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IITGN

Digital Systems
LAB Assignment-5

Question 1) Design a 4-bit comparator that gives a 1 when both the values are equal, 0 if they are unequal. The 4-bit comparator has A[3:0] and B[4:0] inputs, and a single output f. If A=B, f=1, otherwise f=0. You have to synthesize and show the implementation on FPGA.

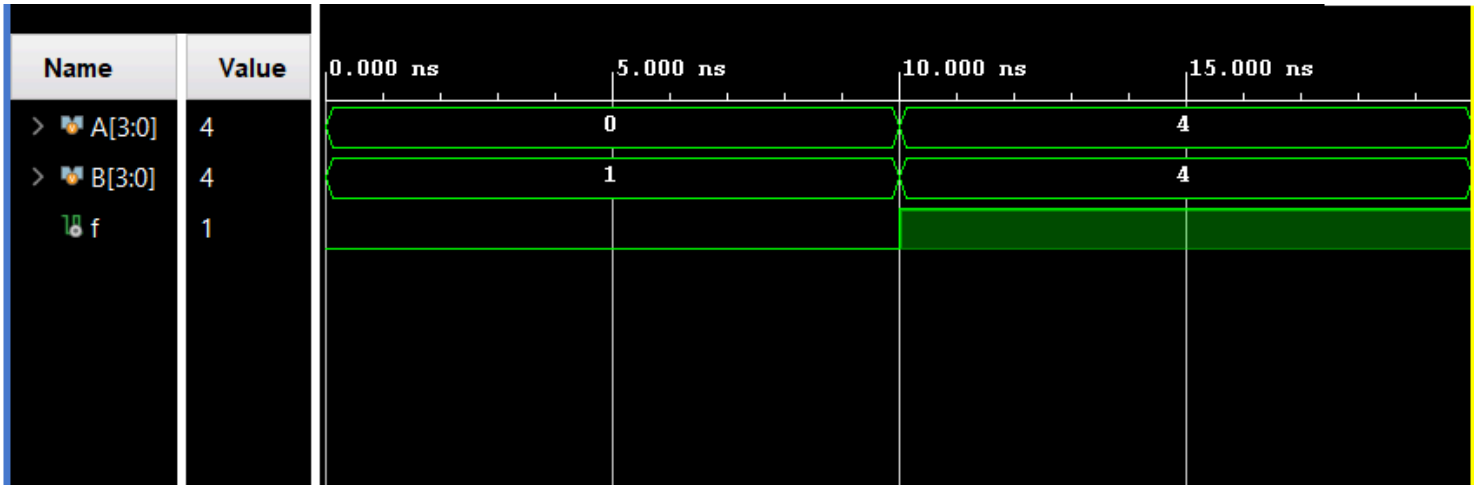
4 Bit Comparator

```
`timescale 1ns / 1ps

module comparator(A, B, f);
input [3:0]A;
input [3:0]B;
output f;

assign f= (A==B) ? 1:0;

endmodule
```

