

Icarus Verilog

I. Setting up directories and folders

Create a folder for your programs in your Documents folder or on your C: drive (Window system). Let's use C:\verilog\homework5, for example. Save your Verilog files to that folder. You can use notepad or any other plain text editor to write your Verilog programs.

Here's two example Verilog files, `simple.v` and `simple_tb.v`, that you can copy into your directory to test things out.

`simple.v:`

```
module simple(A, B);

    input  [3:0] A;
    output [3:0] B;

    // mix up the input bits
    assign B = { A[0], A[2], A[1], A[3] };

endmodule
```

`simple_tb.v:`

```
module simple_tb;

    reg [3:0] A = 4'b1010;

    wire [3:0] B;

    initial
        begin
            $dumpfile("simple.vcd");
            $dumpvars(0, s);
            $monitor("A is %b, B is %b.", A, B);
            #50 A = 4'b1100;
            #50 $finish;
        end

    simple s(A, B);

endmodule
```

II. Compiling your Verilog program

You need to *compile* your Verilog program before you can simulate it. Open up a DOS prompt (run `cmd.exe` from the Start menu) and type the following, hitting enter after each line:

```
K:  
cd verilog\homework5  
iverilog -o simple.vvp simple.v simple_tb.v
```

If the compilation went OK, you won't see any output. What this does is creating a file called `simple.vvp` that we can feed to the simulator.

III. Running the simulation

To run the simulation, type

```
vvp simple.vvp
```

and hit Enter. You should see output something like:

```
VCD info: dumpfile simple.vcd opened for output.  
A is 1010, B is 0011.  
A is 1100, B is 0101.
```

IV. Viewing the output

You can use the GTKWave program to view the output. From the DOS prompt, type

```
gtkwave simple.vcd
```

to view the results of your simulation.

V. Troubleshooting

VI. I get the error "Unknown module type: foo" when I run iverilog!

You might have run `iverilog` without all of the sources needed to define all of the modules. A common cause is compiling `foo_tb.v` without also compiling `foo.v`.

VII. I get the error "foo.vvp: Unable to open input file." when I run vvp!

You might have forgotten to specify `-o foo.vvp` when you ran `iverilog`.

VIII. The vvp program never stops running!

Is there a `$finish` statement anywhere in your code? Are you sure it is getting run? You should be able to type `Ctrl + C` at the DOS prompt to kill the simulator.

IX. There is no data file produced!

Make sure your test bench includes a `$dumpfile` statement and a `$dumpvars` statement.