COMPSYS 305 Interim Progress Report

Team Oreos: *Group 23*

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Game strategy, and design specifications and plans

This mini-project aims to create a Flappy Bird game by programming a Terasic DEO board in VHDL. This game is controlled and played using a PS/2 for mouse, DIP switches, push buttons available on the DEO board with a VGA for the monitor. The FPGA carries out the game logic. The game is displayed on a VGA screen with a resolution of 640 x 480 pixels. It could be displayed on an ordinary computer monitor via the VGA interface.

The game's objective is simple: keeping the bird alive as long as possible by avoiding the pipes and the upper and lower boundaries. The player can do so by using the PS/2 mouse so that the bird keeps on flapping its wings. If the bird hits a pipe or touches anything, it loses life points, and if it stops flapping, it free falls towards the ground and dies. Moreover, if the bird is not flapping its wings, it would free-fall towards the ground and die.

When the console is powered up/restarted, the main menu will appear, asking the player to select the game mode. The game will have two operation modes for the player to choose from; Training Mode and Single Player Game. The player can choose the game mode from the DIP switches on the console (the DEO board). The game can be started by pressing the push button on the console.

The Training mode is the lowest level, and it will run until the blood/life of the bird will become zero. In this mode, the player would get to know how to play the game. After the blood/life of the bird becomes zero, i.e. the bird dies, the player will return to the main menu asking if they want to restart the Training Mode or choose Single Player Game mode.

In Single player mode, the aim is to keep the bird alive as long as possible until the bird has finished the levels. The player will be able to score based on how many pipes they have crossed without hitting a boundary. If the player hits a boundary they will lose a life and respawn at the beginning of the level. If they lose three lives they will lose the game. After a certain score has been achieved the level would increase. With each level the speed of the game will increase which would increase the difficulty. If the player manages to stay alive after completing level three they will win the game. The game also contains bonus features like milk bottles which increase the life of the bird and mint lollies which the player can collect to increase their score.

Block diagram showing all the components of the game and their interfaces

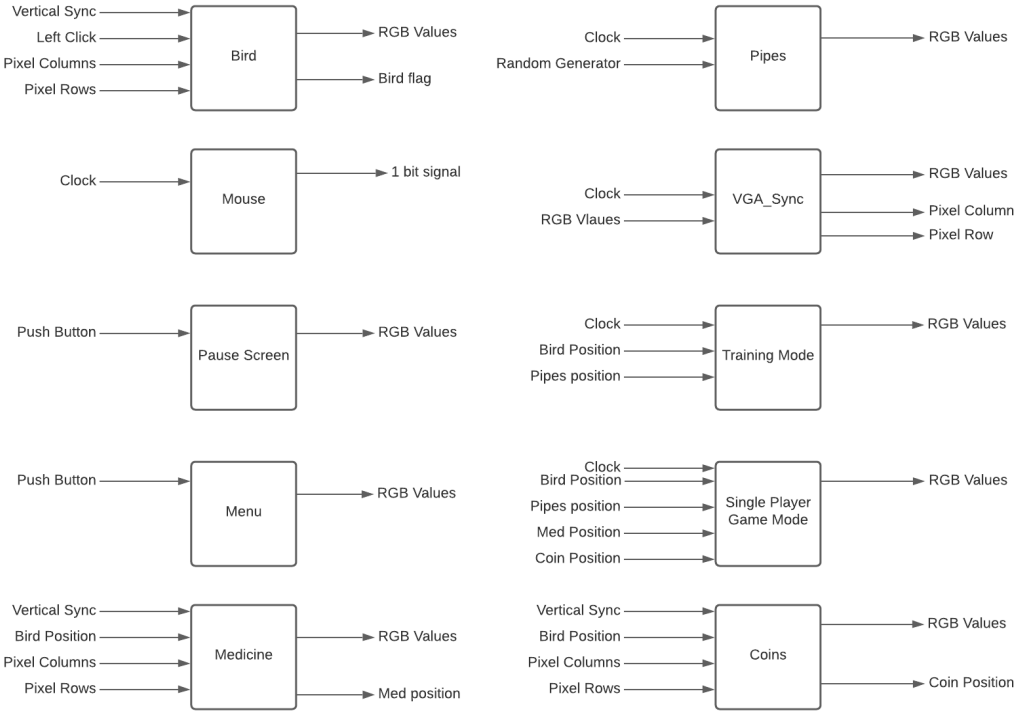

Fig 1: Block diagram

High-level state machine of the game

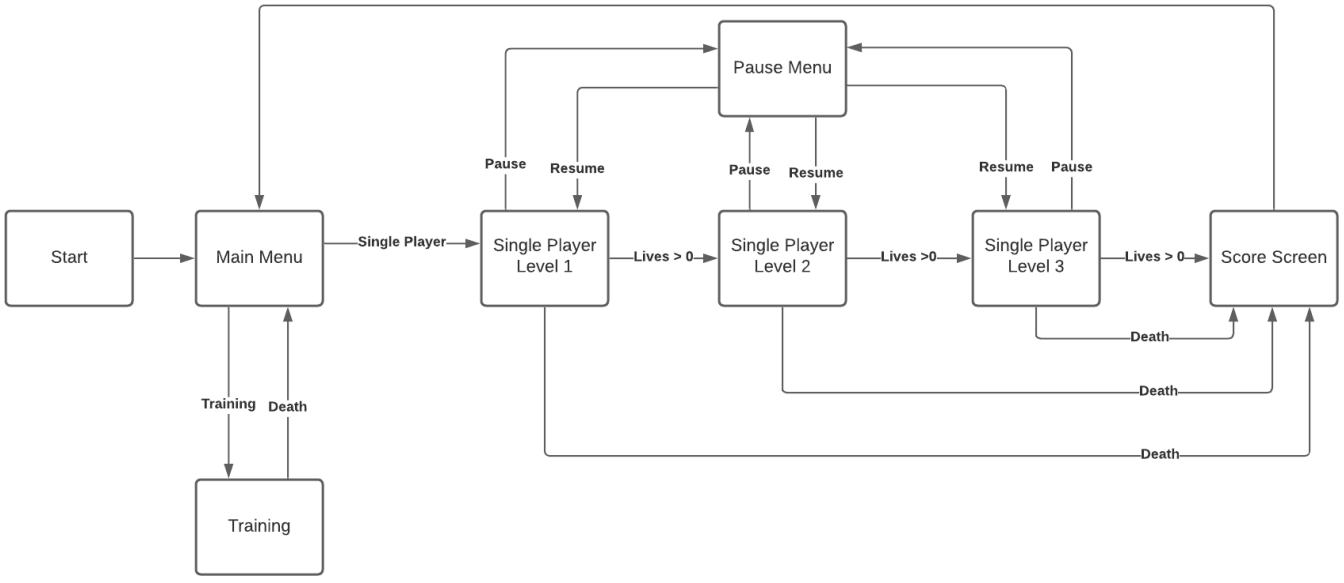

Fig 2: High-level state machine diagram