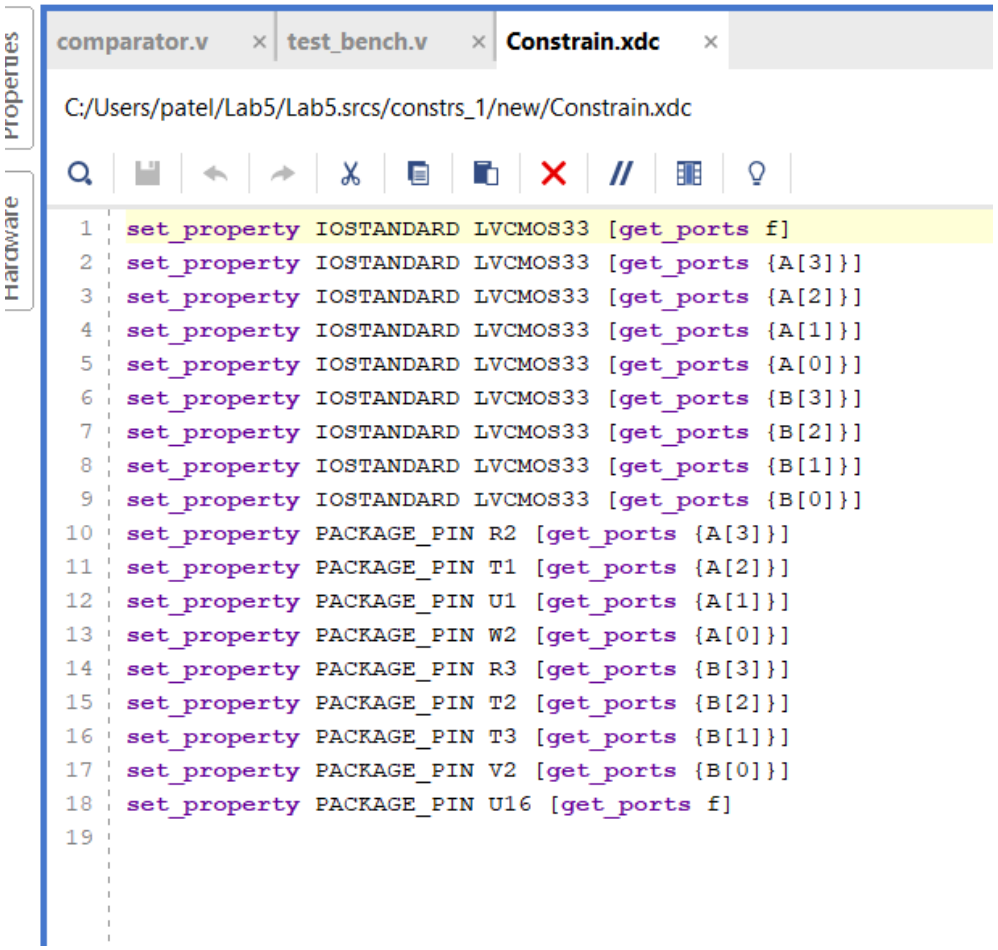
Test Bench

```
`timescale 1ns / 1ps

module test_bench();
reg  [3:0]A;
reg [3:0]B;
wire f;

comparator uut(A,B,f);

initial
begin
A= 4'b0000; B=4'b0001;#10
A= 4'b0100; B=4'b0100;#10


$finish();
```

