Lab 04

Modulo and Floating-Point Division

Description

This lab demonstrates implementations of the modulo operator and simplified floating-point division. You will experiment with a program simulating the modulo operator, simulate a hardware implementing floating-point division, and analyze a case study related to floating-point hardware.

Procedure

Part A

- Download 04A-handout from Canvas and complete this module, following along with the instructor.

Part B

- Download 04B-handout and `lab04.vhd` from Canvas and complete this module, following along with the instructor.

Part C

- Download 04C-handout from Canvas and complete this module, following along with the instructor.

Deliverables

Lab Report

- Submit an **informal report** including the following:
  - Answers to the discussion questions from the activity at the end of Part A.
  - Your completed datasheet from Part B, including manually calculated results, simulation results, actual values, and error percentages.
  - A screenshot of your Vivado simulation waveform from Part B.
  - Answers to the discussion questions from the activity at the end of Part B.
  - Your reflection to the case study as described in Part C.

Outcomes

- Understand how the modulo operation is implemented in hardware.
- Practice working with VHDL.
- Practice using Vivado for hardware simulation.
- Understand a simple floating-point representation.
- Understand how floating-point division is implemented in hardware.
- Use critical thinking and the entrepreneurial mindset to analyze a case study.
- Understand ramifications (technical and non-technical) of decisions (eKSO 2a).
- Consider a problem from multiple viewpoints (eKSO 2f).