

CA Lab: Homework 9

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Task Description

Immediate Extension Unit

Solution

The module:

```
1 module IEU #(
2     parameter N = 16, M = 32
3 ) (
4     input U,
5     input [N-1:0] imm,
6     output [M-1:0] res
7 );
8     assign res = U
9         ? imm[15:0]
10        : { {(M-N){imm[15]}} , imm[15:0] };
11 endmodule
```

The testbench:

```
1 module ieu_tb();
2
3     reg U;
4     reg [15:0] imm;
5     wire [31:0] res;
6
7     IEU #(.N(16), .M(32)) UUT (
8         .U(U),
9         .imm(imm),
10        .res(res)
11    );
12
13    initial begin
14        $dumpfile("ieu-tb.vcd");
15        $dumpvars(0, ieu_tb);
16        U = 0;
17        imm = 3;
18        #10;
19        imm = 16'b1010101010101010;
20        #10;
```

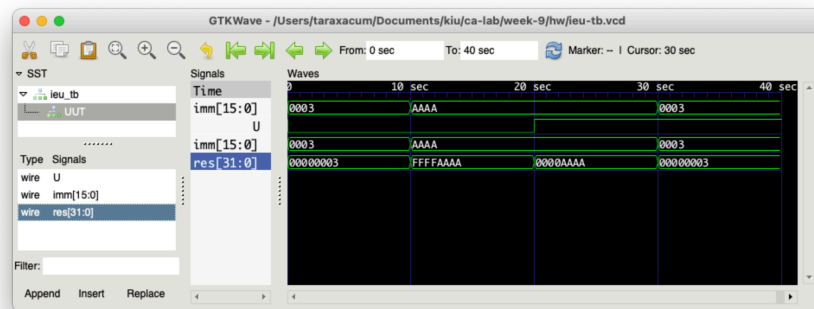
```

21     U = 1;
22     #10;
23     imm = 3;
24     #10;
25 end
26 endmodule

```

Simulation and Testing

The timing diagrams:



Reference

- me