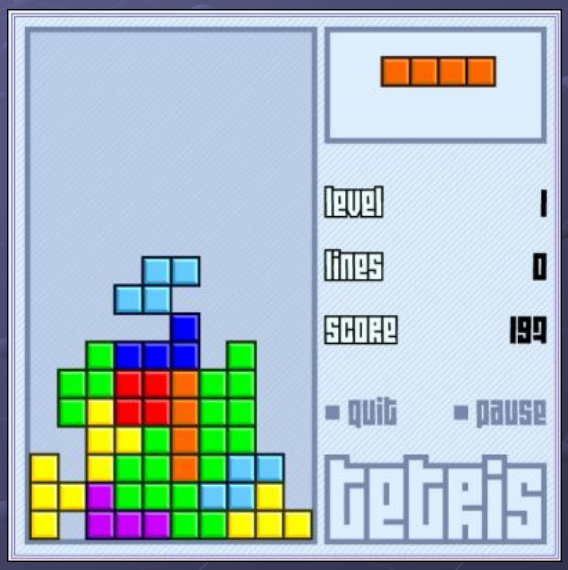
Interactive Tetris

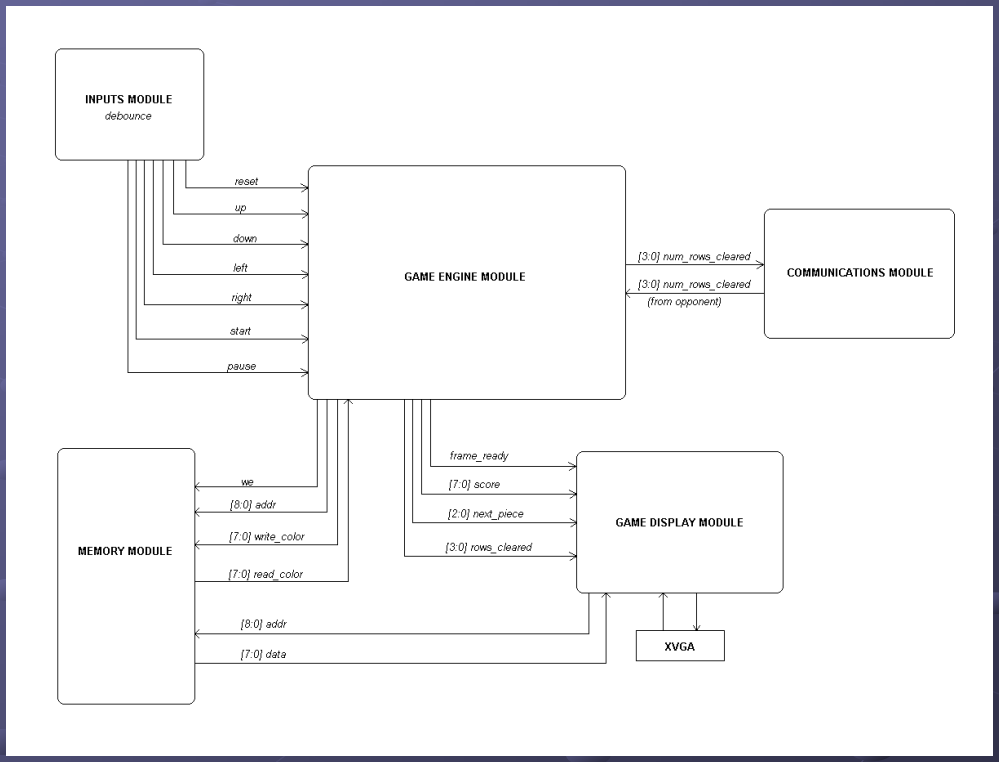
By Igor Geller and Lily Wang

Description

- An interactive game of Tetris on a grid of 20 by 10, where two players communicate over the serial ports of two labkits.

