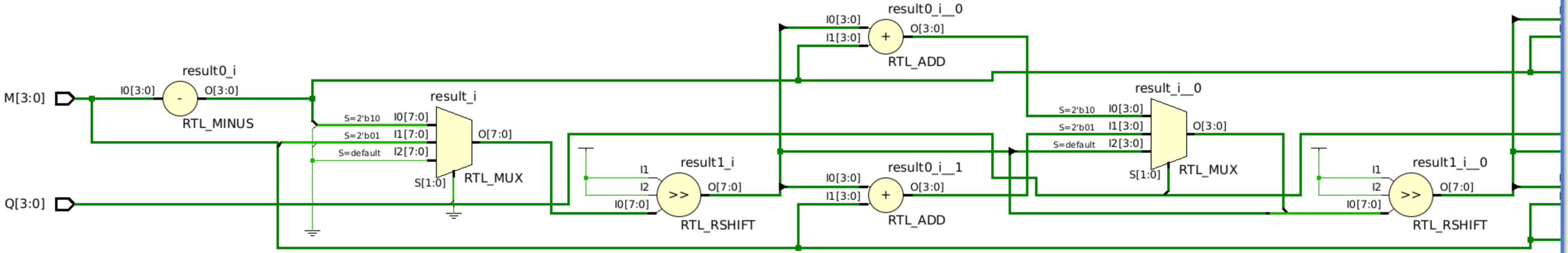
