CONNECT-4 GAME

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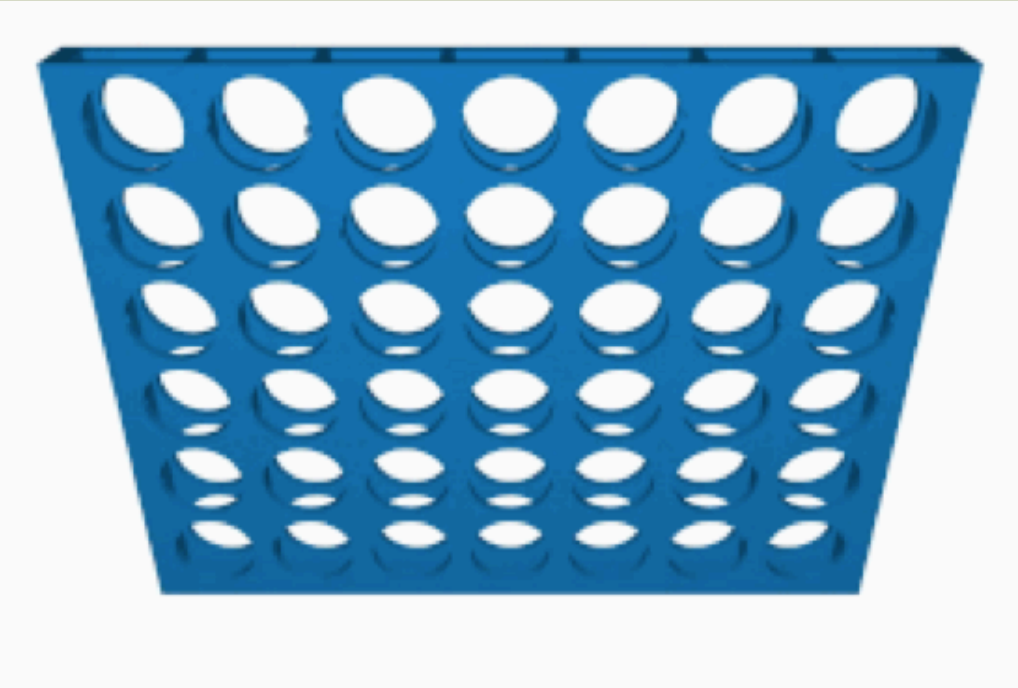
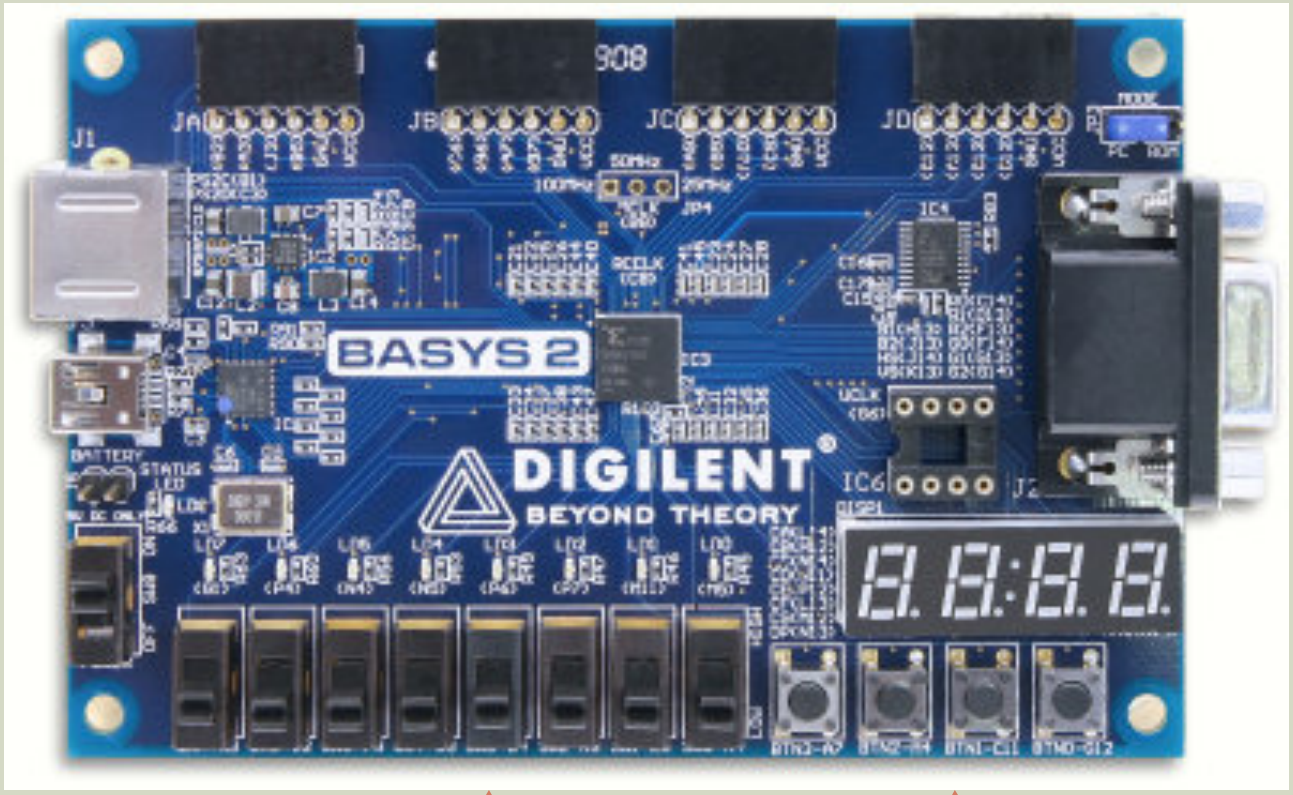
ECE 3135
Final Project