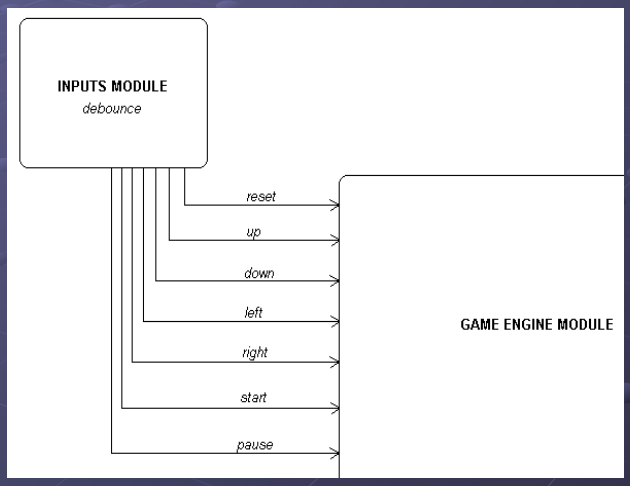


Block Diagram



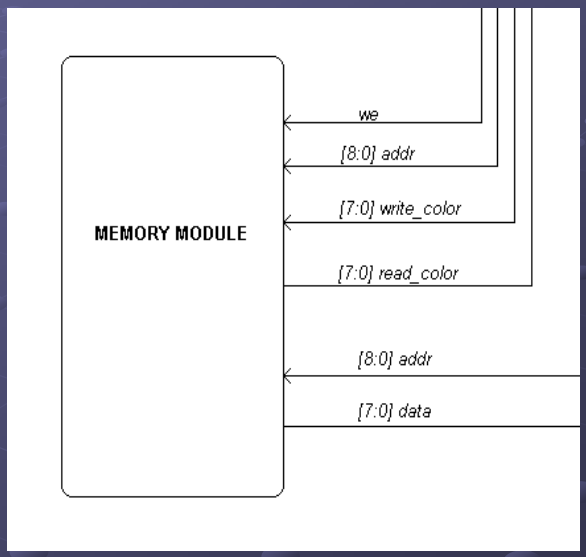
The Inputs Module

- This module interfaces user inputs from the keyboard to the game engine. Pressing keys on the keyboard will serve as interaction for each player, which will be worked out in the logic of the game engine.



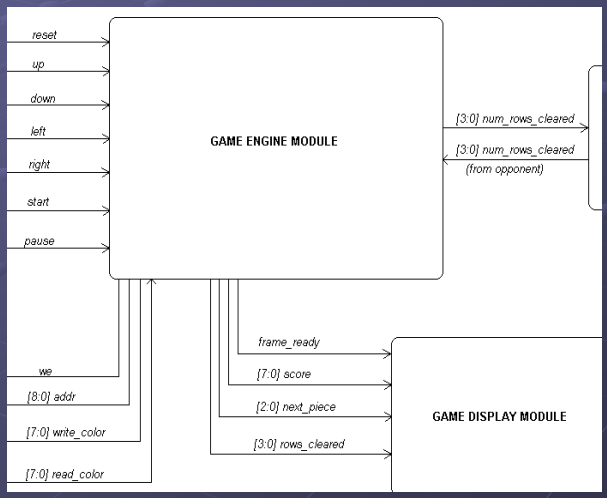
The Memory Module

- Dual-port BRAM 512x8
- Stores the 8 bit colors
- Game Engine writes to and reads colors from BRAM
- Display module reads colors from BRAM

