Module 1

The Tool Set Part 3

Processor Architecture Simulation

- Several versions of MIPS RISC processor will be studied
  - Single Cycle MIPS (Selected Instructions)
  - Multiple Cycle MIPS (Selected Instructions)
  - Pipelined Processor (Selected Instructions)
  - Pipelined Processor with FPU (Selected Instructions)
  - Pipelined Processor with FPU/Cache/VM (Selected Instructions)
  - Dual Processor Pipelined Processor (Selected Instructions)
- HDL Simulations Tools
  - Vivado 2020.2 (Web version) (Or latest Version)

Getting Started

- In order to start work, we need to install our tools, get the hardware and make sure our software runs properly.
  - The tools run extremely well on Linux. They sort of run under Windows 10
  - You may have more issues making Windows work
- For Discussion Forum One, install the tools, and attempt to run the first lab.
- I recommend that you use Linux, but if you already have Vivado running with the FPGA board on a Windows system (from the VHLD Class), you should be able to use that configuration.

First Step

- I have a getting started document that will guide you installing everything on a linux system
  - Use the instructions to install the tools on Windows and Linux
  - There are several unique procedures to update libraries and cable drivers, plus additional tools required by linux (make, git).
- For this first lab, we are just getting everything in place. Future discussion forums will modify the code to add instructions and exercise capability.

HDL Simulation Tools

- Vivado From Xilinx used for Simulation of VHDL and Verilog and driving the Nexys 4 DDR board or Nexys A7 board - https://www.xilinx.com/support/download.html
- CodeScape MIPS SDK: https://www.mips.com/develop/tools/codescape-mips-sdk/download-codescape-mips-sdk-essentials/

Tools Installation

- Vivado is very large, start loading early
- The linux system should have at least 100Gbytes to host the operating system, tools and code.

Xilinx Vivado 2020.2

- We will use the free WebPACK edition
- The initial installation file is small, but the Operational code is very large. Start early and install it.
- You will need to register for a free login at Xilinix.com

Instruction Set Simulation Tools

- MARS – MIPS Assembler and Runtime Simulator - http://courses.missouristate.edu/KenVollmar/mars/
- SPIM – A MIPS 32 Simulator - http://spimsimulator.sourceforge.net/
- ASMSIM.jar (MIPS simulator from Author of Computer Principles Text) - http://cis.k.hosei.ac.jp/~yamin/asm/
- CodeScape – Gnu Tools:
  - Make
  - Gcc
  - Assembler

Plan of Attack

- Install the tools:
  - Vivado 2020.2
  - Install the MTI Bare Metal Tools
  - Install MARS Simulator
  - Install QtSpim
  - Install ASMSIM.jar
- Use the discussion forum to get assistance with any problems.

Coming Up Next

- Digital Design Concepts