6 rows x 7 columns

Take turns dropping discs from the top of this grid. Disc will fall straight down and occupy the next available space.

Objective: Be the first player to get four discs in a row. Vertically. Horizontally. Or Diagonally.



Switches

Buttons

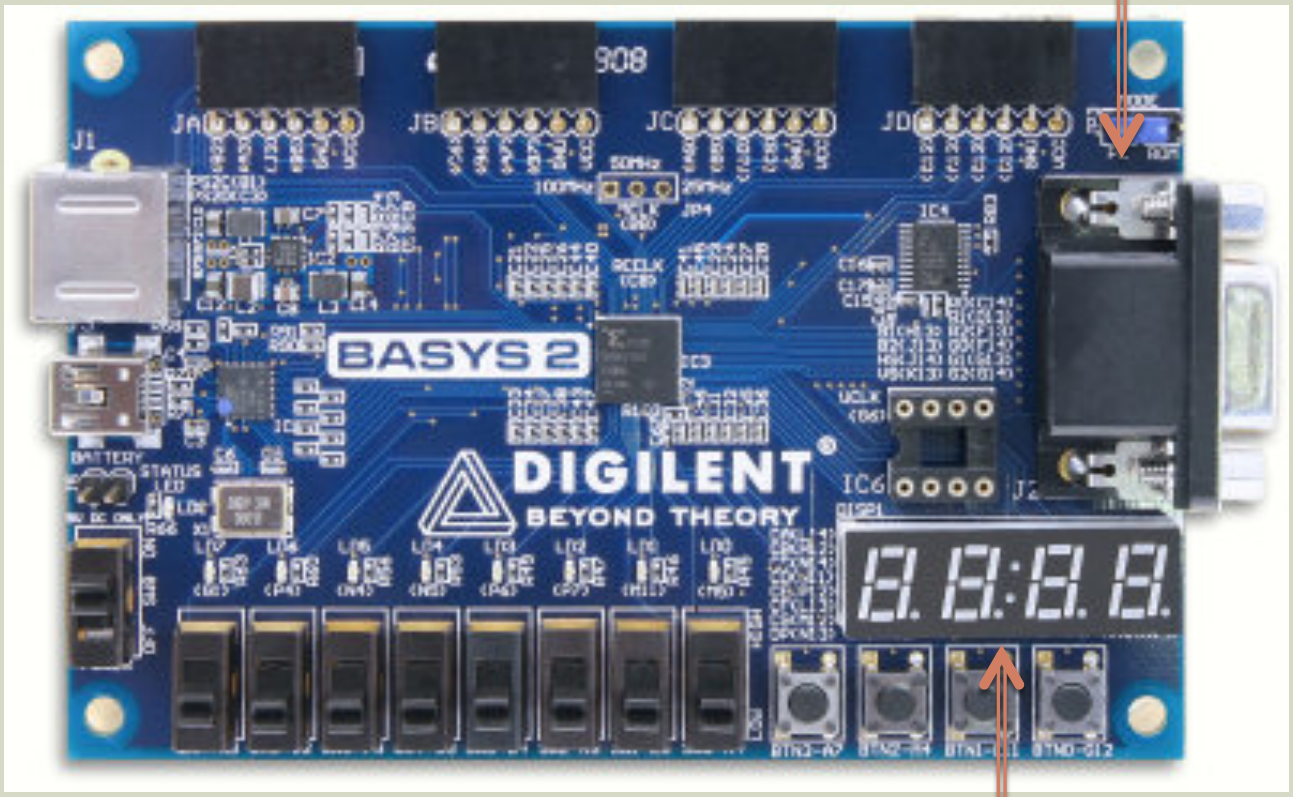
User Inputs

Sw6-0 Column Input

Btn0: P1 Input
Btn1: P2 Input

Btn3: Reset

VGA



Seven Segment Displays

Outputs

