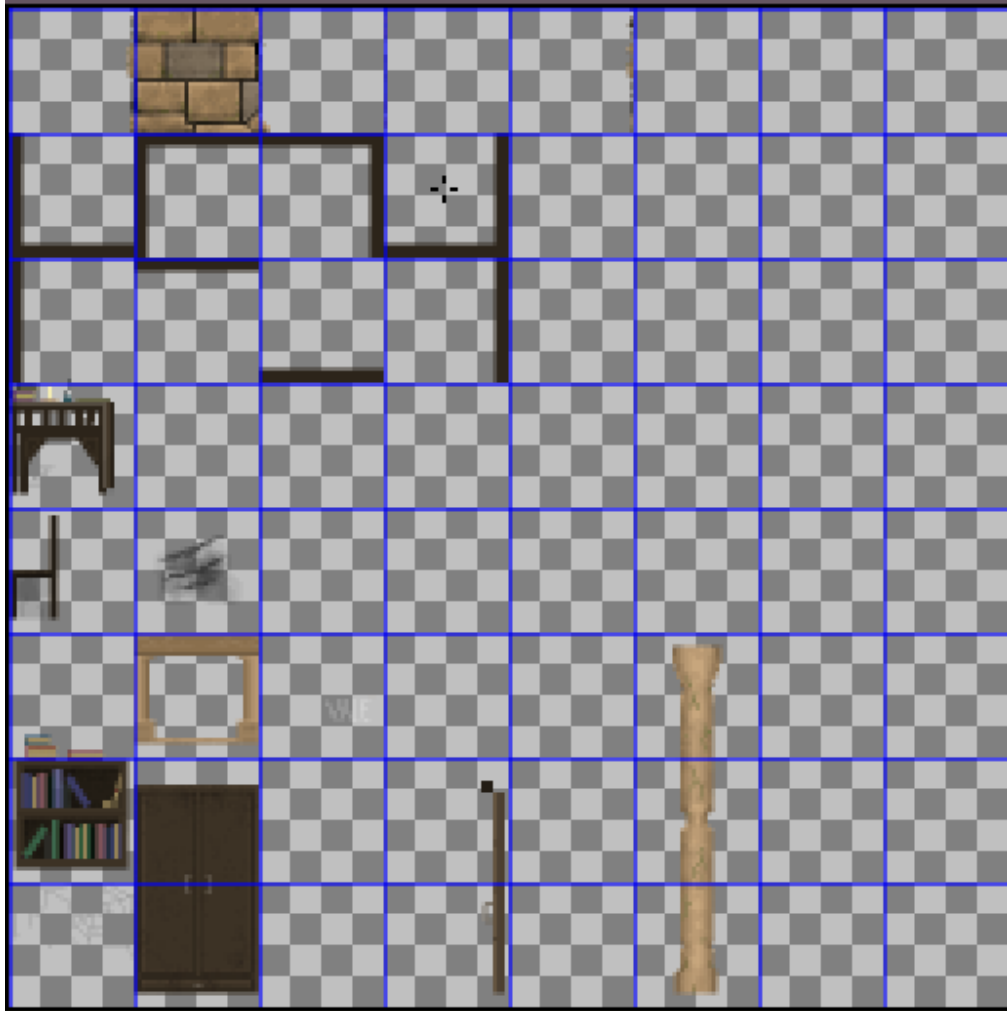
# Tileset



**Scene initially created as a whole piece**

# Tileset

A collection of assets broken up into a uniform grid.



64x64 tiles

This tileset is not complete btw.

