Tetris clone - FITris

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1 Introduction

Tetris is a tile-based video game designed by Russian software engineer Alexey Pajitnov in 1984. Game has over the years gone through several versions each with small modifications.

For my semestral work I tried to create a Tetris clone based on the Nintendo Entertainment System Tetris [1] with small addition from Super Rotation System [2], standard for how Tetris blocks rotate.

2 Input

Due to its popularity and its vast community Tetris has countless materials to source from. Tetris Wiki [3] was especially helpful for implementation of Super Rotation System.

3 Methods

On the surface, Tetris seems like a simple game to implement, from block movement to drawing the game using, in my opinion, beginner friendly Pygame, set of Python modules. The only hard part, around which I couldn't get my head, was the rotation of blocks.

J-Block (block with the shape of the letter J), L-Block, S-Block, T-Block, Z-Block have their rotation axis in place, where anyone would guess. However, the I-Block and O-Block are symmetric from both axis and therefor their rotation axis cannot be inside one of the tiles.

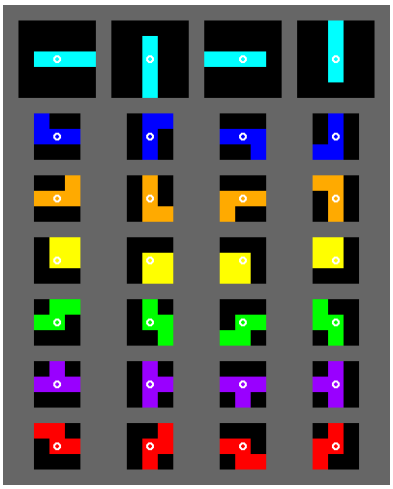
This problem was solved by introducing the Super Rotation System. The system, in a grid indexed from left to right on x-axis and from bottom to top on y-axis, is based on the idea of blocks remembering its rotation state and whenever a block rotates it needs to be offset [2]. The offset is then the difference between their values in the table. For instance, the offset for O-Block after rotating clockwise from spawn state is equal to (0, 0) - (0, -1) = (0, 1). Without the offset the O-Block would wobble around its rotation axis, which if you have ever played Tetris, is not the way O-Block rotates.

Table 1: O-Block Offset Data

Rotation State	Offset
0	(0, 0)
R	(0, -1)
2	(-1, -1)
L	(-1, 0)

0 - Spawn state
R - After rotating clockwise from spawn
2 - After two consecutive rotations
L - After rotating counter-clockwise from spawn

Figure 1: Rotation state for each block



Source: https://tetris.wiki/File:SRS-pieces.png

4 Results

From my point of view, I was successful in recreating Tetris. I was able to achieve correct behaviour for every Tetris block. The game also takes into account aberrations, called Wall Kicks, of Super Rotation System, which are commonly used by high-level Tetris players [2].

5 Conclusion

It was great introduction to game development and will certainly be a great experience for my further studies of computer graphics.

References

[1] Tetris (NES, Nintendo). Tetris (NES, Nintendo). online, 2020. [cit. 2020–05–04] https://tetris.wiki/Tetris_(NES,_Nintendo).

[2] Super Rotation System. Super Rotation System. online, 2020. [cit. 2020–05–04] https://tetris.wiki/Super_Rotation_System.

[3] Tetris Wiki. Tetris Wiki. online, 2020. [cit. 2020–05–04] https://tetris.wiki/.