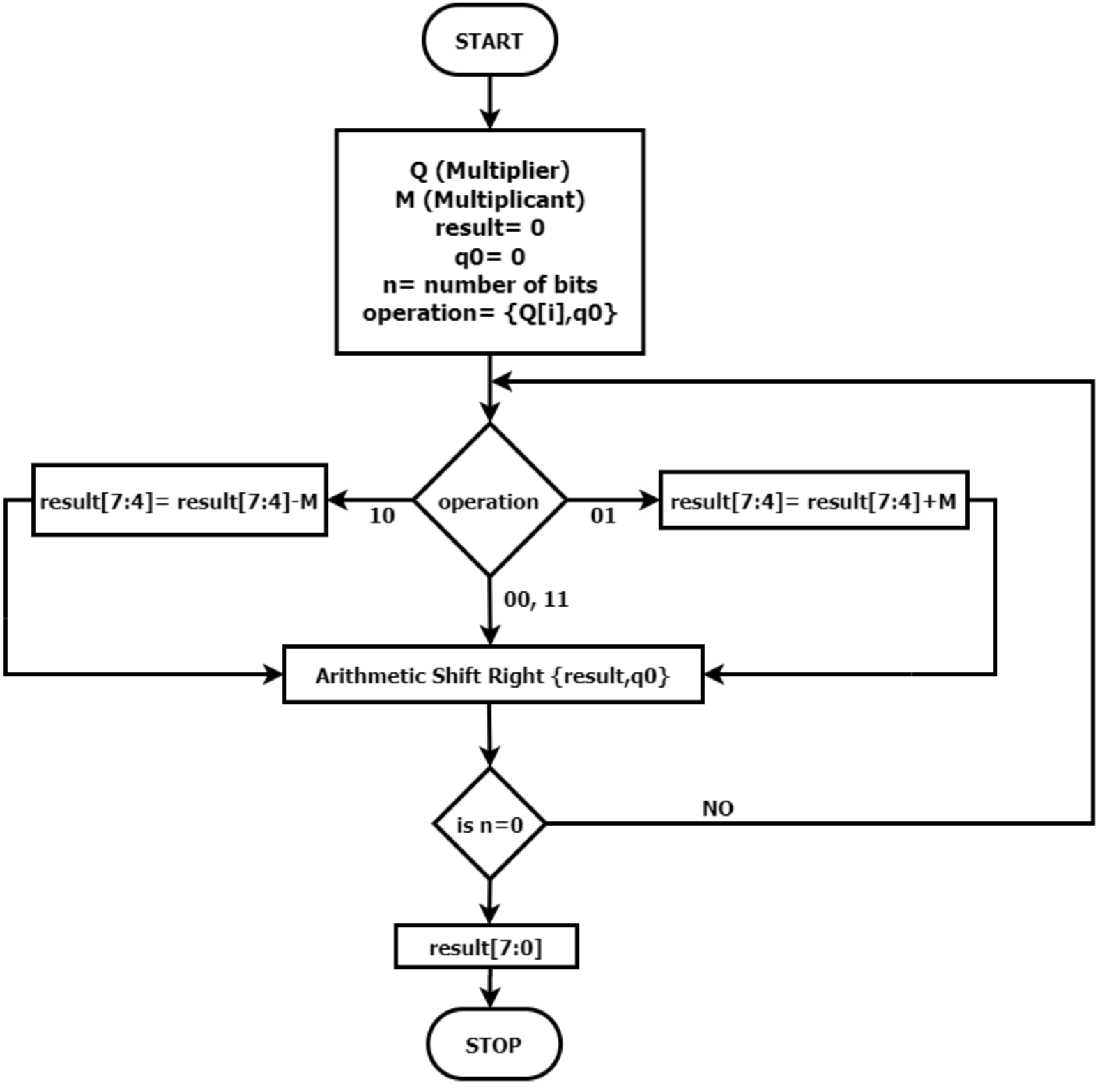
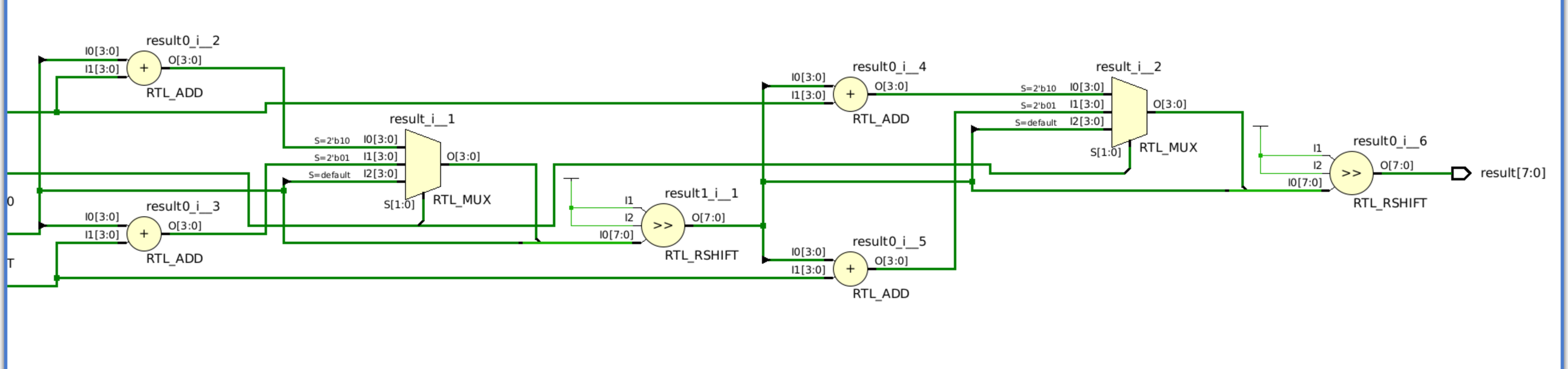
