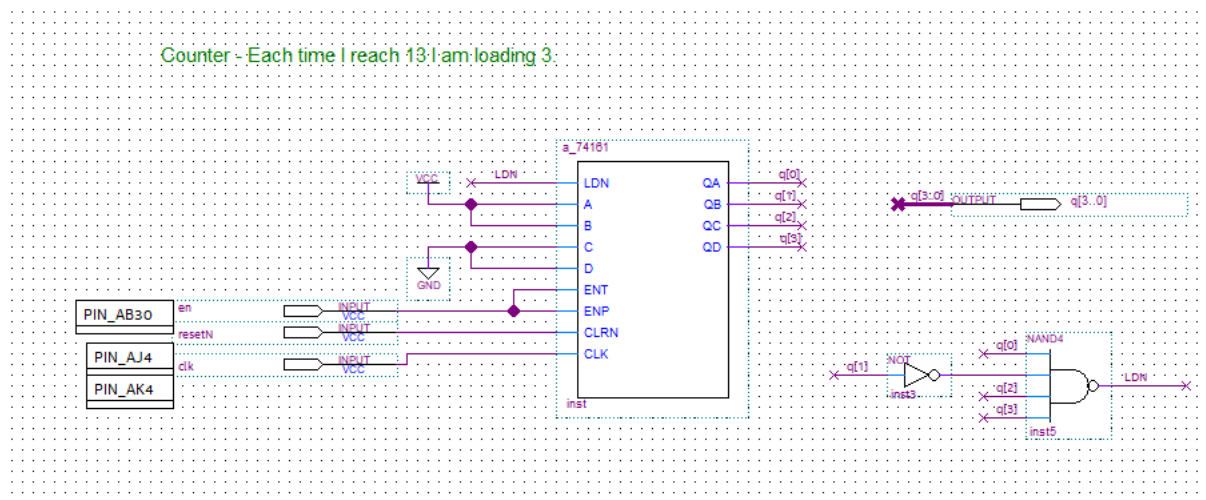
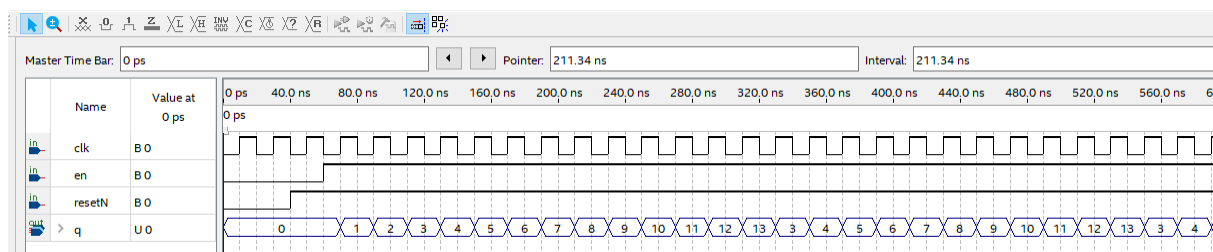


Counter BDF:

Counter - Each time I reach 13 I am loading 3.



Simulation Waveform:



Counter Code:

// A default counter

```
module a_74161(
    input logic LDN, //Load
    input logic A,
    input logic B,
    input logic C,
    input logic D,

    input logic ENT,
    input logic ENP,
    input logic CLRN,
    input logic CLK,
    output logic QA,
    output logic QB,
    output logic QC,
    output logic QD

);
```

```
logic [3:0] count;
```

```

always_ff @(posedge CLK, negedge CLRN)
begin
    if (!CLRN) begin
        count <= 4'b0;
    end
    else if (ENP && ENT ) begin
        if ( !LDN ) begin
            count <= {D,C,B,A};
        end
    end
    else
        count <= count + 1'b1;

    end

end

assign QA = count[0];
assign QB = count[1];
assign QC = count[2];
assign QD = count[3];

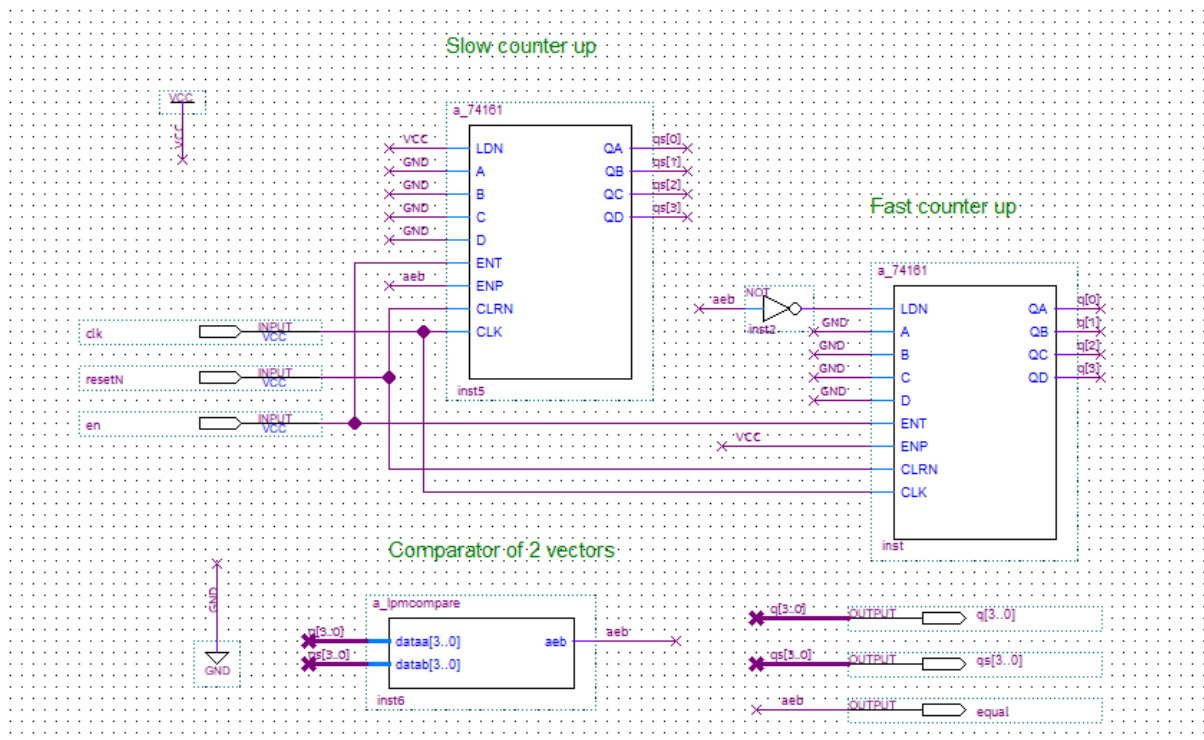
endmodule

```

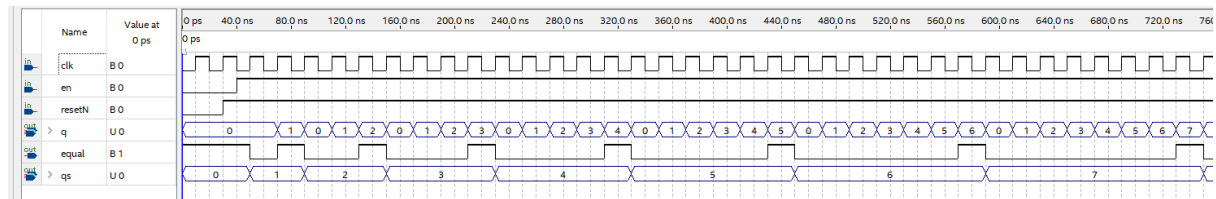
Inflating Counter:

We have two counters: a fast counter and a slow counter, along with a comparator. Each time the outputs of the slow and fast counters are equal, the slow counter increases and the fast counter loading zero.

BDF:



Simulation Waveform:



Comparator Code:

// Comparator - compare the output between Counter#1 and Coounter#2

```
module a_lpmcompare (
    input logic [3:0] dataa,
    input logic [3:0] datab,
    output logic aeb
);
```

```
    assign aeb = ( dataa == datab ) ? 1'b1 : 1'b0;
```

```
endmodule
```