SSD0: Win Condition
(0 = Draw/None)
(1 = Player 1 Wins)
(2 = Player 2 Wins)

SSD2: Column Selected
(1-7, E = Enter)

SSD3: Player Turn

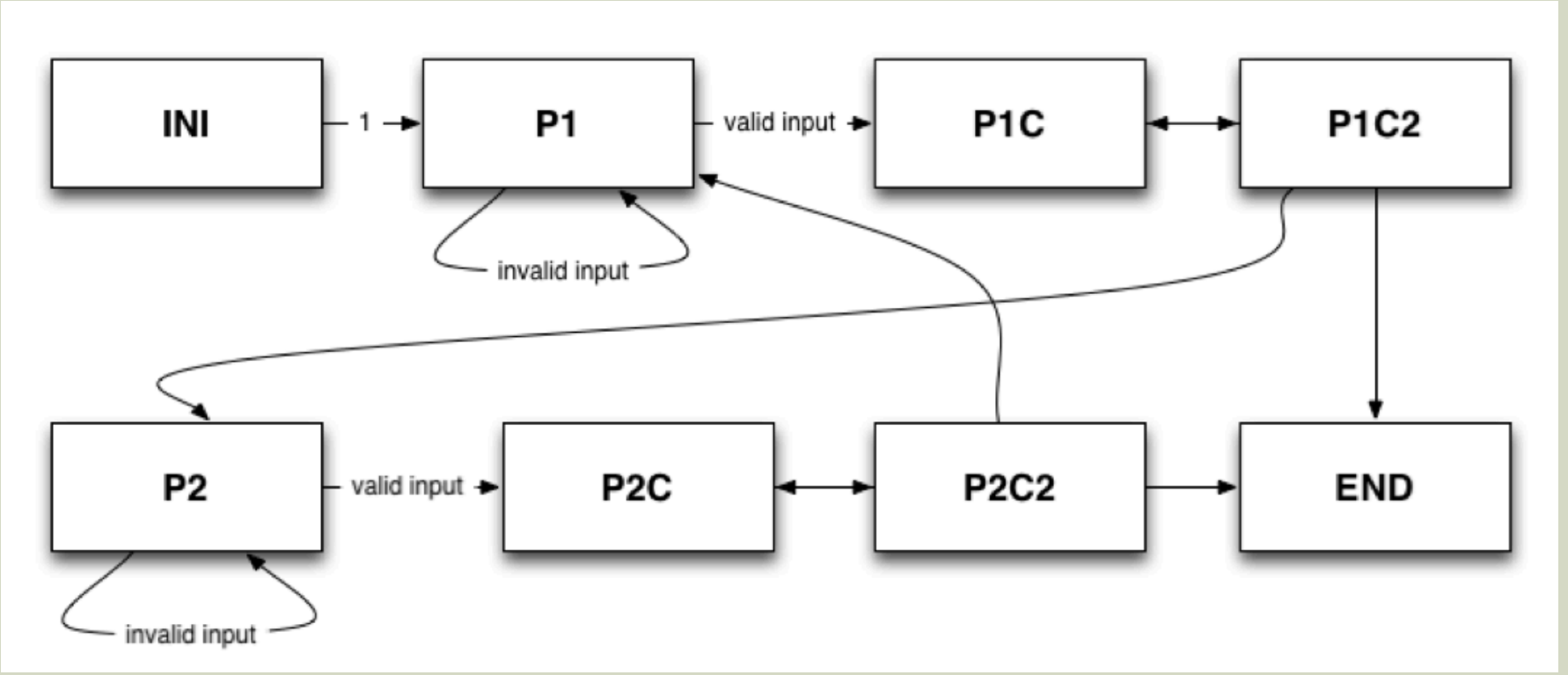
VGA

MODULES

- Connect Four Top Module (All Input/Output, Module Instantiation)
- Connect Four SM (State Machine)
- Connect Four VGA (VGA Output Generation)
- Sync (Sync Generator – Vertical, Horizontal)
- Deb (Debouncer – to get clear picture)

