SystemC & Behavior Coding

Assignment 5, 2025-11-13

Abstract

Install SystemC 3.0.2, and compile and test the timer module described on pages 39 and 40 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 39 and 40 of the Lecture Notes, Chapter 4.

SystemC 3.0.2

Description

1. You must use SystemC 3.0.2 for all SystemC assignments of this course. You can download SystemC 3.0.2 from http://www.accellera.org/downloads/standards/systemc and select systemc-3.0.2. 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 provided in the lecture notes and install SystemC 3.0.2 on your computer.
3. SystemC 3.0.2 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 approximately 30 cycles (300 ns, that is). Before the first 300 ns runs out, the 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)`.

Please submit the source code and `Makefile` only. Do not turn in the executable and waveform. Make use of code generator AI as much as possible to generate the `sc_main` so you can complete the assignment in time. The deadline of this assignment will not be extended. Although you can choose to code all by yourself, it is also crucial to learn how to make use of AI to help you work efficiently. Thoroughly verify the AI-generated code using the verification skills we discussed in the first class.

Due date
3:00 PM, November 20th, 2025

Score weight (towards the final grade) 5%