

計算機システム設計論 演習問題(4)  
62014205 中野宏志

コードを以下に示す。

```
module chat(input in,clk,rst,output logic out);
  logic [3:0] count;
  logic val;

  always_ff @(negedge clk) begin
    if(rst) val <= 0;
    else begin
      if(!in) val <= 1;
      else val <= val;
    end
  end

  always_ff @(negedge clk) begin
    if(rst) count <= 4'b1111;
    else if(val) begin
      if(count != 0) count <= count - 1;
      else count <= count;
    end
  end

  always_comb begin
    if(count==0 || count ==4'b1111) out = in; //counter が始動する前 or 終了した後は in をそのまま出力
    else out = 0; //counter が動いている間は 0 を出力
  end
endmodule
```

続いてシミュレーションに使用した test モジュールを示す。

```
module test;
  logic in,clk,rst;
  logic out;
  always #5 clk = ~clk;
  chat chat(in,clk,rst,out);
  initial begin
    $dumpfile("chat.vcd");
    $dumpvars(0,test);
    in = 1;
    clk = 0;
    rst = 1;
    #10
    rst = 0;
    in = 1;
    #10
    in = 0;
    #10
    in = 1;
    #10
    in = 0;
    #10
    in = 1;
    #10
    in = 1;
  end
endmodule
```

```
#10
in = 1;
#10
in = 0;
#10
in = 1;
#10
in = 1;
#10
in = 1;
#10
in = 0;
#10
in = 1;
#10
in = 1;
#10
in = 1;
#10
in = 0;
#10
in = 0;
#10
in = 0;
#10
in = 0;
#10
in = 0;
#10
in = 0;
#10
in = 0;
#10
in = 0;
#10
in = 0;
#10
in = 0;
#10
in = 0;
#10
in = 0;
#10
in = 0;
#10
in = 1;
rst = 1;
#10
in = 1;
rst = 0;
#10
in = 1;
#10
in = 1;
#10
in = 0;
#10
in = 0;
#10
in = 0;
#10
in = 1;
#10
in = 0;
#10
in = 0;
$finish;
end
endmodule
```

シミュレーション結果を以下に示す。