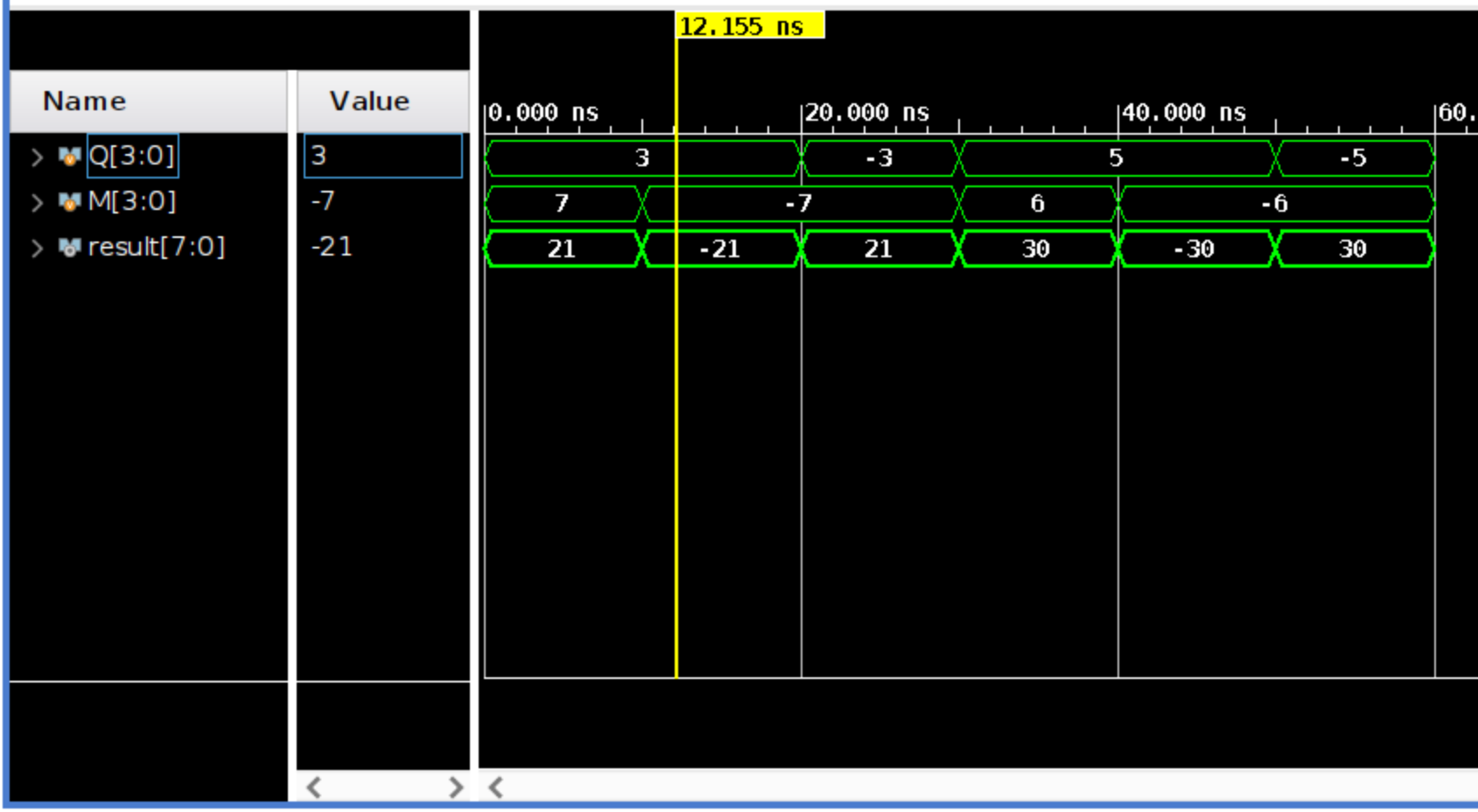

