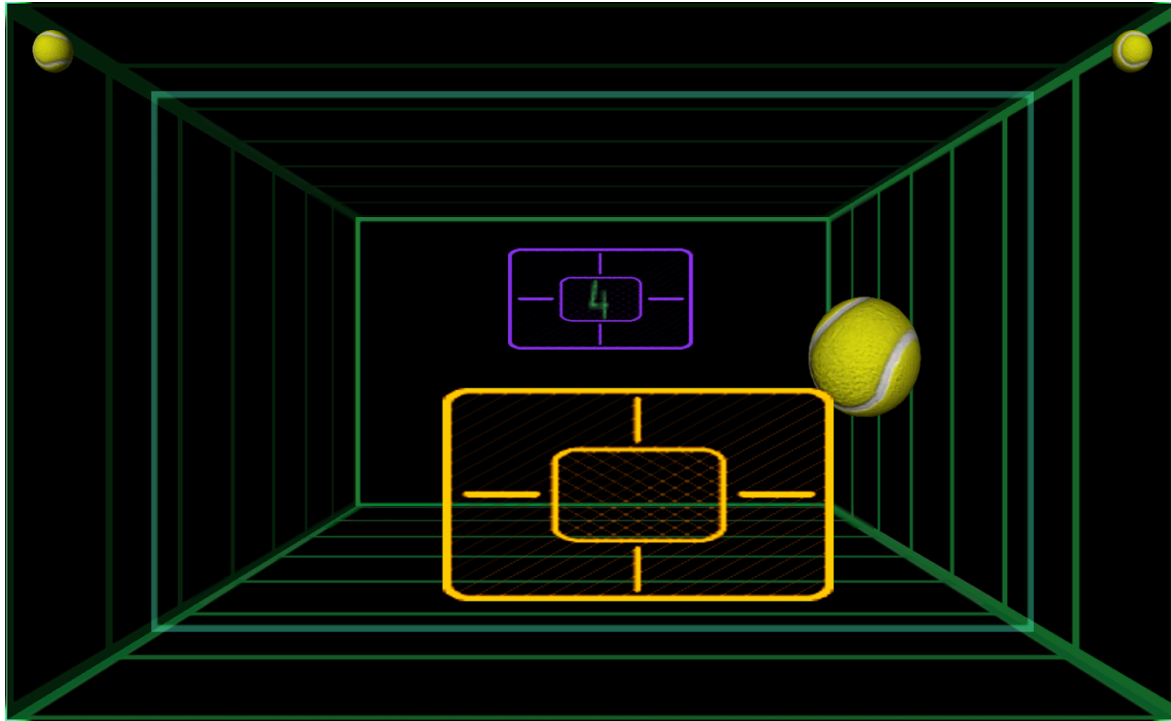


# 3D Multiplayer Pong

6.111 Fall 2016 Final Project

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# Game Overview



Pong, but in a 3D space

2 Players

Each player will have their own paddle and screen

Audio and score keeping for immersive experience

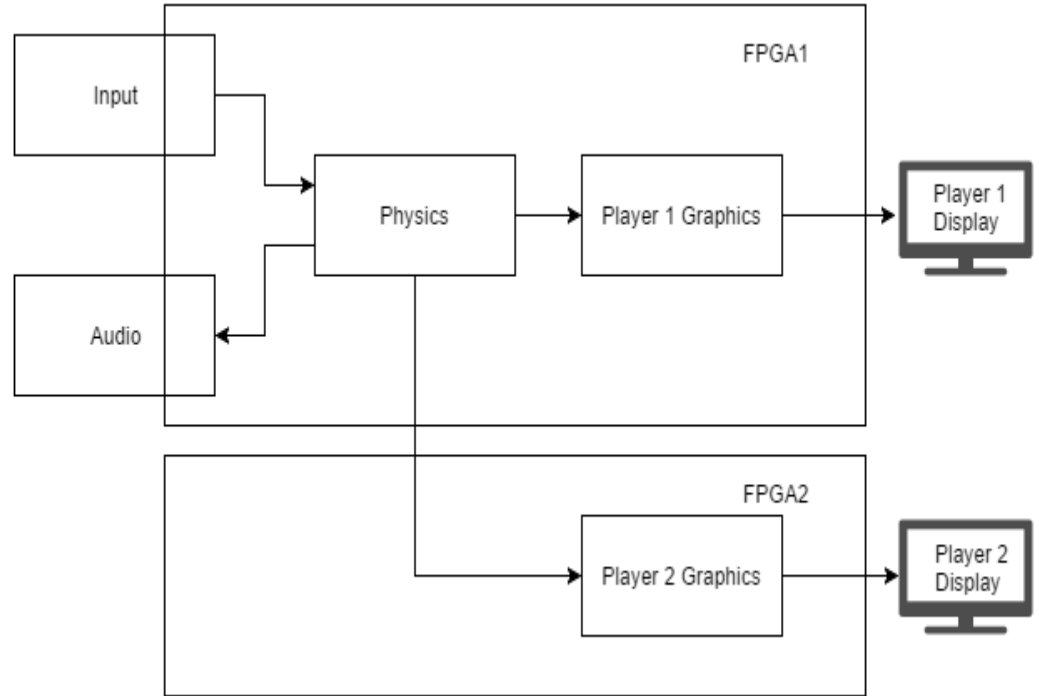
# Implementation Overview

2 Gyroscope /Accelerometer  
Paddles for two player  
experience

Physics Module for the Game  
Logic

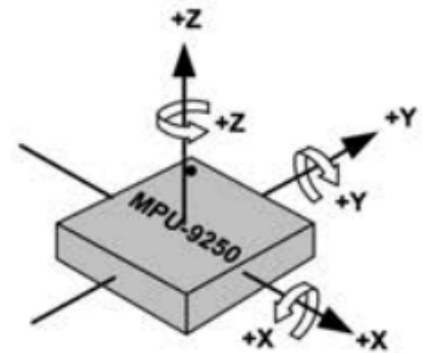
Audio for paddle collisions/  
goals

Two FPGAs for one screen  
per player



# Sensor Input Processing

- MPU-9250
  - Accelerometer: Tracks paddle direction
  - Gyro: Tracks paddle angle relative to screen
- Sensor → ADC → Processing → Physics Module
  - SPI Communication between sensor and FPGA1
  - Calibration to set frame of play
  - Sample at 65MHz
  - Processed data ready for physics module



# Game Physics

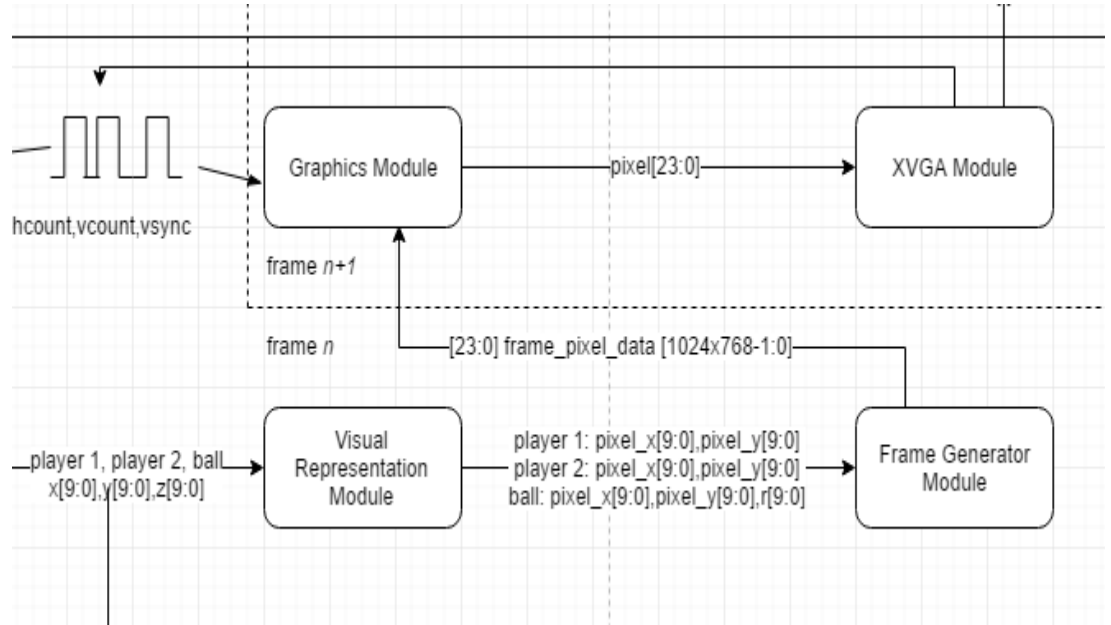
- Takes output from the gyroscope/accelerometer input processing module
  - Computing based on 3-D gamespace
- Accounts for angle of sensors

# Graphics

Visual Rep Module will turn 3D coordinates to 2D sprite coordinates and size parameters

Frame Gen Module will create frame data (scene, sprites) in BRAM.

Graphics/XVGA Module will send the frame data to the VGA on the next frame



# Audio

- Sound when
  - Game begins
  - Paddle hits ball
  - Player scores
  - Game ends
- Implementation
  - Tone generator

# Stretch Goals

- 3-dimensional multiplayer pong provides many opportunities to get creative
- Software-side: gravity, obstacles, one-player AI-based gameplay, shading
- Hardware-side: simulated sensor spin



# Timeline

11/7-11/1: Acquire hardware, test hardware, wrap up design conceptualization, presentation

11/14-11/18: Finalize proposal, begin implementation, develop sensor input module

11/21-11/26: Finish developing game physics, X VGA module, simple graphics generation

11/28-12/2: Polish graphics module, extend implementation with audio module

12/5-12/10: Work on stretch goals, publish results in final project report

12/12-12/17: Demo week

Questions?