

Stage A Report: Birdy Flap

Team Y: A.RAI, A.HOLLINGS, S.KYLE

Game Strategy, Design Specifications, and Plans

The objective of the game is to keep a free falling bird flying by causing the bird to flap, collecting as many coins and avoiding obstacles on the way to reach the highest score. As this objective is achieved, the levels increase resulting in the bird flying faster and the obstacles becoming more frequent and harder to pass.

The user can cause the bird to flap by pressing the left mouse button. The bird flaps once per press, however is unable to rise above the top edge of the screen.

The score is increased by 1 point for every obstacle avoided, and each coin collected. Coins are generated randomly every two to five obstacles. A new obstacle is generated when the previous obstacle is equidistant from the bird and the right edge of the screen.

The bird is given 3 life points at the start of the game, and can only gain 1 life point each time they reach the next level. A life point is lost each time the bird bumps into an obstacle or falls to the ground. When the bird loses a life point, the bird is placed back to the start of the level, and does not move until the player flaps the bird by pressing the left mouse button, after which it continues as normal. The score is reset back to the value the player entered the level with.

Once the life points reach zero, the game is over and an end screen is displayed showing their score and the current high score. Their high score is displayed compared to their score, and if they surpass the previous highscore, their score is stored on an SD card along with the name of the current player (input by an onscreen keyboard) to be shown at the end screen of subsequent games until the high score is surpassed. If the bird reaches the end of Level 3, the end screen with their score and the high score is shown and the same process of storing the high score is conducted.

When the user turns on the DE0, a menu screen is displayed with 2 game mode options: Training mode or Normal mode. The training mode's purpose is to introduce the user to the objectives of the game, how to increase their score, what life points are, and how to control the bird. The normal mode is the game with all features, and assumes the user knows how to control the bird and the objective of the game.

Design of the game

There are four different types of screens that can be displayed - the playing screen, the menu screen, pause screen, and end screen. Here are some first drafts of the components of each screen.
Game Mode, Pausing, Training mode, Menu Screen, End Screen

If the user selects game mode, the game starts from the lowest level with a countdown of 3 seconds and all features are present as above. There will be 3 levels in game mode. Each level is passed after the bird reaches a score of 15 (this incentivises the player to go for the coins as well as try to pass the obstacles).

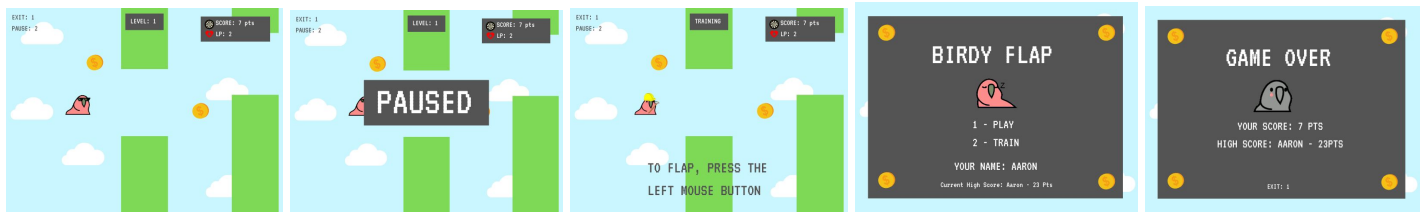
Each level's difficulty progresses in game mode as follows (with 1 being the smallest / slowest and 7 being the highest/fastest).

Level	Start Speed	End Speed	Gap btw. Obstacles
1	1	5	5
2	2	6	4
3	3	7	3

The starting speed at each level is higher than the starting speed, however lower than the end speed of the previous level to allow the user to get used to the decrease in gap between obstacles.

