The Interactive Snake Game

ECE532 Digital Systems Design Final Demo

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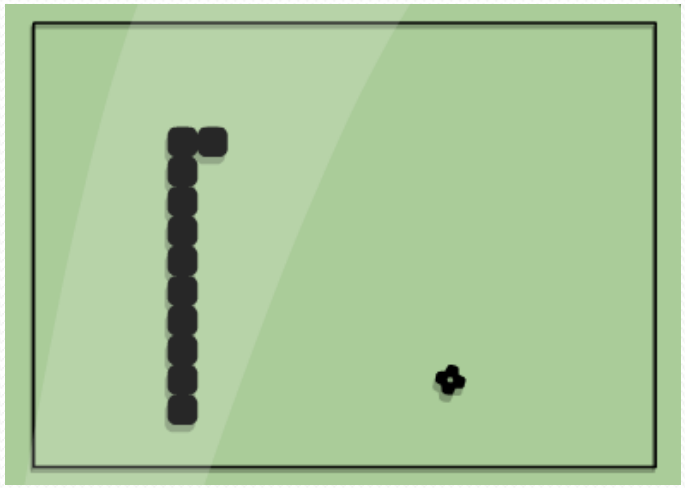
Project Overview

SNAKE



Classical Game + Motion Detection

Xilinx XUP Virtex II Pro Development Board

Review of Project Goals

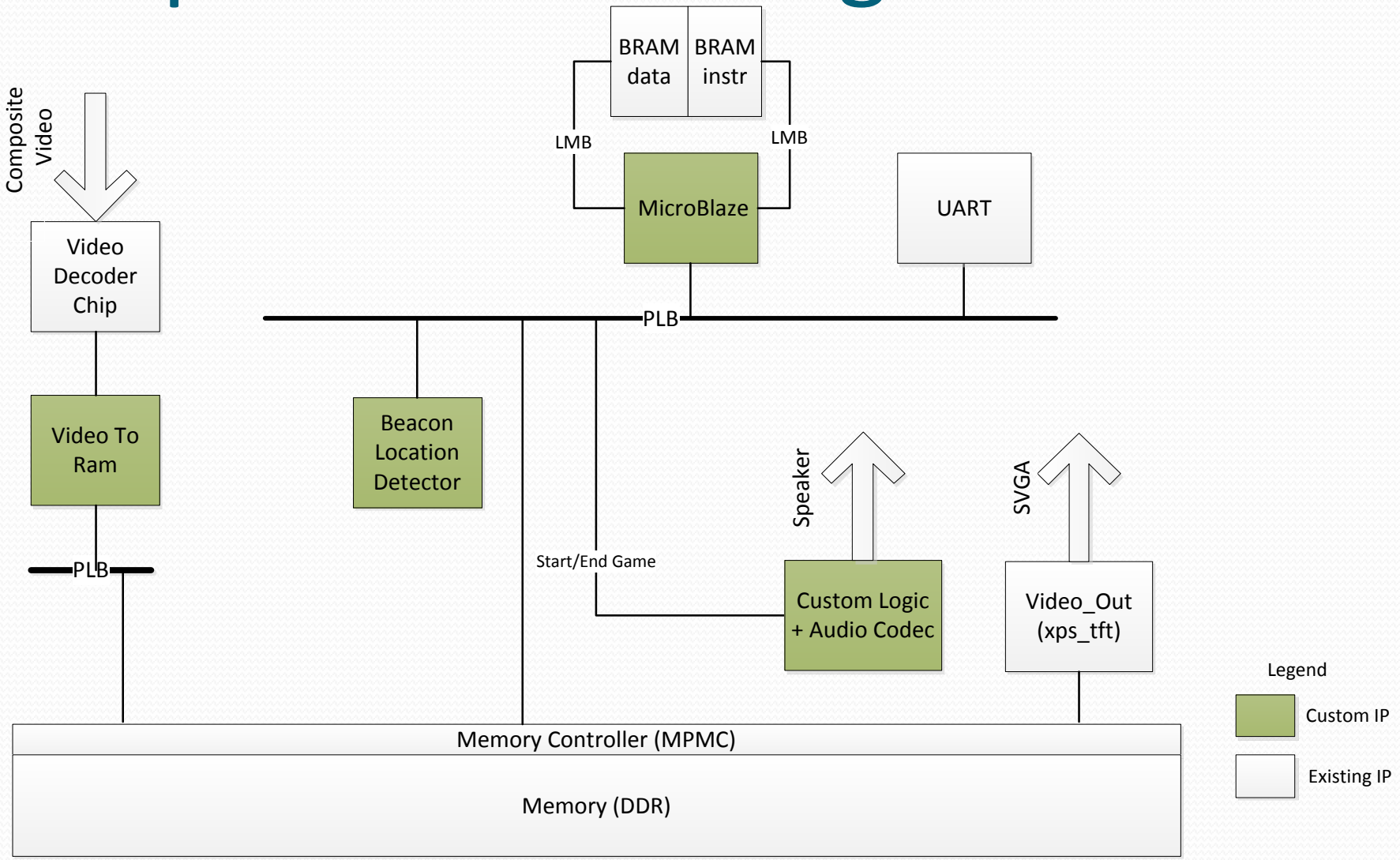
Major Goals:

- ✓ Basic game rules (Start – Score – Game Over)
- ✓ Real-time detection and tracking of the beacon
- ✓ Real-time projection of snake body
- ✓ "Game Start" and "Game Over" screens
- ✓ Maintaining an acceptable frame rate so that the game is playable

