Digital Design & Computer Arch.

Lab 8.2 Supplement: Full System Integration

Prof. Onur Mutlu

ETH Zürich

Spring 2023

Lab 8 Overview

- You will build a whole single-cycle processor and write assembly code that runs on the FPGA board.
- You will learn how a processor is built.
- Learn how the processor communicates with the outside world.
- Implement the MIPS processor and demonstrate a simple "snake" program on the FPGA starter kit.

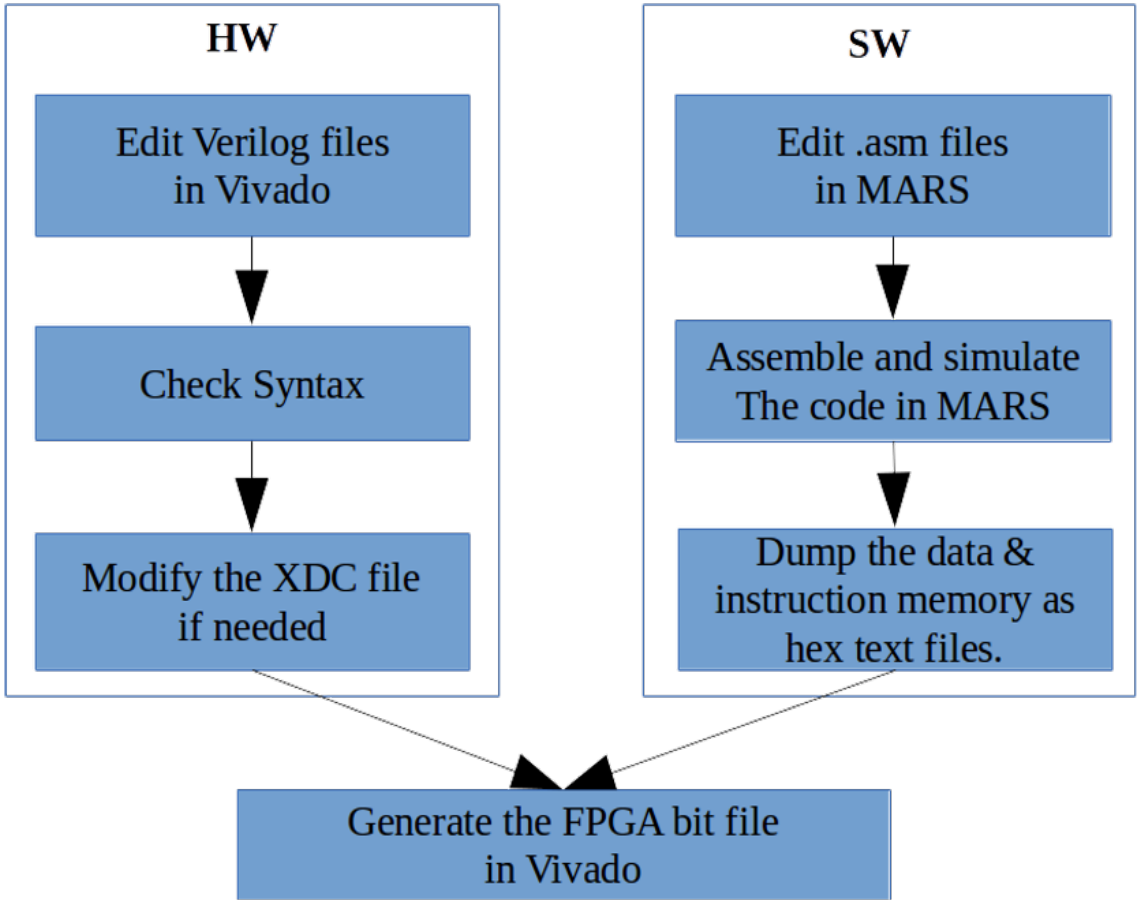
Lab 8 Sessions

- **Session I:** The Crawling Snake
