COMP3211/COMP9211 Computer Architecture

Lab1 Xilinx Vivado

Goals

1. Learn simulation with Vivado.
2. Study how to build a hardware model and evaluate the hardware design with Vivado.

Tasks:

Task 1 (10 marks):

- Build a hardware model to rotate-left-shift a 16-bit value by a given number of bits.
- Simulate and verify your model.
- Synthesize the model to find its delay and area cost.

Task 2 (15 marks):

- Design and build a parameterized hardware model for majority voting of n voters in an organization, where n is in the range of 16 to 1024.
- Simulate and verify your model.
- Synthesize the model to find its delay and area cost. Is your design is cost effective?

For the above two tasks, assume device xc7a100tfg256-3 (as used in the tutorial) is used.

Due: Your lab class in Week 2

- Lab presentation for **peer assessment**

Assessment scheme:

Your work will be assessed by your peer students and tutor. For the assessment,

- Your TLB class is randomly divided into (up to) two assessement groups, each capped at 12 students. This is to allow sufficient time for the assessment. For a small TLB class, one assessment group may only be required.

  For f2f classes, the assessement will be conducted in an on-campus classroom and for online classes, the assessment will be conducted in a MS Teams meeting.
  The arrangment for each assessment group will be available in the Files folder of your class Teams channel.

- During assessment, each student is given 6 mins for presentation and 2 mins for Q&A.
    - The presentation covers three areas: design idea, HDL model, simulation results, and any discussion required for each task.
- Your work is assessed based on three categories, each accounting up to 5 marks (see the guide marks provided):
    - Presentation (0-5)
        - Clarity (2)
        - Logic (2)
        - Timing management (1)
    - Completion (0-7)
        - HDL model (2)
        - Valid simulation results (3)
        - Discussion (2)
    - Quality (0-5)
        - You can give marks based on different aspects demonstrated in the lab work, for example, an interesting design idea, a clever modeling strategy, good design analysis, thorough evaluation, and adequate discussion.

  The link of an assessment form will be available in your MS teams channel.

- Your tutor will organize and steer the lab session.
  By the end of the lab class, all students are required to submit their assessment forms. Your participation to the assessment will be taken into account to the overall lab participation marks.

- Your marks are determined by
    - 80% from peers, and
    - 20% from tutor