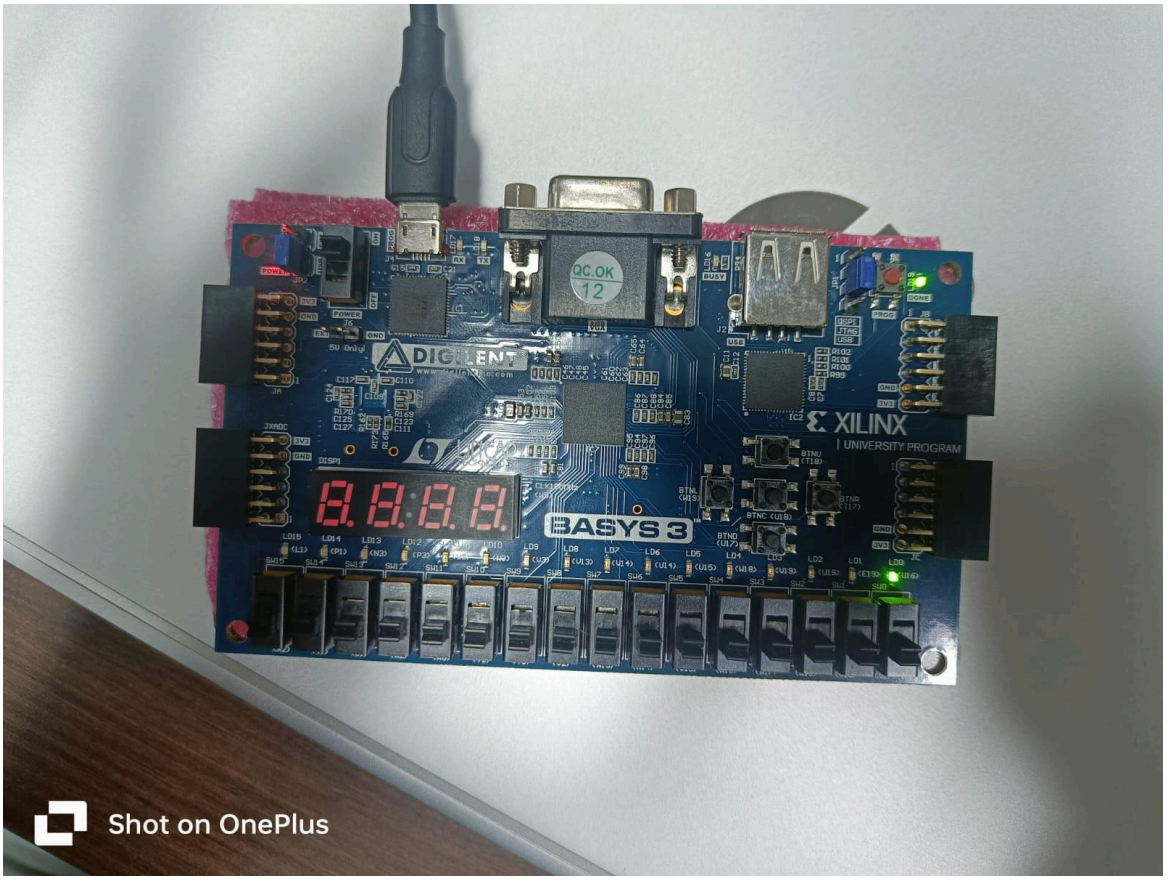
Simulation



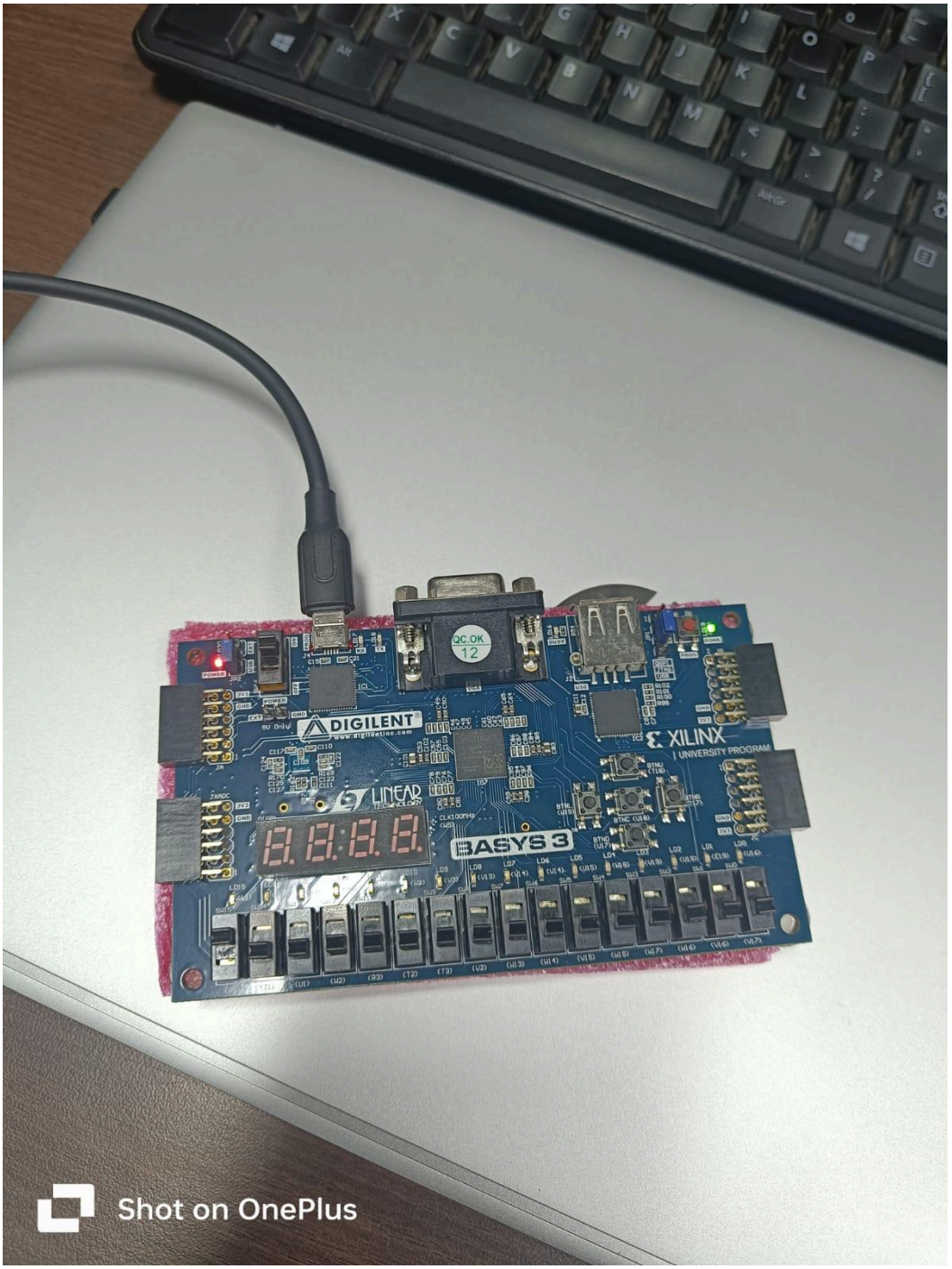
Constrain.xdc



