Xilinx Introduction Part IV

Objectives

This tutorial will give you further practice with Xilinx, in particular with using Verilog modules.

Constructing an adder using Verilog.

Write a Verilog program

1. Open your favorite text editor and type in the following Verilog program. Note the word "type". Not copy. Read through the program and make sure you understand what the HDL code does.
2. Save the file as x1bitadder.v in a convenient location.

```
module x1bitadder(
//   1-bit full adder

    // Inputs:
    a,      // a Input
    b,      // b Input
    cin,    // carry in

    // Outputs:
    sum,    // lsb of a + b + ci
    cout    // carry out
 );

// Port mode declarations:
    // Inputs:
    input a;
    input b;
    input cin;

    // Outputs:
    output sum;
    output cout;

// Identifiers:
    wire t1, t2, t3;

// Functionality:

    // co = (a AND b) OR (a AND cin) OR (b AND cin)
    assign t1 = a & b;
    assign t2 = a & cin;
    assign t3 = b & cin;
    assign cout = t1 | t2 | t3;

    // sum = a XOR b XOR ci
    assign sum = a ^ b ^ cin;

endmodule
```

Create a project and add the file.

1. After creating the project, in the Sources in Project window, select the project name and select "Add Source". Look for the file x1bitadder.v and select it to add to the project.
   Note: After creating the project you will have to copy the Verilog file to the project folder before trying to add it to the project. If the file is any other location, while adding the file, Xilinx will complain if there any spaces in the path name. Copying the file to the appropriate folder does not necessarily add it to the project.

Create the symbol

2. Select the Verilog file from the Sources in Project window.
3. In the Processes in Project window, double click on Create Schematic Symbol to create a symbol for the adder.

Create a schematic

4. Add a new schematic file to the project.
5. Add the above created symbol to the schematic file. (Look for the symbol under Symbols->C:/Xilinx/projects/<nameofyourproject>)
6. Complete the schematic by adding wires and pins for the 3 inputs and 2 outputs.
7. Create a test bench waveform as shown below.
8. Simulate the testbench waveform and test your adder.