

Problem

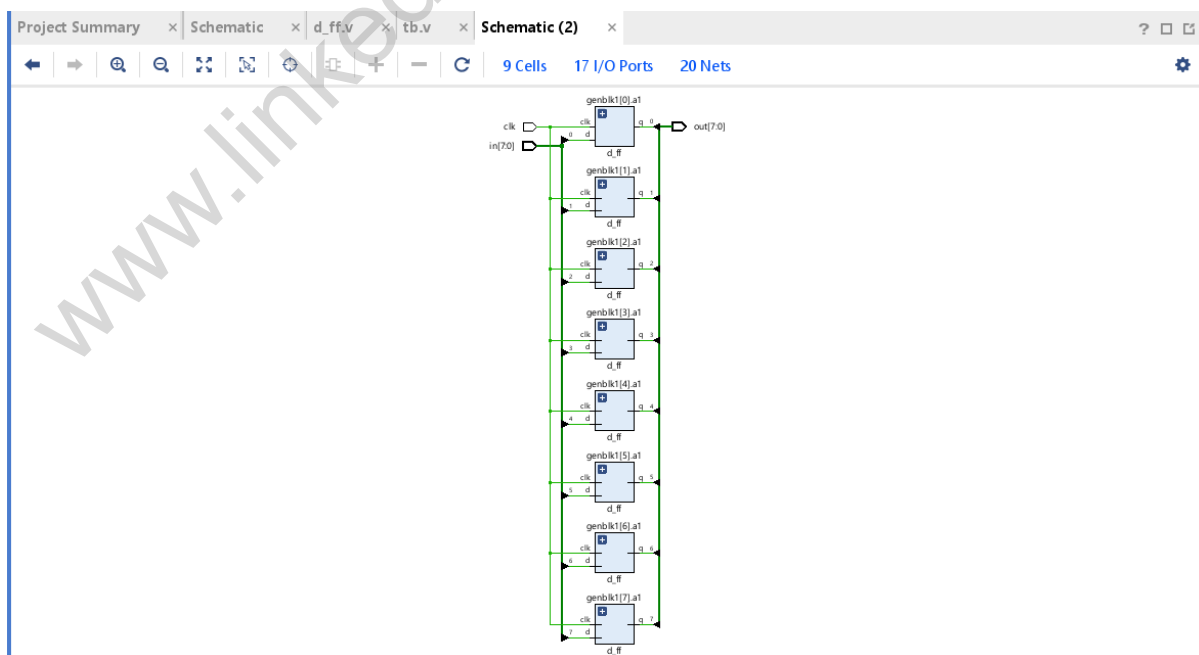
Create 8 D flip-flops. All DFFs should be triggered by the positive edge of the same clk.

Design

```
module d_ff( input clk,d,
             output reg q
            );
    always@(posedge clk)
        q<=d;
endmodule

module pipo #(parameter Bitwidth=8)(input [Bitwidth-1:0] in,
                                     input clk,output [Bitwidth-1:0]
out);
    generate
    genvar i;
    for (i = 0; i < Bitwidth; i = i + 1) begin
        d_ff a1(clk,in[i],out[i]);
    end
endgenerate
endmodule
```

Circuit



Testbench

```
module tb( );
reg clk;reg [7:0] in;
wire[7:0] out;

pipo a1(in,clk,out);

always #5 clk=~clk;

initial begin
clk=0;
repeat(10)begin
#3
in=$random;
#7;
end
end
endmodule
```

Waveform