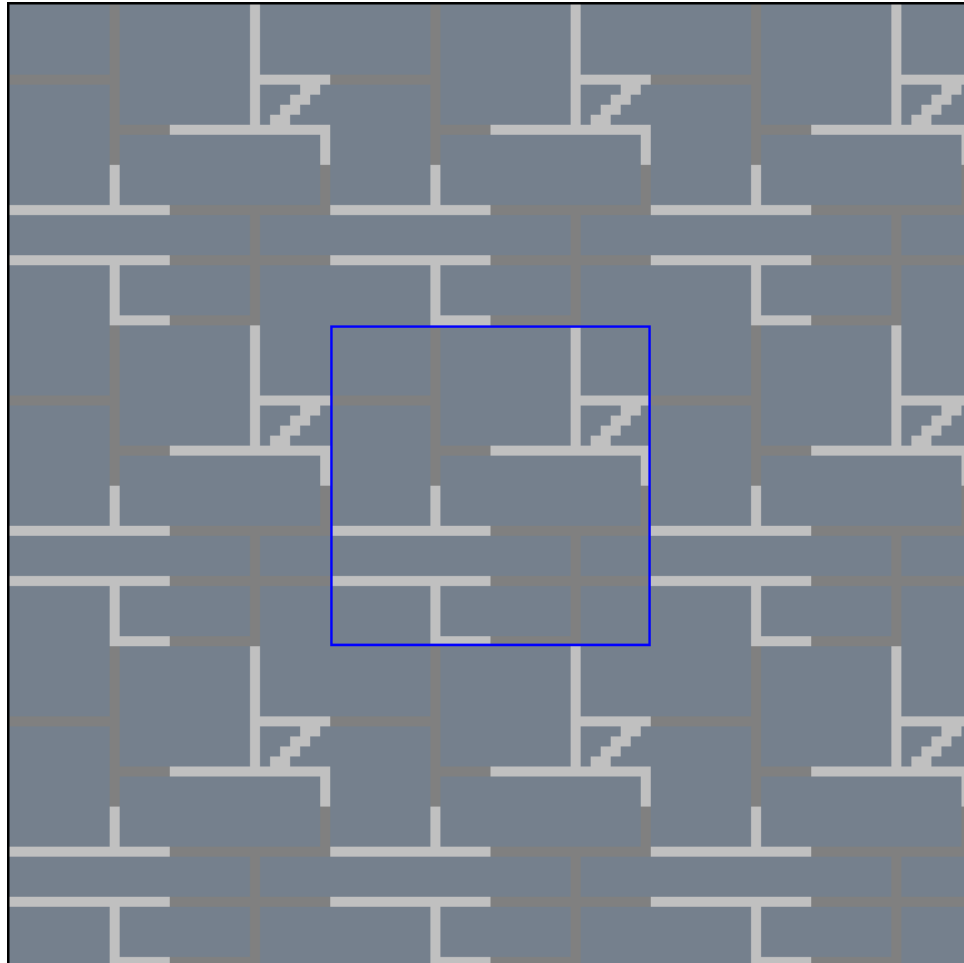
# Tilemap



**Initial scene converted into tilemap**

# Seamless tile

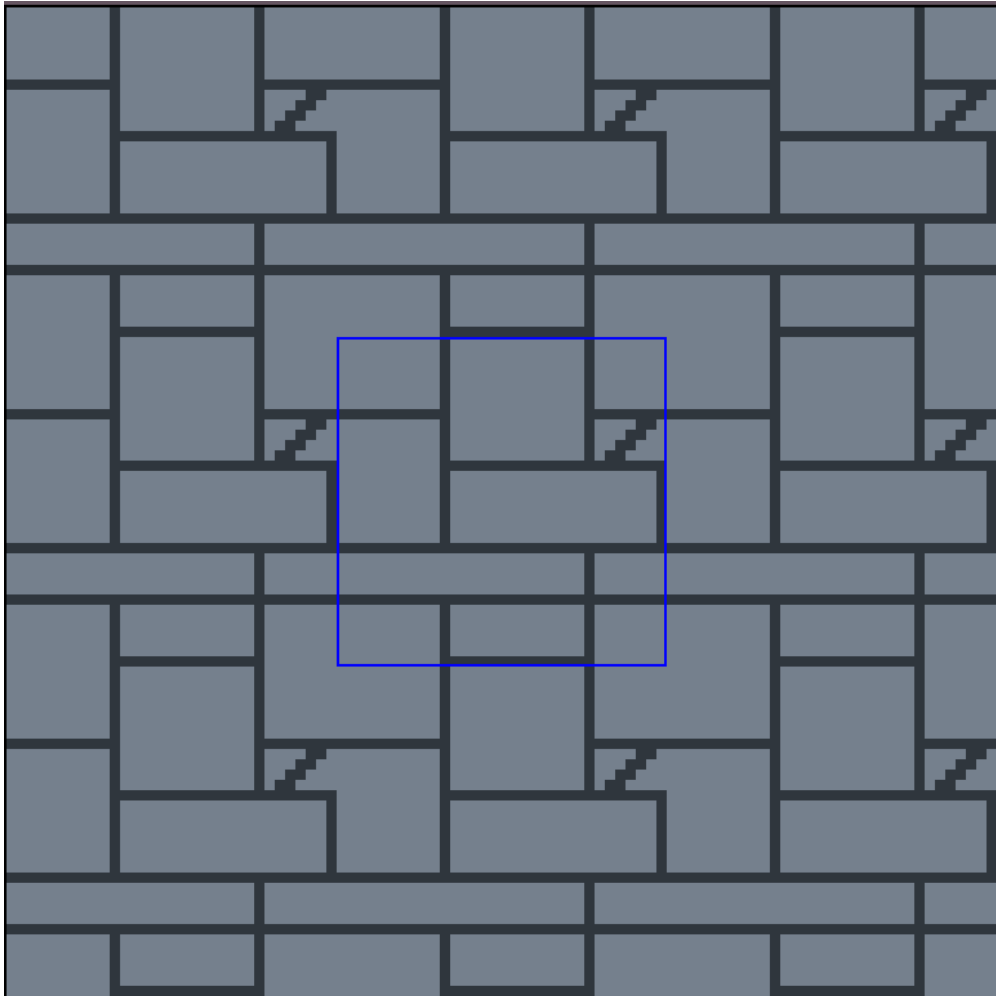
## Tiled bricks example



**Outline basic shape**

# Seamless tile

Tiled bricks example

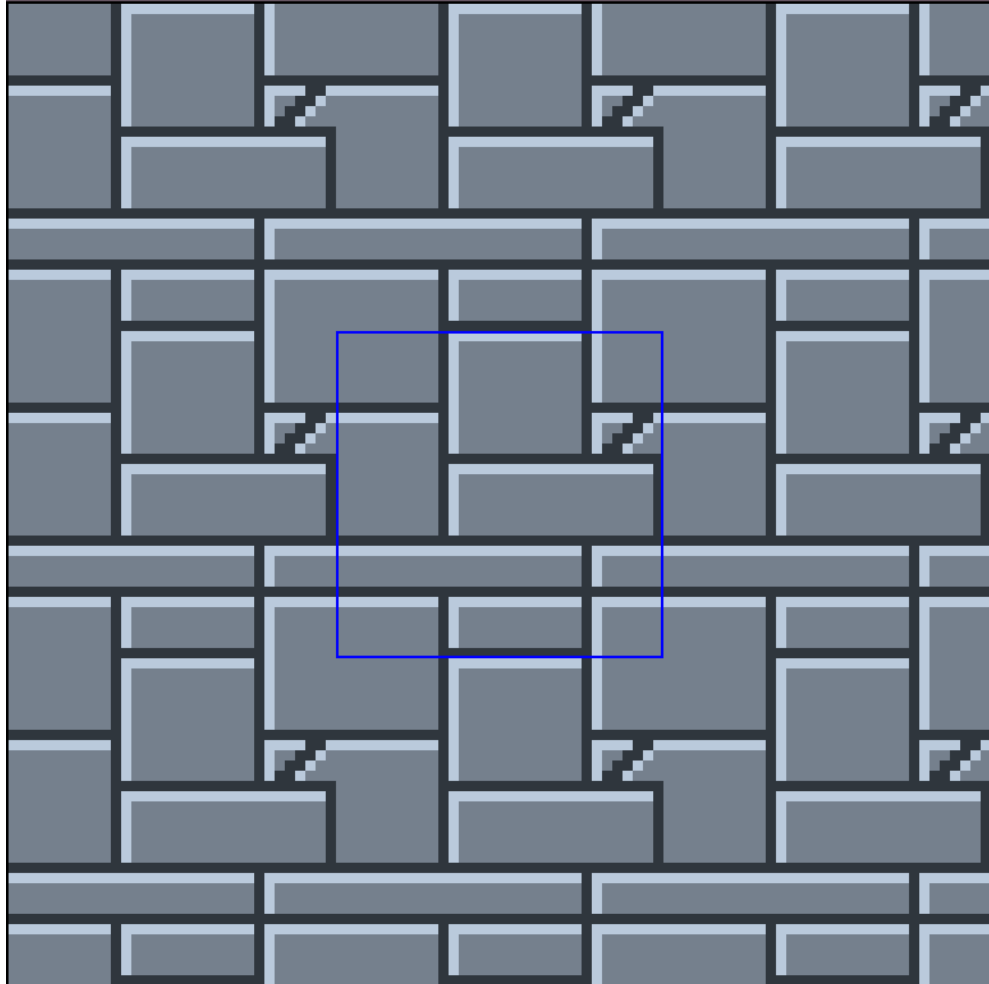


Fill gaps



# Seamless tile

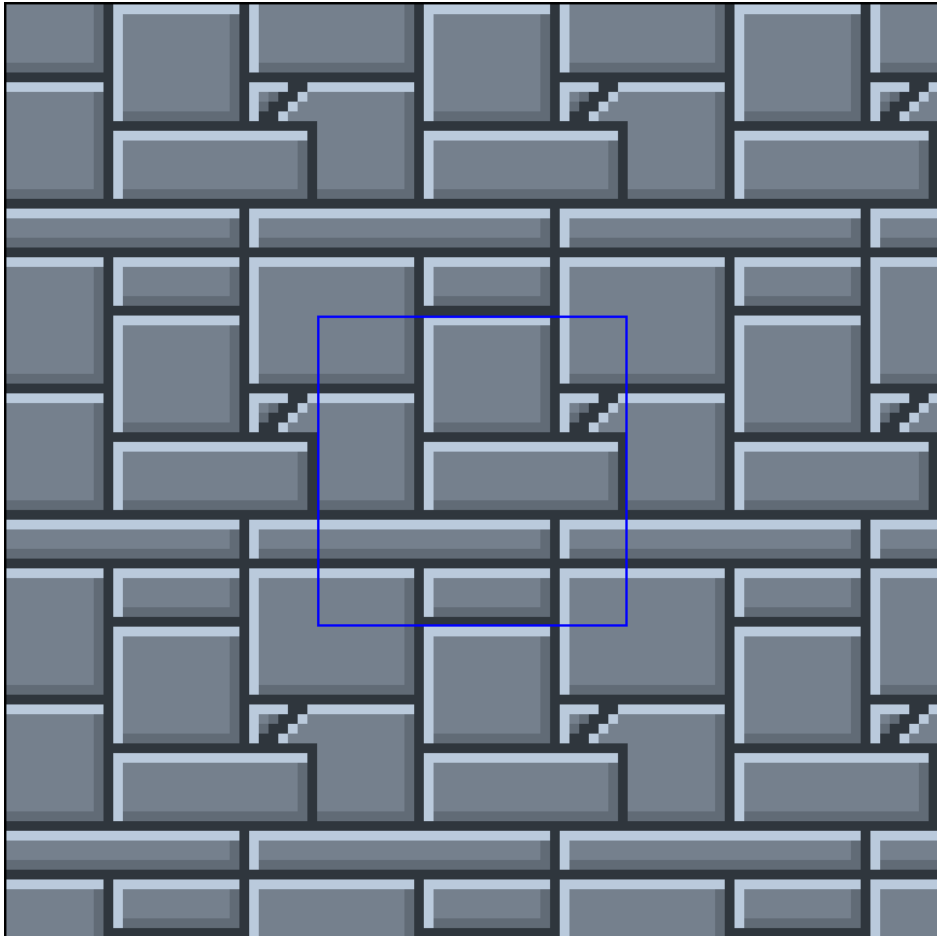
## Tiled bricks example



Light edge from top left corner

# Seamless tile

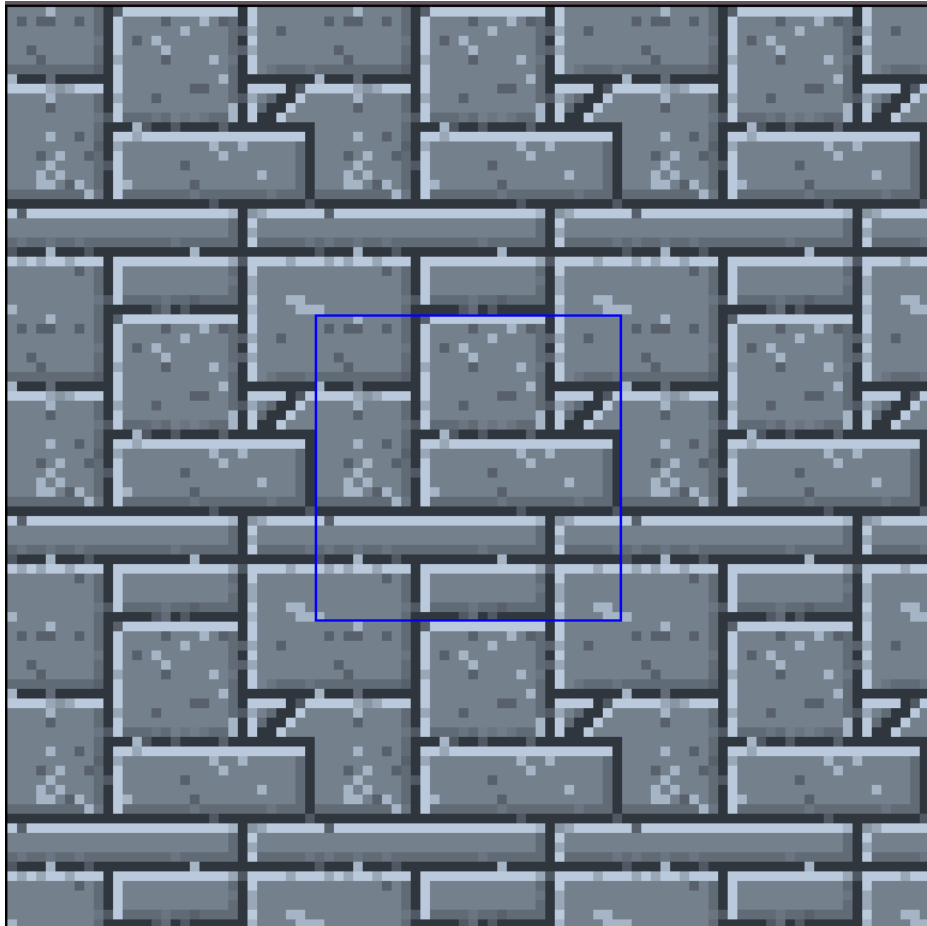
## Tiled bricks example



**Dark edge from bottom right  
corner**