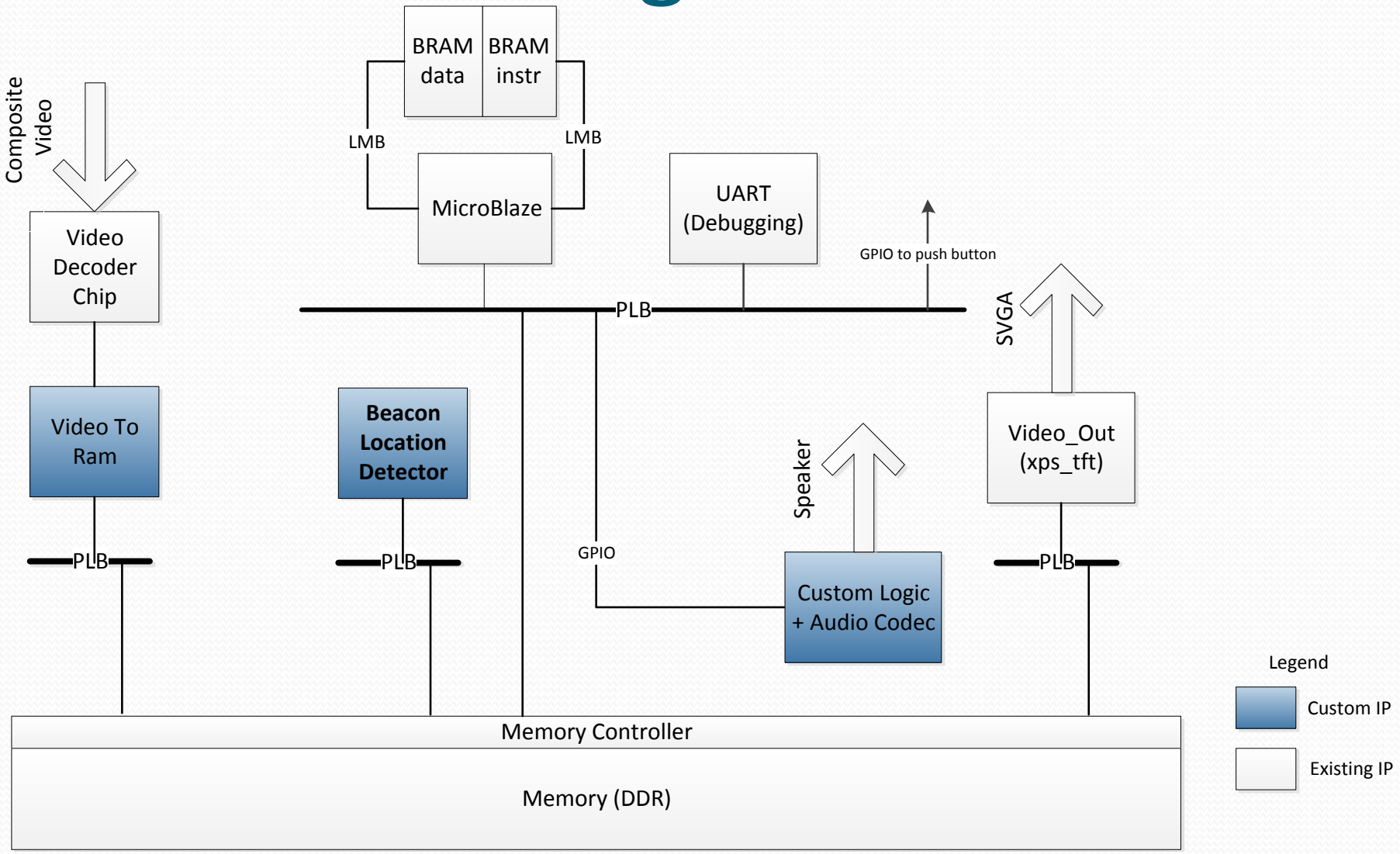
Optional Goals:

- ✓ Beacon location calibration
- ✓ Video effects, including colour and shaping of objects on screen
- ✓ Sound effects for events in game
- ✓ Increasing game difficulty
- × Additional obstacles on screen for increased difficulty
- × Difficulty level selection menu at game start screen
- × Numerical displaying of scoring
- × Automatic pause/resume when beacon is not detected

Proposed Block Diagram



Final Block Diagram



Design Process

1) Group **discussion** on design requirements and system architecture
2) **Partition** the entire design into smaller pieces (System » Software + Hardwar » Individual blocks)
3) Specify **interface** for each interconnection between blocks
4) Assign blocks to individual members to work in **parallel**
5) Individual approach: **test-driven** iterative design
6) **Integrating** finished pieces together, testing on larger scale
7) If anything goes wrong, goes back to step 3) to check interfaces

Difficulties

- The EDA tools are outdated and buggy
- Technical issues: PLB protocol; video initialization code; out of BRAM
- Catch up with delayed schedule
- GUI and graphics are time consuming
- Nature of digital design: slow compilation, simulation for testing and debugging

What We Learned

- General approach to designing digital systems as a group
- Technical skills: EDA and other software, test-driven design approach, etc.
- Efficient time management is critical
- Communication is important

Acknowledgement

- Professor Paul Chow
- Ruediger Willenberg
- All our fellow students!

Demo & Questions

Thank you!