COMPSYS 305 Interim Progress Report

Team Oreos: *Group 23*

Dhvani Shah, Pooja Patel, Samantha Jermyn

Department of Electronics and Computer System Engineering, University of Auckland

dsha439@aucklanduni.ac.nz, ppat965@aucklanduni.ac.nz, sjer215@aucklanduni.ac.nz

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 steering clear of the pipes. 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.

When the console is powered up/restarted, the main menu will appear, asking the player to select the game mode. There are 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) and start the game by pressing the push button.

The *Training mode* is the lowest level, and it will run until the blood/life of the bird will become zero. After the blood/life of the bird becomes zero, i.e. the bird dies, the player will return to the main menu.

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 (Kit Kat bars) 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 all three lives are lost, they will lose the game. After a specific score has been achieved, the level would increase. With each level, the motion speed of the bird will increase, which would increase the difficulty.
If the player manages to stay alive after completing level three, they win the game. When the player dies or completes the game, a score screen will show up that shows the total score of the player and provides an option to return to the main menu.
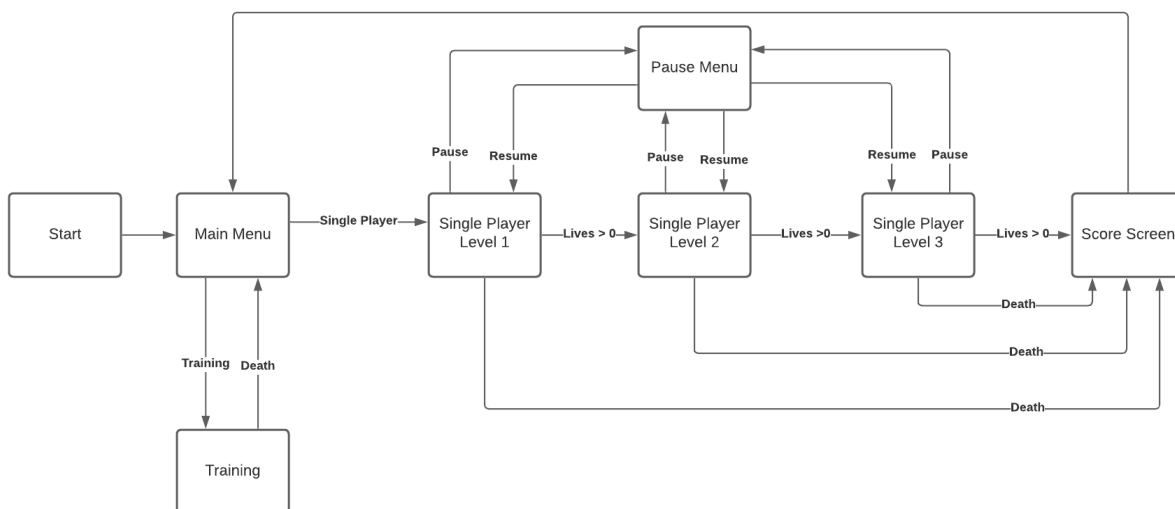The game also contains bonus features like milk bottles which increase the life of the bird, and mint lollies which the player can collect to increase their score.

Block diagram showing all the components of the game and their interfaces
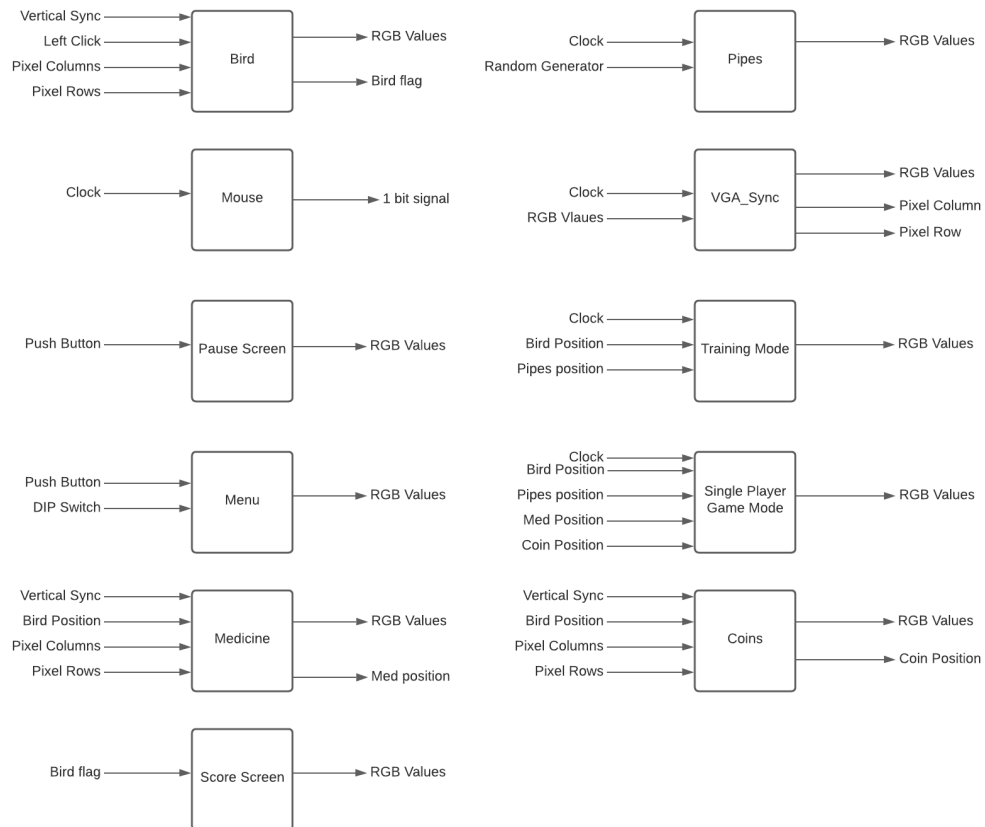
Fig 1: *Block diagram*

High-level state machine of the game

Fig 2: *High-level state machine diagram*