

Game Strategy

The goal of our project is to implement a Flappy Bird clone on the DE0-CV board using VHDL. The game will be controlled using a PS/2 mouse, DIP switches and push buttons, and the gameplay will be displayed on a monitor via VGA output.

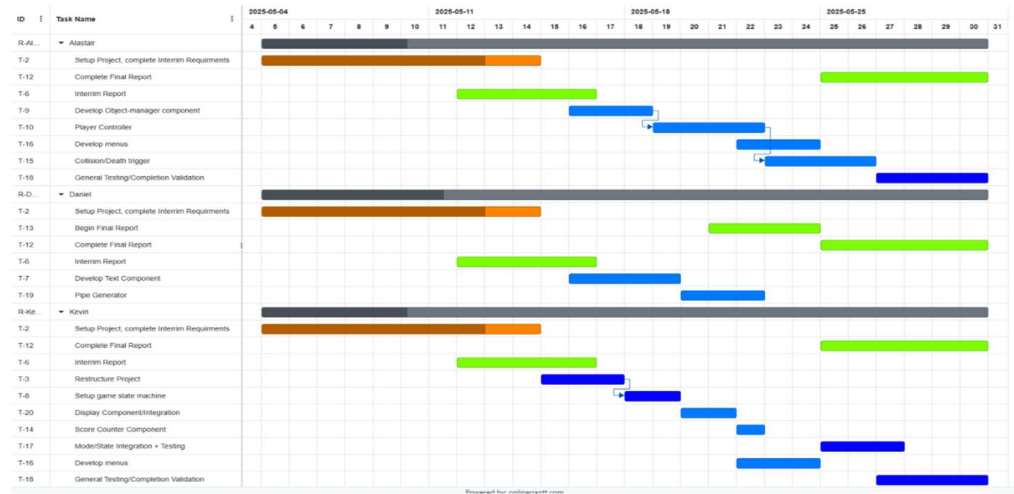
The player controls a bird moving it to avoid obstacles and collect gifts. The objective of the game is to keep the bird alive by navigating it through gaps between pipes while avoiding collisions. The game is controlled using a PS/2 mouse, where the left click will cause the bird to flap upward; otherwise, the bird will fall. If the bird touches a pipe or the ground, it loses life points. Once all lives are lost, the game ends. The player can also collect randomly appearing gifts for bonus points, extra lives or special perks that aids their game.

Game Specification and Plan

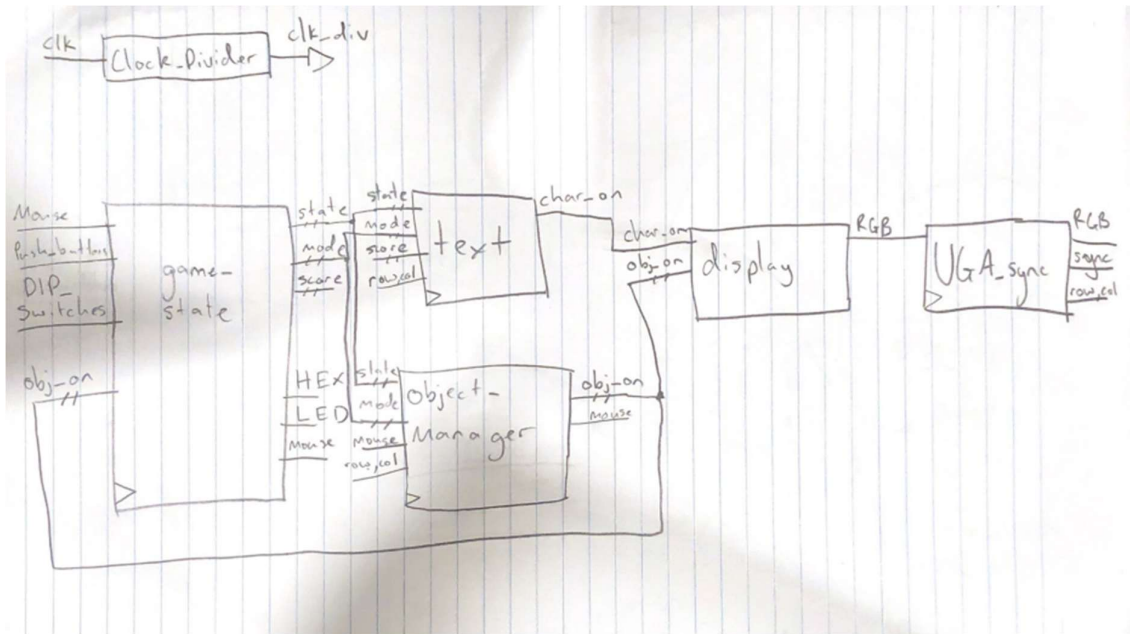
The input and output devices used in our design include a PS/2 mouse for controlling the bird’s movement, push buttons for starting the game and pausing/resuming gameplay, and DIP switches for selecting between Training and Normal mode. The VGA output is used to display game graphics such as the bird, pipes, gifts, and score, while the seven-segment display is used to show relevant gameplay statistics. The resolution of the output is 640x480 pixels.

The game goes through several distinct stages. It begins in the idle or Main Menu state, where the player is prompted to select a game mode via the DIP switch. Once the Start push-button is pressed, the game transitions into the Gameplay state. Depending on the DIP switch, the mode will be set to either Training or Normal mode. During gameplay, the player can pause the game using the Pause push-button, activating the paused state. The Pause button can be pressed again to resume back to the Gameplay state. In Normal mode, if certain conditions are met such as time passed, score met, or the number of obstacles passed, the mode will switch to Hard. If further requirements are met, the mode will switch to Expert mode. If the bird collides with an obstacle or the ground, life points are depleted and once fully depleted the game enters the game over state. Clicking the mouse during Gameplay will ‘bounce’ the bird and allow the player to control the bird to avoid obstacles and collect gifts.

Gantt Chart



Block Diagram



Finite State Machine