# Seamless tile

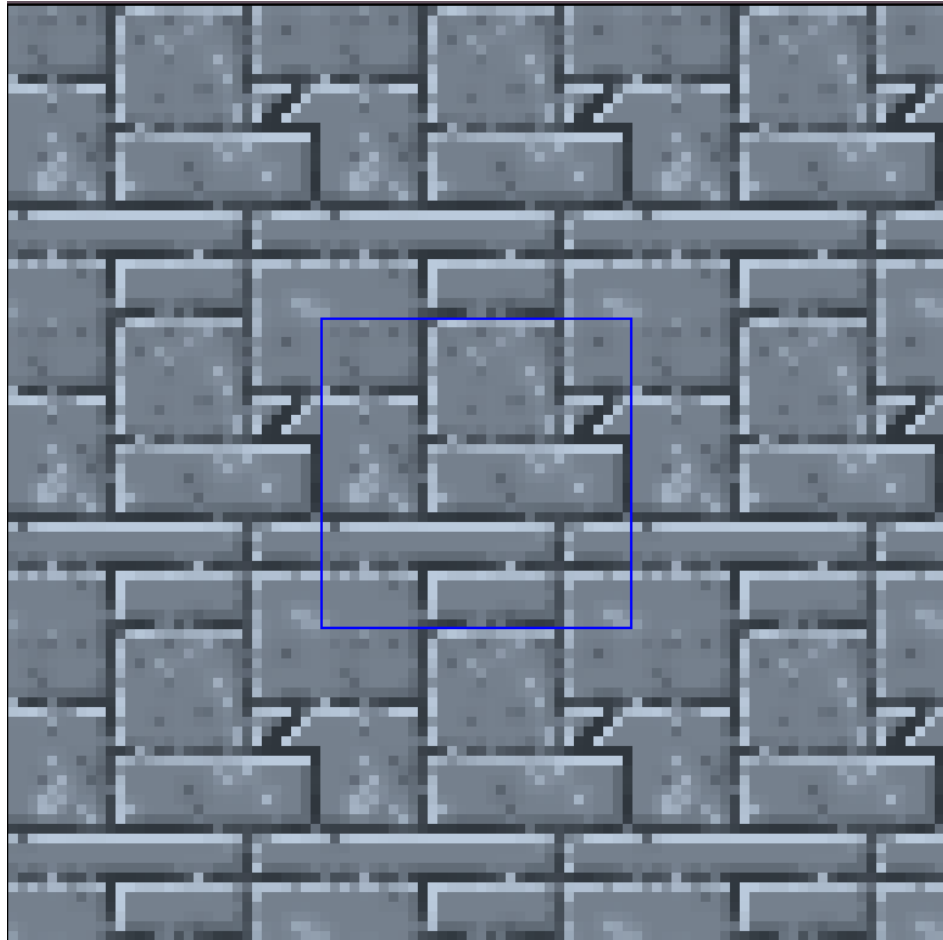
## Tiled bricks example



**Add some dust**

# Seamless tile

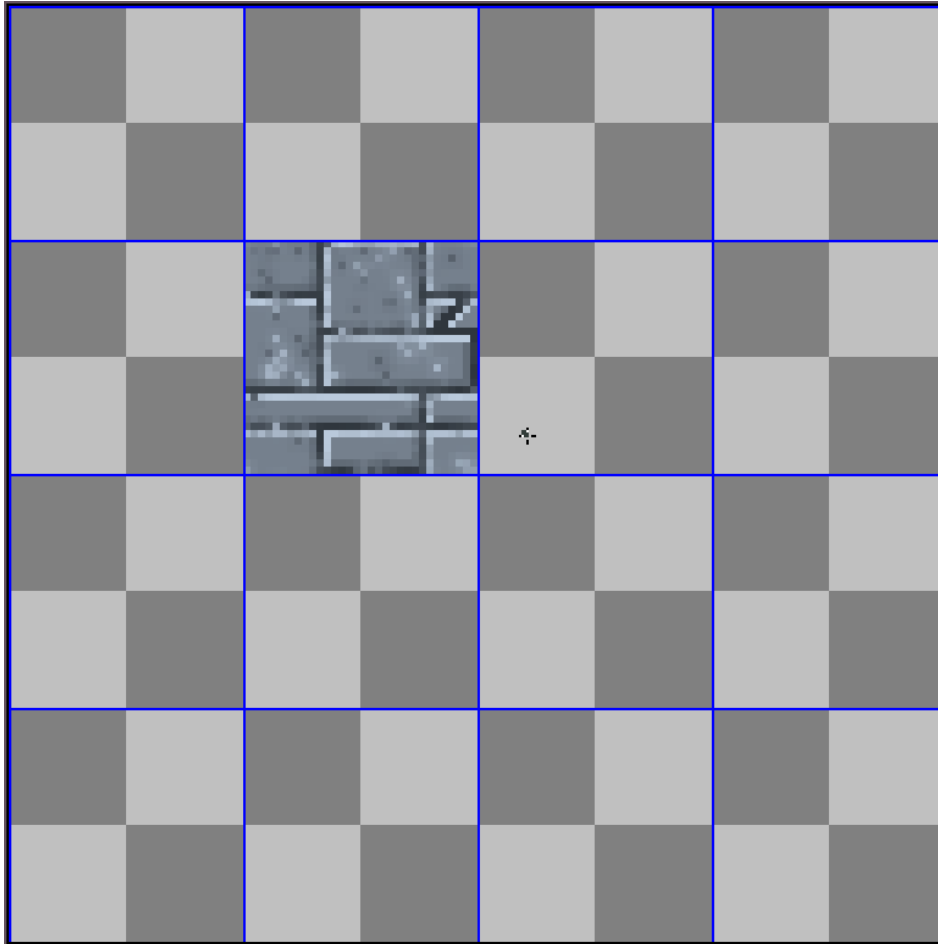
## Tiled bricks example



**Blur the dust a little**

# Seamless tile

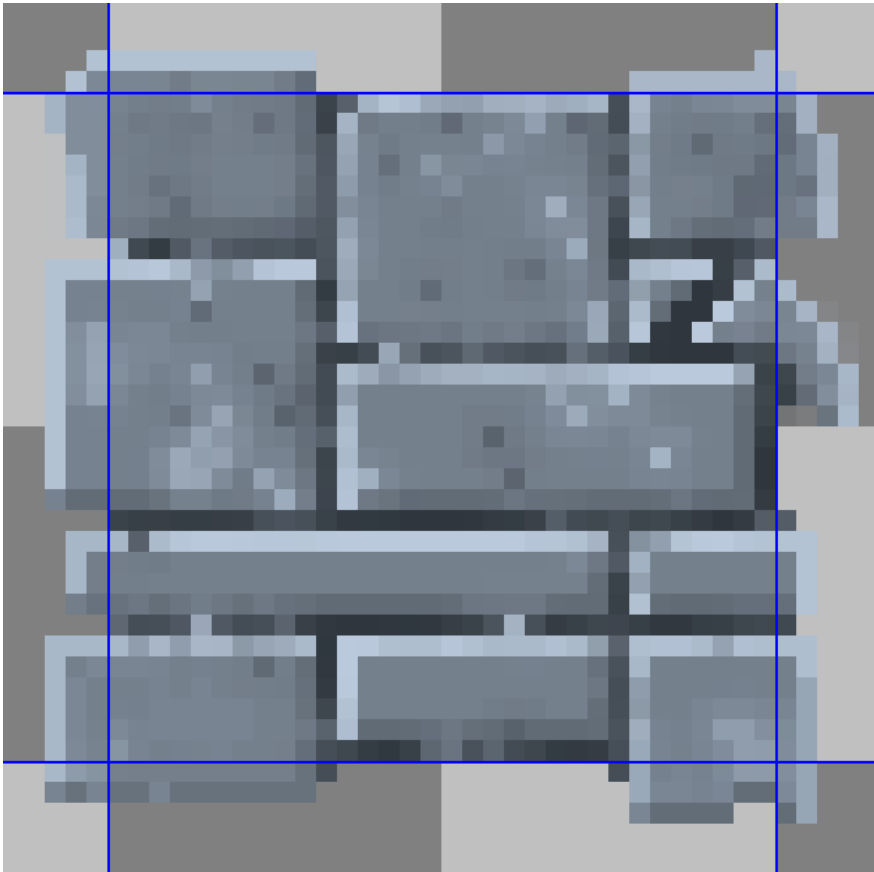
## Tiled bricks example



**Throw resulting tile  
onto tileset**

# Seamless tile

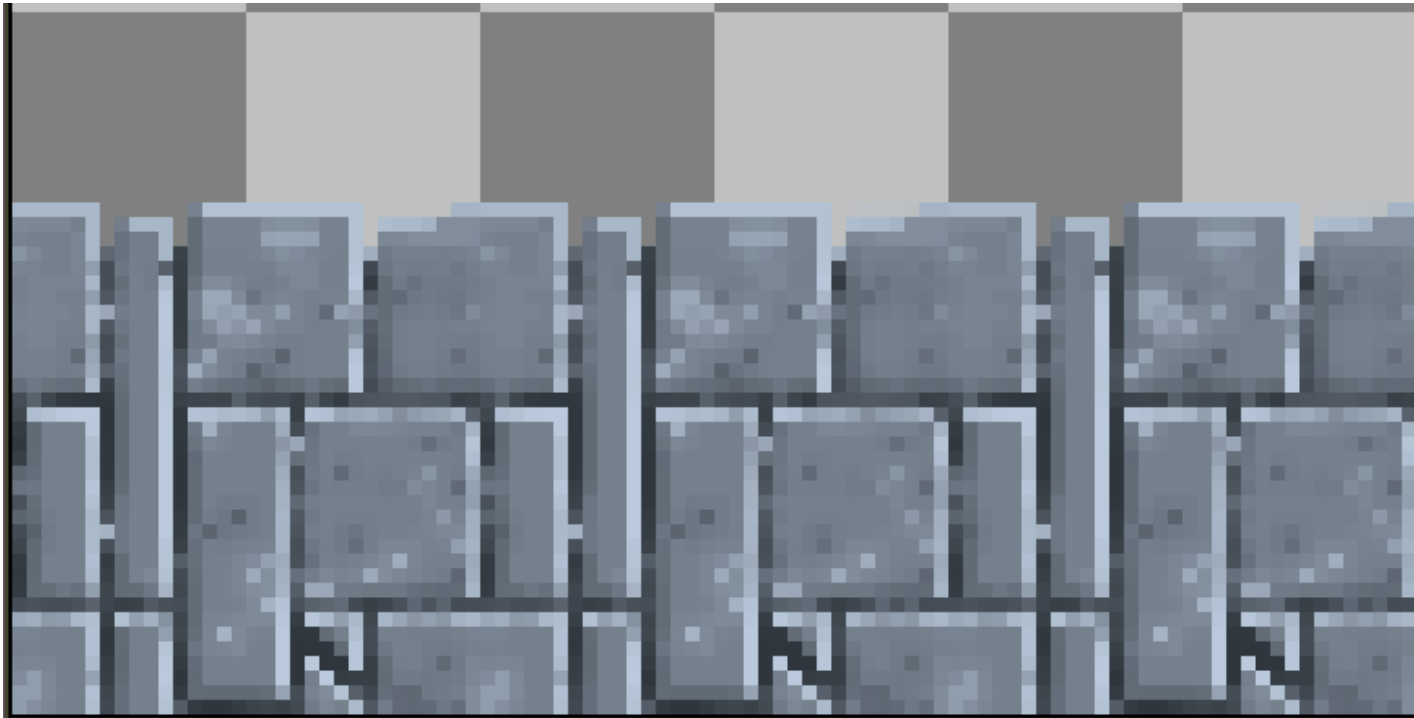
## Tiled bricks example



**Outline it to make  
more universal**

# Seamless tile

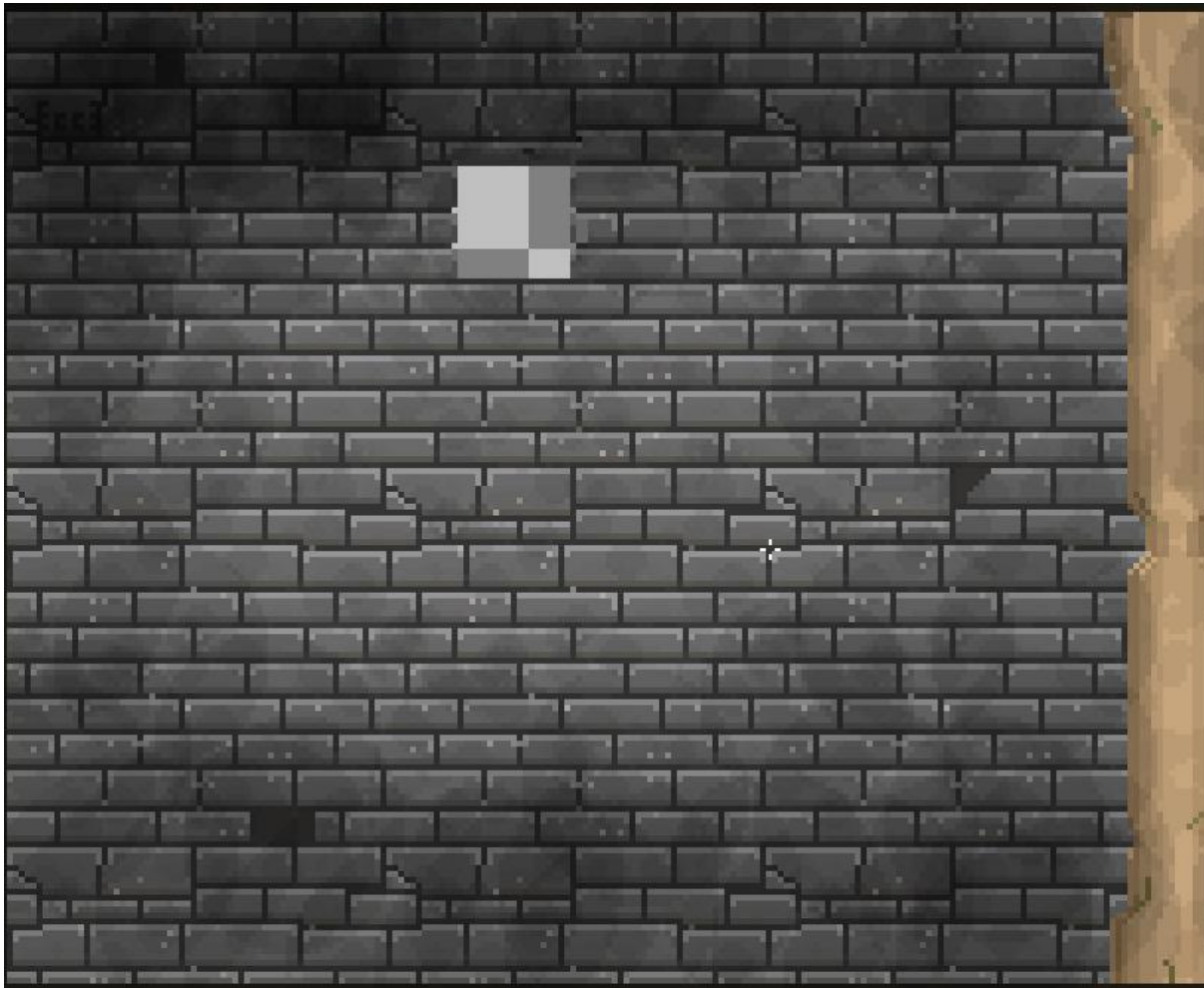
