Interconnection network
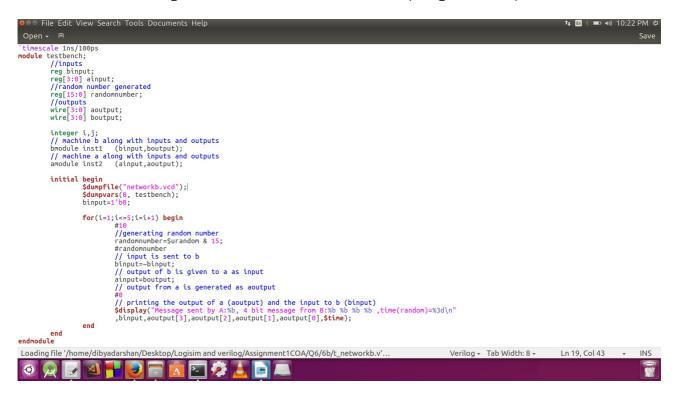
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//Module for machine b
module bmodule(input binput,output reg [3:0] boutput);
        // binput is the input given and boutput is the output generated
        always@(binput) begin
                // 4 bit output generated by b(1 1 1 1), IT CAN BE CHANGED BY THE USER
                boutput=15;
        end
endmodule
//Module for machine a
module amodule(input[3:0] ainput,output reg [3:0] aoutput);
        // ainput is the input given and aoutput is the output generated
        always@(ainput) begin
                aoutput=ainput;
        end
endmodule
```

Machine A sends message to machine B at random intervals (using $urandom)

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`timescale 1ns/100ps
module testbench;
        //inputs
        reg binput;
        reg[3:0] ainput;
        //random number generated
        reg[15:0] randomnumber;
        //outputs
        wire[3:0] aoutput;
        wire[3:0] boutput;

        integer i,j;
        // machine b along with inputs and outputs
        bmodule inst1   (binput,boutput);
        // machine a along with inputs and outputs
        amodule inst2   (ainput,aoutput);

        initial begin
                $dumpfile("networkb.vcd");
                $dumpvars(0, testbench);
                binput=1'b0;

                for(i=1;i<=5;i=i+1) begin
                        #10
                        //generating random number
                        randomnumber=$urandom & 15;
                        #randomnumber
                        // input is sent to b
                        binput=~binput;
                        // output of b is given to a as input
                        ainput=boutput;
                        // output from a is generated as aoutput
                        #0
                        // printing the output of a (aoutput) and the input to b (binput)
                        $display("Message sent by A:%b, 4 bit message from B:%b %b %b %b ,time(random)=%3d\n"
                        ,binput,aoutput[3],aoutput[2],aoutput[1],aoutput[0],$time);
                end
        end
endmodule
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```

Then B responds with 4 messages (1 1 1 1). This is sent as input to A. Then this message is printed along with the message passed to B.