- Connect Four UCF

STATE MACHINE DIAGRAM
(IMPLEMENTATION)

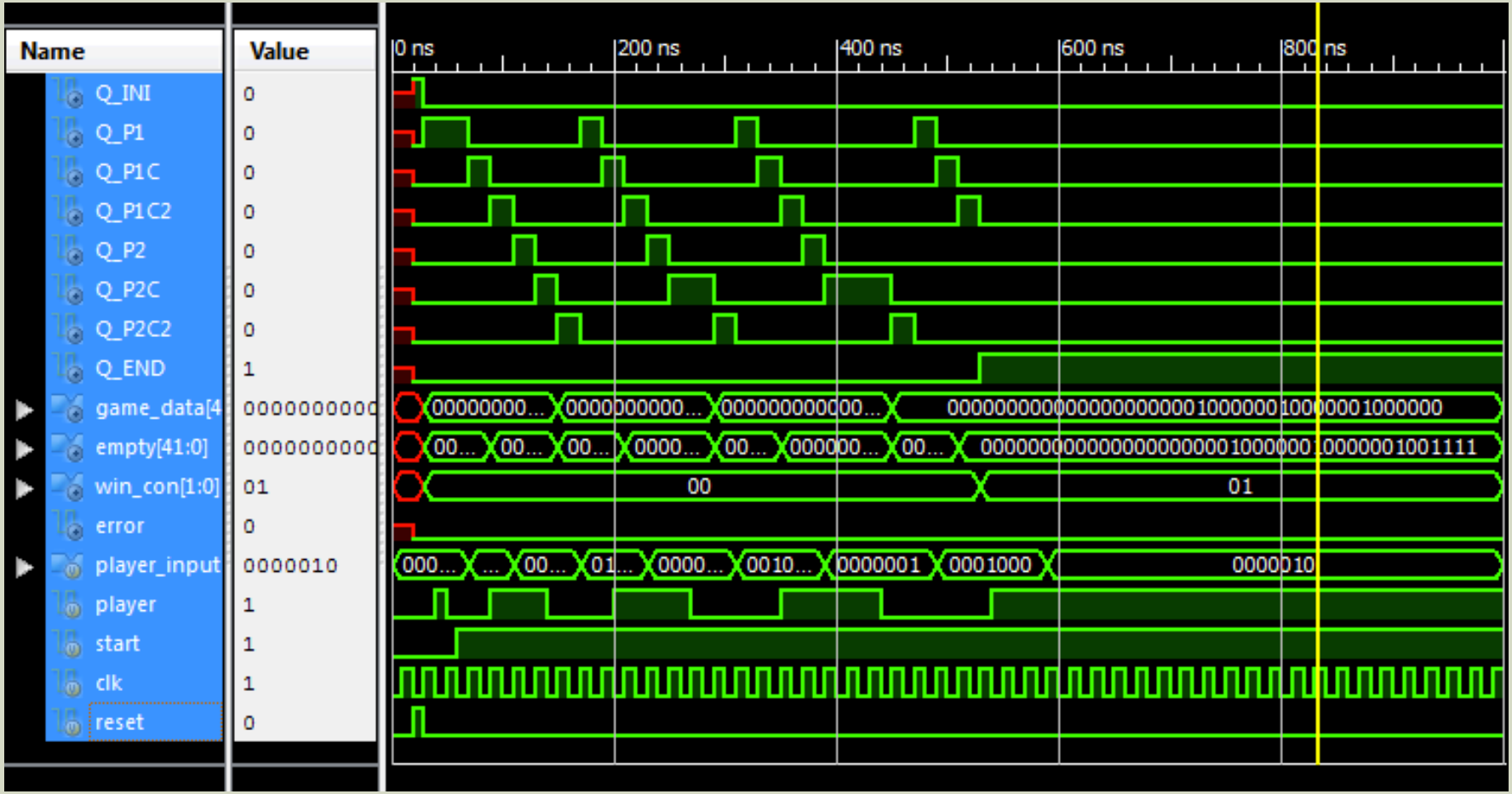


STATE MACHINE DIAGRAM
(STATE DETAILS)

- IN1: Initial State
- P1: Player 1 Move/Validate Input
- P1C: Check game logic/Update board/Output
- P1C2: Check for End Condition
- P2: Player 2 Move/Validate Input
- P2C: Check game logic/Update board/Output
- P2C2: Check for End Condition
- END: End Condition Met/Logic/Stop Game