Tiled bricks example



Usage

# Seamless tile

## Tiled bricks example

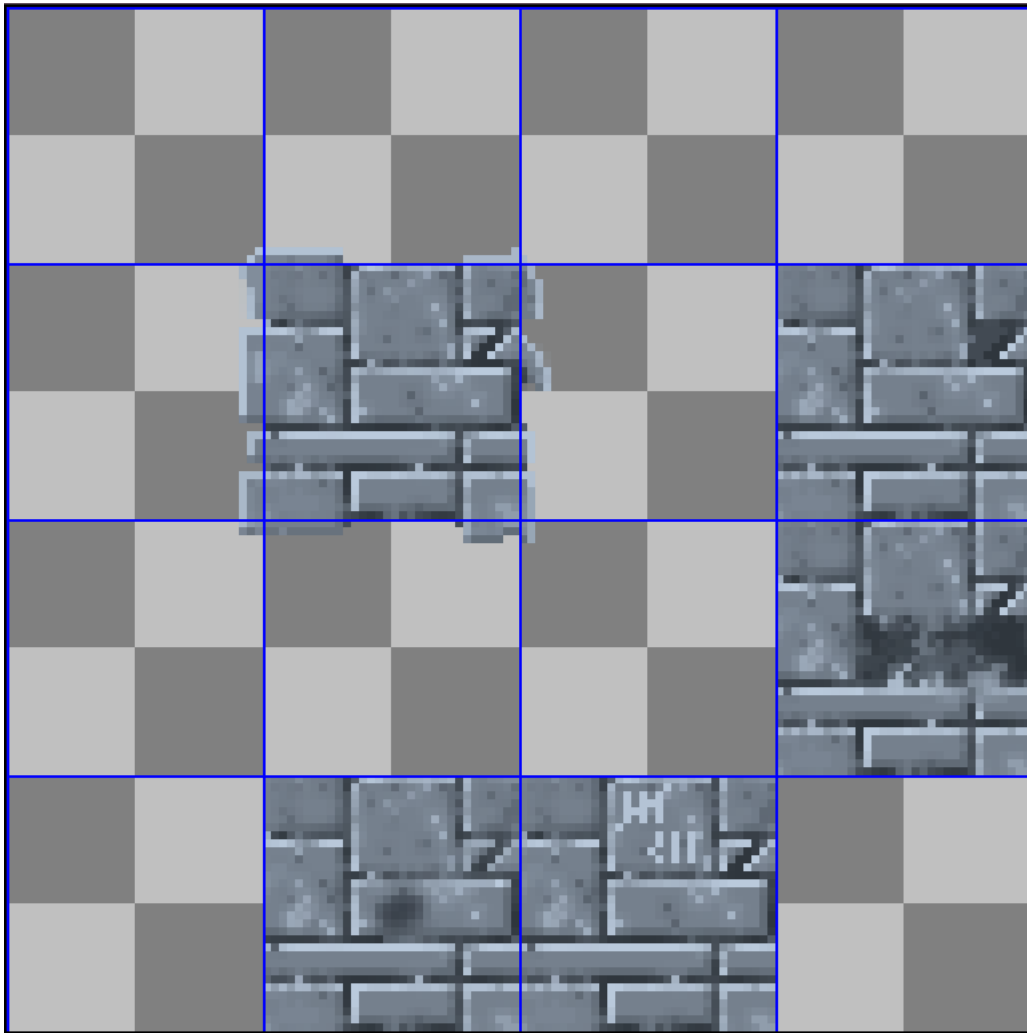


**Make variations**



# Seamless tile

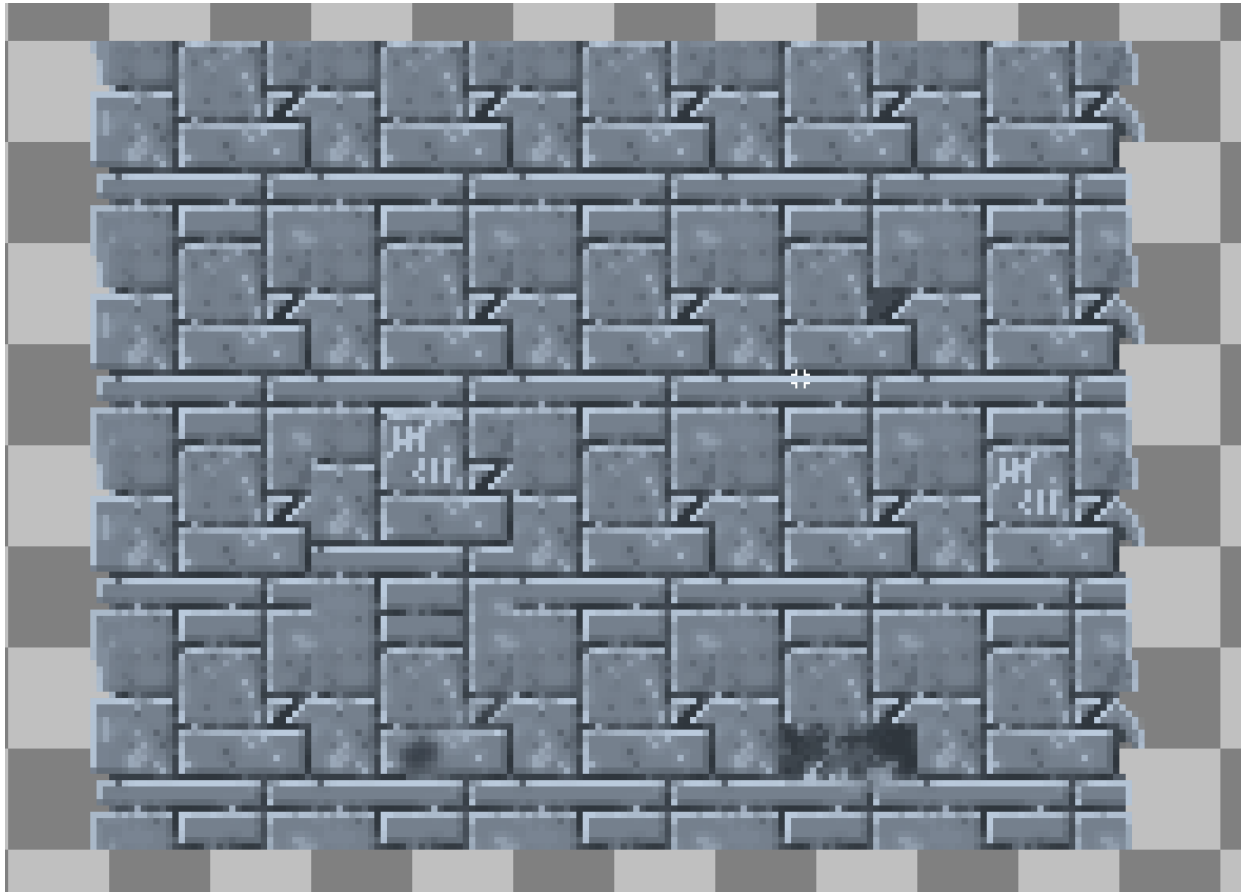
## Tiled bricks example



**Introduce variations**

# Seamless tile

## Tiled bricks example



**Introduce variations**

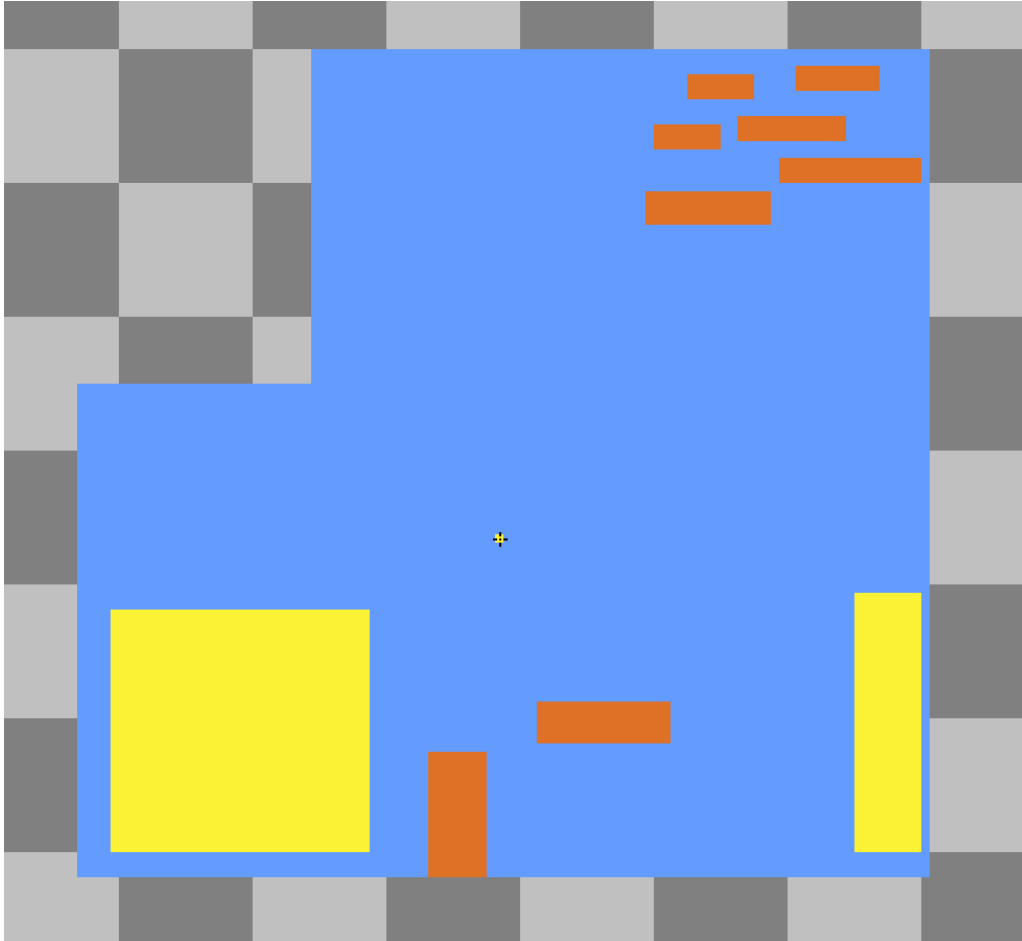
# Composition trick

Primary, Secondary, Tertiary shapes



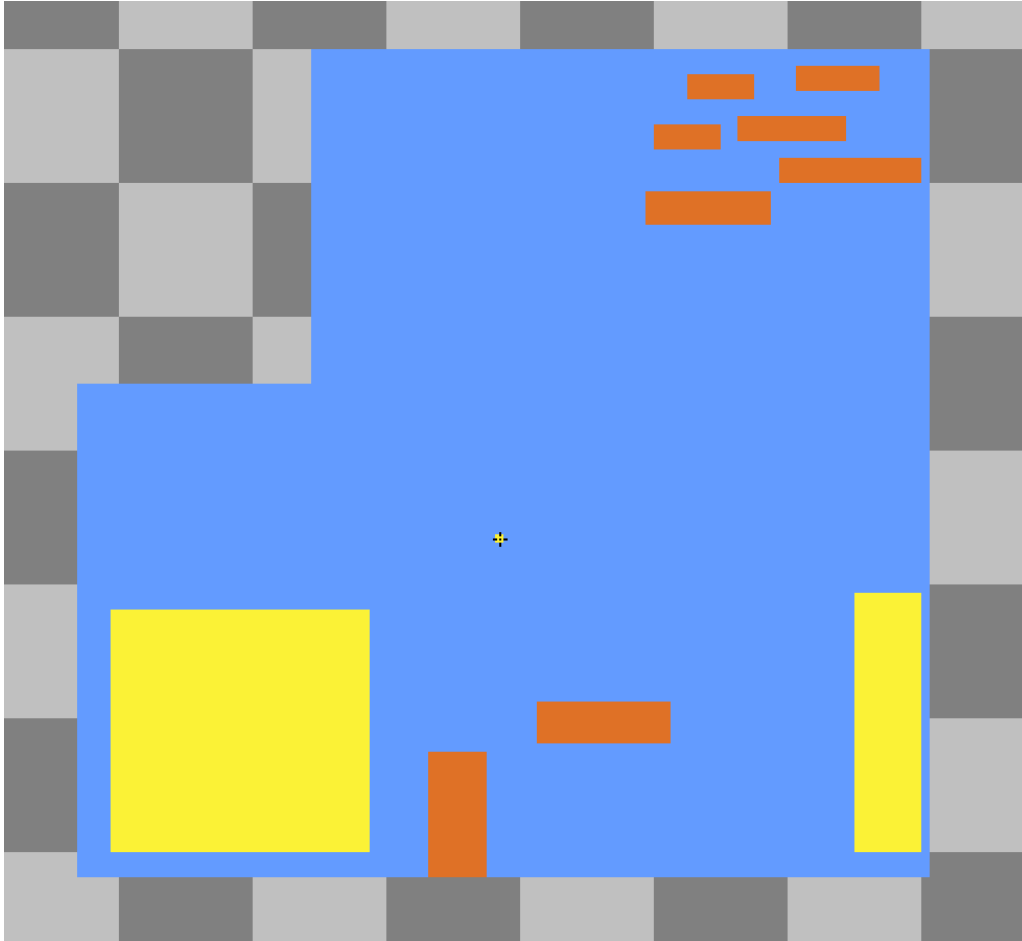
Something looks off, what exactly?

