SystemC & Behavior Coding

Assignment 5, 2024-11-28

Abstract

Install SystemC 3.0.1, and compile and test the timer module described on pages 38 and 39 of the Lecture Notes, Chapter 4.

Please read carefully. All outputs required are described in the text. Five (5) points will be taken for each bug, missing the required output and behavior.

The 'timer' module

Description

1. Copy exactly the timer module on pages 38 and 39 of the Lecture Notes, Chapter 4.

SystemC 3.0.1

Description

1. You must use SystemC 3.0.1 for all SystemC assignments of this course. You can download SystemC 3.0.1 from http://www.accellera.org/downloads/standards/systemc and select systemc-3.0.1. Please fill out your basic data and register. Do not worry. Accellera will not try to sell you anything or release your information to anyone.
2. Follow the instructions and install SystemC 3.0.1 on your computer.
3. SystemC 3.0.1 uses DLL and setting rpath during linking is a must. An example Makefile with rpath setting is provided.

sc_main

Description

1. Create a test suite, i.e. `sc_main`, for the `timer` module, that
   - Instantiate a `timer` module
   - Provide a 100MHz clock to the `timer` module
   - Create a trace file named `RESULT.vcd`. And trace ports/variable in the following order:
     - `clock`
     - `start`

        - `timeout`
        - `count`

    - Feed in a `start` signal to create a trace that contains a waveform of exactly 30 cycles (300ns, that is.) This 30-cycle waveform should include the following scenarios:
        - reset the `timer` for 3 cycles before it is released for counting,
        - during counting reset the `timer` before `count` reaches 0, and
        - during counting reset the `timer` after `count` reaches 0

Note: to give a specific value to a signal, say, `start` in the `sc_main()` that connects to the `timer->start` port, it can be written as `start.write(0)` or `start.write(1)`.

Using Generative AI

It is encouraged to use Generative AI (GAI) to solve the problem as in earlier assignments. If you use GAI to solve the problem, please compose a prompt to ask the GAI to create another `sc_main()` program i.e., the test bench, and call it `gai_main.cpp`, to test the correctness of the `timer` module. Note that this new sc_main() needs to design a new waveform, and name the output waveform file `RESULTgai.vcd`. Turn in the prompt you composed and the `gai_main.cpp` thus generated as well.

Please turn in the source codes and `makefile` only. Do not turn in the executable and waveform.

Due date
3:00 PM, December 5th, 2024

Score weight (towards the final grade) 5%