Chess game animation in blender

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May 31, 2021

Contents

1 Introduction

1.1 Project aims

2 The idea

3 Implementation

3.1 Blender side

3.1.1 Piece modelling

Pieces were modelled after the reference image below Figure 1. From this image the pieces where traced using the `Add Vertex` tool, from the Add Mess Extra Objects add-on. To transform this line of vertices to a solid object a `Screw` modifier was applied.

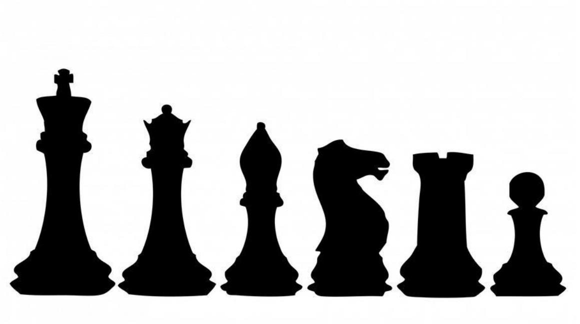
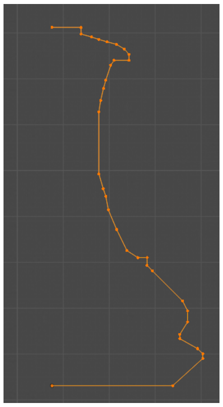
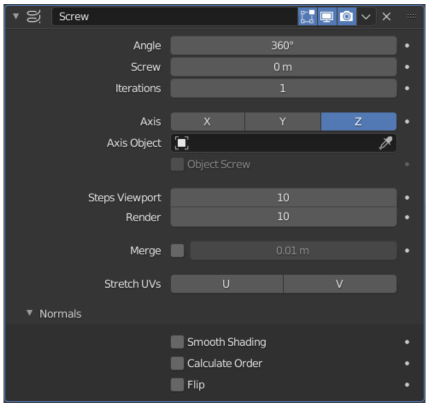


Figure 1: Reference image, Licensed under Pixabay License





Screw

Angle 360°
Screw 0 m
Iterations 1

Axis X Y [✓ Z]
Axis Object
□ Object Screw

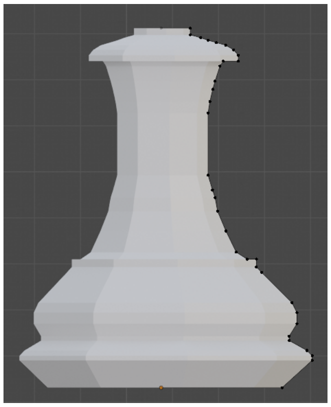
Steps Viewport 10
Render 10

Merge □ 0.01 m

Stretch UVs U V

Normals

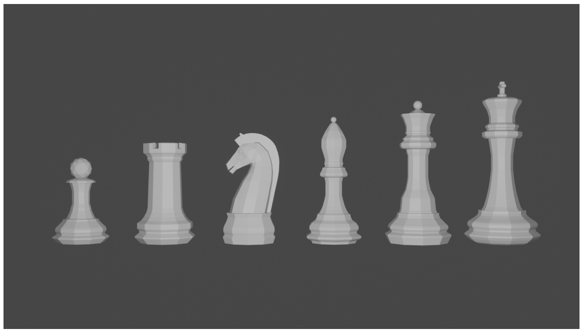
□ Smooth Shading
□ Calculate Order
□ Flip



The notable changes from the default settings is the lowering of the steps from 16 → 10 and disabling `Smooth Shading`. This was a stylistic choice as it was believed that the low polygon look would better demonstration reflections and the planned indirect lighting (see Lighting - Disco Ball).

To model the knight, 3 seperate reference images where used.

Additionally ico-spheres where added to piece some pieces additional detail.



3.1.2 Board

1. Chess board
2. Marble exterior

3.1.3 Textures and shading

3.1.4 Particle effects

1. Explosions
2. Confetti

3.1.5 Lighting

1. Direct
2. Indirect
3. Disco ball

3.1.6 Render engine

1. Eevee
2. Cycles
    (a) Thank you to Jack

3. Luxcore

3.2 Python side

3.2.1 Processing games

3.2.2 Unique pairing problem

3.2.3 The solution

3.2.4 Array index to world space

8	56	57	58	59	60	61	62	63
7	48	49	50	51	52	53	54	55
6	40	41	42	43	44	45	46	47
5	32	33	34	35	36	37	38	39
4	24	25	26	27	28	29	30	31
3	16	17	18	19	20	21	22	23
2	8	9	10	11	12	13	14	15
1	0	1	2	3	4	5	6	7
	a	b	c	d	e	f	g	h

1. Abuse of this functionality

3.2.5 Special moves

1. Promotion
2. En passant
3. Castling

3.2.6 Animation

1. Key frames
   (a) Timing
2. Interpolation

3.3 Reproducibility

This project was created used

- Blender 2.92 `https://www.blender.org/`

- Python `3.9.5` [1] `https://www.python.org/`
- python-chess `1.5.0` [2] `https://github.com/niklasf/python-chess`

3.3.1 Python environment

Blender is distributed with its own python installation for consistency, however this means that installed python modules are not present [1]. To mitigate this the `--target` flag for `pip install` can be used to install directly to the blender python environment [2].

```
pip install -t ~/.config/blender/2.92/scripts/modules chess
```

4 Results

5 Evaluation

[1] Blender comes bundled with this version. If the system python is used instead ensure it is above `3.7` for the `__future__` module.

[2] This project requires the `Outcome` class released in `1.5.0`

6 Appendix

References

[1] B. Foundation. “Tips and tricks - blender python api.” (2021), [Online]. Available: `https://docs.blender.org/api/current/info_tips_and_tricks.html#bundled-python-extensions` (cit. on p. 5).

[2] pip developers, *Pip-install(1) linux man page*, 20.3 (cit. on p. 5).