# Primary, Secondary, Tertiary shapes



Let's analyze

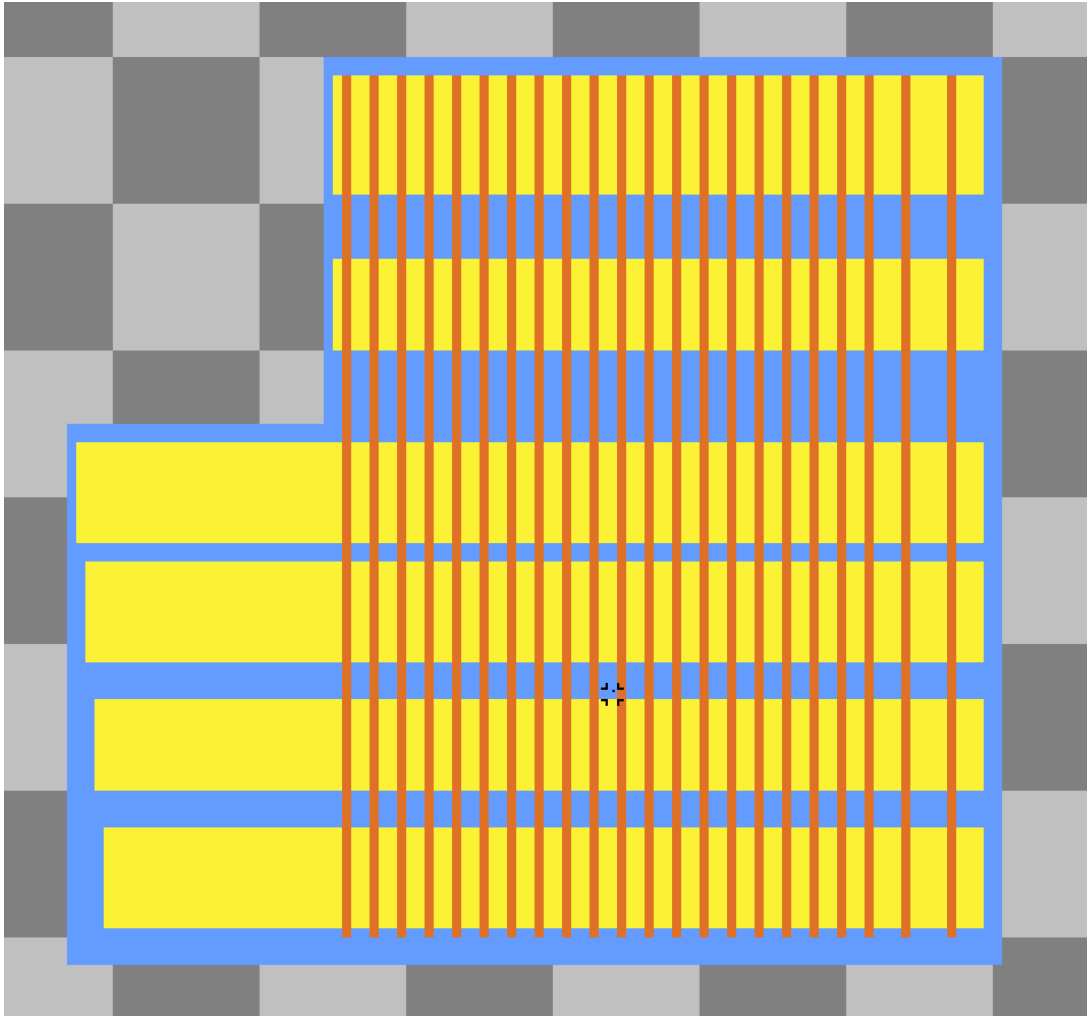
# Primary, Secondary, Tertiary shapes



**Let's analyze**

**> Bad distribution of shapes**

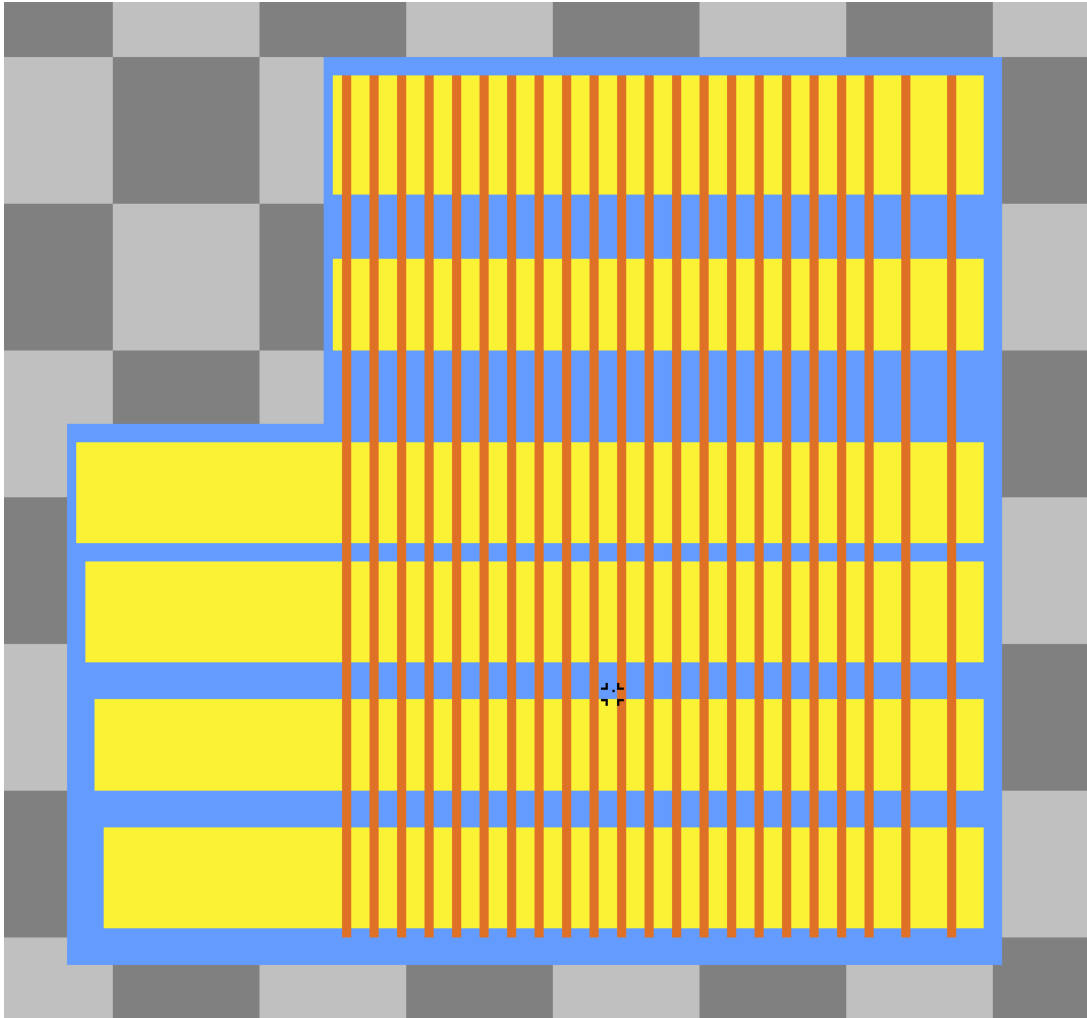
# Primary, Secondary, Tertiary shapes



Another example

➤ What this time?