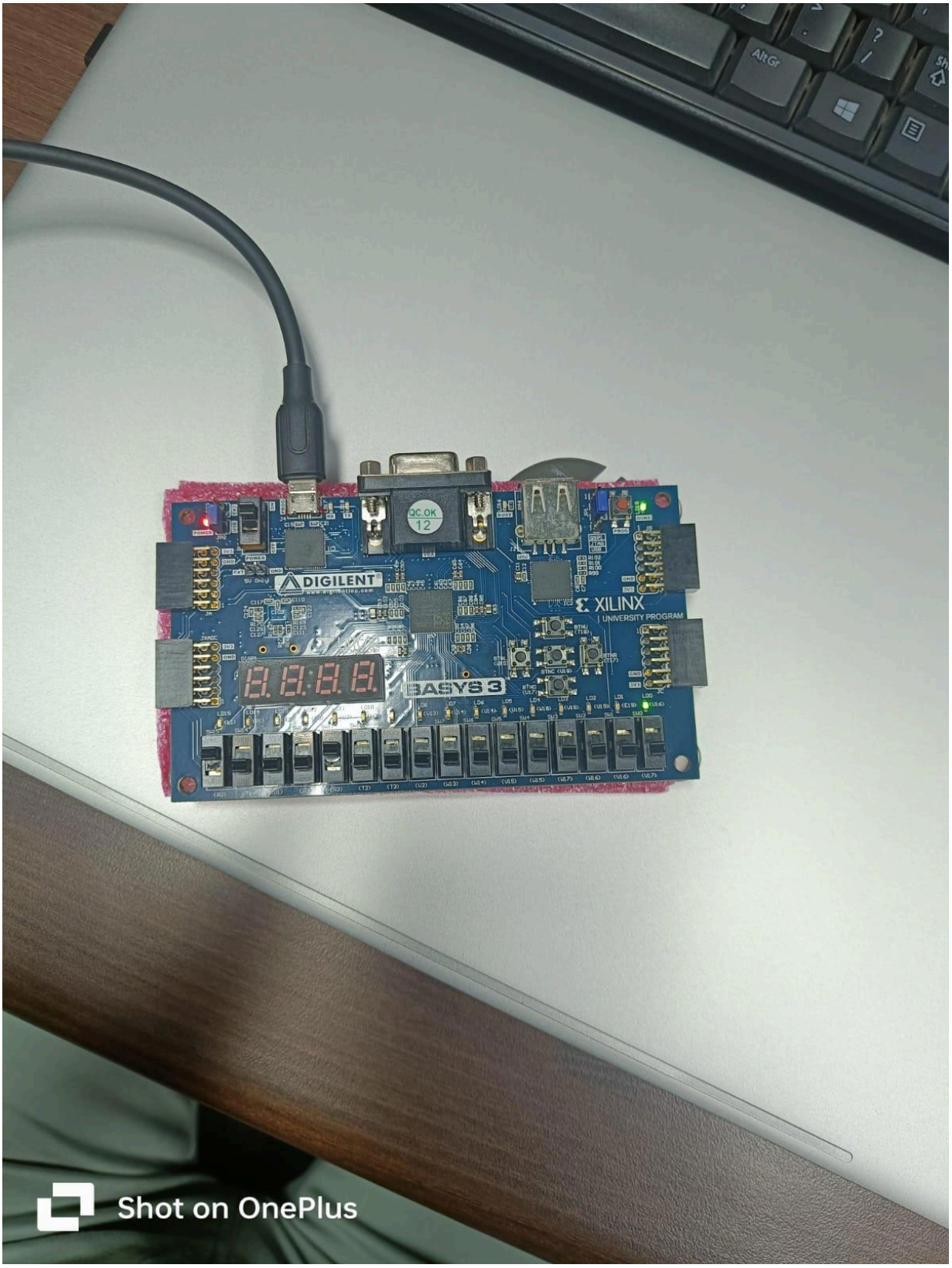
A[3]=R[2]
A[2]=T[1]
A[1]=U[1]
A[0]=W[2]
B[3]=R[3]
B[2]=T[2]
B[1]=T[3]
B[0]=V[2]
f=Led=U[16]