- **Session II:** Speed Up the Snake

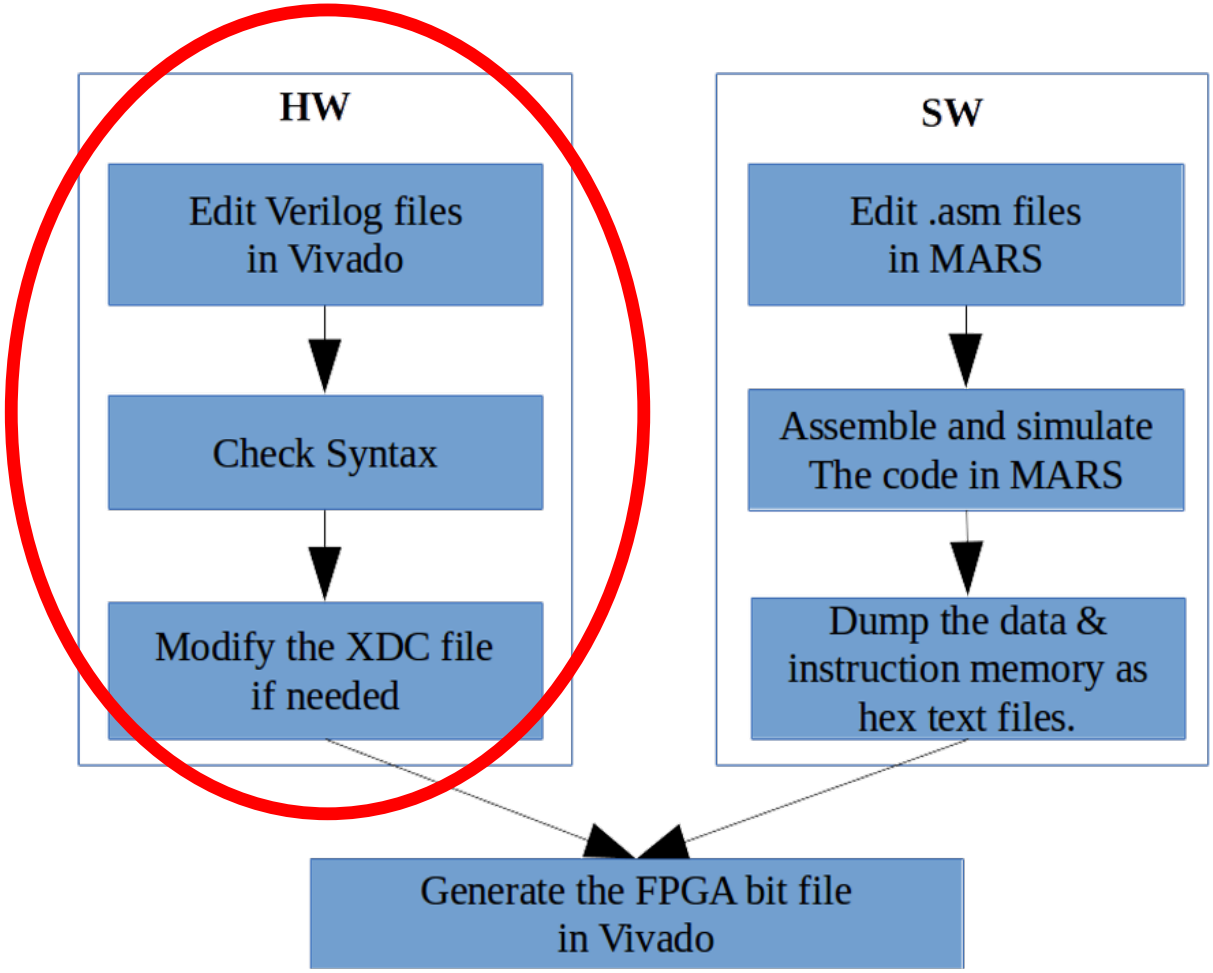
Lab 8 Session II: Speed Up the Snake

- Extend the top-level hierarchy:
  - Modify the I/O controller to accept the inputs.
- Understand the provided assembly program and modify your assembly code to accept inputs.
  - The snake should crawl at different speeds for different inputs.
  - The inputs will be controlled by switches on the FPGA board.
- *Optionally, you have two challenge tasks to complete.*
  - Change the direction of the snake.
  - Change the pattern of the snake.