# Primary, Secondary, Tertiary shapes



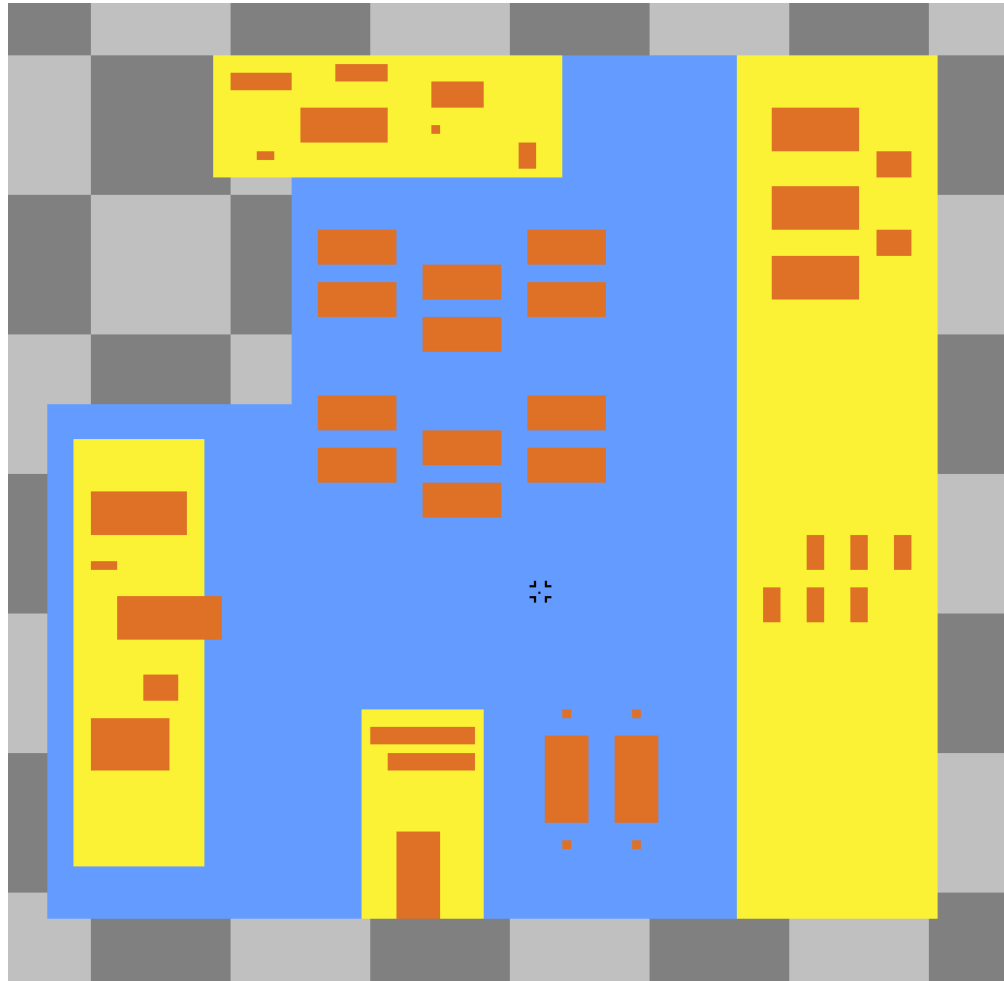
**Eye has no place to rest on**

# Primary, Secondary, Tertiary shapes **In reality**





# Primary, Secondary, Tertiary shapes



**Finally...**

# Primary, Secondary, Tertiary shapes



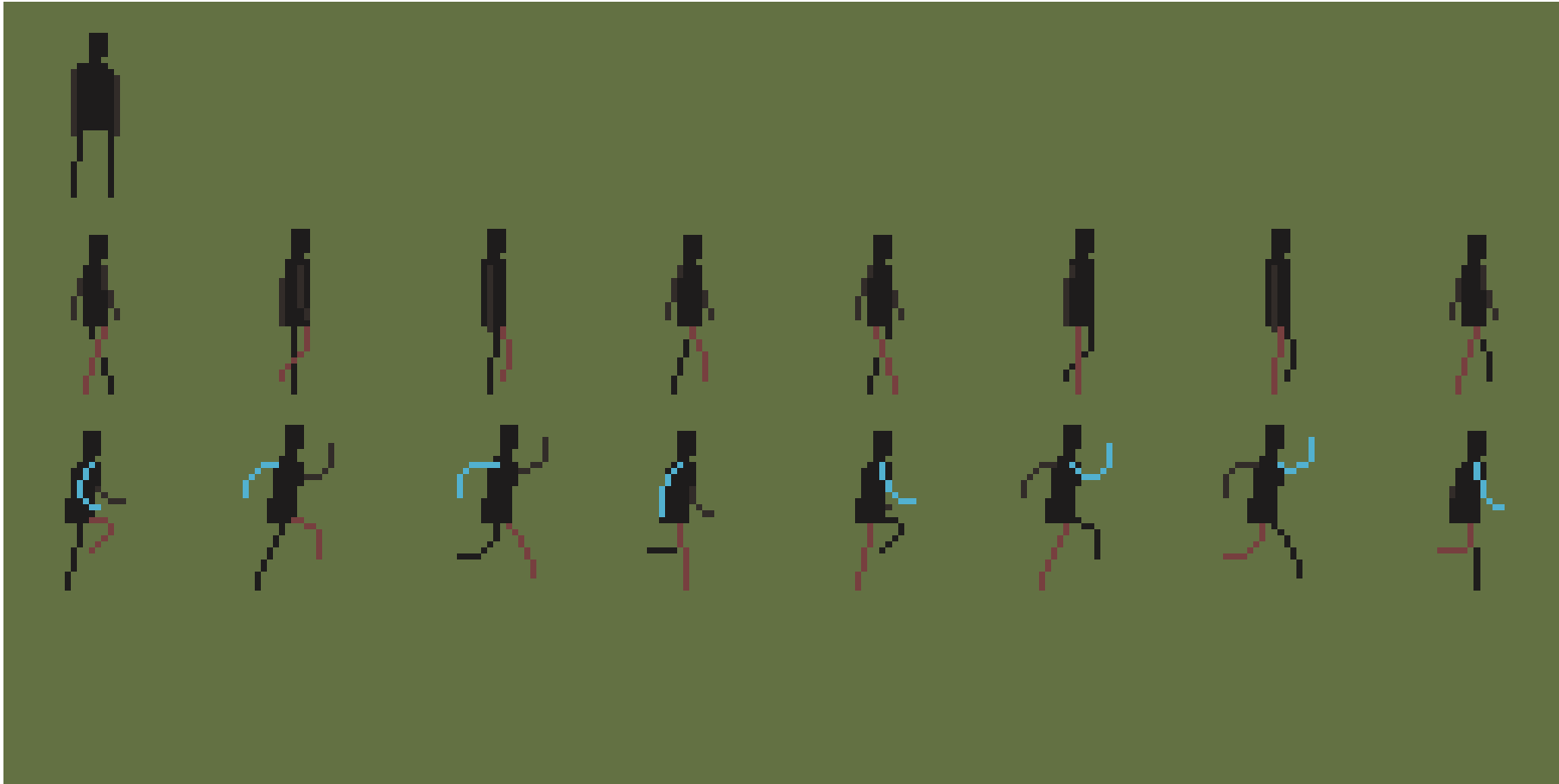
**Quick Implementation**

# Animations

**How to start from nowhere?**

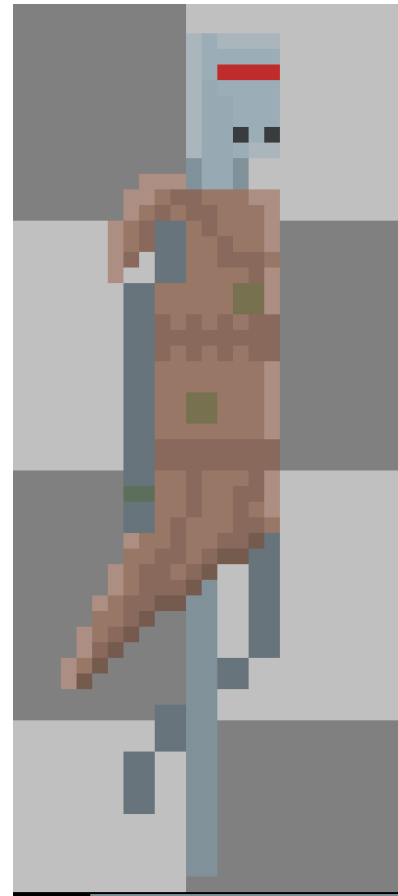
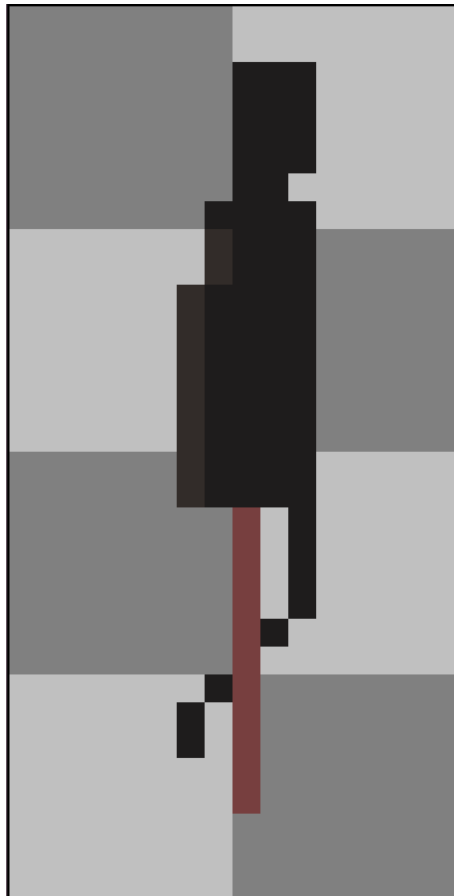
# Animations

