Flappy Bird

IS1200 Advanced Mini Project Abstract

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Objective and Requirements

The objective of this project was to design and implement a version of the game *Flappy Bird* that runs on our DTEK-V board. The game renders graphics through a VGA interface, generates pipes at random vertical positions, and allows the bird to be controlled via the on-board button. The system updates game states and graphics in real time using interrupts from the internal clock. Key requirements included smooth frame updates on the VGA display, responsive input from the button, and correct collision detection with the pipes and screen boundaries.

Solution

Our solution used the board's button, switch 3 and a VGA controller to display graphics on a screen. The VGA controller draws the bird, the scrolling background, the moving pipes, the starting screen, and the game over screen. Pipe positions were generated using random coordinates and height generation. The bird's movement was controlled by the on board button. Starting the game at the beginning or restarting after a loss was triggered by an on board switch. The score was displayed in real time on the 7-segment displays.

Verification

We verified the system through extensive testing of edge cases. For example, we tested the bird colliding with the screen boundaries and with pipes at different positions. Playtesting confirmed that the game logic (flapping, pipe collisions, and scoring) behaved as intended.

Contributions

The work was divided such that Panayiotis focused mainly on the game logic and Marios on the graphics. However, much of the work was carried out collaboratively, with ideas discussed and refined together before implementation.

Reflections

Through this project, we successfully implemented a playable version of *Flappy Bird* on the DTEK-V platform. We gained valuable experience in combining hardware peripherals such as the VGA controller, and on board buttons and switches, with efficient software design. Key challenges included graphics rendering, handling real-time interrupts reliably, and ensuring smooth responsiveness to player inputs. Overall, the project allowed us to deepen our understanding

of embedded systems, hardware/software integration, and game development under real-time constraints.