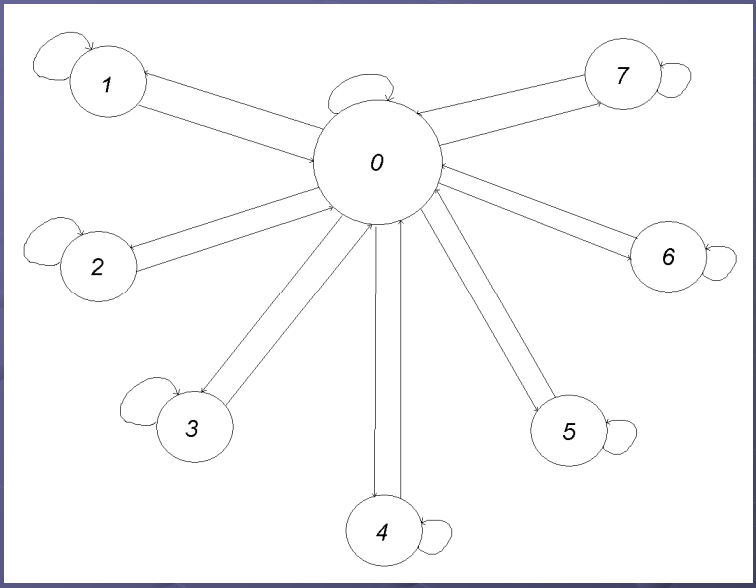


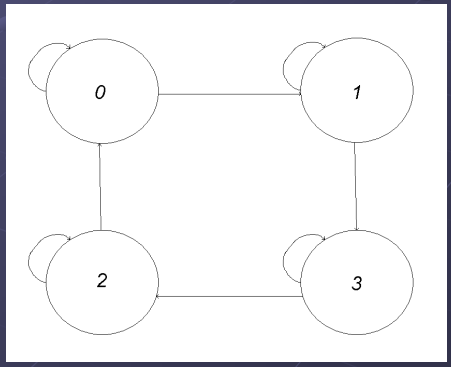
The Game Engine

- The game engine will consist of three parts:
- Part 1: movement of an active shape defined in a 4-by-4 square based on the inputs to the module.
- Part 2: Transfer of the “active” status from a given shape to a newly generated one at the top of the screen.
- Part 3: Updating the stored values after the completed row or a signal from communication module.



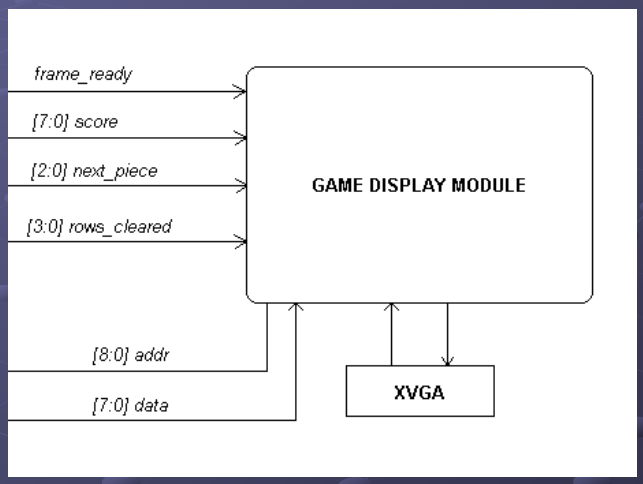
Game Engine FSM





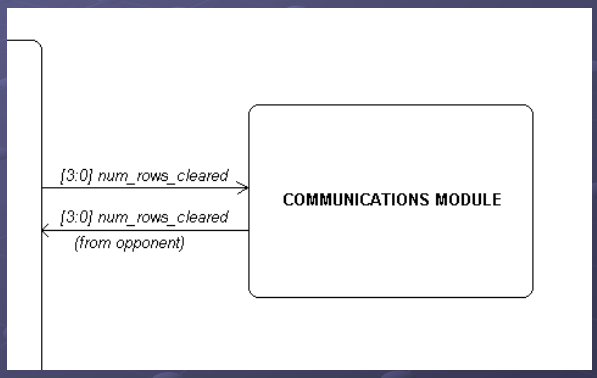
The Game Display

- Input: colors accessed from the memory module, and game information from the game engine module.
- Outputs to memory module an address created by the concatenation of the x and y coordinates of the square.
- Outputs to XVGA a pixel at the appropriate square of the corresponding color.



The Communications Module

- Modular design allows us to first build the one player tetris game, then add communications between labkits to implement the full two player game.
- This module handles the serial port communications between the labkits of two Tetris opponents.
- Takes as input a signal *Num_Rows_Cleared* from the game engine module which it sends in a packet over the serial port to the opponent's labkit, causing his/her game speed to increase by a number proportional to *Num_Rows_Cleared.*



Testing

- The inputs module: tested by hooking up signals to the LED display on the labkit.
- The memory module: tested by manipulating data using switches and the enter button as inputs.
- The display module: tested by feeding in a test memory block.
- The game engine: tested by plugging into the display module.
- The communications module: tested by feeding the packets from the serial port in a self-loop.

Timeline

- 11/21 - Finish the display module
- 11/21 - Implement part 1 of the game engine
- 11/26 - Implement part 2 of game engine
- 11/30 - Implement part 3 of game engine
- 11/30 - Finish communications module.
- 12/3 - Integrate display and game engine; finish implementing one-player tetris.
- 12/5 - Finish two-player tetris.

Possible Extensions

- Audio
- Display next piece
- Track and display score
- Allow both clockwise and counterclockwise piece rotation
- Smooth fall achieved by interpolation