## 1. Start from a stickman



# Animations

## 1. Start from a stickman



# Animations

## 1. Start from a stickman



# Animations

## 2. Rotoscoping



# Animations

## 2. Rotoscoping (Prince of Persia 1989)





# Downscaling

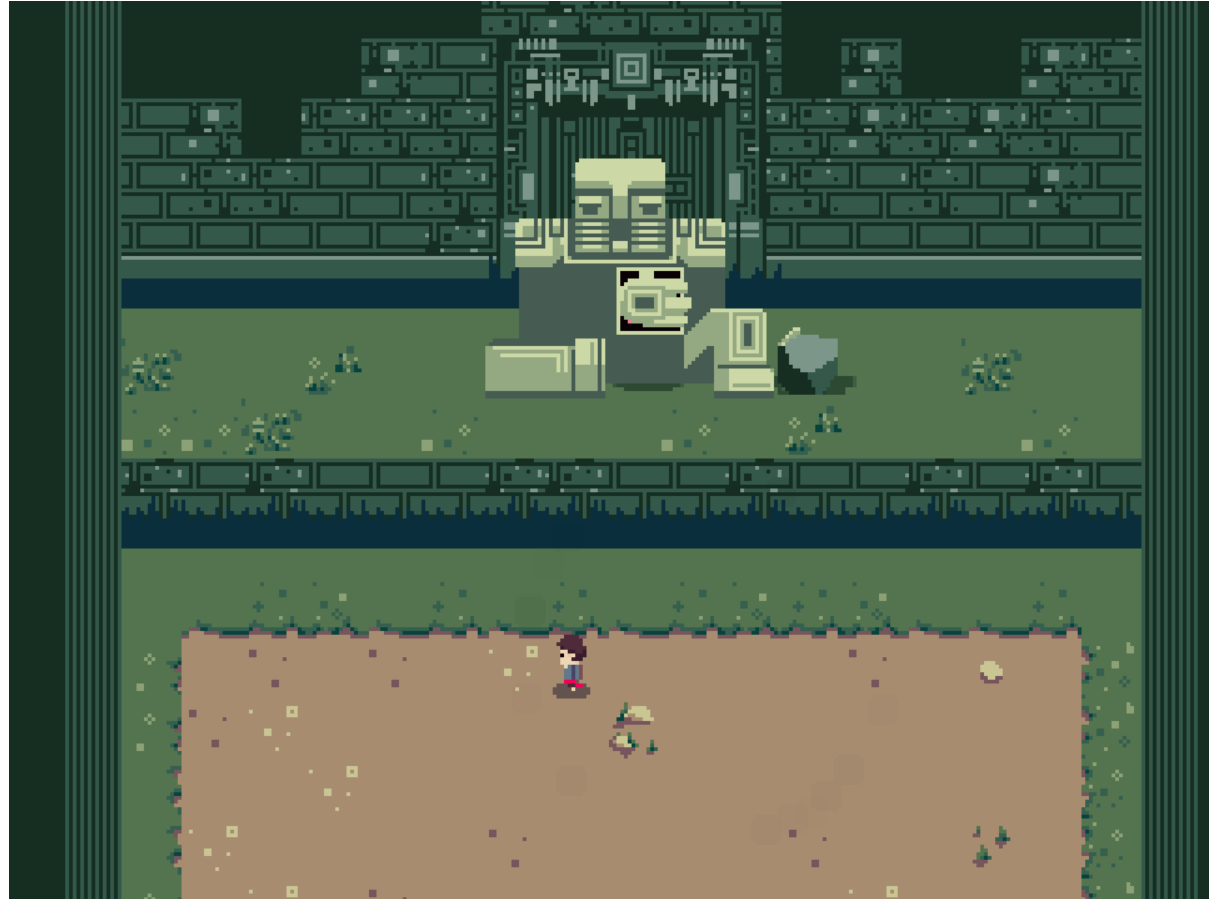


# Animations

## 3. Study existing games



**Terraria**



**Titan Souls**

# Lighting

## 1. Predrawn (i.e on image)

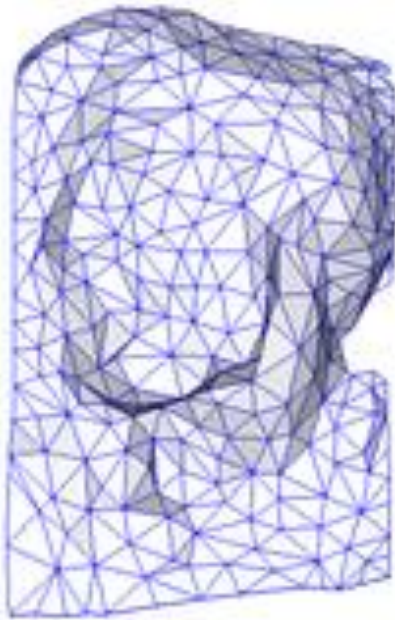


# Lighting

## 2. Normal Mapping



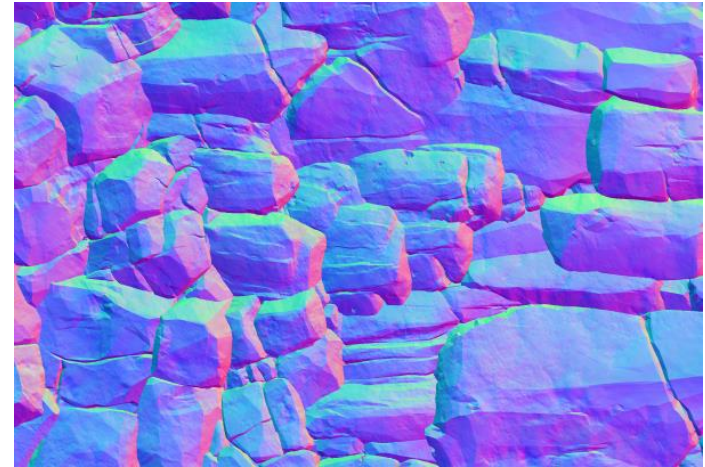
original mesh  
4M triangles



simplified mesh  
500 triangles



simplified mesh  
and normal mapping  
500 triangles



# Lighting

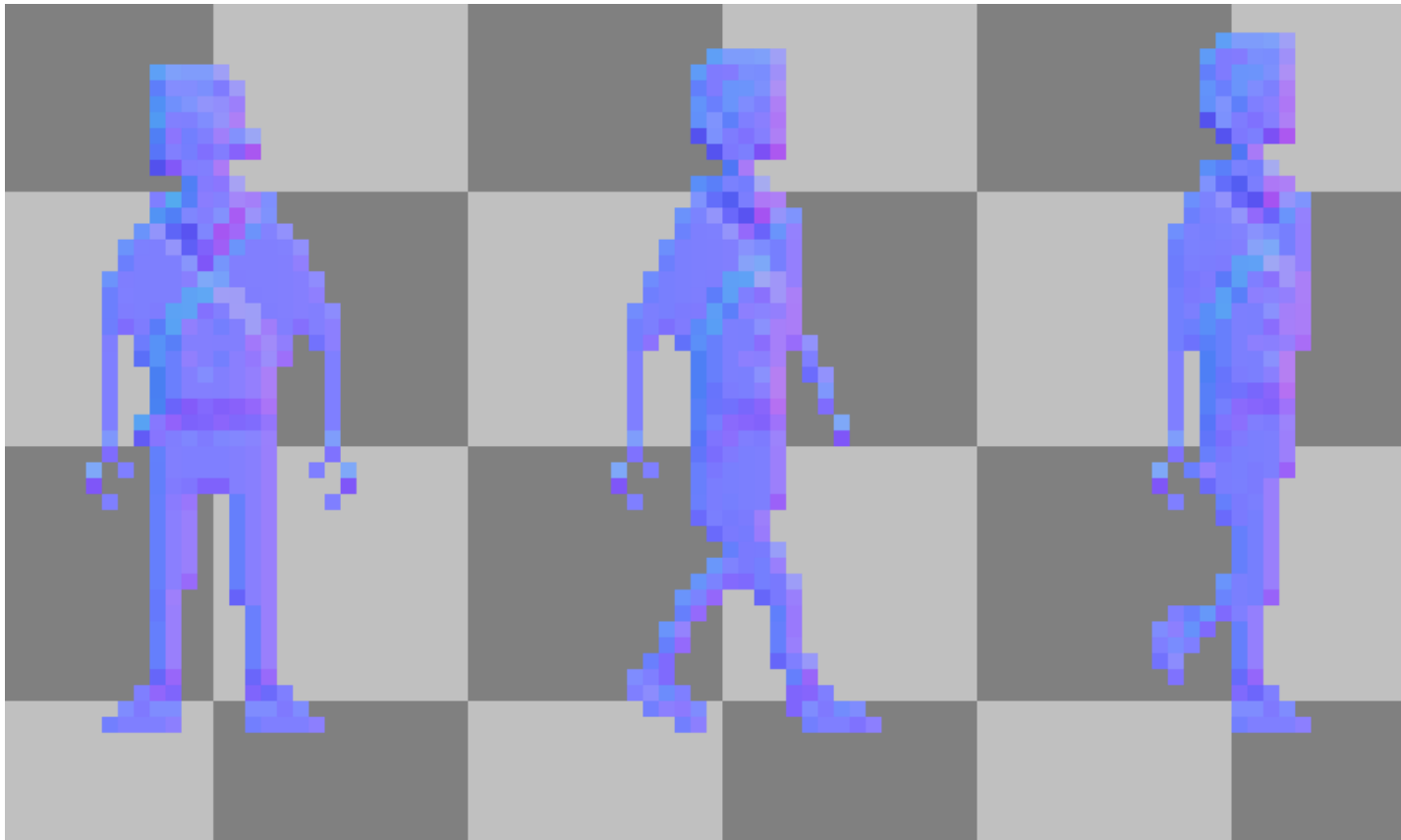
## 2. Normal Mapping



**The Siege and the Sandfox (UE4)**

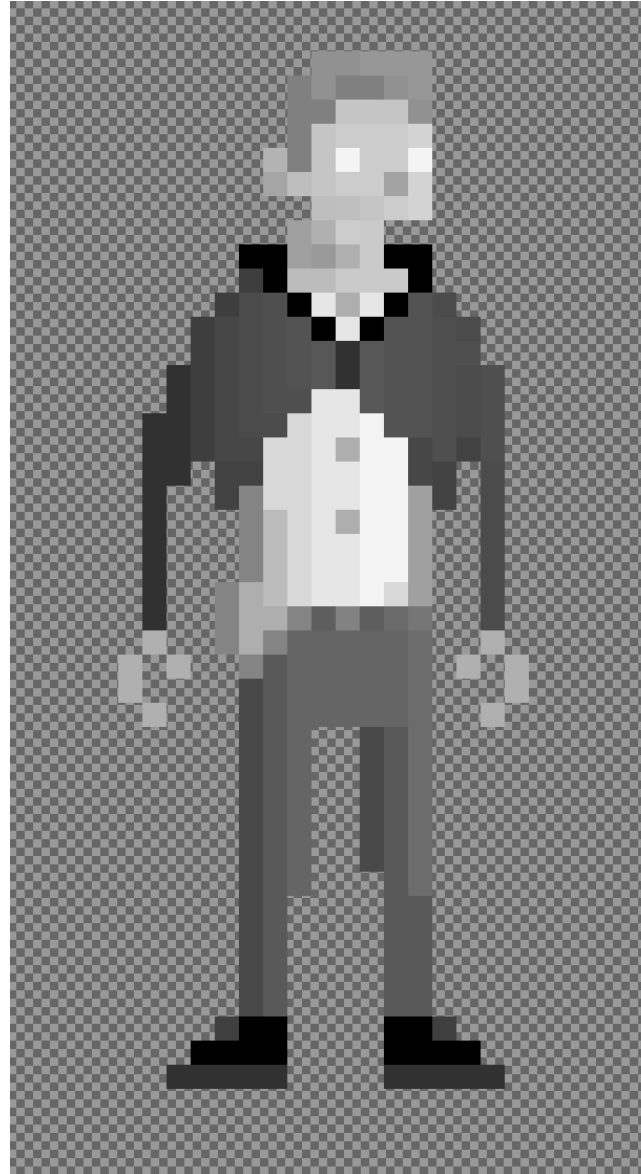
# Lighting

## 2. Normal Mapping



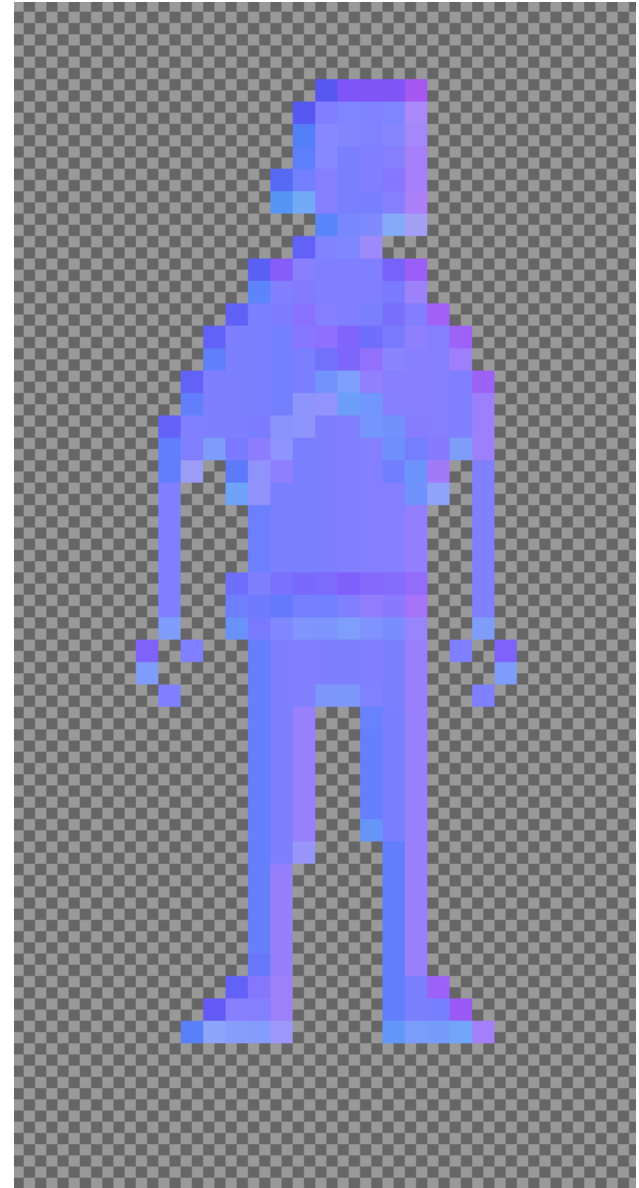
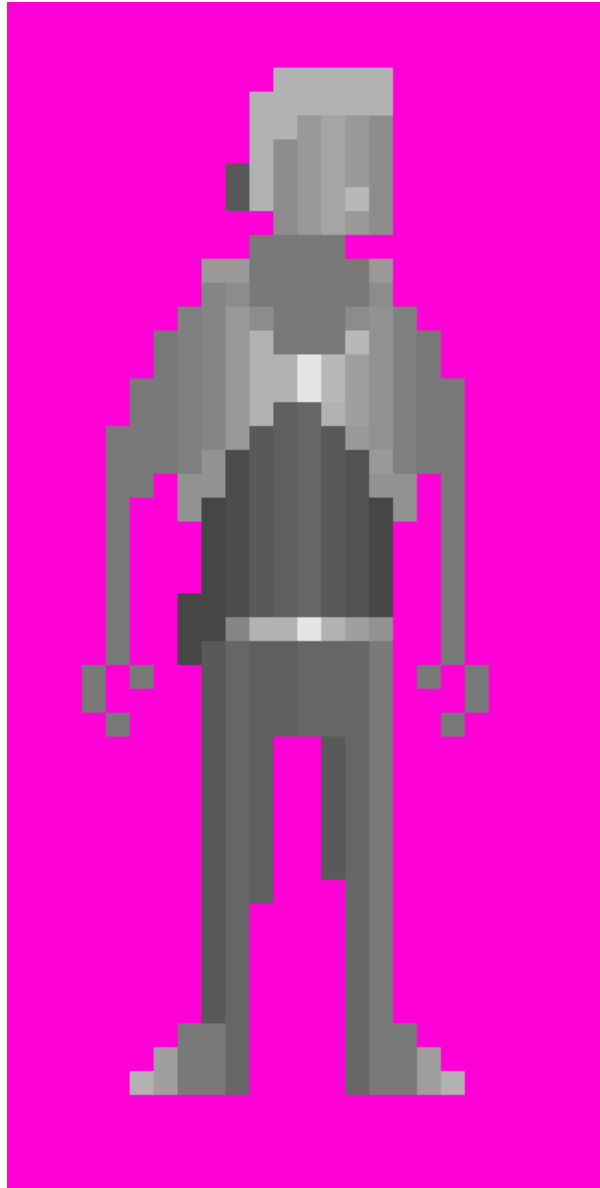
# Normal Mapping