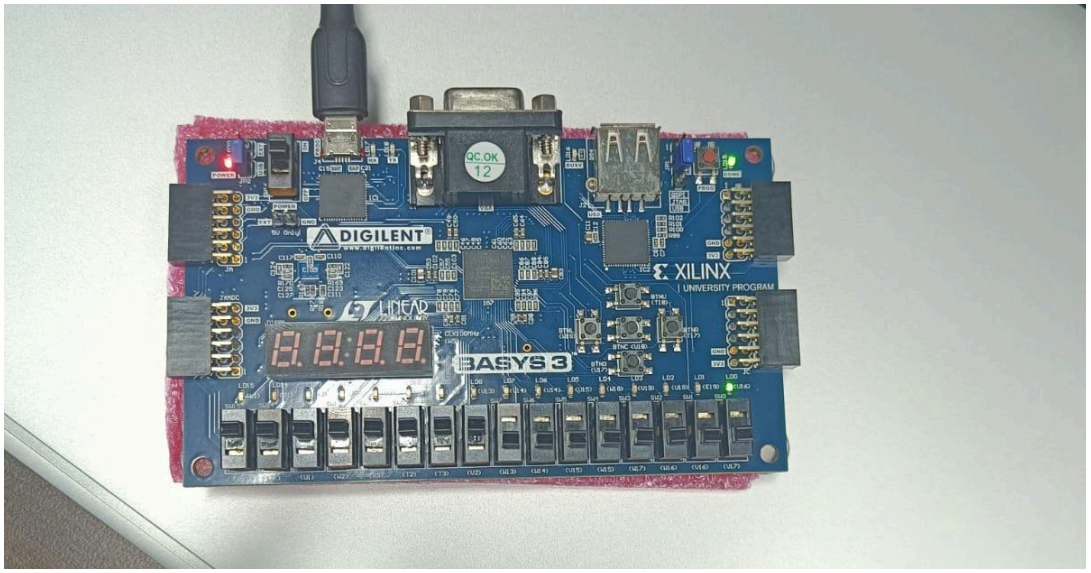
A=0000
B=0000
Led is Blinking



A=1000
B=0000
Led is Not Blinking



A=1000
B=1000
Led is Blinking



A=1111
B=1111
Led is Blinking