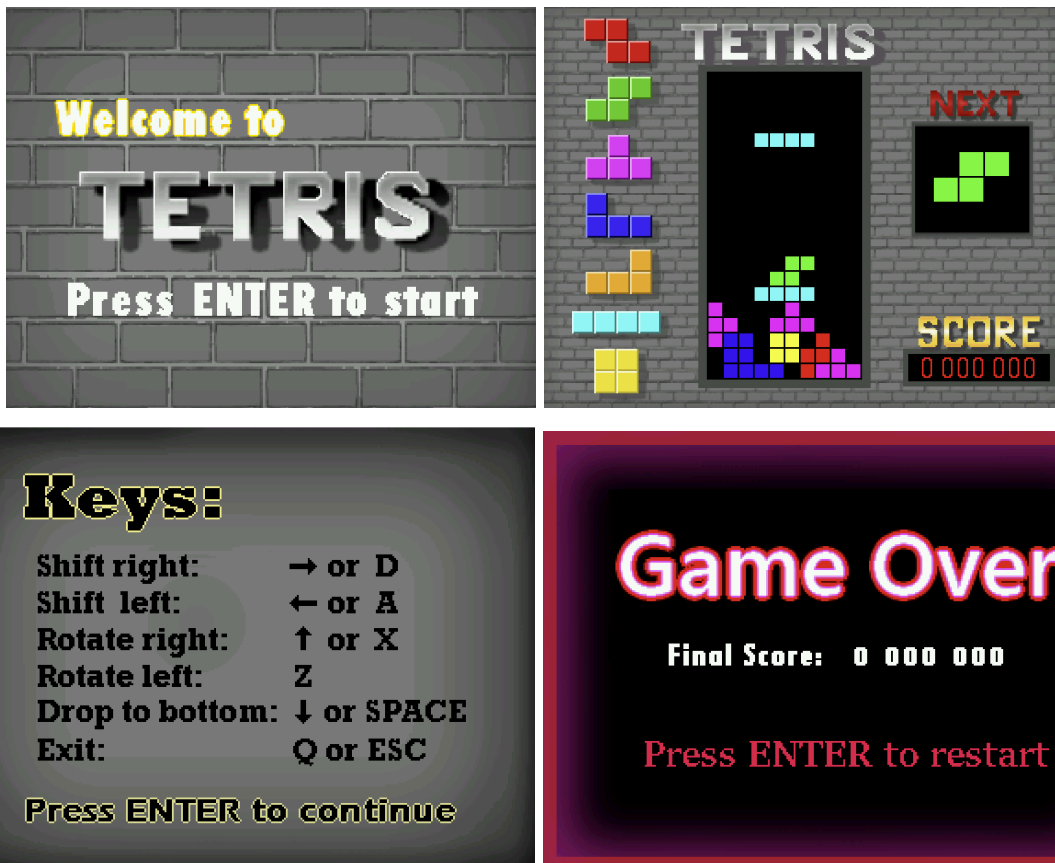


**ECE243 - Final Project**  
**Project: Tetris**  
**Team: Richelle Pereira & Christina Xie**



**Description:**





Player controls geometric shapes, via PS/2 keyboard, descending on the game board on the VGA display. These shapes are composed of four square blocks each. The main objective is to strategically stack the shapes to form complete horizontal lines, facilitating their removal from the board and accruing points without filling the board to the top. The game is over when the board is filled to the top of the board, and no more blocks can be placed.

**Featured:**

- Used polling for checking inputs for PS/2 keyboard and clears the FIFO.
- Used a scoring algorithm to check and keep track of cleared rows and accordingly shift the board down by the number of rows cleared.
- Used algorithm to handle game logic depending on the inputs.
- Used helper function to rotate, shift, and drop down of the block and clearing of previous block for each previous animation.

- Coded proper collision logic to check when a block collides with another block or is within boundary.
- Used double-buffering to render the game on the VGA display for smoother visuals.
- Used structs like 'TetrisBlocks' to access the block attributes, positions and offsets.
- Used audio interface to output sounds for a major change (i.e. sound is outputted when... (1) row is cleared, (2) a shape collides with another shape, 3) game is over.

### Controls:

- ❖ Used PS/2 keyboard interface to control the geometric shape's descending movement on the board.
- ❖ Following are the control keys:
  - Start/restart/continue game: 'ENTER'
  - Shift shape right:  or 'D'
  - Shift shape left:  or 'A'
  - Rotate clockwise:  or 'X'
  - Rotate counter-clockwise: 'Z'
  - Hard drop-down  or 'SPACE'
  - Exit game: 'Q' / 'ESC'

### Researched Material:

[https://www-ug.eecg.toronto.edu/msl/handouts/DE1-SoC\\_Computer\\_Nios.pdf](https://www-ug.eecg.toronto.edu/msl/handouts/DE1-SoC_Computer_Nios.pdf)

[https://www-ug.eecg.utoronto.ca/desl/nios\\_devices\\_SoC/ARM/dev\\_ps2.html](https://www-ug.eecg.utoronto.ca/desl/nios_devices_SoC/ARM/dev_ps2.html)

[https://github.com/kk4ead/vga-vector/blob/master/alt\\_up\\_ps2\\_port.c](https://github.com/kk4ead/vga-vector/blob/master/alt_up_ps2_port.c)