a. From grayscale of original



# Normal Mapping

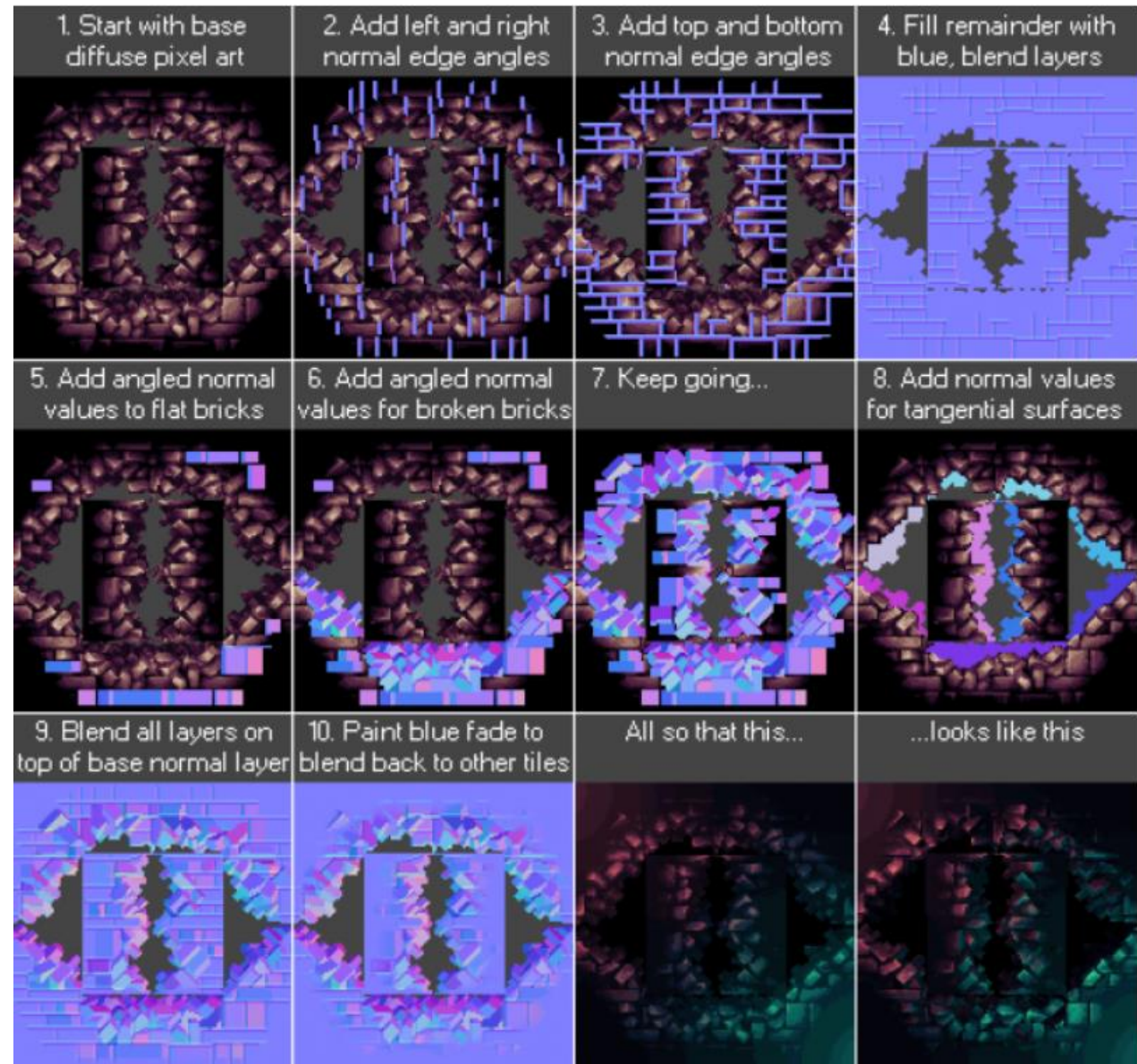
b. From heightmap





# Normal Mapping

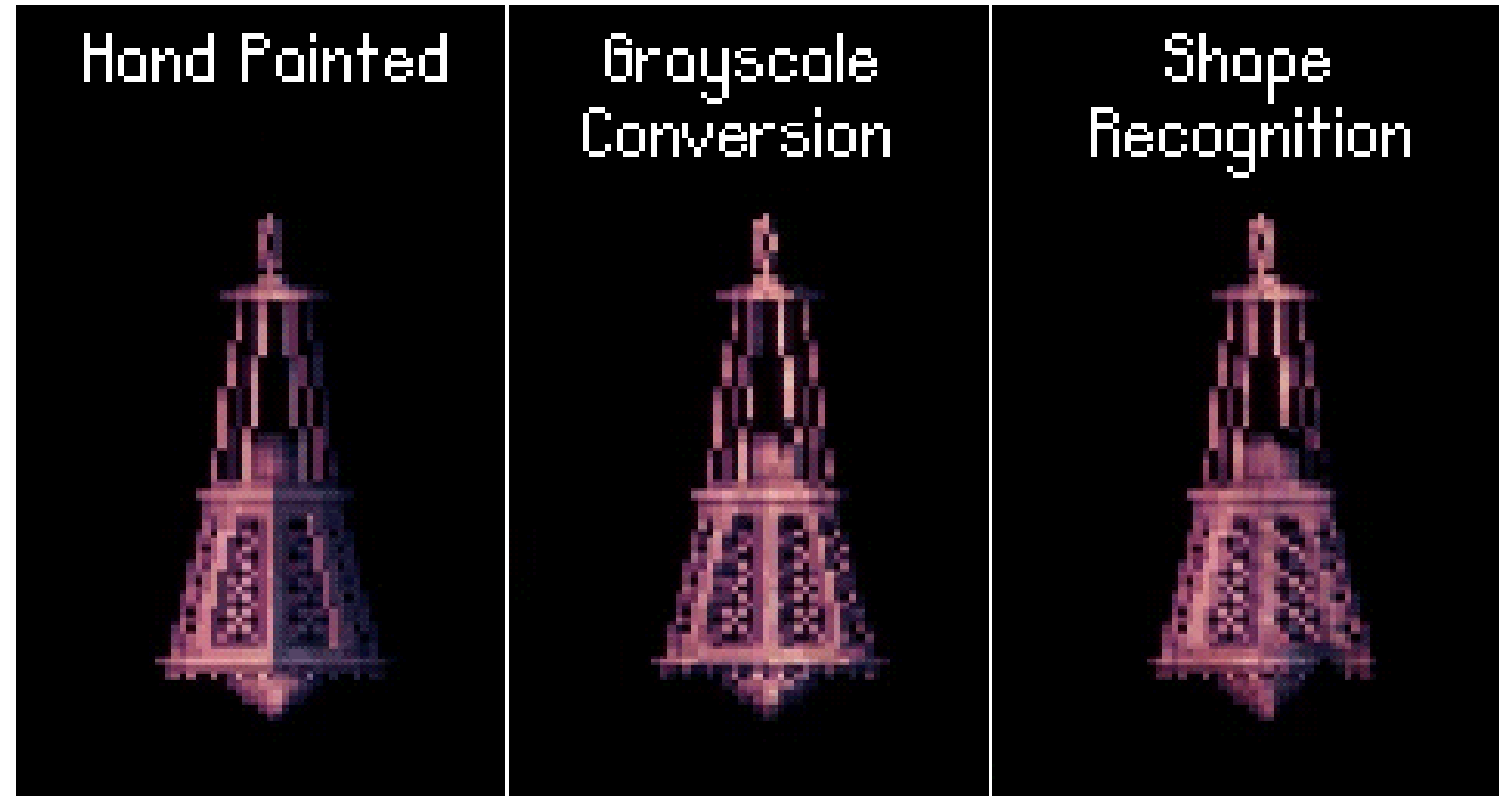
c. Hand painted



**The Siege and the Sandbox (UE4)**

# Normal Mapping

c. Hand painted



**The Siege and the SandFox (UE4)**

# Lighting

## 3. From Voxel Art



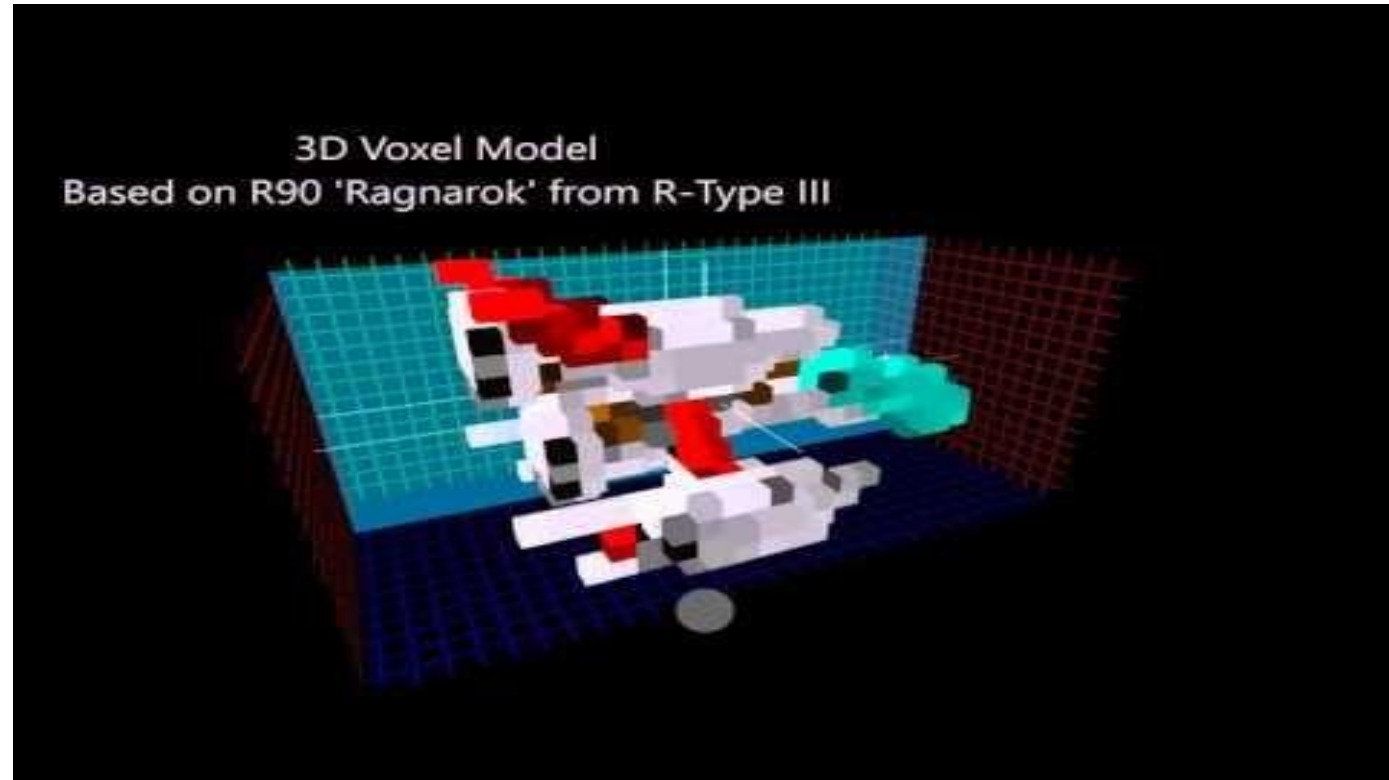
# Lighting

## 3. From Voxel Art

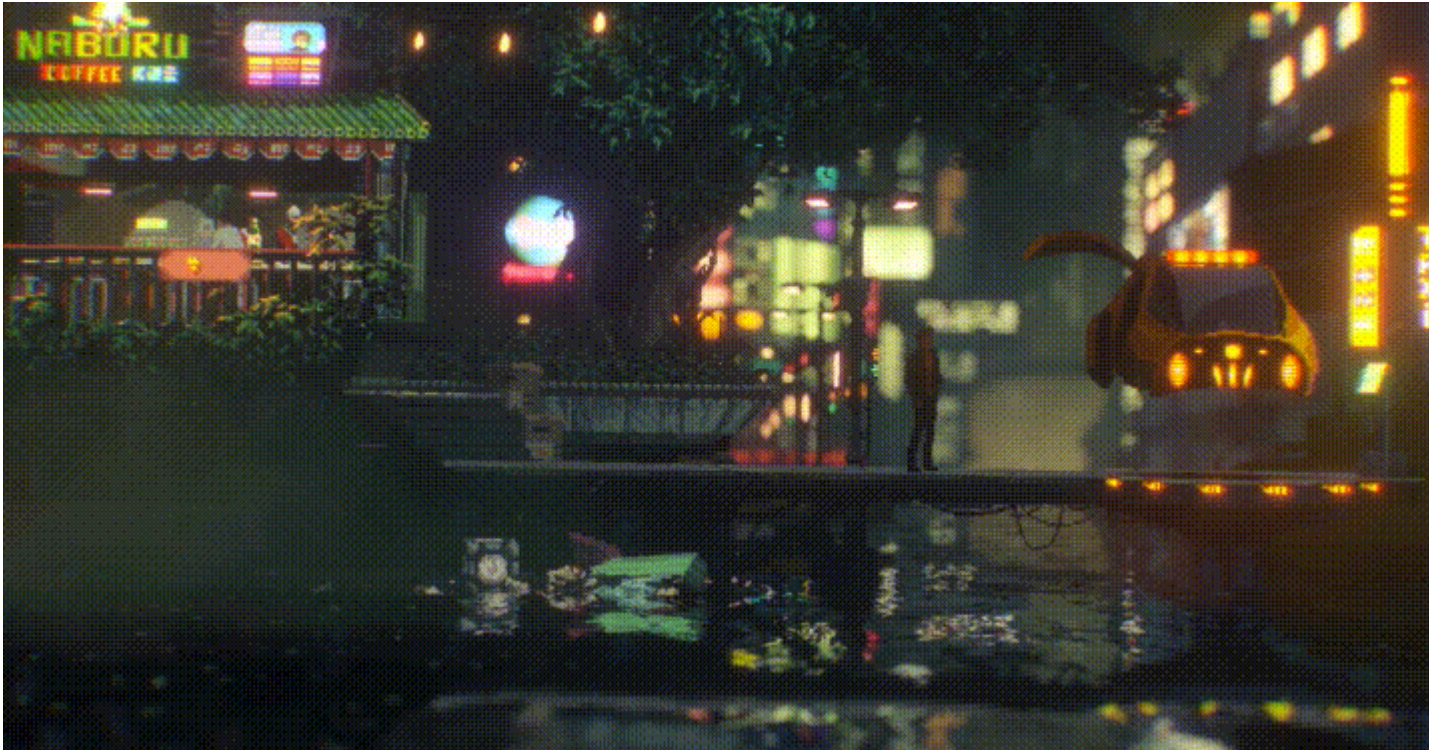


# Lighting

## 3. From Voxel Art



# Pixel Art in modern game engines



**The Last Night (Unity)**



# Pixel Art in modern game engines



**The Siege and the Sandfox (UE4)**

# References

- <https://www.creativeshrimp.com/the-secret-of-high-quality-art.html>
- [http://www.neilblevins.com/cg\\_education/primary\\_secondary\\_and\\_tertiary\\_shapes/primary\\_secondary\\_and\\_tertiary\\_shapes.htm](http://www.neilblevins.com/cg_education/primary_secondary_and_tertiary_shapes/primary_secondary_and_tertiary_shapes.htm)
- <https://pixabay.com/>
- <https://www.creativebloq.com/illustration/examples-pixel-art-2132036>
- [Stickman Spritesheet - pinkuboa.tumblr.com](http://Stickman Spritesheet - pinkuboa.tumblr.com)
- [https://www.gamasutra.com/view/news/312977/Adding\\_depth\\_to\\_2D\\_with\\_handdrawn\\_normal\\_maps\\_in\\_The\\_Siege\\_and\\_the\\_Sandfox.php](https://www.gamasutra.com/view/news/312977/Adding_depth_to_2D_with_handdrawn_normal_maps_in_The_Siege_and_the_Sandfox.php)
- <https://80.lv/articles/the-siege-and-the-sandfox-pixel-art-game-with-ue4/>
- [Dynamically Lit Pixel Art - Unreal Engine 4 - YouTube](#)
- [How To Make Pixel Art From A Photograph Using Gimp - YouTube](#)
- [The Last Night - E3 2017 reveal trailer - YouTube](#)
- [The Last Night: The Journey to One of the Most Beautiful Games of E3 - IGN First - YouTube](#)
- [Siege and Sandfox Gameplay - 2D STEALTH METROIDVANIA - YouTube](#)
- [PIXEL ART in UNREAL - Building a Metroidvania - YouTube](#)
- <https://terraria.org/>
- <https://www.aseprite.org/>
- <https://color.adobe.com/>
- <https://www.gimp.org/>
- <https://www.devolverdigital.com/games/view/titan-souls>