# Digital Design 1 Project 2 Report

Our team, consisting of Saeed, Cherif, and Ouail, worked together to bring the Ping Pong game to life on the Basys 3 board. We divided the tasks almost evenly, with each of us taking on specific modules that matched our skills. This approach allowed us to balance the workload while making sure every part of the project worked together smoothly.

## Top Module

Ouail took the lead on the topmodule, which tied all the different parts of the game together. This module was responsible for handling inputs like button presses for paddle movement, managing VGA synchronization for the display, and sending outputs such as RGB signals, sounds, and updates to the seven-segment display. Ouail made sure the inputs were properly debounced, the VGA synchronization woRked without glitches, and the finite state machine (FSM) controlled the game states correctly. His role required a solid understanding of how all the components fit together.

## Graphics and Game Mechanics

Cherif focused on the pixels module, which controlled the visual aspects of the game. This included drawing the paddles, the ball, and the background, as well as handling collision detection between the ball and paddles or boundaries. Cherif also implemented the ball's movement logic, including changes in speed and direction when it hit the paddles. He ensured the game looked smooth and responsive on the VGA display and added effects like the red ball to enhance gameplay. Cherif also integrated logic to handle scoring events and reset the ball when needed, keeping the game flow consistent.

## Scoring, Text Display, and Sound

Saeed was in charge of the scoring and text display modules and also managed the buzzing sound whenever the ball touched the paddle. In the text module, he developed the functionality to display player scores and messages like "Game Over" on the screen. This involved rendering characters based on ASCII values and positioning them correctly on the VGA display. In the score module, Saeed

created the logic to track and update scores during the game. He also connected this to the seven-segment display, ensuring real-time updates. For the sound effect, Saeed implemented a mechanism to generate a buzzing tone, synchronized with ball-paddle collisions, adding a lively element to the game. His attention to detail ensured these features worked smoothly without impacting the overall game performance.

We worked closely together on the FSM that managed the game states, such as *newGame*, *play*, *newBall*, and *over*. By dividing responsibilities and collaborating where needed, we successfully created a working Ping Pong game on the Basys 3 board. Ouail handled the overall integration and FSM design, Cherif managed graphics and gameplay logic, and Saeed took care of scoring, text display, and sound effects. Together, we built a game that functions smoothly and provides a fun, engaging experience. So have fun!