SystemC and Electronic System Level Design Methodology

Assignment 3, 2024-03-18

Abstract

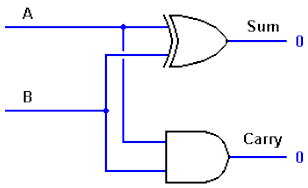
Implement a half-adder. Then use two (2) half-adders to implement a full adder.

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

The half-adder `SC_METHOD` module

Description

1. A half-adder schematic is given below

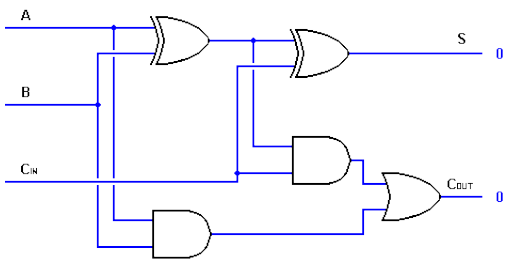


2. Use above schematic as the specification and implement a `SC_MODULE` with a `SC_METHOD` process, for which the module must be named as `HalfAdder`. All input and output ports must be named exactly the same as in the schematic.
3. You must name the SystemC files as `HalfAdder.h` and `HalfAdder.cpp`. This is to make it easier to compile your code using my makefile. Fail to do so will be penalized with 5 pts.

The full-adder `SC_METHOD` module

Description

1. A full-adder schematic is given below



2. Use above schematic as the specification and implement a `SC_MODULE` with a `SC_METHOD` process, for which the module must be

named as `FullAdder`. You must instantiate two (2) half-adders developed above to implement this full-adder. Again, all input and output ports are named exactly the same as in the schematic. C_{in} should be named as `Cin` and C_{out} should be named as `Cout`.

3. You must name the SystemC files as `FullAdder.h` and `FullAdder.cpp`. Fail to do so will be penalized with 5 pts.

sc_main

Description

1. Create two test suites in one `sc_main`, and you must name the file `main.cpp`, that
    - Instantiate both half-adder and full-adder modules
    - Provide all possible combinations to these modules, i.e. 4 input vectors to the half-adder and 8 input vectors to the full-adder.
2. Create a trace file named `RESULT.vcd`. And trace ports are shown as follows:
    - Half-adder `A`
    - Half-adder `B`
    - Half-adder `Sum`
    - Half-adder `Carry`
    - Full-adder `A`
    - Full-adder `B`
    - Full-adder `Cin`
    - Full-adder `S`
    - Full-adder `Cout`

makefile

Description

1. A `makefile` must be provided, with proper modifications to your environment.

Please turn in the source codes and `makefile` only. Combine all the files using zip, gzip, or tar. Please do not use rar. Do not turn in the executable.

Due date

2:00 PM, March 25, 2024

Score weight (towards the final grade) 5%