



2) Design Rationale

Polyomino Piece Properties:

The custom piece in this puzzle that I made is 7 squares large rather than the standard 4 squares each Tetris piece is. The also having an uneven shape to it. As an object like the other blocks in the Tetris system, it follows the same behaviours as the other pieces, like how it falls, rotates, and locks on to the board. However, its unique size and shape make it harder to place compared to the regular tetronimos. Because of its shape it cannot fit cleanly into most spaces unless the board is somewhat prepared for it ahead of time. This makes it super less flexible and more punishing if places incorrectly. Unlike the smaller pieces it cannot easily fix mistakes or fill small gaps. This forces players to think ahead of time about their board around the piece rather than reacting in the moment. It's more like a piece you would instantly want to hold for later. This makes the piece interesting within the Tetris system as it changes how the player interacts with the board and views the board entirely.

Piece Sequence and Board State Relationship:

The piece sequence was made to work directly with the board state I was making rather than allowing for a random placement. Each piece in the sequence has a specific role in shaping the board. Earlier pieces that are being placed down are being placed in a certain way to create the gaps / uneven surfaces that are required to make the piece made fit properly. The relationship between the sequence and the board is all intentional, placing a piece "the wrong way" early on could clear a line, but it will break the setup that is needed for future pieces. The custom piece only appears after the board has been shaped the right way for the board to accept it properly due to its uniqueness. So, it will seem like a difficult object to work with, however its very much needed to fully complete the board. This creates a strong relationship where each piece depends on the previous placement of the other one.

Board State Challenge:

The board state is made to challenge the players. The starting board has a lot of uneven terrain, which restricts where pieces can be placed safely. Each board state makes sure that at least one line is cleared after every piece, keeping the puzzle moving. The behaviour of the board changes as pieces are placed, making gaps that must be filled by the correct piece that is coming up. These gaps pretty much tell you exactly where it must be filled by

the next piece without literally telling you where to place it, its all visual. The challenge comes from understanding how the empty spaces relate to future pieces, not from fast reactions or advanced play styles. The board state encourages careful planning and looking ahead, making sure you understand how the objects and their properties will interact with the board overtime. This creates a fair challenge puzzle that rewards the players that think ahead of what is coming next rather than speed or reflexes.

Game System Development

Custom Gameplay Experience: (Special Board State)

For this assignment, the design was made into a custom gameplay experience using a Special Board State. Instead of starting with an empty board, the game begins with a prefilled layout using static gray blocks that act as obstacles (Big Bang Tetris gamemode). These blocks are not part of any of the active piece and exist only to shape the puzzle. This forces the players to interact with the board differently compared to standard tetris where the early game is very open and forgiving.

The game uses a fixed piece sequence rather than random spawning. The pieces spawn in a specific order (J, T, I, custom P7, L, O) and each one is required to progress the board towards a solvable state. The custom P7 piece comes in only after the board has been shaped in a way that allows it to be fit correctly, making it feel like a key piece rather than just another block.

Once the full sequence of pieces has been placed, the game stops. As this is a puzzle rather than the regular survival based Tetris mode. The goal isn't to last as long as possible but to understand the board, piece order, and unique piece design work together to reach a successful end state.

LINK TO GAMEPLAY VIDEO:

<https://youtu.be/GLgT5lCkuNo>