COEN 317 Lab 2 (UJ-X)

by

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Performed on

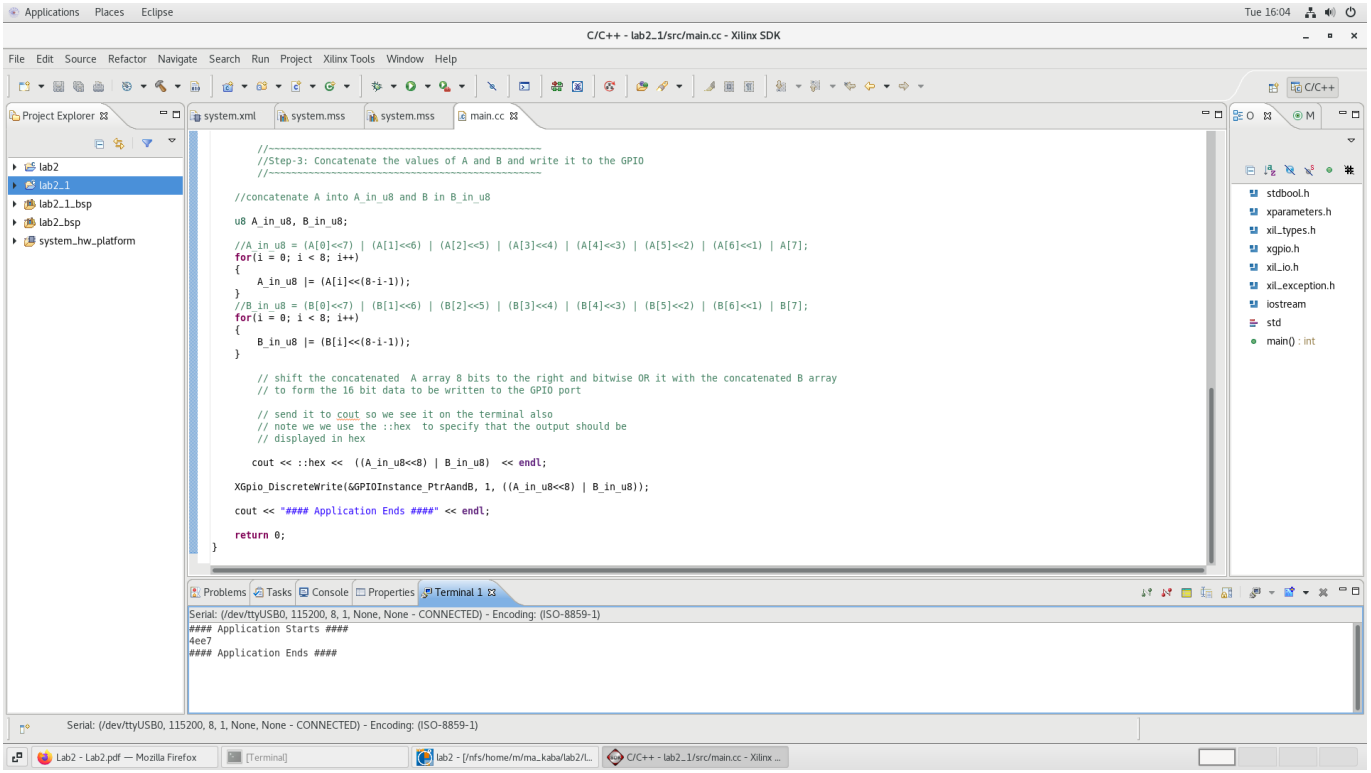
February 13th, 2024

"I certify that this submission is my original work and meets the Faculty's Expectations of Originality."

Introduction

This lab experiment aims to explore the utilization of programmable logic within the XC7020 chip. Specifically, we will implement a two-input AND gate, with each input spanning 8 bits. The processor will supply data to the AND gate via a 16-bit wide General Purpose Input/Output (GPIO). The resulting 8 outputs from the AND gate will be visually displayed using LEDs.

Results



In the main.cc program, we made modifications to the initial values of two boolean arrays, A and B, updating them from their original setups to new initial values. After implementing these changes, we recompiled the code and subsequently downloaded it to the board to observe the behavior of the 8 LEDs. Following these adjustments, the program proceeds to configure the GPIO port for output. It initializes the two boolean arrays, A and B, each

containing eight values. These values are then combined into two 8-bit numbers, which are further merged into a single 16-bit number. This concatenated 16-bit number is then transmitted to the GPIO port, influencing the state of the connected LEDs based on the newly assigned values.

Conclusion

In conclusion, the second lab experiment on the XC7020 chip successfully demonstrated the implementation of a two-input AND gate with visual output through LEDs, highlighting the chip's programmable logic capabilities. By adjusting the initial values of Boolean arrays and observing the LED responses, we effectively showcased the AND gate's operation via a 16-bit wide GPIO input. This hands-on approach not only validated the programmable logic's functionality but also emphasized the importance of precise input configuration. The experiment serves as a foundational step towards deeper exploration of digital logic circuits in programmable devices.