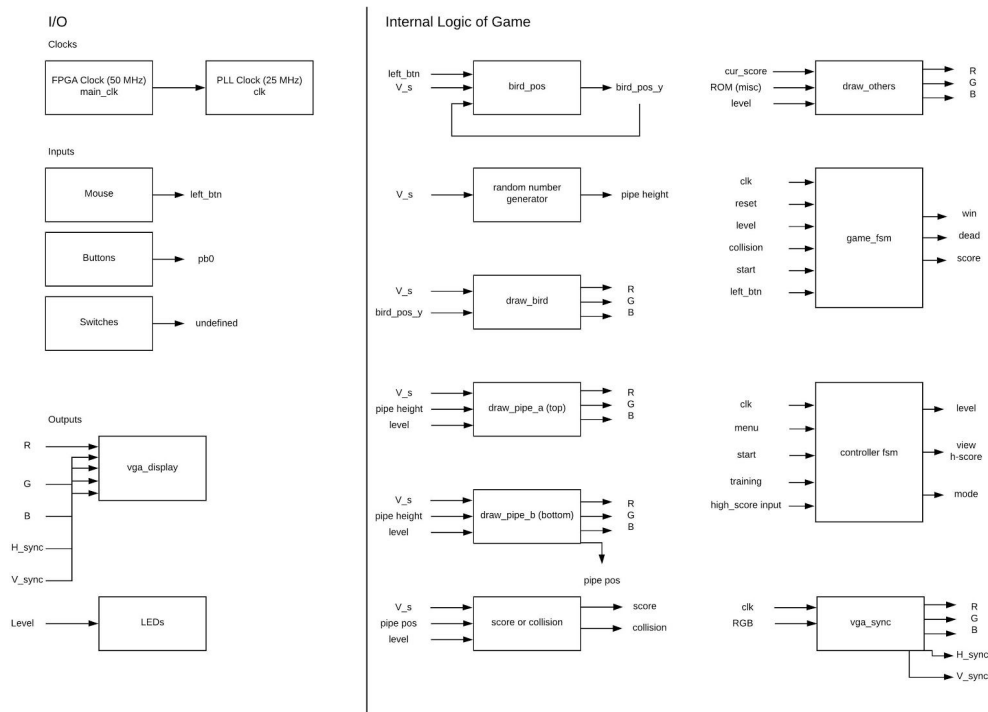
If the user selects training mode, a prompt displays showing them how to cause the bird to flap and increase their score. In training mode, there is no level progression, and they are always in level 1. If an obstacle is hit, their life points will decrease until they run out of life points, and then the end screen is shown displaying their score and name against the highest score and name during the current training session. The game is restarted at the lowest level until the user exits training mode. When exiting training mode, the training session is ended and high score restarted.

In both modes, some extra features will be included. One is the ability to pause the game by pressing push button 1 which results in a pause prompt displaying. When the user wants to resume the game, they press the same button, the bird resumes in the same state as before with the same score, life points, and level, however does not move until the user presses the left mouse button and causes the bird to flap. There is also an option to exit the game by pressing push button 0, in which the game is finished, no end screen is displayed and they return to the menu screen.



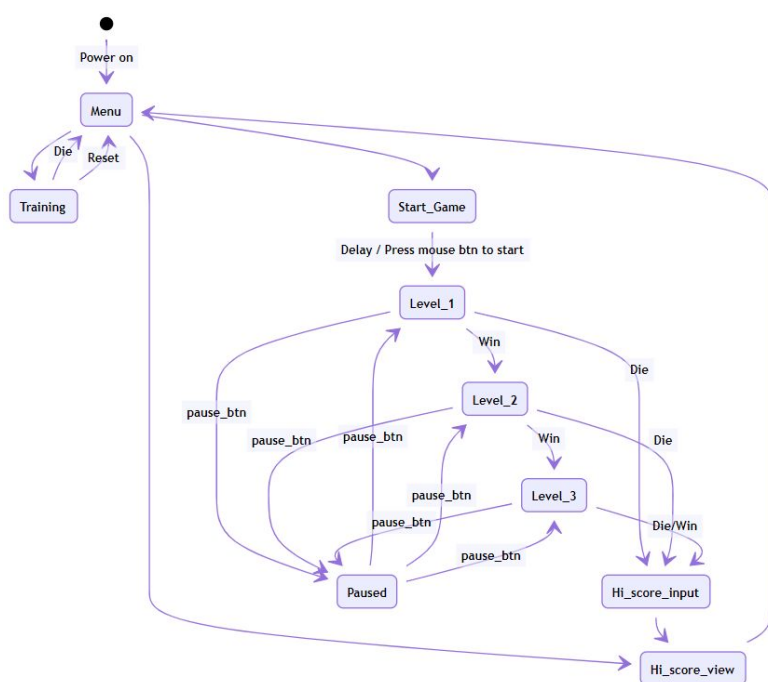
Components of Game & Interfaces

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



State Machine

Controller State Machine



Game State Machine

