

# Tetris Video Game

## Group Members

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## Goal

Our plan is to build a Tetris video game system using the hardware on the FPGA board to relay button presses on the keyboard to the game logic. We plan to connect a VGA output for the display for our game. The components that need to be done are: 1) register key inputs from the keyboard, 2) output pixels to a VGA display, 3) generate random tetromino blocks to drop, and 4) detect and clear lines that have been filled.

## Milestone 1

The first phase of our project will be simply to connect our board to a VGA output and a keyboard. We want to have key presses reflect as changes on the screen, which provides the basis for the remainder of our project. We wanted to create a simple test with a white square on a black grid, and be able to use the arrow keys to move the square one grid in each of the four cardinal directions.

## Milestone 2

The second phase will be to begin introducing the game logic. There are six different types of tetromino blocks: the O, J, L, Z, S, and I blocks. The game should randomly generate a

block at the beginning of the game, and it should begin falling at a regular rate on the screen when it appears. The left and right arrow keys should move the piece left and right as it falls, the down key should make the key fall faster, and the up key should rotate the piece counterclockwise. The piece should stop falling when it reaches the bottom of the grid.

### **Milestone 3**

The third phase will be to make this process iterative. Each time the piece falls to the bottom of the grid, the process should repeat, and the game should generate a new block to follow the same process as the first block. The piece should stop falling if it either runs into the bottom of the grid, or into a block that has previously been placed. The game should also check for rows that have been filled each time a piece has fallen, and clear rows that have been filled.

Furthermore, we plan to introduce scoring to the game. We can display a running score somewhere on the screen, to be updated with each row the player clears. Further area of development is to introduce a high score functionality that keeps track of the highest scores that have been achieved as long as the system is not shut down.