*SSD Updating in Real-Time

STATE MACHINE WAVEFORM

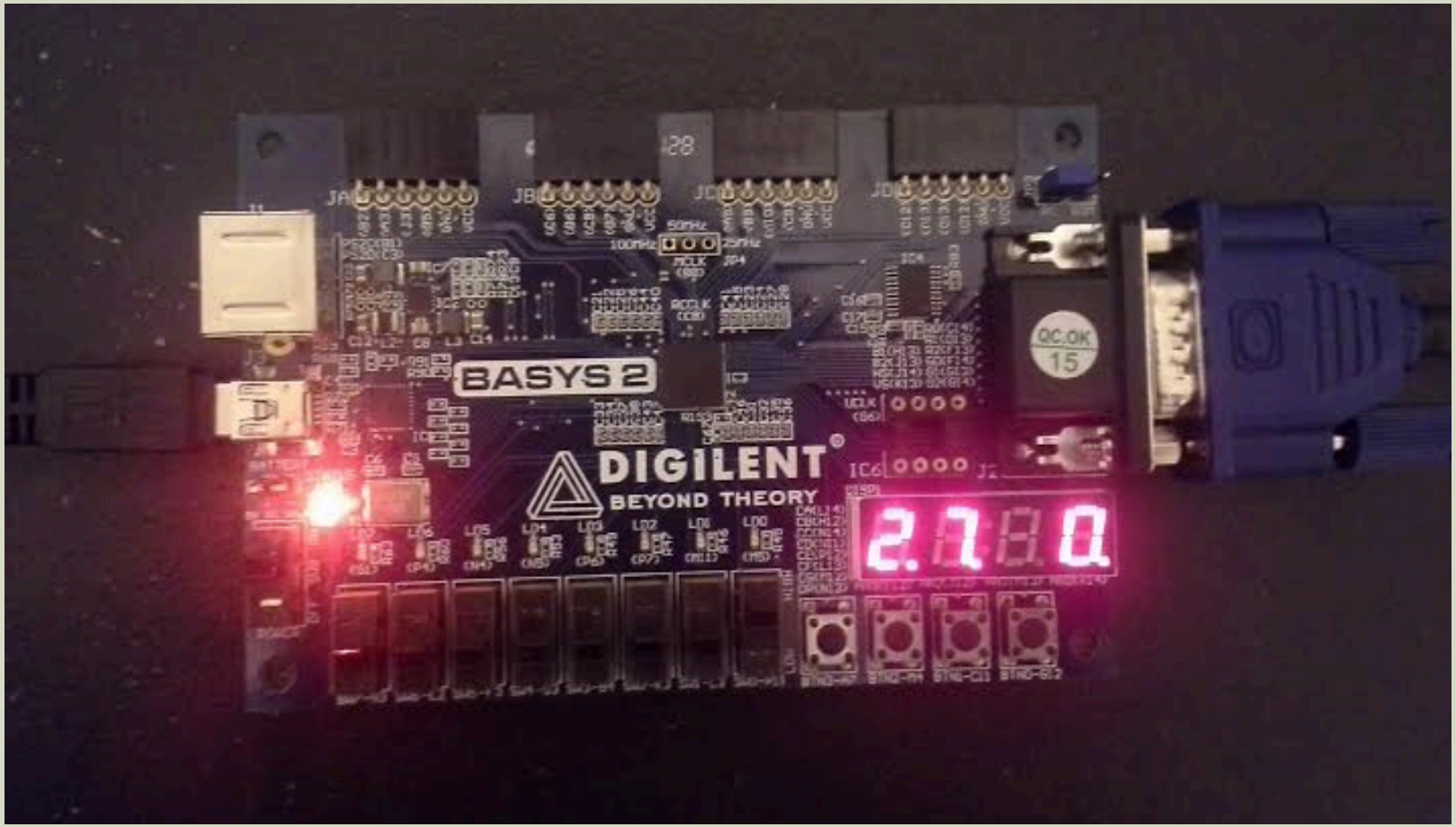


VGA DISPLAY

Green Lines: Boundaries

Red Squares: Player 1
Blue Squares: Player 2

SEVEN SEGMENT DISPLAYS



CONCLUSION

- Which topics we utilized from class/lab:
  - VGA Demo
  - State Machine/Diagram
  - SSD Implementation
  - Dividing up Modules – Instantiation
  - Efficient Coding
- Most Difficult Aspects of Project:
  - VGA Display
  - Integration of all Modules
  - Debouncing
- Potential Modifications:
  - Circles – not Squares
  - Player blocks shown above Grid

IN-CLASS DEMONSTRATION

THE END

Thank You