

SystemC & Behavior Coding

Assignment 7, 2021-12-24

Abstract

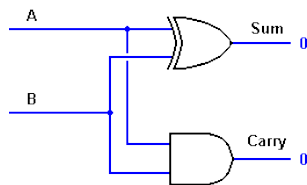
Implement a half-adder. Then use two (2) half-adders to implement a full adder.

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

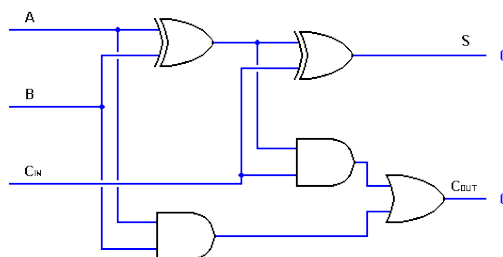


2. Use above schematic as the specification and implement a SC_MODULE with a SC_METHOD process, for which the module **must** be named as HalfAdder. All input and output ports **must** be named exactly the same as in the schematic.
3. You **must** name the SystemC files as HalfAdder.h and HalfAdder.cpp. 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. `Cin` should be named as `Cin` and `Cout` 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 in the following order:
 - “ Half-adder A
 - “ Half-adder B
 - “ Half-adder Sum
 - “ Half-adder Carry
 - “ Full-adder A
 - “ Full-adder B
 - “ Full-adder C_{in}
 - “ Full-adder S
 - “ Full-adder C_{out}

makefile

Description

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

Please turn in the `HalfAdder` and `FullAdder` source codes and `main.cpp` described in the **sc_main** section only and the `makefile`. Do not turn in the executable and waveforms.

Due date

2PM, December 31th, 2021

Score weight (towards the final grade) 5%