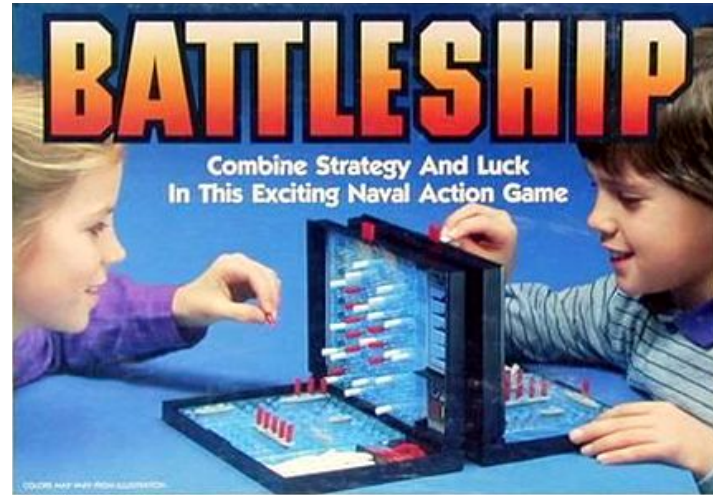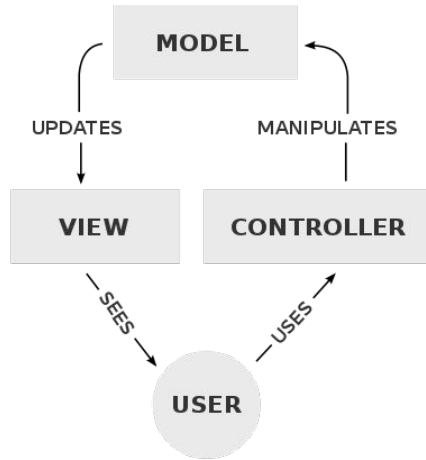# Battleship: FPGA Edition

Harry Guo & Wei Tang

Overall Idea

A simple modified version of battleship that pins 2 players head to head using the FPGA inputs and a processor. MVC concept design.

Game Flow

1) Player 1 places their ships on the board
2) Player 2 places their ships on the board
3) Player 1 and Player 2 alternate turns until one player has eradicated all the ships of the opposing player

I/O

1) 4 Pushbuttons
   a) Up, Down, Left, Right
2) Multiple Slide Switches
   a) Placing a ship
   b) Bombing a ship
   c) Setting the orientation of ship
   d) Stages
3) VGA
   a) Game Display

Hardware Usage

- Use of multiple VGA controller modules to implement movement and display on the board

Processor Usage

- Two Doubly clocked memory to keep track of ship statuses
- Modified the STORE WORD instruction to fit use in the game
- Constant values stored in registers

Double Doubly Clocked Memory Units

- One that updates display
- One that keeps track of which block we were at
- Both units wrote to matching copies of memory

Modified STORE WORD

sw $X, N(0)

X = value to be stored

N = immediate value to be added to boxSelect

Code Flow