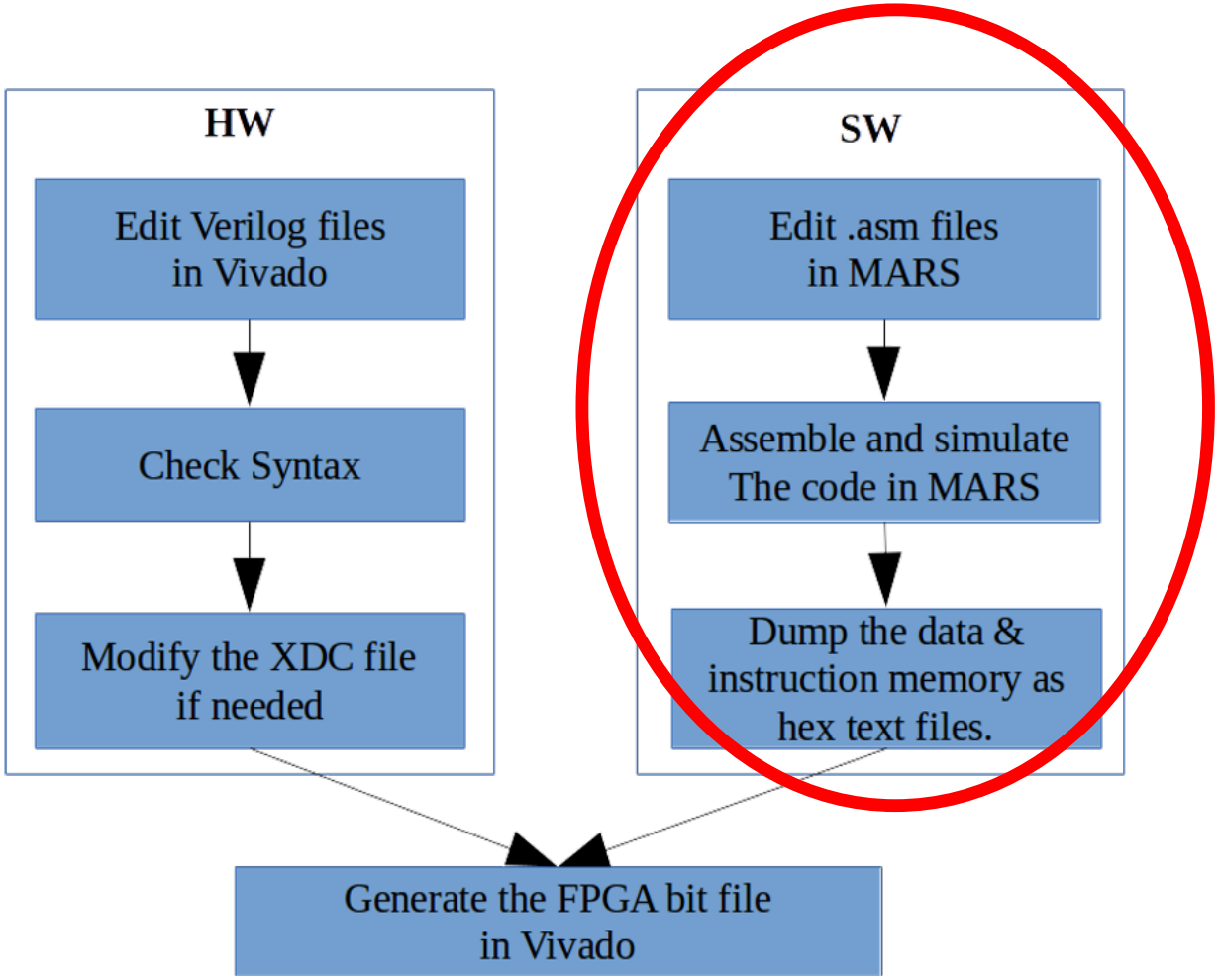
Lab 8 Session II: Summary of the Flow



Lab 8 Session II: Extending I/O



Lab 8 Session II: Modifying the Assembly



Last Words

- You will build a whole single-cycle processor and write assembly code that runs on the FPGA board.
- You will learn how a processor is built.
- Learn how the processor communicates with the outside world.
- Implement the MIPS processor and demonstrate a simple "snake" program on the FPGA starter kit.
- You will have some questions to answer in the report.

Report Deadline

23:59, 2 June 2023

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