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Abstract

Our project is developing a FPGA version “Flappy Bird” controlled by APP on android phone via bluetooth. We displayed the game on a monitor through VGA port. Additional to the origional game mode. we added a two-player mode providing competition between friends and the hard mode with changing barrier openings.

Special Instructions

According to ucf we use, Bluetooth chip is plugged in POMD BANK0.

Code

UART.v

This module is used for communication between Bluetooth chip and FPGA board. The duplexing communication is on a baud rate 9600. The input and output data are transmitted in ASIC code wich is a 8-bit packet.

main.v

This module is the main logoic module that connects all other functional modules.
Within it, there are decoders that transfrom the control signal from UART to one hot code that can be easily identified by functional parts in the module.
There is also a switcher that automatically switch signals between keyboard and bluetooth.
Control signals are used to control bird position and overall game state machine.
Random number generator is used to generate barriers randomly.
Collide controller and score counter work based on bird position and barrier positions.
All those variebles are output to VGA module for display.

VGA

mem_interface: convert the indexed image to 8 bit color

display_mux: display each object in different layer

bird_state_gererato.v: gererate bird state to make bird fly

SD card

SD card is a failure of this project. SD card transmit commands and response between master and SD card via CMD pin. And the data is transmitted via CMD0 pin if using spi mode as well as low speed SD mode, or via CMD0, CMD1, CMD2, CMD3 in high speed SD mode. Usually the first step is sending CMD0 to SD card to make the card idle, which is 01 000000 00000000000000000000000000000000 1001010 1. The first 2 bits 01 are the start bits, followed by the 6-bit command index 000000, and then followed by the argument from bit position 39 to 18, which are all zeros for CMD0. Then 1001010 is the Cyclic Rudundancy Code (CRC), followed by 1 which is the start bit. The response should be 00 000000 00000000000000000000000000000000 0000000 1, however, This response have not been detected, and the reason have not been figured out. The code used have beed attached.

cmd_gererator.v: gererate CMD0

response.v: detect response of CMD01 and set an led on

BTClient.java

Main function creat RFcomm Socket for connect to Bluetooth chip and also defines how the button work by using onclicklisteners() and ontouchlisteners().

playerlayout.xml

Defines all button positons and textviews to show on the screen.