M[3:0]
Q[3:0]
result0_i
I0[3:0]
O[3:0]
-
RTL_MINUS
result_i
S=2'b10
S=2'b01
S=default
I0[7:0]
I1[7:0]
I2[7:0]
O[7:0]
S[1:0]
RTL_MUX
result1_i
I1
I2
I0[7:0]
>>
O[7:0]
RTL_RSHIFT
result0_i__0
I0[3:0]
I1[3:0]
+
O[3:0]
RTL_ADD
result0_i__1
result_i__0
result1_i__0


START
Q (Multiplier)
M (Multiplicant)
result= 0
q0= 0
n= number of bits
operation= {Q[i],q0}
operation
result[7:4]= result[7:4]-M
10
result[7:4]= result[7:4]+M
01
00, 11
Arithmetic Shift Right {result,q0}
is n=0
NO
result[7:0]
STOP


result0_i__2
I0[3:0]
I1[3:0]
O[3:0]
RTL_ADD
result_i__1
S=2'b10
S=2'b01
S=default
I0[3:0]
I1[3:0]
I2[3:0]
O[3:0]
S[1:0]
RTL_MUX
result0_i__3
I0[3:0]
I1[3:0]
O[3:0]
RTL_ADD
result1_i__1
I1
I2
I0[7:0]
>>
O[7:0]
RTL_RSHIFT
result0_i__4
I0[3:0]
I1[3:0]
O[3:0]
RTL_ADD
result0_i__5
I0[3:0]
I1[3:0]
O[3:0]
RTL_ADD
result_i__2
S=2'b10
S=2'b01
S=default
I0[3:0]
I1[3:0]
I2[3:0]
O[3:0]
S[1:0]
RTL_MUX
result0_i__6
I1
I2
I0[7:0]
>>
O[7:0]
RTL_RSHIFT
result[7:0]

booth_multiplier.v | booth_multiplier_tb.v | Untitled 1*



Tcl Console | Messages | Log

```
#   }
# }
# run 1000ns
   3 *   7 =   21
   3 *  -7 =  -21
  -3 *  -7 =   21
   5 *   6 =   30
   5 *  -6 =  -30
  -5 *  -6 =   30
$finish called at time : 60 ns : File "/home/itzzinfinity/Cozy Drive/100daysofRTL/day_063/
```

Type a Tcl command here

booth_multiplier.v | booth_multiplier_tb.v | Untitled 1*

/home/itzzinfinity/Cozy Drive/100daysofRTL/day_063/project_1/project_1.srcs/sources_1/new/booth_multiplier.v

```
1  `timescale 1ns / 1ps
2  //////////////////////////////////////////////////////////////////////////////////
3  // Engineer: Anjan Prasad
4  // Create Date: 11/25/2024 08:30:57 AM
5  // Module Name: booth_multiplier
6  //////////////////////////////////////////////////////////////////////////////////
7
8  module booth_multiplier (
9      input signed [3:0] Q, M,
10   output reg signed [7:0] result
11   );
12   reg [1:0] operation;
13   integer i;
14   reg q0;
15   reg [3:0] M_comp;
16
17   always @(Q,M)
18   begin
19     result = 8'd0;
20     q0 = 1'b0;
21     M_comp = -M;
22
23     for (i=0; i<4; i=i+1)
24     begin
25       operation = { Q[i], q0 };
26       case(operation)
27         2'b10 : result[7:4] = result[7:4] + M_comp;
28         2'b01 : result[7:4] = result[7:4] + M;
29       endcase
30       result = result >> 1;
31       result[7] = result[6];
32       q0= Q[i];
33
34     end
35   end
36 endmodule
37
38
```

Tcl Console | Messages | Log

booth_multiplier.v | booth_multiplier_tb.v | Untitled 1*

/home/itzzinfinity/Cozy Drive/100daysofRTL/day_063/project_1/project_1.srcs/sim_1/new/booth_multiplier_tb.v

```
1   `timescale 1ns / 1ps
2   //////////////////////////////////////////////////////////////////////////////////
3   // Engineer: Anjan Prasad
4   // Create Date: 11/25/2024 08:35:29 AM
5   // Module Name: booth_multiplier_tb
6   //////////////////////////////////////////////////////////////////////////////////
7
8   module test_bench;
9   reg signed [3:0] Q,M;
10  wire signed [7:0] result;
11
12  booth_multiplier DUT (Q,M,result);
13
14  initial begin
15      Q= 3; M= 7; #10;
16      Q= 3; M= -7; #10;
17      Q= -3; M= -7; #10;
18      Q= 5; M= 6; #10;
19      Q= 5; M= -6; #10;
20      Q= -5; M= -6; #10;
21  end
22
23  initial begin
24      $monitor("%d * %d = %d", Q,M,result);
25      #60 $finish;
26  end
27  endmodule
28
29
```

Tcl Console | Messages | Log